REGULATION
2017

INDEX

REGULATION - 2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

1.1.1. Relevance of Curriculum to Local, National, Regional, Global, Development Needs

COURSE OBJECTIVE R-(2017)

LOCAL NEEDS	
REGIONAL NEEDS	
NATIONAL NEEDS	
GLOBAL NEEDS	

SEM	Course code	Course name	Course outcomes
I	17147S11	COMMUNICATIVE ENGLISH	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.
I	17148S12	ENGINEERING MATHEMATICS - I	Use both the limit definition and rules of differentiation to differentiate functions. Apply differentiation to solve maxima and minima problems. Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. Apply various techniques in solving differential equations.
I	17149S13	ENGINEERING PHYSICS	The students will gain knowledge on the basics of properties of matter and its applications, The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and The students will understand the basics of crystals, their structures and different crystal growth techniques.
I	17149S14	ENGINEERING CHEMISTRY	The knowledge gained on engineering materials, fuels, energy sources and water treatment Techniques will facilitate better understanding of engineering processes and applications for further learning

I	17150S16	PROBLEM SOLVING AND PYTHON PROGRAMMING	Develop algorithmic solutions to simple computational problems Read, write, execute by hand simple Python programs. Structure simple Python programs for solving problems. Decompose a Python program into functions. Represent compound data using Python lists, tuples, dictionaries.. Read and write data from/to files in Python Programs.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

B.TECH(P.T)(R-2017)

SEM	Course code	Course name	Courseoutcomes
I	17148S11P	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	• Be capable of mathematically formulating certainpractical problems in terms of partial differentialequations,solvethemandphysicallyinterpretthe results. • Havegainedawellfoundedknowledgeof Fourier series, their different possible forms and the frequently neededpracticalharmonic analysis thatanengineer mayhavetomake from discrete data. • Haveobtainedcapacitytoformulateandidentify certainboundary value problems encountered in engineeringpractices, decide on applicability of the Fourier seriesmethod of solution, solvethemandinterpret theresults. • Have grasped the concept of expression of a function,undercertainconditions,asadoubleintegralleadingtoidentification of transform pair, and specialization onFourier transform pair, their properties, the possible specialcaseswithattentiontotheirapplications.
	17152H12P	ELECTROMAGNETIC THEORY	• Displayanunderstandingoffundamentalelectromagneticlaws and concepts • WriteMaxwell'sequationsinintegral,differentialandphasorforms and explain their physical meaning • Explainelectromagneticwavepropagationinlossyandinlossless media • Solvesimpleproblemsrequiringestimationofelectricand magnetic field quantities based on these concepts and law

	17152H13P	DIGITAL ELECTRONICS	• Usedigitalelectronicsinthepresentcontemporaryworld • Designvariouscombinationaldigitalcircuitsusinglogicgates • Dotheanalysisanddesignproceduresforsynchronousandasynchronous sequential circuits • Usethesemiconductormemoriesandrelatedtechnology • Useelectroniccircuitsinvolvedinthedesignoflogicgates
	17152H14P	ELECTRONIC CIRCUITS –I	• Themethodsofbiasingtransistors • Designofsimpleamplifiercircuits • Mid–bandanalysisofamplifiercircuitsusingsmall-signal equivalent circuits to determine gain inputimpedance and output impedance • Methodofcalculatingcutofffrequenciesandtodeterminebandwidth • Designofpoweramplifiersandheatsinks
	17152H15P	SIGNALSAND SYSTEMS	• Tostudythepropertiesandrepresentationofdiscreteacontinuous signals. • Tostudythesamplingprocessandanalysisofdiscrete systemsusingz-transforms.

	17148S21P	NUMERICAL METHODS	• The roots of nonlinear (algebraic or transcendental)equations,solutionsoflargesystemsofline arequationsand eigenvalue problems of a matrix can be obtained numericallywhereanalyticalmethodsfailtogiveasolution. • When huge amounts of experimental data are involved,the methods discussed on interpolation will be useful inconstructinganapproximatepolynomialtorepresentthed ata and to find the intermediate values. • The numerical differentiation and integration findapplicationwhenthefunctionintheanalyticalformist oocomplicatedor thehugeamountsofdata aregivensuchas series of measurements, observations or someother empirical information. • Since manyphysicallaws arecouchedinterms of rateofchange of one/two or more independent variables, mostoftheengineeringproblemsarecharacterizedintheform of either nonlinear ordinary differential equations orpartial differential equations. The methods introduced inthesolution of ordinary differential equations and partial differentialequationswillbeusefulinattemptinganyengineering problem.
	17153S22P	ELECTRICAL ENGINEERING ANDCONTROL SYSTEMS	• TounderstandtheoperationofElectricalmachinesandtran sformers • Tounderstandtheopenloopandclosedloop(feedback)systems • To understand time domain and frequency domainanalysisofcontrolsystemsrequiredforstabilityanaly sis. • Tounderstandthecompensationtechniquethatcanbeuse d to stabilize control system

	17152H23P	LINEAR INTEGRATED CIRCUITS	• Tointroducethebasicbuildingblocksoflinearintegrated circuits. • Toteachthelinearandnon-linearapplicationsofoperational amplifiers. • Tointroducethetheoryandapplicationsofanalogmultipliers and PLL. • ToteachthetheoryofADC andDAC • Tointroduceafewspecialfunctionintegratedcircuits.
II	17152H24P	ELECTRONIC CIRCUITS	• Theadvantagesandmethodofanalysisoffeedbackamplifiers • AnalysisanddesignofRCandLCoscillators,tunedamplifiers, wave shaping circuits, multivibrators, blockingoscillatorsandtimebasedgenerators.
	17152H25P	TRANSMISSION LINES AND WAVEGUIDES	• Tobecomefamiliarwithpropagationofsignalsthroughlines • UnderstandsignalpropagationatRadiofrequencies • Understandradiopropagationinguidedsystems • Tobecomefamiliarwithresonators
	17148S31P	PROBABILITY ANDRANDOM PROCESSES	• Haveafundamentalknowledgeofthebasicprobabilityconcepts. • Have a well – founded knowledge of standarddistributionswhichcandescribereallifephenomena. • Acquireskillsinhandlingsituationsinvolvingmorethanone random variable and functions of random variables. • Understandandcharacterizephenomenawhichevolvewith respect to time in probabilistic manner.

LOCAL NEEDS   REGIONALNEEDS   NATIONALNEEDS   GLOBALNEEDS

			• Beabletoanalyzetheresponseofrandominputsto lineartimeinvariantsystems.
	17152H32 P	MICROPROCESSOR, INTERFACING AND APPLICATIONS	• Tointroducethearchitectureandprogrammingof8085microprocessors. • Tointroducetheinterfacingofperipheraldevices with8085 microprocessors. • Tointroducethearchitectureandprogrammingofan8086 microprocessor. • Tointroducetheapplications, programmingwithan8085microprocessor.
	17152H33 P	DIGITAL SIGNAL PROCESSING	• TostudyDFTand itscomputation • Tostudythedesigntechniquesfordigitalfilters • Tostudythefinitewordlengtheffectsinsignalprocessing • Tostudythenon-parametricmethods ofpowerspectrumestimations • Tostudythefundamentalsofdigitalsignalprocessors.
III	17152H34 P	COMMUNICATION THEORY	• ToprovidevariousAmplitudemodulationandde modulation systems. • ToprovidevariousAnglemodulationanddemodulationsystems. • Toprovidesomedepthanalysisinnoiseperformanceofvarious receivers. • Tostudysomebasic informationtheorywithsomechannel coding theorems
	17152L35 P	DIGITAL SIGNAL PROCESSING AND MICROPROCESSOR LAB	• Carryoutbasicsignalprocessingoperations • DesignandImplement theFIRandIIR Filters inDSPProcessorforperformingfilteringoperation over real-time signals • InterfacedifferentI/Oswithprocessor • GeneratewaveformsusingMicroprocessors • ExecuteProgramsin8085
	17152H41 P	DIGITAL COMMUNICATION	• To study pulse modulation and discuss the process ofsampling,quantizationandcodingthatarefundamentalto the digital transmission of analog signals. • To learn baseband pulse transmission, which deals withthetransmissionofpulse-amplitude, modulatedsignalsintheir baseband form.
	17152H42 P	ANTENNAAND WAVE PROPAGATION	• Tostudyradiationfromacurrentelement. • Tostudyantennaarrays • Tostudyaperture antennas • Tolearnspecialantennassuchasfrequencyindependent andbroadbandantennas.
	17152H43 P	COMPUTER NETWORKS	• Tointroducethestudentsthefunctionsofdifferentlayers. • TointroduceIEEEstandardsemployedincomputernetworking.
	17152L45 P	NETWORKS AND COMMUNICATION LAB	• Communicatebetweentwodesktopcomputers • Implementthedifferentprotocols • Implementandcomparethevariousroutingalgorithms • Usethesimulation tool. • Simulate&validatethevariousfunctionalmodules ofacommunication system • Applyvariouschannelcodingschemes&demonstrate

LOCAL NEEDS   REGIONALNEEDS   NATIONALNEEDS   GLOBALNEEDS

			theircapabilitiestowardstheimprovementofthenoiseperformance of communication system
	17152E44 AP	**HIGHSPEED NETWORKS**	- StudentswillgetanintroductionaboutATMandFramerelay. - Studentswillbeprovidedwithanup-to-datesurveyofdevelopments in High Speed Networks. - Enablethestudentstoknowtechniquesinvolvedtosupport real-time traffic and congestion control. - Studentswillbeprovidedwithdifferentlevels ofqualityof service (Q.S) to different applications.
	17152E44 BP	**ADVANCED DIGITAL SIGNAL PROCESSING**	Tostudytheparametric methods for power spectrumestimation. TostudyadaptivefilteringtechniquesusingLMSalgorithmsandto study the applications of adaptive filtering. Tostudymultiratesignalprocessingfundamentals.To study the analysis of speech signals. Tointroducethestudenttowavelettransforms.
	17152E44 CP	**SPEECH PROCESSING**	- Tointroducethemodelsforspeechproduction - Todeveloptimeandfrequencydomaintechniquesforestimating speech parameters - Tointroduceapredictivetechniqueforspeechcompression - Tounderstandspeechrecognition,synthesisandspeakeridentification.
	17152E44 DP	**FUZZYLOGIC AND NEURAL NETWORKS**	- Tointroducetheideasoffuzzysets, fuzzylogicanduseof heuristics based on human experience - Tobecomefamiliarwithneuralnetworksthatcanlearnfrom available examples and generalize to formappropriate rules for inferencing systems - Toprovidethemathematicalbackgroundfor carryingoutthe optimization associated with neural network learning - Tofamiliarizewithgeneticalgorithmsandotherrandomsearch procedures useful while seeking global optimumin self-learning situations - To introduce case studies utilizing the above andillustratetheintelligentbehaviorofprogramsbasedon soft computing
	17152E44 EP	**ADVANCED ELECTRONIC SYSTEM DESIGN**	- TostudyRFcomponentssuchasresonator,filter,transmission lines, etc… - TolearndesignofRFamplifiersusingtransistors. - TostudymodernPower SuppliesusingSCRandSMPStechnology - Tolearnaboutsignalshielding&groundingtechniquesand study of A/D and D/A Converters. - TolearnknowledgeaboutfabricationofPCBsusingCAD.
	17152H51 P	**OPTICAL COMMUNICAT ION AND** NETWORKS	- Tolearnthebasicelementsofopticalfibertransmissionlink, fiber modes configurations and structures. - To understand the different kinds of losses, signaldistortion in optical waveguides and other signaldegradationfactors.DesignoptimizationofSMfibers, RIprofile and cut-off wavelength. - To learn the various optical source materials, LEDstructures,quantumefficiency,Laserdiodesanddifferent fiberamplifiers.

LOCAL NEEDS   REGIONALNEEDS   NATIONALNEEDS   GLOBALNEEDS

			• To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration.
	17152H52P	MICROWAVE ENGINEERING	• To study passive microwave components and their S-Parameters. • To study Microwave semiconductor devices & applications. • To study Microwave sources and amplifiers.
	17152H53P	VLSI DESIGN	• To learn the basic CMOS circuits. • To learn the CMOS process technology. • To learn techniques of chip design using programmable devices. • To learn the concepts of designing VLSI subsystems.
	17152L55P	OPTICAL COMMUNICATION AND MICROWAVE LAB	• Analyze the performance of a simple optical link. • Test microwave and optical components. • Analyse the mode characteristics of fiber • Analyse the radiation pattern of the antenna.
	17158E54AP	ENVIRONMENTAL SCIENCE AND ENGINEERING	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course. • Public awareness of the environment is at an infant stage. • Ignorance and incomplete knowledge has lead to mis conceptions • Development and improvement in standard of living has lead to serious environmental disasters
	17152E54BP	OPTO ELECTRONIC DEVICES	• To know the basics of solid state physics and understand the nature and characteristics of light. • To understand different methods of luminescence, display devices and laser types and their applications. • To learn the principle of optical detection mechanism in different detection devices. • To understand different light modulation techniques and the concepts and applications of optical switching. • To study the integration process and application of optoelectronic integrated circuits in transmitters and receivers.
	17152E54CP	RADAR AND NAVIGATIONAL AIDS	• To derive and discuss the Range equation and the nature of detection. • To apply doppler principle to radars and hence detect moving targets, cluster, also to understand tracking radars • To refresh principles of antennas and propagation as related to radars, also study of transmitters and receivers. • To understand principles of navigation, in addition to approach and landing aids as related to navigation • To understand navigation of ships from shore to shore.
	17152E54DP	DIGITAL IMAGE PROCESSING	• To study the image fundamentals and mathematical transforms necessary for image processing. • To study the image enhancement techniques • To study image restoration procedures. • To study the image compression procedures. • To study the image segmentation and representation techniques.

			•
	17152E54 EP	**ENGINEERING ACOUSTICS**	• Toprovidemathematicalbasisforacousticswaves • Tointroducetheconceptofradiationreceptionabsorption and attenuation of acoustic waves. • Topresentthecharacteristicbehaviour ofsoundinpipes,resonators and filters. • Tointroducethepropertiesofhearingandspeech • Todescribethearchitectureandenvironmentinclusiveofreverberation and noise
	17152H61 P	**MOBILE AND WIRELESS COMMUNICAT ION**	• Itdealswiththefundamentalcellularradioconceptssuchas frequency reuse and handoff. This also demonstratestheprincipleoftrunkingefficiencyandhowtrunkingandinterference issues between mobile and base stationscombinetoaffecttheoverallcapacityofcellular systems. • It presents different ways to radio propagation modelsand predict the large – scale effects of radio propagationin many operating environments. This also covers smallpropagationeffectssuchasfading,timedelayspreadandDoppler spreadanddescribeshowtomeasureandmodeltheimpact that signal bandwidthand motionhaveontheinstantaneous received signal through the multipathchannel. • It provides ideas about analog and digital modulationtechniquesusedinwirelesscommunication.Italsodealswith the different typesof equalization techniques anddiversity concepts. •
	17152H62 P	**MEDICAL ELECTRONICS**	• Tostudythemethodsofrecordingvariousbiopotentials • Tostudyhowtomeasurebiochemicalandvariousphysiological information • Tounderstandtheworkingofunitswhichwill helptorestore normal functioning • Tounderstandtheuseofradiationfor diagnosticandtherapy • Tounderstandtheneedandtechniqueofelectricalsafetyin Hospitals •
	17152H63 P	**MICROCONTR OLLER AND EMBEDDED SYSTEMS**	• Tostudy8051architecture • Towriteassemblylanguageprogramming • Tostudytheembeddedarchitectureandreal time applications
	17152L65 P	**VLSI AND EMBEDDED SYSTEMSLAB**	• WriteHDLcodeforbasicaswellasadvanceddigitalintegrated circuit • ImportthelogicmodulesintoFPGABoards • SynthesizePlaceandRoutethedigitalIPs • WriteprogramsinARMfor aspecific Application • Interfacememory,A/DandD/AconvertorswithARMsystem • Analyzetheperformanceof interrupt • Writeaprogramfor interfacingkeyboard,display,motor andsensor.
	17160E64 AP	**PRINCIPLES OF MANAGEMENT**	• Uponcompletionofthecourse, studentswillbeabletohave clear understanding • Managerialfunctionslikeplanning,organizing,staffing,

			leading&controllingandhavesamebasicknowledgeoninternational aspect of management
	17152E64 BP	SATELLITE COMMUNICAT ION	• Overviewofsatellitesystemsinrelationtootherterr estrial systems. • Studyofsatelliteorbitsandlaunching. • Studyofearthsegment andspacesegment components • Studyofsatelliteaccessbyvarious users. • StudyofDTHandcompressionstandards.
	17152E64 CP	ROBOTICS	• Thecoursehasbeensodesignedtogivethestudentsanovera ll view of the mechanical components andmathematics associated with the same. • Actuatorsandsensorsnecessaryforthefunctioningofthe robot.
	17152E64 DP	REMOTE SENSING	• PrinciplesofRemoteSensingandGIS • AnalysisofRSandGISdataandinterpretingthedataformode ling application
	17150E64 EP	NETWORK SECURITY	• Toknowthemethodsofconventional encryption. • Tounderstandtheconceptsofpublickeyencryptionandnum ber theory • TounderstandauthenticationandHashfunctions • Toknowthenetworksecuritytoolsandapplications. • Tounderstandthesystemlevelsecurity used
	17160S71P	TOTAL QUALITY MANAGEMENT	• The student would be able to apply the tools andtechniquesofqualitymanagementtomanufacturingand servicesprocesses.
	17152H72 P	WIRELESS NETWORKS	• TounderstandphysicalaswirelessMAClayeralte rnatives techniques. • Tolearnplanningandoperationofwirelessnetworks. • TostudyvariouswirelessLANandWANconcepts. • TounderstandWPANandgeo-locationsystems.
	17152H73 P	TELECOMMUN ICATION SWITCHING AND NETWORKS	• TointroducetheconceptsofFrequencyandTimedivi sion multiplexing. • Tointroducedigitalmultiplexinganddigitalhierarchyna mely SONET / SDH • To introducetheconcepts of spaceswitching, timeswitchingandcombinationswitching,exampleof aswitch namely No.4 ESS Toll switch. • To introduce the need for network synchronization andstudysynchronizationissues.Tooutlinenetworkcontrol and management issues. • Tostudytheenhancedlocalloopsystemsinadigital environment.TointroduceISDN,DSL/ADSL,andfiberoptic systems in the subscriber loop.
	17152E74 AP	POWER ELECTRONICS	• Tostudyaboutpower electroniccircuitsforvoltageandcurrent control and protection. • TolearntheswitchingcharacteristicsoftransistorsandSC Rs. Series and parallel functions of SCRs,Programmable triggering methods of SCR. • TolearncontrolledrectificationACsupplies. • Tostudyconverters andinverters. • Tolearnaboutmotorcontrol,charges,SMPSandUPS.
	17152E74 BP	ADVANCED MICROPROCE SSORS	• Tointroducetheconceptsintheinternalprogrammingmo del of Intel family of microprocessors. • TointroducetheprogrammingtechniquesusingMASM,

			DOSandBIOSfunctioncalls.
			• Tointroducethebasicarchitectureofthepentiumfamilyof processors.
			• Tointroducethearchitectureprogrammingandint erfacing of 16 bit microcontrollers.
			• TointroducetheconceptsandarchitectureofRISCpro cessor and ARM
	17152E74 CP	ELECTROMAG NETIC INTERFERENC E AND COMPATIBILI TY	• To understand EMI Sources, EMI problems and theirsolutionmethodsinPCBlevel/Subsystemandsystem level design.
			• Tomeasuretheemission. immunitylevelfromdifferentsystems to couple with the prescribed EMC standards
	17152E74 DP	SOLIDSTATE ELECTRONIC DRIVES	• Tolearncrystalstructuresofelementsusedforfabr ication of semiconductor devices.
			• Tostudyenergybandstructureofsemiconductordev ices.
			• Tounderstandfermilevels, movementofchargecarriers,Diffusion current and Drift current.
	17152E74 EP	COMPUTER HARDWARE AND INTERFACING	• TointroduceissuesrelatedtoCPUand memory.
			• Tounderstandthecomponents onthe motherboard
			• Tounderstanddifferentstoragemedia
			• TointroducethefeaturesofdifferentI/O peripheral devicesandtheir interfaces

I	17154S15	ENGINEERING GRAPHICS	Familiarize with the fundamentals and standards of Engineering graphics Perform freehand sketching of basic geometrical constructions and multiple views of objects. Project orthographic projections of lines and plane surfaces. Draw projections and solids and development of surfaces. Visualize and to project isometric and perspective sections of simple solids.
I	17150L17	PROBLEM SOLVING ANDPYTHON PROGRAMMING LAB	Write, test, and debug simple Python programs. Implement Python programs with conditionals and loops. Develop Python programs step-wise by defining functions and calling them. Use Python lists, tuples, dictionaries for representing compound data. Read and write data from/to files in Python.
I	17149L18	PHYSICS AND CHEMISTRY LAB	Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
I	171VEA19	VALUE EDUCATION	To learn about philosophy of Life and Individual qualities To learn and practice social values and responsibilities To learn and practice mind culture, forces acting on the body To learn more of Responsibilities and Rights as Professional and facing Global Challenges Emerge as responsible citizen with clear conviction to be a role-model in the society.
II	17147S21	TECHNICAL ENGLISH	Read technical texts and write area- specific texts effortlessly. Listen and comprehend lectures and talks in their area of specialisation successfully. Speak appropriately and effectively in varied formal and informal contexts. Write reports and winning job applications.
I	17148S22A	ENGINEERING MATHEMATICS– II	Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. Gradient, divergence and curl of a vector point function and related identities. Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. Analytic functions, conformal mapping and complex integration. Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
	17149S23B	PHYSICS FOR ELECTRONICS ENGINEERING	Gain knowledge on classical and quantum electron theories, and energy band structuues, Acquire knowledge on basics of semiconductor physics and its applications in various devices, Get knowledge on magnetic and dielectric properties of materials, Have the necessary understanding on the functioning of optical

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

			materials for optoelectronics, Understand the basics of quantum structures and their applications in spintronics and carbon electronics.
	17152S25B	CIRCUIT ANALYSIS	Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time Design and understand and evaluate the AC and DC circuits.
	17153S24B	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION	Understand electric circuits and working principles of electrical machines Understand the concepts of various electronic devices Choose appropriate instruments for electrical measurement for a specific application calculate dynamic forces exerted in rigid body determine the friction and the effects by the laws of friction
	17152S26B	ELECTRONIC DEVICES	Explain the V-I characteristic of diode, UJT and SCR Describe the equivalence circuits of transistors Operate the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices
	17154L27	ENGINEERING PRACTICES LAB	Fabricate carpentry components and pipe connections including plumbing works. Use welding equipments to join the structures. Carry out the basic machining operations Make the models using sheet metal works Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings
	17152L28B	CIRCUITS AND DEVICES LAB	Analyze the characteristics of basic electronic devices Design RL and RC circuits Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems
	171ICA29	FUNDAMENTALS OF INDIAN CONSTITUTION AND ECONOMY	Understand the emergence and evolution of Indian Constitution. Understand the structure and composition of Indian Constitution Understand and analyse federalism in the Indian context. Understand and analyse the three organs of the state in the contemporary scenario. Understand and Evaluate the Indian Political scenario amidst the emerging challenges.
III	17148S31B	LINEAR ALGEBRA AND PARTIAL DIFFERENTIAL EQUATIONS	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts. Demonstrate accurate and efficient use of advanced algebraic techniques. Demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about the statements proven by the text. Able to solve various types of partial differential equations. Able to solve engineering problems using Fourier series.
	17152C32	CONTROL SYSTEMS ENGINEERING	Identify the various control system components and their representations. Analyze the various time domain parameters. Analysis the various frequency response plots and its system.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

			Apply the concepts of various system stability criterions. Design various transfer functions of digital control system using state variable models.
	17152C33	FUNDAMENTALS OF DATA STRUCTURES IN C	Implement linear and non-linear data structure operations using C Suggest appropriate linear / non-linear data structure for any given data set. Apply hashing concepts for a given problem Modify or suggest new data structure for an application Appropriately choose the sorting algorithm for an application.
	17152C34	DIGITAL ELECTRONICS	Use digital electronics in the present contemporary world Design various combinational digital circuits using logic gates Do the analysis and design procedures for synchronous and asynchronous sequential circuits Use the semiconductor memories and related technology Use electronic circuits involved in the design of logic gates
	17152C35	SIGNALS AND SYSTEMS	To be able to determine if a given system is linear/causal/stable Capable of determining the frequency components present in a deterministic signal Capable of characterizing LTI systems in the time domain and frequency domain To be able to compute the output of an LTI system in the time and frequency domains
	17152C36	ELECTRONIC CIRCUITS I	Acquire knowledge of Working principles, characteristics and applications of BJT and FET Frequency response characteristics of BJT and FET amplifiers Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers Apply the knowledge gained in the design of Electronic circuits
	17152L37	FUNDAMENTALS OF DATA STRUCTURES IN C LAB	To understand and implement basic data structures using C To apply linear and non-linear data structures in problem solving. To learn to implement functions and recursive functions by means of data structures To implement searching and sorting algorithms.
	17152L38	ANALOG AND DIGITAL CIRCUITS LAB	Design and Test rectifiers, filters and regulated power supplies. Design and Test BJT/JFET amplifiers. Differentiate cascode and cascade amplifiers. Analyze the limitation in bandwidth of single stage and multi stage amplifier Measure CMRR in differential amplifier Simulate and analyze amplifier circuits using PSpice. Design and Test the digital logic circuits.
	17152L39	INTERPERSONAL SKILLS / LISTENING & SPEAKING	Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills Make effective presentations.
IV		PROBABILITY AND RANDOM PROCESSES	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. Apply the concept random processes in engineering disciplines. Understand and apply the concept of correlation and spectral

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

			densities. The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random inputs to linear time invariant systems.
	17152C42	ELECTRONIC CIRCUITS II	Analyze different types of amplifier, oscillator and multivibrator circuits Design BJT amplifier and oscillator circuits Analyze transistorized amplifier and oscillator circuits Design and analyze feedback amplifiers Design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors
	17152C43	COMMUNICATION THEORY	Design AM communication systems Design Angle modulated communication systems Apply the concepts of Random Process to the design of Communication systems Analyze the noise performance of AM and FM systems Gain knowledge in sampling and quantization
	17152C44	ELECTROMAGNETIC FIELDS	Display an understanding of fundamental electromagnetic laws and concepts Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning Explain electromagnetic wave propagation in lossy and in lossless media Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws
	17152C45	LINEAR INTEGRATED CIRCUITS	Design linear and non linear applications of OP – AMPS Design applications using analog multiplier and PLL Design ADC and DAC using OP – AMPS Generate waveforms using OP – AMP Circuits Analyze special function ICs
	17149S46	ENVIRONMENTAL SCIENCE AND ENGINEERING	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course. Public awareness of environmental is at infant stage. Ignorance and incomplete knowledge has lead to misconceptions Development and improvement in standard of living has lead to serious environmental disasters
	17152L47	CIRCUITS DESIGN AND SIMULATION LAB	Analyze various types of feedback amplifiers Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool.
	17152L48	LINEAR INTEGRATED CIRCUITS LAB	Design amplifiers, oscillators, D-A converters using operational amplifiers. Design filters using op-amp and performs an experiment on frequency response. Analyze the working of PLL and describe its application as a frequency multiplier. DesignDC power supply using ICs. Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

	17152CRS	RESEARCH LED SEMINAR	Exposure to various research domains Acquaintance with languages of research Development for research aptitude
V	17152C51	DIGITAL COMMUNICATION	Design PCM systems Design and implement base band transmission schemes Design and implement band pass signaling schemes Analyze the spectral characteristics of band pass signaling schemes and their noise performance Design error control coding schemes
	17152C52	DISCRETE-TIME SIGNAL PROCESSING	Apply DFT for the analysis of digital signals and systems Design IIR and FIR filters Characterize the effects of finite precision representation on digital filters Design multirate filters Apply adaptive filters appropriately in communication systems
	17152C53	COMPUTER ARCHITECTURE AND ORGANIZATION	Describe data representation, instruction formats and the operation of a digital computer Illustrate the fixed point and floating-point arithmetic for ALU operation Discuss about implementation schemes of control unit and pipeline performance Explain the concept of various memories, interfacing and organization of multiple processors Discuss parallel processing technique and unconventional architectures
	17152C55	COMMUNICATION NETWORKS	Identify the components required to build different types of networks Choose the required functionality at each layer for given application Identify solution for each functionality at each layer Trace the flow of information from one node to another node in the network
	17152L57	DISCRETE TIME SIGNAL PROCESSING LAB	Carryout basic signal processing operations Demonstrate their abilities towards MATLAB based implementation of various DSP systems Analyze the architecture of a DSP Processor Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals Design a DSP system for various applications of DSP.
	17152L58	COMMUNICATION SYSTEMS LAB	Communicate between two desktop computers Implement the different protocols Program using sockets. Implement and compare the various routing algorithms Use the simulation tool.
	17152CRM	RESEARCH METHODOLOGY	Understand the approaches towards and constraints in good research.Use the statistical tools used in research methodology Compose the manuscript for publication Obtain computational and excel- skills for research in engineering
VI	17152C61	MICROPROCESSORS AND MICROCONTROLLERS	Understand and execute programs based on 8086 microprocessor. Design Memory Interfacing circuits. Design and interface I/O circuits. Design and implement 8051 microcontroller based systems.
	17152C62	VLSI DESIGN	Realize the concepts of digital building blocks using MOS

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

			transistor.
			Design combinational MOS circuits and power strategies.
			Design and construct Sequential Circuits and Timing systems.
			Design arithmetic building blocks and memory subsystems.
			Apply and implement FPGA design flow and testing.
	17152C63	WIRELESS COMMUNICATION	Characterize a wireless channel and evolve the system design specifications
			Design a cellular system based on resource availability and traffic demands
			Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration
	17152S64	PRINCIPLES OF MANAGEMENT	Upon completion of the course, students will be able to have clear understanding
			Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of managemenT
	17152C65	TRANSMISSION LINES AND RF SYSTEMS	Explain the characteristics of transmission lines and its losses
			Write about the standing wave ratio and input impedance in high frequency transmission lines
			Analyze impedance matching by stubs using smith charts
			Analyze the characteristics of TE and TM waves
			Design a RF transceiver system for wireless communication
	LAB 17152L61	MICROPROCESSORS AND MICROCONTROLLERS LAB	Write ALP Programmes for fixed and Floating Point and Arithmetic operations
			Interface different I/Os with processor
			Generate waveforms using Microprocessors
			Execute Programs in 8051
			Explain the difference between simulator and Emulator
	LAB 17152L62	VLSI DESIGN LAB	Write HDL code for basic as well as advanced digital integrated circuit
			Import the logic modules into FPGA Boards
			Synthesize Place and Route the digital IPs
			Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools
	17152L63	PROFESSIONAL COMMUNICATION	Make effective presentations
			Participate confidently in Group Discussions.
			Attend job interviews and be successful in them.
			Develop adequate Soft Skills required for the workplace
	17152L64	TECHNICAL SEMINAR	To study research papers for understanding of a new field, in the absence of a textbook, tosummarise and review them
			To identify promising new directions of various cutting edge technologies
			To impart skills in preparing detailed report describing the project and results
			To effectively communicate by making an oral presentation before an evaluation committee
	17152CBR	PARTICIPATION IN BOUNDED RESEARCH	Hands on exposure to problem solving tools in contemporary research
			Evolve research intuitiveness and orientation
			Familiarize with cutting edge research trends
VII	17152C71	ANTENNAS AND	Apply the basic principles and evaluate antenna parameters and

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		MICROWAVE ENGINEERING	link power budgets Design and assess the performance of various antennas Design a microwave system given the application specifications
	17152C72	OPTICAL COMMUNICATION	Realize basic elements in optical fibers, different modes and configurations. Analyze the transmission characteristics associated with dispersion and polarization techniques. Design optical sources and detectors with their use in optical communication system. Construct fiber optic receiver systems, measurements and coupling techniques. Design optical communication systems and its networks.
	17152C73	EMBEDDED AND REAL TIME SYSTEMS	Describe the architecture and programming of ARM processor Outline the concepts of embedded systems Explain the basic concepts of real time operating system design Model real-time applications using embedded-system concepts
	17152C75	AD HOC AND WIRELESS SENSOR NETWORKS	Know the basics of Ad hoc networks and Wireless Sensor Networks Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement Apply the knowledge to identify appropriate physical and MAC layer protocols Understand the transport layer and security issues possible in Ad hoc and sensor networks. Be familiar with the OS used in Wireless Sensor Networks and build basic modules
	17152L77	EMBEDDED LAB	Write programs in ARM for a specific Application Interface memory, A/D and D/A convertors with ARM system Analyze the performance of interrupt Write program for interfacing keyboard, display, motor and sensor. Formulate a mini project using embedded system
	17152L78	ADVANCED COMMUNICATION LAB	Analyze the performance of simple optical link by measurement of losses and Analyzing the mode characteristics of fiber Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER Estimate the Wireless Channel Characteristics and Analyze the performance of Wireless Communication System Understand the intricacies in Microwave System design
	17152CSR	DESIGN/SOCIO TECHNICAL PROJECT	Sensitiveto social needs for innovation Develop teams and work towards interdisciplinary synchronous research strategy Develop critical thinking and synergistic research approach.
VIII	17152P83	PROJECT WORK	apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. use effectively oral, written and visual communication. identify, analyze, and solve problems creatively through sustained critical investigation. integrate information from multiple sources. demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

			practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.
	17152COMS	COMPS	The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them.
	17152E56A	OBJECT ORIENTED PROGRAMMING	Develop Java programs using OOP principles Develop Java programs with the concepts inheritance and interfaces Build Java applications using exceptions and I/O streams Develop Java applications with threads and generics classes Develop interactive Java programs using swings
	17152E56B	MEDICAL ELECTRONICS	Know the human body electro- physiological parameters and recording of bio-potentials Comprehend the non-electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood cell count, blood flow meter etc. Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventilators Comprehend physical medicine methods eg. ultrasonic, shortwave, microwave surgical diathermies , and bio-telemetry principles and methods Know about recent trends in medical instrumentation
	17152E56C	OPERATING SYSTEMS	Analyze various scheduling algorithms. Understand deadlock, prevention and avoidance algorithms. Compare and contrast various memory management schemes. Understand the functionality of file systems. Perform administrative tasks on Linux Servers and compare iOS and Android Operating Systems.
	17152E56D	ROBOTICS AND AUTOMATION	Explain the concepts of industrial robots in terms of classification, specifications and coordinate systems, along with the need and application of robots & automation Examine different sensors and actuators for applications like maze solving and self driving cars. Design a 2R robot & an end-effector and solve the kinematics and dynamics of motion for robots. Explain navigation and path planning techniques along with the control architectures adopted for robot motion planning. Describe the impact and progress in AI and other research trends in the field of robotics
	17152E56E	NANOTECHNOLOGY AND APPLICATIONS	Describe the basic science behind the properties of materials. Interpret the creation, characterization, and manipulation of nanoscale materials. Comprehend the exciting applications of nanotechnology at the leading edge of scientific research Apply their knowledge of nanotechnology to identify how they can be exploited for new applications.
	17152E56F	HUMAN RIGHTS	Engineering students will acquire the basic knowledge of human rights
	17152E56G	TOTAL QUALITY MANAGEMENT	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes
	17152E66A	CRYPTOGRAPHY AND NETWORK SECURITY	Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems
	17152E66B	ADVANCED DIGITAL	Articulate and apply the concepts of special random processes in

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		SIGNAL PROCESSINGS	practical applications Choose appropriate spectrum estimation techniques for a given random process Apply optimum filters appropriately for a given communication application Apply appropriate adaptive algorithm for processing non-stationary signals Apply and analyse wavelet transforms for signal and image processing based applications
	17152E66C	MEMS AND NEMS	Interpret the basics of micro/nano electromechanical systems including their applications and advantages Recognize the use of materials in micro fabrication and describe the fabrication processes including surface micromachining, bulk micromachining and LIGA. Analyze the key performance aspects of electromechanical transducers including sensors and actuators Comprehend the theoretical foundations of quantum mechanics and Nano systems
	17152E66D	MULTIMEDIA COMPRESSION AND COMMUNICATION	Design audio compression techniques Configure Text, image and video compression techniques Select suitable service model for specific application Configure multimedia communication network
	17152E66E	CMOS ANALOG IC DESIGN	Realize the concepts of Analog MOS devices and current mirror circuits. Design different configuration of Amplifiers and feedback circuits. Analyze the characteristics of frequency response of the amplifier and its noise. Analyze the performance of the stability and frequency compensation techniques of Op-Amp Circuits. Construct switched capacitor circuits and PLLs
	17152E66F	WIRELESS NETWORKS	Conversant with the latest 3G/4G networks and its architecture Design and implement wireless network environment for any application using latest wireless protocols and standards Ability to select the suitable network depending on the availability and requirement
	17152E66G	INTELLECTUAL PROPERTY RIGHTS	Ability to manage Intellectual Property portfolio to enhance the value of the firm.
	17152E76A	ADVANCED WIRELESS COMMUNICATION	Comprehend and appreciate the significance and role of this course in the present contemporary world Apply the knowledge about the importance of MIMO in today's communication Appreciate the various methods for improving the data rate of wireless communication system
	17152E76B	COGNITIVE RADIO	Gain knowledge on the design principles on software defined radio and cognitive radio Develop the ability to design and implement algorithms for cognitive radio spectrum sensing and dynamic spectrum access Build experiments and projects with real time wireless applications Apply the knowledge of advanced features of cognitive radio for real world applications
	17152E76C	FOUNDATION SKILLS	Define, formulate and analyze a problem

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		IN INTEGRATED PRODUCT EVELOPMENT	Solve specific problems independently or as part of a team Gain knowledge of the Innovation & Product Development process in the Business Context Work independently as well as in teams Manage a project from start to finish
	17152E76D	MACHINE LEARNING TECHNIQUES	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches Apply specific supervised or unsupervised machine learning algorithm for a particular problem Analyse and suggest the appropriate machine learning approach for the various types of problem Design and make modifications to existing machine learning algorithms to suit an individual application Provide useful case studies on the advanced machine learning algorithms .
	17152E76E	ELECTRONIC PACKAGING AND TESTING	Give a comprehensive introduction to the various packaging types used along with the associated thermal, speed, signal and integrity power issues Enable design of packages which can withstand higher temperature, vibrations and shock Design of PCBs which minimize the EMI and operate at higher frequency Analyze the concepts of Testing and testing methods
	17152E76F	MIXED SIGNAL IC DESIGN	Apply the concepts for mixed signal MOS circuit. Analyze the characteristics of IC based CMOS filters. Design of various data converter architecture circuits. Analyze the signal to noise ratio and modeling of mixed signals. Design of oscillators and phase lock loop circuit.
	17152E76G	DISASTER MANAGEMENT	Differentiate the types of disasters, causes and their impact on environment and society Assess vulnerability and various methods of risk reduction measures as well as mitigation. Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.
	17152E81A	Electromagnetic Interference and Compatibility	Identify the various types and mechanisms of Electromagnetic Interference Propose a suitable EMI mitigation technique Describe the various EMC Standards and methods to measure them
	17152E81B	LOW POWER SoC DESIGN	Analyze and design low-power VLSI circuits using different circuit technologies for system on chip design
	17152E81C	PHOTONIC NETWORKS	Use the backbone infrastructure for our present and future communication needs Analyze the architectures and the protocol stack Compare the differences in the design of data plane, control plane, routing, switching, resource allocation methods, network management and protection methods in vogue
	17152E81D	COMPRESSIVE SENSING	Appreciate the motivation and the necessity for compressed sensing technology. Design a new algorithm or modify an existing algorithm for different application areas in wireless sensor network.
	17152E81E	DIGITAL IMAGE PROCESSING	To possess knowledge on nanotechnology based applications in each industry To provide details of contemporary industrial applications of nanotechnology To provide an overview of future technological advancements and increasing role of nanotechnology in each industry

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

			Ability to select control equipments. Ability to ensure quality, control and preventive measures.
	17152E81F	PROFESSIONAL ETHICS IN ENGINEERING	to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.
	17152E82A	VIDEO ANALYTICS	Design video analytic algorithms for security applications Design video analytic algorithms for business intelligence Design custom made video analytics system for the given target application
	17152E82B	DSP PROCESSOR ARCHITECTURE AND PROGRAMMING	Analyze the concepts of Digital Signal Processors Demonstrate their ability to program the DSP processor for signal processing applications Discuss, compare and select the suitable Advanced DSP Processors for real-time signal processing applications
	17152E82C	SATELLITE COMMUNICATION	Analyze the satellite orbits Analyze the earth segment and space segment Analyze the satellite Link design Design various satellite applications
	17152E82D	SOFT COMPUTING	Apply suitable soft computing techniques for various applications. Integrate various soft computing techniques for complex problems.
	17152E82E	PRINCIPLES OF SPEECH PROCESSING	Design speech compression techniques Configure speech recognition techniques Design speaker recognition systems Design text to speech synthesis systems
	17152E82F	FUNDAMENTALS OF NANOSCIENCE	Will familiarize about the science of nanomaterials Will demonstrate the preparation of nanomaterials Will develop knowledge in characteristic nanomaterial
	17150FE54A	DATABASE MANAGEMENT SYSTEMS	Understand relational data model, evolve conceptual model of a given problem, its mapping to relational model and Normalization Query the relational database and write programs with database connectivity Understand the concepts of database security and information retrieval systems
	17150FE54B	CLOUD COMPUTING	Articulate the main concepts, key technologies, strengths and limitations of cloud computing. Learn the key and enabling technologies that help in the development of cloud. Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models. Explain the core issues of cloud computing such as resource management and security. Be able to install and use current cloud technologies. Choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.
	17153FE54A	INDUSTRIAL NANOTECHNOLOGY	To possess knowledge on nanotechnology based applications in each industry To provide details of contemporary industrial applications of nanotechnology To provide an overview of future technological advancements and increasing role of nanotechnology in each industry .
	17153FE54B	ENERGY CONSERVATION AND MANAGEMENT	Can carryout energy accounting and balancing Can suggest methodologies for energy savings

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

	17154FE54A	RENEWABLE ENERGY SOURCES	Understanding the physics of solar radiation. Ability to classify the solar energy collectors and methodologies of storing solar energy. Knowledge in applying solar energy in a useful way. Knowledge in wind energy and biomass with its economic aspects. Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.
	17154FE54B	AUTOMOTIVE SYSTEMS	Identify the different components in automobile engineering. Have clear understanding on different auxiliary and transmission systems usual.
	17155FE54A	AIR POLLUTION AND CONTROL ENGINEERING	An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management Ability to identify, formulate and solve air and noise pollution problems Ability to design stacks and particulate air pollution control devices to meet applicable standards. Ability to select control equipments. Ability to ensure quality, control and preventive measures.
	17155FE54B	GEOGRAPHIC INFORMATION SYSTEM	Have basic idea about the fundamentals of GIS. Understand the types of data models. Get knowledge about data input and topology. Gain knowledge on data quality and standards. Understand data management functions and data output
	17150FE74A	INTRODUCTION TO C PROGRAMMING	Develop simple applications using basic constructs Develop applications using arrays and strings Develop applications using functions and structures
	17150FE74B	DATA STRUCTURES AND ALGORITHMS	Implement linear data structures and solve problems using them. Implement and apply trees and graphs to solve problems. Implement the various searching and sorting algorithms.
	17153FE74A	BASIC CIRCUIT THEORY	Ability to introduce electric circuits and its analysis Ability to impart knowledge on solving circuit equations using network theorems Ability to introduce the phenomenon of resonance in coupled circuits. Ability to introduce Phasor diagrams and analysis of three phase circuits
	17153FE74B	INTRODUCTION TO RENEWABLE ENERGY SYSTEMS	Ability to understand and analyze power system operation, stability, control and protection. Ability to handle the engineering aspects of electrical energy generation and utilization. Ability to understand the stand alone and grid connected renewable energy systems. Ability to design of power converters for renewable energy applications. Ability to acquire knowledge on wind electrical generators and solar energy systems. Ability to design power converters used for hybrid renewable energy systems
	17154FE74A	INDUSTRIAL SAFETY	identify and prevent chemical, environmental mechanical, fire hazard through analysis and apply proper safety techniques on safety engineering and management

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

	17154FE74B	TESTING OF MATERIALS	Identify suitable testing technique to inspect industrial component Ability to use the different technique and know its applications and limitations
	17155FE74A	GREEN BUILDING DESIGN	Identify existing energy codes, green building codes and green rating systems. Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design. Identify and use construction materials and methods that more easily allow for salvage and re-use of building materials. Understand the techniques and benefits of building performance testing, monitoring and metering. Identify and make use of techniques for weatherization and sustainable remodeling of existing structures
	17155FE74B	WASTE WATER TREATMENT	Will have knowledge about adsorption and oxidation process. Will gain idea about various methods available for water treatment. Will appreciate the necessity of water and acquire knowledge of preliminary treatment.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

Mapping of COs and Pos

2017 regulation-UG(FT)

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
I	17147S11	Communicative English	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.						✔	✔	✔	✔	✔	✔	
	17148S12	Engineering Mathematics – I	• Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. • Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. • Determine convergence/divergence of	✔	✔	✔	✔							✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations.												
	17149S13	Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications, • The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, • The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, • The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and • The students will understand the basics of crystals, their structures and different crystal growth techniques.	✓	✓	✓	✓							✓	✓
	17149S14	Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	✓	✓	✓	✓							✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
	17154S15	Engineering Graphics	• Familiarize with the fundamentals and standards of Engineering graphics • Perform freehand sketching of basic geometrical constructions and multiple views of objects. • Project orthographic projections of lines and plane surfaces. • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.	✓									✓	✓	✓
	17150S16	Problem Solving and Python Programming	• Develop algorithmic solutions to simple computational problems • Read, write, execute by hand simple Python programs. • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries. • Read and write data from/to files in Python Programs.	✓	✓	✓	✓	✓						✓	✓
	17150L17	Problem Solving and Python	• Write, test, and debug simple Python programs. • Implement Python programs with	✓	✓	✓	✓							✓	✓

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
		Programming Laboratory	conditionals and loops. • Develop Python programs step-wise by defining functions and calling them. • Use Python lists, tuples, dictionaries for representing compound data. • Read and write data from/to files in Python.												
	17149L18	Physics and Chemistry Laboratory	Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications. • To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis. • To acquaint the students with the determination of molecular weight of a polymer by viscometery.	✓	✓	✓	✓							✓	✓
	171VEA1 9	Value Education	• To learn about philosophy of Life and Individual qualities • To learn and practice social values and responsibilities • To learn and practice mind culture, forces acting on the body • To learn more of Responsibilities and Rights as Professional and facing Global Challenges • Emerge as responsible citizen with clear		✓		✓		✓	✓	✓	✓	✓		

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			conviction to be a role-model in the society.												
II	17147S21	Technical English	• Read technical texts and write area- specific texts effortlessly. • Listen and comprehend lectures and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.					✓	✓	✓	✓	✓	✓	✓	✓
	17148S22	Engineering Mathematics – II	• Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. • Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	✓	✓	✓	✓							✓	✓
	17149S23 B	Physics for Electronics Engineering	• Gain knowledge on classical and quantum electron theories, and energy band structuues, • Acquire knowledge on basics of	✓	✓	✓	✓							✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			semiconductor physics and its applications in various devices, • Get knowledge on magnetic and dielectric properties of materials, • Have the necessary understanding on the functioning of optical materials for optoelectronics, • Understand the basics of quantum structures and their applications in spintronics and carbon electronics.												
	17153S24 B	Basic Electrical and Instrumentation Engineering	• Understand the concept of three phase power circuits and measurement. • Comprehend the concepts in electrical generators, motors and transformers • Choose appropriate measuring instruments for given application	✔	✔	✔	✔	✔	✔					✔	✔
	17152S25 B	Circuit Analysis	• Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time • Design and understand and evaluate the AC and DC circuits.	✔	✔	✔	✔	✔	✔					✔	✔
	17152S26 B	Electronic Devices	• Explain the V-I characteristic of diode, UJT and SCR • Describe the equivalence circuits of transistors • Operate the basic electronic devices such as	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices												
	17154L27	Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works. • Use welding equipments to join the structures. • Carry out the basic machining operations • Make the models using sheet metal works • Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings • Carry out basic home electrical works and appliances • Measure the electrical quantities • Elaborate on the components, gates, soldering practices.	✓	✓	✓	✓	✓						✓	✓
	17152L28 B	Circuits and Devices Laboratory	• Analyze the characteristics of basic electronic devices • Design RL and RC circuits • Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems	✓	✓	✓	✓	✓						✓	✓
	171ICA29	Fundamentals of Indian Constitution and Economy	• Understand the emergence and evolution of Indian Constitution. • Understand the structure and composition of Indian Constitution			✓			✓	✓	✓	✓	✓		

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Understand and analyse federalism in the Indian context. • Understand and analyse the three organs of the state in the contemporary scenario. • Understand and Evaluate the Indian Political scenario amidst the emerging challenges.												
III	17148S31 B	Linear Algebra and Partial Differential Equations	• Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts. • Demonstrate accurate and efficient use of advanced algebraic techniques. • Demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about the statements proven by the text. • Able to solve various types of partial differential equations. Able to solve engineering problems using Fourier series.	✓	✓	✓	✓	✓						✓	✓
	17152C32	Control Systems Engineering	• Identify the various control system components and their representations. • Analyze the various time domain parameters. • Analysis the various frequency response plots and its system. • Apply the concepts of various system stability criterions.	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Design various transfer functions of digital control system using state variable models.												
	17152C33	Fundamentals of Data Structures In C	• Implement linear and non-linear data structure operations using C • Suggest appropriate linear / non-linear data structure for any given data set. • Apply hashing concepts for a given problem • Modify or suggest new data structure for an application • Appropriately choose the sorting algorithm for an application	✔	✔	✔	✔	✔	✔					✔	✔
	17152C34	Digital Electronics	• Use digital electronics in the present contemporary world • Design various combinational digital circuits using logic gates • Do the analysis and design procedures for synchronous and asynchronous sequential circuits • Use the semiconductor memories and related technology • Use electronic circuits involved in the design of logic gates	✔	✔	✔	✔	✔	✔					✔	✔
	17152C35	Signals and Systems	• To be able to determine if a given system is linear/causal/stable • Capable of determining the frequency components present in a deterministic signal	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Capable of characterizing LTI systems in the time domain and frequency domain • To be able to compute the output of an LTI system in the time and frequency domains												
	17152C36	Electronic Circuits- I	• Acquire knowledge of o Working principles, characteristics and applications of BJT and FET o Frequency response characteristics of BJT and FET amplifiers • Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers • Apply the knowledge gained in the design of Electronic circuits	✓	✓	✓	✓	✓	✓					✓	✓
	17152L37	Fundamentals of Data Structures In C Laboratory	• To understand and implement basic data structures using C • To apply linear and non-linear data structures in problem solving. • To learn to implement functions and recursive functions by means of data structures • To implement searching and sorting algorithms	✓	✓	✓	✓	✓	✓					✓	✓
	17152L38	Analog and Digital Circuits Laboratory	• Design and Test rectifiers, filters and regulated power supplies. • Design and Test BJT/JFET amplifiers.	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Differentiate cascode and cascade amplifiers. • Analyze the limitation in bandwidth of single stage and multi stage amplifier • Measure CMRR in differential amplifier • Simulate and analyze amplifier circuits using PSpice. • Design and Test the digital logic circuits.												
	17152L39	Interpersonal Skills / Listening & Speaking	• Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills. • Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities. • improve general and academic listening skills • Make effective presentations.												
IV	17148S41 B	Probability and Random Processes	• Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. • Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.	✓	✓	✓	✓	✓						✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Apply the concept random processes in engineering disciplines. • Understand and apply the concept of correlation and spectral densities. • The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random inputs to linear time invariant systems.												
	17152C42	Electronic Circuits II	• Analyze different types of amplifier, oscillator and multivibrator circuits • Design BJT amplifier and oscillator circuits • Analyze transistorized amplifier and oscillator circuits • Design and analyze feedback amplifiers • Design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors.	✓	✓	✓	✓	✓	✓					✓	✓
	17152C43	Communication Theory	• Design AM communication systems • Design Angle modulated communication systems • Apply the concepts of Random Process to the design of Communication systems • Analyze the noise performance of AM and	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			FM systems • Gain knowledge in sampling and quantization												
	17152C44	Electromagnetic Fields	• Display an understanding of fundamental electromagnetic laws and concepts • Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning • Explain electromagnetic wave propagation in lossy and in lossless media • Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws	✓	✓	✓	✓	✓	✓					✓	✓
	17152C45	Linear Integrated Circuits	• Design linear and non linear applications of OP – AMPS • Design applications using analog multiplier and PLL • Design ADC and DAC using OP – AMPS • Generate waveforms using OP – AMP Circuits • Analyze special function Ics	✓	✓	✓	✓	✓	✓					✓	✓
	17149S46	Environmental Science and Engineering	One will obtain knowledge on the following after completing the course. • Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has	✓	✓		✓		✓	✓	✓			✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			lead to misconceptions • Development and improvement in standard of living has lead to serious environmental disasters												
	17152L47	Circuits Design and Simulation Laboratory	• Analyze various types of feedback amplifiers • Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators • Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool.	✔	✔	✔	✔	✔	✔					✔	✔
	17152L48	Linear Integrated Circuits Laboratory	• Design amplifiers, oscillators, D-A converters using operational amplifiers. • Design filters using op-amp and performs an experiment on frequency response. • Analyze the working of PLL and describe its application as a frequency multiplier. • DesignDC power supply using ICs. • Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE.	✔	✔	✔	✔	✔	✔					✔	✔
	17152CRS	Research Led Seminar	• Exposure to various research domains • Acquaintance with languages of research • Development for research aptitude	✔	✔	✔	✔	✔	✔						
V	17152C51	Digital Communication	• Design PCM systems • Design and implement base band	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			transmission schemes • Design and implement band pass signaling schemes • Analyze the spectral characteristics of band pass signaling schemes and their noise performance • Design error control coding schemes												
	17152C52	Discrete-Time Signal Processing	• Apply DFT for the analysis of digital signals and systems • Design IIR and FIR filters • Characterize the effects of finite precision representation on digital filters • Design multirate filters • Apply adaptive filters appropriately in communication systems	✔	✔	✔	✔	✔	✔					✔	✔
	17152C53	Computer Architecture and Organization	• Describe data representation, instruction formats and the operation of a digital computer • Illustrate the fixed point and floating-point arithmetic for ALU operation • Discuss about implementation schemes of control unit and pipeline performance • Explain the concept of various memories, interfacing and organization of multiple processors • Discuss parallel processing technique and	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			unconventional architectures												
	171__FE5 4_	**Free Elective - I**													
	17150FE5 4A	Database Management Systems	• Understand relational data model, evolve conceptual model of a given problem, its mapping to relational model and Normalization • Query the relational database and write programs with database connectivity • Understand the concepts of database security and information retrieval systems	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	17150FE5 4B	Cloud Computing	• Articulate the main concepts, key technologies, strengths and limitations of cloud computing. • Learn the key and enabling technologies that help in the development of cloud. • Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models. • Explain the core issues of cloud computing such as resource management and security. • Be able to install and use current cloud technologies. • Choose the appropriate technologies, algorithms and approaches for	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			implementation and use of cloud.												
	17153FE5 4A	Industrial Nano Technology	• To possess knowledge on nanotechnology based applications in each industry • To provide details of contemporary industrial applications of nanotechnology • To provide an overview of future technological advancements and increasing role of nanotechnology in each industry	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
	17153FE5 4B	Energy Conservation and Management	• Can carry out energy accounting and balancing • Can suggest methodologies for energy savings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17154FE5 4A	Renewable Energy Sources	• Understanding the physics of solar radiation. • Ability to classify the solar energy collectors and methodologies of storing solar energy. • Knowledge in applying solar energy in a useful way. • Knowledge in wind energy and biomass with its economic aspects. • Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17154FE5 4B	Automotive Systems	• Identify the different components in automobile engineering. • Have clear understanding on different	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			auxiliary and transmission systems usual.												
	17155FE5 4A	Air Pollution and Control Engineering	• An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management • Ability to identify, formulate and solve air and noise pollution problems • Ability to design stacks and particulate air pollution control devices to meet applicable standards. • Ability to select control equipments. • Ability to ensure quality, control and preventive measures.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	17155FE5 4B	Geographic Information System	• Have basic idea about the fundamentals of GIS. • Understand the types of data models. • Get knowledge about data input and topology. • Gain knowledge on data quality and standards. • Understand data management functions and data output	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	☐	✔
	17152C55	Communication Networks	• Identify the components required to build different types of networks • Choose the required functionality at each layer for given application	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Identify solution for each functionality at each layer • Trace the flow of information from one node to another node in the network												
	17152E56 _	**Elective - I**													
	17152E56 A	Object Oriented Programming	• Develop Java programs using OOP principles • Develop Java programs with the concepts inheritance and interfaces • Build Java applications using exceptions and I/O streams • Develop Java applications with threads and generics classes • Develop interactive Java programs using swings	✓	✓	✓	✓	✓	✓				✓	✓	✓
	17152E56 B	Medical Electronics	• Know the human body electro-physiological parameters and recording of bio-potentials • Comprehend the non-electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood cell count, blood flow meter etc. • Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators,	✓	✓	☐	☐	☐	✓					✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			dialyzers and ventilators • Comprehend physical medicine methods eg. ultrasonic, shortwave, microwave surgical diathermies , and bio-telemetry principles and methods • Know about recent trends in medical instrumentation												
	17152E56 C	Operating Systems	• Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems. • Perform administrative tasks on Linux Servers and compare iOS and Android Operating Systems.	✓	✓	✓	✓	✓	✓				✓	✓	✓
	17152E56 D	Robotics and Automation	• Explain the concepts of industrial robots in terms of classification, specifications and coordinate systems, along with the need and application of robots & automation • Examine different sensors and actuators for applications like maze solving and self driving cars. • Design a 2R robot & an end-effector and solve the kinematics and dynamics of	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			motion for robots. • Explain navigation and path planning techniques along with the control architectures adopted for robot motion planning. • Describe the impact and progress in AI and other research trends in the field of robotics												
	17152E56 E	Nano Technology and Applications	• Describe the basic science behind the properties of materials. • Interpret the creation, characterization, and manipulation of nanoscale materials. • Comprehend the exciting applications of nanotechnology at the leading edge of scientific research • Apply their knowledge of nanotechnology to identify how they can be exploited for new applications.	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
	17152E56 F	Human Rights	• Engineering students will acquire the basic knowledge of human rights.	☐	☐	☐	☐	☐	✓	✓	✓			☐	✓
	17152E56 G	Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.						✓	✓	✓				✓
	17152L57	Discrete Time Signal Processing Laboratory	• Carryout basic signal processing operations • Demonstrate their abilities towards	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			MATLAB based implementation of various DSP systems • Analyze the architecture of a DSP Processor • Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals • Design a DSP system for various applications of DSP												
	17152L58	Communication Systems Laboratory	• Simulate & validate the various functional modules of a communication system • Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes • Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system • Simulate end-to-end communication Link	✔	✔	✔	✔	✔	✔					✔	✔
	17152L59	Communication Networks Laboratory	• Communicate between two desktop computers • Implement the different protocols • Program using sockets. • Implement and compare the various routing algorithms • Use the simulation tool.	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
	17152CRM	Research Methodology	• Understand the approaches towards and constraints in good research.Use the statistical tools used in research methodology • Compose the manuscript for publication • Obtain computational and excel- skills for research in engineering	✓	✓	✓	✓	✓	✓	✓	✓				
VI	17152C61	Microprocessors and Microcontrollers	• Understand and execute programs based on 8086 microprocessor. • Design Memory Interfacing circuits. • Design and interface I/O circuits. • Design and implement 8051 microcontroller based systems.	✓	✓	✓	✓	✓	✓					✓	✓
	17152C62	VLSI Design	• Realize the concepts of digital building blocks using MOS transistor. • Design combinational MOS circuits and power strategies. • Design and construct Sequential Circuits and Timing systems. • Design arithmetic building blocks and memory subsystems. • Apply and implement FPGA design flow and testing.	✓	✓	✓	✓	✓	✓					✓	✓
	17152C63	Wireless Communication	• Characterize a wireless channel and evolve the system design specifications • Design a cellular system based on resource	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			availability and traffic demands • Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.												
	17152C64	Principles of Management	• Upon completion of the course, students will be able to have clear understanding • Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management						✔	✔	✔		✔	✔	✔
	17152C65	Transmission Lines and RF Systems	• Explain the characteristics of transmission lines and its losses • Write about the standing wave ratio and input impedance in high frequency transmission lines • Analyze impedance matching by stubs using smith charts • Analyze the characteristics of TE and TM waves • Design a RF transceiver system for wireless communication	✔	✔	✔	✔	✔	✔					✔	✔
	17152E66 _	**Elective - II**													
	17152E66 A	Cryptography and Network Security	• Understand the fundamentals of networks security, security architecture, threats and vulnerabilities	✔	✔	✔	✔	✔	✔	☐	✔	✔	✔	☐	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Apply the different cryptographic operations of symmetric cryptographic algorithms • Apply the different cryptographic operations of public key cryptography • Apply the various Authentication schemes to simulate different applications. • Understand various Security practices and System security standards												
	17152E66 B	Advanced Digital Signal Processing	• Articulate and apply the concepts of special random processes in practical applications • Choose appropriate spectrum estimation techniques for a given random process • Apply optimum filters appropriately for a given communication application • Apply appropriate adaptive algorithm for processing non-stationary signals • Apply and analyse wavelet transforms for signal and image processing based applications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	17152E66 C	MEMS and NEMS	• Interpret the basics of micro/nano electromechanical systems including their applications and advantages • Recognize the use of materials in micro fabrication and describe the fabrication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			processes including surface micromachining, bulk micromachining and LIGA. • Analyze the key performance aspects of electromechanical transducers including sensors and actuators • Comprehend the theoretical foundations of quantum mechanics and Nano systems												
	17152E66 D	Multimedia Compression and Communication	• Design audio compression techniques • Configure Text, image and video compression techniques • Select suitable service model for specific application • Configure multimedia communication network	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	17152E66 E	CMOS Analog IC Design	• Realize the concepts of Analog MOS devices and current mirror circuits. • Design different configuration of Amplifiers and feedback circuits. • Analyze the characteristics of frequency response of the amplifier and its noise. • Analyze the performance of the stability and frequency compensation techniques of Op-Amp Circuits. • Construct switched capacitor circuits and PLLs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
	17152E66F	Wireless Networks	• Conversant with the latest 3G/4G networks and its architecture • Design and implement wireless network environment for any application using latest wireless protocols and standards • Ability to select the suitable network depending on the availability and requirement • Implement different type of applications for smart phones and mobile devices with latest network strategies	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	17152E66G	Intellectual Property Rights	• Ability to manage Intellectual Property portfolio to enhance the value of the firm.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	17152L61	Microprocessors and Microcontrollers Laboratory	• Write ALP Programmes for fixed and Floating Point and Arithmetic operations • Interface different I/Os with processor • Generate waveforms using Microprocessors • Execute Programs in 8051 • Explain the difference between simulator and Emulator	✔	✔	✔	✔	✔	✔					✔	✔
	17152L62	VLSI Design Laboratory	• Write HDL code for basic as well as advanced digital integrated circuit • Import the logic modules into FPGA Boards • Synthesize Place and Route the digital IPs	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools												
	17152L63	Professional Communication	• Make effective presentations • Participate confidently in Group Discussions. • Attend job interviews and be successful in them. • Develop adequate Soft Skills required for the workplace						✓				✓		✓
	17152L64	Technical Seminar	• To study research papers for understanding of a new field, in the absence of a textbook, to summarise and review them • To identify promising new directions of various cutting edge technologies • To impart skills in preparing detailed report describing the project and results • To effectively communicate by making an oral presentation before an evaluation committee	☐	✓	☐	✓	✓	✓	☐	✓	✓	✓	✓	✓
	17152CB R	Participation in Bounded Research	• Hands on exposure to problem solving tools in contemporary research • Evolve research intuitiveness and orientation • Familiarize with cutting edge research	✓	✓	✓	✓	✓	✓	✓	✓				

54

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			trends												
VII	17152C71	Antennas and Microwave Engineering	• Apply the basic principles and evaluate antenna parameters and link power budgets • Design and assess the performance of various antennas • Design a microwave system given the application specifications	✔	✔	✔	✔	✔	✔					✔	✔
	17152C72	Optical Communication	• Realize basic elements in optical fibers, different modes and configurations. • Analyze the transmission characteristics associated with dispersion and polarization techniques. • Design optical sources and detectors with their use in optical communication system. • Construct fiber optic receiver systems, measurements and coupling techniques. • Design optical communication systems and its networks.	✔	✔	✔	✔	✔	✔					✔	✔
	17152C73	Embedded and Real Time Systems	• Describe the architecture and programming of ARM processor • Outline the concepts of embedded systems • Explain the basic concepts of real time operating system design • Model real-time applications using embedded-system concepts	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
	171__FE74_	**Free Elective - II**													
	17150FE74A	Introduction to C Programming	• Develop simple applications using basic constructs • Develop applications using arrays and strings • Develop applications using functions and structures	✓	☐	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	17150FE74B	Data Structures and Algorithms	• Implement linear data structures and solve problems using them. • Implement and apply trees and graphs to solve problems. • Implement the various searching and sorting algorithms.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	17153FE74A	Basic Circuit Theory	• introduce electric circuits and its analysis • impart knowledge on solving circuit equations using network theorems • introduce the phenomenon of resonance in coupled circuits. • introduce Phasor diagrams and analysis of three phase circuits	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17153FE74B	Introduction to Renewable Energy Systems	• understand and analyze power system operation, stability, control and protection. • handle the engineering aspects of electrical energy generation and utilization. • understand the stand alone and grid	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			connected renewable energy systems. • design of power converters for renewable energy applications. • acquire knowledge on wind electrical generators and solar energy systems. • design power converters used for hybrid renewable energy systems.												
	17154FE7 4A	Industrial Safety	• identify and prevent chemical, environmental mechanical, fire hazard through analysis and apply proper safety techniques on safety engineering and management.	✓	☐	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17154FE7 4B	Testing of Materials	• Identify suitable testing technique to inspect industrial component • Use the different technique and know its applications and limitations	✓	☐	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17155FE7 4A	Green Building Design	• Identify existing energy codes, green building codes and green rating systems. • Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design. • Identify and use construction materials	✓	☐	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			and methods that more easily allow for salvage and re-use of building materials. • Understand the techniques and benefits of building performance testing, monitoring and metering. • Identify and make use of techniques for weatherization and sustainable remodeling of existing structures												
	17155FE74B	Waste Water Treatment	• Will have knowledge about adsorption and oxidation process. • Will gain idea about various methods available for water treatment. • Will appreciate the necessity of water and acquire knowledge of preliminary treatment.	✔	☐	✔	✔	✔	✔	✔	✔	✔	✔	☐	✔
	17152C75	Adhoc and Wireless Sensor Networks	• Know the basics of Ad hoc networks and Wireless Sensor Networks • Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement • Apply the knowledge to identify appropriate physical and MAC layer protocols • Understand the transport layer and security issues possible in Ad hoc and sensor networks.	✔	✔	✔	✔		✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Be familiar with the OS used in Wireless Sensor Networks and build basic modules												
	17152E76 _	**Elective - III**													
	17152E76 A	Advanced Wireless Communication	• Comprehend and appreciate the significance and role of this course in the present contemporary world • Apply the knowledge about the importance of MIMO in today's communication • Appreciate the various methods for improving the data rate of wireless communication system	✓	✓	✓	☐	✓	✓	✓	✓	✓	✓	☐	✓
	17152E76 B	Cognitive Radio	• Gain knowledge on the design principles on software defined radio and cognitive radio • Develop the ability to design and implement algorithms for cognitive radio spectrum sensing and dynamic spectrum access • Build experiments and projects with real time wireless applications • Apply the knowledge of advanced features of cognitive radio for real world applications	✓	✓	✓	☐	✓	✓	✓	✓	✓	✓	☐	✓
	17152E76	Foundation Skills	• Define, formulate and analyze a problem	✓	☐	✓	☐	✓	✓	✓	✓	✓	✓	☐	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
	C	in Integrated Product Development	• Solve specific problems independently or as part of a team • Gain knowledge of the Innovation & Product Development process in the Business Context • Work independently as well as in teams • Manage a project from start to finish												
	17152E76 D	Machine Learning Techniques	• Differentiate between supervised, unsupervised, semi-supervised machine learning approaches • Apply specific supervised or unsupervised machine learning algorithm for a particular problem • Analyse and suggest the appropriate machine learning approach for the various types of problem • Design and make modifications to existing machine learning algorithms to suit an individual application • Provide useful case studies on the advanced machine learning algorithms	✔	☐	✔	☐	✔	✔	✔	✔	✔	✔	☐	✔
	17152E76 E	Electronics Packaging and Testing	• Give a comprehensive introduction to the various packaging types used along with the associated thermal, speed, signal and integrity power issues • Enable design of packages which can	✔	☐	✔	☐	✔	✔	✔	✔	✔	✔	☐	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			withstand higher temperature, vibrations and shock • Design of PCBs which minimize the EMI and operate at higher frequency • Analyze the concepts of Testing and testing methods												
	17152E76 F	Mixed Signal IC Design	• Apply the concepts for mixed signal MOS circuit.• Analyze the characteristics of IC based CMOS filters.• Design of various data converter architecture circuits.• Analyze the signal to noise ratio and modeling of mixed signals.• Design of oscillators and phase lock loop circuit.	✔	☐	✔	☐	✔	✔	✔	✔	✔	✔	☐	✔
	17152E76 G	Disaster Management	• Differentiate the types of disasters, causes and their impact on environment and society • Assess vulnerability and various methods of risk reduction measures as well as mitigation. • Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.	✔	✔	✔	☐	✔	✔	✔	✔	✔	✔	☐	✔
	17152L77	Embedded Laboratory	• Write programs in ARM for a specific Application • Interface memory, A/D and D/A convertors with ARM system	✔	✔	✔	✔	✔	✔					✔	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Analyze the performance of interrupt • Write program for interfacing keyboard, display, motor and sensor. • Formulate a mini project using embedded system												
	17152L78	Advanced Communication Laboratory	• Analyze the performance of simple optical link by measurement of losses and Analyzing the mode characteristics of fiber • Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER • Estimate the Wireless Channel Characteristics and Analyze the performance of Wireless Communication System • Understand the intricacies in Microwave System design	✓	✓	✓	✓	✓	✓					✓	✓
	17152CSR	Design/Socio Technical Project	• Sensitive to social needs for innovation • Develop teams and work towards interdisciplinary synchronous research strategy • Develop critical thinking and synergistic research approach.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VIII	17152E81 _	**Elective – IV**													
	17152E81 A	Electro Magnetic Interference and	• Identify the various types and mechanisms of Electromagnetic Interference	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
		Compatibility	• Propose a suitable EMI mitigation technique • Describe the various EMC Standards and methods to measure them												
	17152E81 B	Low Power SoC Design	• Analyze and design low-power VLSI circuits using different circuit technologies for system on chip design	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17152E81 C	Photonic Networks	• Use the backbone infrastructure for our present and future communication needs • Analyze the architectures and the protocol stack • Compare the differences in the design of data plane, control plane, routing, switching, resource allocation methods, network management and protection methods in vogue	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17152E81 D	Compressive Sensing	• Appreciate the motivation and the necessity for compressed sensing technology. • Design a new algorithm or modify an existing algorithm for different application areas in wireless sensor network.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17152E81 E	Digital Image Processing	• Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			• Operate on images using the techniques of smoothing, sharpening and enhancement. • Understand the restoration concepts and filtering techniques. • Learn the basics of segmentation, features extraction, compression and recognition methods for color models.												
	17152E81 F	Professional Ethics in Engineering	• to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.	☐	☐	☐	☐	✔	✔	✔	✔	✔	✔	☐	✔
	17152E82 _	**Elective – V**													
	17152E82 A	Video Analytics	• Design video analytic algorithms for security applications • Design video analytic algorithms for business intelligence • Design custom made video analytics system for the given target application	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	☐	✔
	17152E82 B	DSP Architecture and Programming	• Analyze the concepts of Digital Signal Processors • Demonstrate their ability to program the DSP processor for signal processing applications • Discuss, compare and select the suitable Advanced DSP Processors for real-time	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	☐	✔

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			signal processing applications												
	17152E82 C	Satellite Communication	• Analyze the satellite orbits • Analyze the earth segment and space segment • Analyze the satellite Link design • Design various satellite applications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17152E82 D	Soft Computing	• Apply suitable soft computing techniques for various applications. • Integrate various soft computing techniques for complex problems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17152E82 E	Principles of Speech Processing	• Design speech compression techniques • Configure speech recognition techniques • Design speaker recognition systems • Design text to speech synthesis systems	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17152E82 F	Fundamentals of Nano Science	• Will familiarize about the science of nanomaterials • Will demonstrate the preparation of nanomaterials • Will develop knowledge in characteristic nanomaterial	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓
	17152P83	Project Work	• apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12
			field of study. • use effectively oral, written and visual communication. • identify, analyze, and solve problems creatively through sustained critical investigation. • integrate information from multiple sources. • demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards. • practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.												
	17152CO MS	COMPS	• The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them	✓	✓	✓	✓	☐	☐	☐	☐	☐	☐	☐	✓

2017 regulation-UG(PT)

Mapping of COs and Pos

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
I	17148S11BP	Transforms and Partial Differential Equations	• Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results. • Have gained a well founded knowledge of Fourier series, their different possible forms and	✔	✔	✔	✔	✔	☐	☐	☐	☐	☐	✔	✔
	17152H12P	Electromagnetic Theory	• analyze fields a potentials due to static changes • evaluate static magnetic fields • understand how materials	✔	✔	✔	✔	✔	✔	☐	☐	☐	☐	✔	✔

			affect electric and magnetic fields • understand the relation between the fields under time varying situations • understand principles of prop													
17152H13P	Digital Electronics		• introduce number systems and codes • introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions • introduce the methods for simplifying Boolean expressions • outline the	✔	✔	✔	✔	✔	✔	☐	☐	☐	☐	✔	✔

Mapping of COs and Pos

			Description												
			formal procedures for the analysis and des												
		17152H14P	Electronic Circuits - I	• The methods of biasing transistors • Design of simple amplifier circuits • Mid – band analysis of amplifier circuits using small - signal equivalent circuits to determine gain input impedance and output impedance • Method of calculating cutoff fre	✓	✓	✓	✓	✓	✓	☐	☐	☐	☐	✓	✓
		17152H15P	Signals and Systems	• To study the properties and representation of discrete and	✓	✓	✓	✓	✓	✓	☐	☐	☐	☐	✓	✓

Mapping of COs and Pos

			continuous signals. • To study the sampling process and analysis of discrete systems using z-transforms. • To study the analysis and synthesis of discrete time systems.• To study the properties												
II	17148S21P	Numerical Methods	• The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where	✓	✓	✓	✓	✓	□	□	□	□	□	✓	✓

			analytical methods fail to give solution. • When huge amounts of experimen													
17152S22P	Electrical Engineering and Control Systems	• To understand the operation of Electrical machines and transformers • To understand the open loop and closed loop (feedback) systems • To understand time domain and frequency domain analysis of control systems required for stability analysis. • To unde	✓	✓	✓	✓	✓	✓	☐	☐	☐	☐	✓	✓
17152H23P	Linear Integrated Circuits	• To introduce the basic building blocks of linear	✓	✓	✓	✓	✓	✓	☐	☐	☐	☐	✓	✓

			integrated circuits. • To teach the linear and non-linear applications of operational amplifiers. • To introduce the theory and applications of analog multipliers and PLL. • To teach the theory of ADC and													
	17152H24P	Electronic Circuits - II	• The advantages and method of analysis of feed back amplifiers • Analysis and design of RC and LC oscillators, tuned amplifiers, wave shaping circuits,	✔	✔	✔	✔	✔	✔	☐	☐	☐	☐	✔	✔

	Code	Course	Outcomes												
			multivibrators, blocking oscillators and time based generators. • The advantages and method of analysi													
	17152H25P	Transmission Lines and Waveguides	• To become familiar with propagation of signals through lines • Understand signal propagation at Radio frequencies • Understand radio propagation in guided systems • To become familiar with resonators • To become familiar with propagation of sig	✔	✔	✔	✔	✔	✔	☐	☐	☐	☐	✔	✔

PRIST
DEEMED TO BE UNIVERSITY
NAAC ACCREDITED
THANJAVUR – 613 403 – TAMIL NADU

School: ENGINEERINGAND TECHNOLOGY
Dept: ECE- BTech (FT)

Mapping of COs and Pos

III	17148S31BP	Probability and Random Processes	• Have a fundamental knowledge of the basic probability concepts. • Have a well – founded knowledge of standard distributions which can describe real life phenomena. • Acquire skills in handling situations involving more than one random variable and funct	✔	✔	✔	✔	✔	□	□	□	□	□	✔	✔
	17152H32P	Microprocessor Interfacing and Applications	• To introduce the architecture and programming of 8085 microprocessor. • To introduce the interfacing	✔	✔	✔	✔	✔	✔	□	□	□	□	✔	✔

Mapping of COs and Pos

			of peripheral devices with 8085 microprocessor. • To introduce the architecture and programming of 8086 microprocessor. • To introduce the applications,												
		17152H33P	Digital Signal Processing	• To study DFT and its computation • To study the design techniques for digital filters • To study the finite word length effects in signal processing • To study the non-parametric methods of power spectrum estimations	✔	✔	✔	✔	✔	✔	□	□	□	□	✔	✔

Mapping of COs and Pos

	Code	Course	Objectives												
			• To study the fundamentals of digit												
	17152H34P	Communication Theory	• To provide various Amplitude modulation and demodulation systems. • To provide various Angle modulation and demodulation systems. • To provide some depth analysis in noise performance of various receiver. • To study some basic information theory with so	✓	✓	✓	✓	✓	✓	☐	☐	☐	☐	✓	✓
	17152L35P	Digital Signal Processing and Microprocessor Lab	• Carryout basic signal processing operations • Design and	✓	✓	✓	✓	✓	✓	☐	☐	☐	☐	✓	✓

			Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals • Interface different I/Os with processor • Generate waveforms using Microprocessors •													
IV	17152H41P	Digital Communication	• To study pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals.• To learn	✔	✔	✔	✔	✔	✔	☐	☐	☐	☐	✔	✔

Mapping of COs and Pos

		baseband pulse transmission, which deals with the transmission of pulse-amplitude, modu												
17152H42P	Antenna and Wave Propagation	• To study radiation from a current element. • To study antenna arrays • To study aperture antennas • To learn special antennas such as frequency independent and broad band antennas. • To study radio wave propagation. • To study radiation from a current e	✔	✔	✔	✔	✔	✔	□	□	□	□	✔	✔

Mapping of COs and Pos

	Code	Course	Objectives												
	17152H43P	Computer Networks	• To introduce the students the functions of different layers. • To introduce IEEE standard employed in computer networking. • To make students to get familiarized with different protocols and network components.• To introduce the students the functions o	✔	✔	✔	✔	✔	✔	☐	☐	☐	☐	✔	✔
	171__E44_P	**Elective-I**													
	17152E44AP	High Speed Networks	• Students will get an introduction about ATM and Frame relay. • Students will be provided with an up-to-	✔	✔	✔	✔	✔	✔	☐	☐	☐	☐	✔	✔

			date survey of developments in High Speed Networks. • Enable the students to know techniques involved to support real-time traffic and congestion cont															
17152E44BP	Advanced Digital Signal Processing		• To study the parametric methods for power spectrum estimation. • To study adaptive filtering techniques using LMS algorithm and to study the applications of adaptive filtering. • To study multirate signal processing	✔	✔	✔	✔	✔	✔							✔	✔

Mapping of COs and Pos

Code	Course	Objectives														
		fundamentals. • To study the analysis														
17152E44CP	Speech Processing	• To introduce the models for speech production • To develop time and frequency domain techniques for estimating speech parameters • To introduce a predictive technique for speech compression • To understand speech recognition, synthesis and speaker ident	✔	✔	✔	✔	✔	✔								✔
17152E44DP	Fuzzy Logic and Neural Networks	• To introduce the ideas of fuzzy sets, fuzzy logic and use of	✔	✔	✔	✔	✔	✔								✔

Mapping of COs and Pos

Course Code	Course Name	CO Description													
		heuristics based on human experience • To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems • To prov													
17152E44EP	Advanced Electronic System Design	• To study RF component such as resonator, filter, transmission lines, etc… • To learn design of RF amplifiers using transistors. • To study modern Power Supplies using SCR and SMPS	✔		✔		✔	✔	✔	✔	✔	✔			✔

		17152L45P	Networks and Communication Lab	technology • To learn about signal shielding & grounding techniques and s													
				• Communicate between two desktop computers • Implement the different protocols • Implement and compare the various routing algorithms • Use the simulation tool. • Simulate & validate the various functional modules of a communication system • Apply variou	✔	✔	✔	✔	✔	✔						✔	✔

Mapping of COs and Pos

V	17152H51P	Optical Communication and Networks	• To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures. • To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. Design optimization o	✔	✔	✔	✔	✔	✔						✔	✔
	17152H52P	Microwave Engineering	• To study passive microwave components and their S-Parameters. • To study Microwave semiconductor devices & applications. • To study	✔	✔	✔	✔	✔	✔						✔	✔

Mapping of COs and Pos

			Microwave sources and amplifiers. • To study passive microwave components and their S-Parameters. • T																
17152H53P	VLSI Design		• To learn the basic CMOS circuits. • To learn the CMOS process technology. • To learn techniques of chip design using programmable devices. • To learn the concepts of designing VLSI subsystems. • To learn the concepts of modeling a digital system	✔	✔	✔	✔	✔	✔								✔	✔	

Mapping of COs and Pos

			using H												
171__E54_P	**Elective II**														
17149E54AP	Environmental Science and Engineering	• Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in standard of living has lead to serious environmental disasters• Public awareness of environmental is a	✔	✔		✔		✔	✔	✔				✔	✔
17152E54BP	Optoelectronic Devices	• To know the basics of solid	✔	✔	✔	✔	✔	✔					✔	✔

			state physics and understand the nature and characteristics of light. • To understand different methods of luminescence, display devices and laser types and their applications. • To learn the principle of optical detection me																
	17152E54CP	Radar and Navigational Aids	• To derive and discuss the Range equation and the nature of detection. • To apply doppler principle to radars and hence detect moving targets, cluster, also to understand	✔	✔	✔	✔	✔	✔							✔	✔

Mapping of COs and Pos

		tracking radars • To refresh principles of antennas and propagation as related to r														
17152E54DP	Digital Image Processing	• To study the image fundamentals and mathematical transforms necessary for image processing. • To study the image enhancement techniques • To study image restoration procedures. • To study the image compression procedures. • To study the image segmentati	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

17152E54EP	Engineering Acoustics	• To provide mathematical basis for acoustics waves • To introduce the concept of radiation reception absorption and attenuation of acoustic waves. • To present the characteristic behaviour of sound in pipes, resonators and filters. • To introduce the pro	✔	✔	✔	✔	✔	✔							✔	✔
17152L55P	Optical Communication and Microwave Lab	• Analyze the performance of simple optical link. • Test microwave and optical components. • Analyse the mode characteristics	✔	✔	✔	✔	✔	✔							✔	✔

			of fiber • Analyse the radiation of pattern of antenna.• Analyze the performance of simple optical link. • Test microwave and op															
VI	17152H61P	Mobile and Wireless Communication	• It deals with the fundamental cellular radio concepts such as frequency reuse and handoff. This also demonstrates the principle of trunking efficiency and how trunking and interference issues between mobile and base stations combine to	✔	✔	✔	✔	✔	✔						✔	✔

			affect the overal															
17152H62P	Medical Electronics		• To study the methods of recording various biopotentials • To study how to measure biochemical and various physiological information • To understand the working of units which will help to restore normal functioning • To understand the use of radiation f	✔	✔	✔	✔	✔									✔	✔
17152H63P	Micro Controller and Embedded systems		• To study 8051 architecture • To write assembly language programming • To study the	✔	✔	✔	✔	✔	✔								✔	✔

			embedded architecture and real time applications. • To study 8051 architecture • To write assembly language programming • To study the embedded architecture and real time													
171__E64_P	**Elective III**														
	17160E64AP	Principles Of Management	• Upon completion of the course, students will be able to have clear understanding • Managerial functions like planning, organizing, staffing, leading &						✔	✔	✔		✔	✔	✔

Mapping of COs and Pos

		controlling and have same basic knowledge on international aspect of management • Upon completion of t													
17152E64BP	Satellite Communication	• Overview of satellite systems in relation to other terrestrial systems. • Study of satellite orbits and launching. • Study of earth segment and space segment components • Study of satellite access by various users. • Study of DTH and compression standar	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	▢	✔	

Mapping of COs and Pos

17152E64CP	Robotics	• The course has been so designed to give the students an overall view of the mechanical components and mathematics associated with the same. • Actuators and sensors necessary for the functioning of the robot. • The course has been so designed to give the	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
17152E64DP	Remote sensing	• Principles of Remote Sensing and GIS • Analysis of RS and GIS data and interpreting the data for	✓	✓	✓	✓	✓	✓					✓	✓

			modeling applications• Principles of Remote Sensing and GIS • Analysis of RS and GIS data and interpreting the data for modeling applications														
17150E64EP	Network Security	• To know the methods of conventional encryption. • To understand the concepts of public key encryption and number theory • To understand authentication and Hash functions • To know the network security tools and	✔	✔	✔	✔	✔	✔							✔	✔

Mapping of COs and Pos

	Code	Subject	Course Outcomes												
			applications. • To understand the system l												
	17152L65P	VLSI and Embedded systems Lab	• Write HDL code for basic as well as advanced digital integrated circuit • Import the logic modules into FPGA Boards • Synthesize Place and Route the digital IPs • Write programs in ARM for a specific Application • Interface memory, A/D and D/A convertor	✓	✓	✓	✓	✓	✓					✓	✓
VII	17160S71P	Total Quality Management	• The student would be able to apply the						✓	✓	✓		✓	✓	✓

Mapping of COs and Pos

Code	Course	Objectives													
		tools and techniques of quality management to manufacturing and services processes.													
17152H72P	Wireless Networks	• To understand physical as wireless MAC layer alternatives techniques. • To learn planning and operation of wireless networks. • To study various wireless LAN and WAN concepts. • To understand WPAN and geo-location systems.	✔	✔	✔	✔	✔							✔	✔
17152H73P	Telecommunication Switching and Networks	• To introduce the concepts of Frequency and Time division	✔	✔	✔	✔	✔							✔	✔

			PO1	PO2	PO3	PO4	PO5	PO6						PSO1	PSO2
		multiplexing. • To introduce digital multiplexing and digital hierarchy namely SONET / SDH • To introduce the concepts of space switching, time switching and combination switching, example of a sw													
171__E74_P	**Elective IV**														
17152E74AP	Power Electronics	• To study about power electronic circuits for voltage and current control and protection. • To learn the switching characteristics	✔	✔	✔	✔	✔	✔						✔	✔

Mapping of COs and Pos

			of transistors and SCRs. Series and parallel functions of SCRs, Programmable triggering methods of SCR. • To learn controll														
17152E74BP	Advanced Microprocessors		• To introduce the concepts in internal programming model of Intel family of microprocessors. • To introduce the programming techniques using MASM, DOS and BIOS function calls. • To introduce the basic architecture of	✔	✔	✔	✔	✔	✔						✔	✔

	Course Code	Course Name	Objectives															
			Pentium family of processors. • To in															
	17152E74CP	Electromagnetic Interference and Compatibility	• To understand EMI Sources, EMI problems and their solution methods in PCB level / Subsystem and system level design. • To measure the emission. immunity level from different systems to couple with the prescribed EMC standards	✓	✓	✓	✓	✓	✓							✓	✓
	17152E74DP	Solid State Electronic Drives	• To learn crystal structures of elements used for fabrication of semiconductor devices. • To study	✓	✓	✓	✓	✓	✓							✓	✓

			energy band structure of semiconductor devices. • To understand fermi levels, movement of charge carriers, Diffusion current and Drift current. • To study														
	17152E74EP	Computer Hardware and Interfacing	• To introduce issues related to CPU and memory. • To understand the components on the motherboard • To understand different storage media • To introduce the features of different I/O peripheral	✔	✔	✔	✔	✔	✔						✔	✔

		devices and their interfaces.													
17152P75P	Project Work & Viva Voce	• apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. •	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE OBJECTIVE B.TECH(F.T) (R-2017)

Course Code	Course Name	Course Outcomes
17147S11	Communicative English	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves. • Their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.
17148S12	Engineering Mathematics - I	• Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
17149S13	Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications, • The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, • The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, • The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and • The students will understand the basics of crystals, their structures and different crystal growth techniques.
17149S14	Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment • Techniques will facilitate better understanding of

		engineering processes and applications for further learning • the students will acquire knowledge on Fe-Fe_3C phase diagram,various microstructures and alloys • the students will get knowledge on mechanical properties of materials and their measurement • the students will gain knowledge on magnetic, dielectric and superconducting properties of materials.
17150S16	Problem Solving And Python Programming	• Develop algorithmic solutions to simple computational problems • Read, write, execute by hand simple Python programs. • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries..
17154S15	Engineering Graphics	• Familiarize with the fundamentals and standards of Engineering graphics • Perform freehand sketching of basic geometrical constructions and multiple views of objects. • Project orthographic projections of lines and plane surfaces. • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.
17150L17	Problem Solving Andpython Programming Lab	• Write, test, and debug simple Python programs. • Implement Python programs with conditionals and loops. • Develop Python programs step-wise by defining functions and calling them. • Use Python lists, tuples, dictionaries for representing compound data. • Read and write data from/to files in Python.
17149L18	Physics And Chemistry Lab	• Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications • The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

171VEA19	Value Education	• To learn about philosophy of Life and Individual qualities • To learn and practice social values and responsibilities • To learn and practice mind culture, forces acting on the body • To learn more of Responsibilities and Rights as Professional and facing Global Challenges • Emerge as responsible citizen with clear conviction to be a role-model in the society.
17147S21	Technical English	• Read technical texts and write area- specific texts effortlessly. • Listen and comprehend lectures and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications. • the students will understand the basics of ceramics, composites and nanomaterials
17148S22A	Engineering Mathematics– Ii	• Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. • Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
17149S23C	Materials Science	• the students will have knowledge on the various phase diagrams and their applications • the students will acquire knowledge on Fe-Fe_3C phase diagram,various microstructures and alloys • the students will get knowledge on mechanical properties of materials and their measurement • the students will gain knowledge on magnetic, dielectric and superconducting properties of materials • the students will understand the basics of ceramics, composites and nanomaterials.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

17149S24A	Environmental Science And Engineering	o <mark>Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection.</mark> o Onewill obtain knowledge on the following after completing the course. o Public awareness of environmental is at infant stage. o Ignorance and incomplete knowledge has lead to misconceptions o Development and improvement in std. of living has lead to serious environmental disasters
17153S25D	Basic Electrical, Electronics And Instrumentation	▪ Understand electric circuits and working principles of electrical machines ▪ Understand the concepts of various electronic devices ▪ Choose appropriate instruments for electrical measurement for a specific application ▪ calculate dynamic forces exerted in rigid body ▪ determine the friction and the effects by the laws of friction
17154S26D	Engineering Mechanics	▪ illustrate the vectorial and scalar representation of forces and moments ▪ analyse the rigid body in equilibrium ▪ evaluate the properties of surfaces and solids ▪ calculate dynamic forces exerted in rigid body ▪ determine the friction and the effects by the laws of friction
17154L27	Engineering Practices Lab	• Fabricate carpentry components and pipe connections including plumbing works. • Use welding equipments to join the structures. • Carry out the basic machining operations • Make the models using sheet metal works • Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings
17153L28D	Basic Electrical, Electronics And Instrumentation Engineering Laboratory	• Ability to determine the speed characteristic of different electrical machines • Ability to design simple circuits involving diodes and transistors • Ability to use operational amplifiers • Measure the electrical quantities • Elaborate on the components, gates, soldering practices.
171ICA29	Fundamentals Of Indian Constitution And Economy	• Understand the emergence and evolution of Indian Constitution. • Understand the structure and composition of Indian Constitution • Understand and analyse federalism in the Indian context. • Understand and analyse the three organs of the

<mark>LOCAL NEEDS</mark>   <mark>REGIONAL NEEDS</mark>   <mark>NATIONAL NEEDS</mark>   <mark>GLOBAL NEEDS</mark>

		• state in the contemporary scenario. • Understand and Evaluate the Indian Political scenario amidst the emerging challenges.
17148S31C	Transforms And Partial Differential Equations	o Understand how to solve the given standard partial differential equations. o Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. o Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations. o Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering. o Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
17154C32	Engineering Thermodynamics	▪ Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions. ▪ Apply second law of thermodynamics to open and closed systems and calculate entropy and availability. ▪ Apply Rankine cycle to steam power plant and compare few cycle improvement methods o Use sheet metal fabrication tools and make simple tray and funnel ▪ Use different moulding tools, patterns and prepare sand moulds.
17152C33	Fluid Mechanics And Machinery	o Apply mathematical knowledge to predict the properties and characteristics of a fluid. o Can analyse and calculate major and minor losses associated with pipe flow in piping networks. o Can mathematically predict the nature of physical quantities o Can critically analyse the performance of pumps o Can critically analyse the performance of turbines.
17152C34	Production Technology – I	o Explain different metal casting processes, associated defects, merits and demerits o Compare different metal joining processes. o Summarize various hot working and cold working methods of metals. o Distinguish various methods of manufacturing plastic components • manufacturing processes.

17152C35	Electrical Drives And Controls	o Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance • sawing and broaching machines. • Explain the types of grinding and other super finishing processes apart from gear • Electrical machining processes. o Summarize numerical control of machine tools and write a part program.
17154L36	Production Technology Laboratory – I	o Demonstrate the safety precautions exercised in the mechanical workshop. o Make the workpiece as per given shape and size using Lathe. o Use sheet metal fabrication tools and make simple tray and funnel o Use different moulding tools, patterns and prepare sand moulds.
17154L37	Computer Aided Machine Drawing	• Ability to perform speed characteristic of different machine drawing o Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes. o Understand the load transferring mechanism in beams and stress distribution due to shear.
17154L38	Electrical Engineering Laboratory	• Ability to perform speed characteristic of different electrical machine • sawing and broaching machines. • Explain the types of grinding and other super finishing processes apart from gear • Electrical machining processes.
17152L39	Interpersonal Skills / Listening & Speaking	o Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills • Make effective presentations.
17148C41D	Statistics And Numerical Methods	o Apply the concept of testing of hypothesis for small and large samples in real life problems. o Apply the basic concepts of classifications of design of experiments in the field of agriculture. o Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. o Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

17152C42	Theory Of Machines-I	o Discuss the basics of mechanism o Calculate velocity and acceleration in simple mechanisms o Develop CAM profiles o Examine friction in machine elements o Analyze and design thin and thick shells for the applied internal and external pressures.
17154C43	Production Technology – Ii	• Explain the mechanism of material removal processes. • Describe the constructional and operational features of centre lathe and other special • purpose lathes. • Describe the constructional and operational features of shaper, planner, milling, drilling, • sawing and broaching machines. • Explain the types of grinding and other super finishing processes apart from gear • Summarize numerical control of machine tools and write a part program.
17152C44	Engineering Metallurgy	o Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification o Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes. o Clarify the effect of alloying elements on ferrous and non-ferrous metals o Summarize the properties and applications of non metallic materials. o Explain the testing of mechanical properties.
17152C45	Strength Of Materials For Mechanical Engineers	o Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes. o Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment. o Apply basic equation of simple torsion in designing of shafts and helical spring o Calculate the slope and deflection in beams using different methods. o Analyze and design thin and thick shells for the applied internal and external pressures.
17149S46	Thermal Engineering - I	o Apply thermodynamic concepts to different air standard cycles and solve problems. o Solve problems in single stage and multistage air compressors o Explain the functioning and features of IC engines, components and auxiliaries. o Explain the flow in Gas turbines and solve problems o Analyze and design thin and thick shells for the

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		applied internal and external pressures.
17152L47	Production Technology Laboratory – Ii	o use different machine tools to manufacturing gears o Ability to use different machine tools to manufacturing gears o Ability to use different machine tools for finishing operations o Ability to manufacture tools using cutter grinder o Develop CNC part programming
17152L48	Strength Of Materials And Fluid Mechanics And Machinery Laboratory	o Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials. Perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials. o Use the measurement equipments for flow measurement. • Perform test on different fluid machinery
17154L 49	Advanced Reading And Writing	• Write winning job applications. • Read and evaluate texts critically. • Display critical thinking in various professional contexts
79152C51	Thermal Engineering – Ii	o Solve problems in Steam Nozzle • Explain the functioning and features of different types of Boilers and auxiliaries and o calculate performance parameters. • Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems • Summarize the concept of Cogeneration, Working features of Heat pumps and HeatExchangers
17152C52	Design Of Machine Elements	• Explain the influence of steady and variable stresses in machine component design. • Apply the concepts of design to temporary and permanent joints. • Apply the concepts of design to energy absorbing members, connecting rod and crank shaft. • apply the concepts of design to worm and bevel gears. • apply the concepts of design to cams, brakes and clutches
17152C53	Metrology And Measurements	o Describe the concepts of measurements to apply in various metrological instruments o Analyze and design thin and thick shells for the applied internal and external pressures. o Outline the principles of linear and angular measurement tools used for industrial Applications o Explain the procedure for conducting computer aided inspection o Discuss various measuring techniques of mechanical properties in industrial applications
17154C54	Theory Of Machines-Ii	o Calculate static and dynamic forces of

		mechanisms
		o Analyze and design thin and thick shells for the applied internal and external pressures.
		o Calculate the balancing masses and their locations of reciprocating and rotating masses.
		o Compute the frequency of forced vibration and damping coefficient.
		o Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes
17154L56	Theory Of Machines Laboratory	• Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.
		• Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds
		• shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.
		• conduct tests to evaluate the performance of parallel/counter flow heat exchanger
		• apparatus and reciprocating air compressor.
17152L57	Thermal Engineering Laboratory	• conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.
		• conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.
		• conduct tests to evaluate the performance of parallel/counter flow heat exchanger
		• apparatus and reciprocating air compressor.
		• conduct tests to evaluate the performance of refrigeration and airconditioning test rigs
17152L58	Metrology And Measurements Laboratory	• Measure the gear tooth dimensions, angle using sine bar, straightness and flatness,thread parameters, temperature using thermocouple, force, displacement, torque and vibration.
		• Calibrate the vernier, micrometer and slip gauges and setting up the comparator for the
		• inspection.
17152CRM	Research Methodology	• Understand the approaches towards and constraints in good research.Use the statistical tools used in research methodology
		• Compose the manuscript for publication
		• Obtain computational and excel- skills for research in engineering
17152C61	Design Of Transmission Systems	o apply the concepts of design to belts, chains and rope drives.
		o apply the concepts of design to spur, helical gears.
		o apply the concepts of design to worm and bevel gears.
		o apply the concepts of design to cams, brakes and clutches

		• Apply the concepts of design to temporary and permanent joints.
17152C62	Computer Aided Design And Manufacturing	o Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics o Explain the fundamentals of parametric curves, surfaces and Solids o Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines o Summarize the different types of techniques used in Cellular Manufacturing and FMS o Demonstrate manual part programming with G and M codes using CAM
17152C63	Heat And Mass Transfer	• Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems • Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems • Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications • Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems • Summarize the concept of Cogeneration, Working features of Heat pumps and HeatExchangers
17152S64	Finite Element Analysis	o Summarize the basics of finite element formulation. o Apply finite element formulations to solve one dimensional Problems. o Apply finite element formulations to solve two dimensional scalar Problems. o Apply finite element method to solve two dimensional Vector problems. o Apply finite element method to solve problems on iso parametric element and dynamic Problems.
17152C65	Hydraulics And Pneumatics	o Explain the Fluid power and operation of different types of pumps. o Summarize the features and functions of Hydraulic motors, actuators and Flow control Valves o Explain the different types of Hydraulic circuits and systems o Explain the working of different pneumatic circuits and systems o Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.
17152L67	Cad / Cam Laboratory	o Draw 3D and Assembly drawing using CAD software

		o Demonstrate manual part programming with G and M codes using CAM
17154L68	Design And Fabrication Project	o design and Fabricate the machine element or the mechanical product. o demonstrate the working model of the machine element or the mechanical product.
17154L69	Professional Communication	• Make effective presentations • Participate confidently in Group Discussions. • Attend job interviews and be successful in them. • Develop adequate Soft Skills required for the workplace
17152CBR	Participation In Bounded Research	• Hands on exposure to problem solving tools in contemporary research • Evolve research intuitiveness and orientation • Familiarize with cutting edge research trends
17152C71	Power Plant Engineering	o Explain the layout, construction and working of the components inside a thermal power plant. o Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants. o Explain the layout, construction and working of the components inside nuclear power plants. o Explain the layout, construction and working of the components inside Renewable energy power plants. o Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.
17152C72	Process Planning And Cost Estimation	o select the process, equipment and tools for various industrial products. o prepare process planning activity chart. o explain the concept of cost estimation. o compute the job order cost for different type of shop floor. o calculate the machining time for various machining operations.
17152C73	Mechatronics	o Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical and o Computer Systems for the Control of Mechanical, Electronic Systems and sensor technology. o Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing o Modes of Microprocessor and Microcontroller. o Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device Interfacing
17154L77	Simulation And	o simulate the working principle of air

	Analysis Laboratory	conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB. o analyze the stresses and strains induced in plates, brackets and beams and heat transfer o problems. o calculate the natural frequency and mode shape analysis of 2D components and beams. o Explain the architecture, programming and application of programmable logic controllers
17152L78	Mechatronics Laboratory	o Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic o and electrical systems. o Demonstrate the functioning of control systems with the help of PLC and microcontrollers. o to problems and challenges in the areas of Mechatronic engineering. o Discuss various Actuators and Mechatronics system using the knowledge and skills
17152CSR	Design/Socio Technical Project	• Sensitive to social needs for innovation • Develop teams and work towards interdisciplinary synchronous research strategy • Develop critical thinking and synergistic research approach.
17152P83	Project Work	• apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.
17152COMS	Comps	• The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them
17152E56A	Automobile Engineering	o recognize the various parts of the automobile and their functions and materials. o discuss the engine auxiliary systems and engine emission control. o distinguish the working of different types of transmission systems. o explain the Steering, Brakes and Suspension Systems. o predict possible alternate sources of energy for IC Engines.
17154E66B	Welding Technology	o Understand the construction and working principles of gas and arc welding process. o Understand the construction and working principles of resistance welding process. o Understand the construction and working

		o Understand the construction and working principles of various solid state welding process. o Understand the construction and working principles of various special welding processes. o Understand the concepts on weld joint design, weldability and testing of weldments.
17154E66C	Gas Dynamics And Jet Propulsion	o Apply the concept of compressible flows in constant area ducts. o examine the effect of compression and expansion waves in compressible flow. o use the concept of gas dynamics in Jet Propulsion. o apply the concept of gas dynamics in Space Propulsion. o acquired through the course and also from the given case studies
17154E66D	Intellectual Property Rights	o Ability to manage Intellectual Property portfolio to enhance the value of the firm o Summarize the concept of Quality and Process control for variables o Apply the process control for attributes o Explain the concept of sampling and to solve problems o Explain the concept of Life testing
17154E66E	Fundamentals Of Nanoscience	• Will familiarize about the science of nanomaterials • Will demonstrate the preparation of nanomaterials • Will develop knowledge in characteristic nanomaterial o Understand the construction and working principles of various special welding processes. • Understand the concepts on weld joint design, weldability and testing of weldments.
17154E74A	Refrigeration And Air Conditioning	o Explain the basic concepts of Refrigeration o Explain the Vapor compression Refrigeration systems and to solve problems o Discuss the various types of Refrigeration systems o Calculate the Psychrometric properties and its use in psychrometric processes o Explain the concepts of Air conditioning and to solve problems
17154E74B	Renewable Sources Of Energy	o Discuss the importance and Economics of renewable Energy o Discuss the method of power generation from Solar Energy o Discuss the method of power generation from Wind Energy o Explain the method of power generation from Bio Energy o Explain the Tidal energy, Wave Energy, OTEC,

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Hydro energy, Geothermal Energy, Fuel Cells and Hybrid Systems.
17154E74C	Quality Control And Reliability Engineering	o Summarize the concept of Quality and Process control for variables o Apply the process control for attributes o Explain the concept of sampling and to solve problems o Explain the concept of Life testing o Explain the concept Reliability and techniques involved
17154E74D	Unconventional Machining Processes	o Explain the need for unconventional machining processes and its classification o Compare various thermal energy and electrical energy based unconventional machining processes. o Summarize various chemical and electro-chemical energy based unconventional machining processes. o Explain various nano abrasives based unconventional machining processes. o Distinguish various recent trends based unconventional machining processes.
17154E74E	Operations Research	o Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems
17154E74F	Additive Manufacturing	o On completion of this course, students will learn about a working principle o construction of Additive Manufacturing technologies, their potential to support design and manufacturing, o modern development in additive manufacturing process and case studies relevant to mass customized manufacturing o Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots. o Analyze Flow field problems
17154E74G	Total Quality Management	o The student would be able to apply the tools and techniques of quality management to manufacturing and services processes o Apply the process control for attributes o Explain the concept of sampling and to solve problems o Explain the concept of Life testing o Explain the concept Reliability and techniques involved
17154E76A	Robotics	o Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors.

		o Illustrate the different types of robot drive systems as well as robot end effectors.
		o Apply the different sensors and image processing techniques in robotics to improve the
		o ability of robots.
		o Develop robotic programs for different tasks and familiarize with the kinematics motions of robot.
17154E76B	Design Of Jigs, Fixtures And Press Tools	o Summarize the different methods of Locating Jigs and Fixtures and Clamping principles
		o Design and develop jigs and fixtures for given component
		o Discuss the press working terminologies and elements of cutting dies
		o Distinguish between Bending and Drawing dies.
		o Discuss the different types of forming techniques
17154E76C	Computational Fluid Dynamics	o Derive the governing equations and boundary conditions for Fluid dynamics
		o Analyze Finite difference and Finite volume methods for Diffusion
		o Analyze Finite volume method for Convective diffusion
		o Analyze Flow field problems
		o Explain and solve the Turbulence models and Mesh generation techniques
17154E76D	Non Destructive Testing And Evaluation	o Explain the fundamental concepts of NDT
		o Discuss the different methods of NDE
		o Explain the concept of Thermography and Eddy current testing
		o Explain the concept of Ultrasonic Testing and Acoustic Emission
		o Explain the concept of Radiography
17154E76E	Composite Materials And Mechanics	o Summarize the various types of Fibers, Equations and manufacturing methods for Composite materials
		o Derive Flat plate Laminate equations
		o Analyze Lamina strength
		o Analyze the thermal behavior of Composite laminates
		o Analyze Laminate flat plates
17154E76F	Human Rights	• Engineering students will acquire the basic knowledge of human rights
		o Explain the concept of sampling and to solve problems
		o Explain the concept of Life testing
		• Explain the concept Reliability and techniques involved
		o Discuss the press working terminologies and elements of cutting dies
17154E76G	Disaster Management	• Differentiate the types of disasters, causes and their impact on environment and society
		• Assess vulnerability and various methods of risk

		• Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.
17154E82A	Production Planning And Control	▪ Upon completion of this course, the students can able to prepare production planning and control activities ▪ work study, product planning, production scheduling, Inventory Control. ▪ They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP). o Compare various thermal energy and electrical energy based unconventional machining processes. ▪ Summarize various chemical and electro-chemical energy based unconventional machining processes
17154E82B	Entrepreneurship Development	• Differentiate the types of disasters, causes and their impact on environment and society • Assess vulnerability and various methods of risk reduction measures as well as mitigation. • Draw the hazard and vulnerability profile of India, Scenarios in the Indian context • Disaster damage assessment and management. o Classification of robots used in industrial applications
17154E82C	Computer Integrated Manufacturing Systems	o Explain the basic concepts of CAD, CAM and computer integrated manufacturing Systems o Summarize the production planning and control and computerized process planning o Differentiate the different coding systems used in group technology o Explain the concepts of flexible manufacturing system (FMS) o automated guided vehicle (AGV) system
17154E82D	Vibration And Noise Control	o Summarize the Basics of Vibration o Summarize the Basics of Noise o Explain the Sources of Automotive Noise o Discuss the Control techniques for vibration o Describe the sources and control of Noise
17154E82E	Micro Electro Mechanical Systems	• Ability to understand and apply basic science, circuit theory • Electro-magnetic field theory control theory and apply them to electrical engineering problems. o Ability to understand and analyse, linear and digital electronic circuits o Choose the appropriate technologies, algorithms

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		and approaches for implementation and use of cloud.
17154E82F	Professional Ethics In Engineering	• Upon completion of the course, the student should be able to apply ethics in society • discuss the ethical issues related to engineering and realize the responsibilities and rights in the society o Explain the concept of sampling and to solve problems o Explain the concept of Life testing o Explain the concept Reliability and techniques involved
17150FE54A	Database Management Systems	• Understand relational data model, evolve conceptual model of a given problem, its mapping to relational model and Normalization • Query the relational database and write programs with database connectivity • Understand the concepts of database security and information retrieval systems • Be able to install and use current cloud technologies. • Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.
17150FE54B	Cloud Computing	• Articulate the main concepts, key technologies, strengths and limitations of cloud computing. • Learn the key and enabling technologies that help in the development of cloud. • Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models. • Explain the core issues of cloud computing such as resource management and security.
17153FE54A	Industrial Nano Technology	• To possess knowledge on nanotechnology based applications in each industry • To provide details of contemporary industrial applications of nanotechnology • To provide an overview of future technological advancements and increasing role of nanotechnology in each industry • Ability to select control equipments. • Ability to ensure quality, control and preventive measures.
17153FE54B	Energy Conservation And Management	• Can carry out energy accounting and balancing • Can suggest methodologies for energy savings

Code	Course	Outcomes
		• Ability to understand the stand alone and grid connected renewable energy systems.
		• Ability to design of power converters for renewable energy applications.
		• Ability to acquire knowledge on wind electrical generators and solar energy systems.
17154FE54A	Renewable Energy Sources	• Understanding the physics of solar radiation.
		• Ability to classify the solar energy collectors and methodologies of storing solar energy.
		• Knowledge in applying solar energy in a useful way.
		• Knowledge in wind energy and biomass with its economic aspects.
		• Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.
17154FE54B	Automotive Systems	• Identify the different components in automobile engineering.
		• Have clear understanding on different auxiliary and transmission systems usual.
		• distinguish the working of different types of transmission systems.
		• explain the Steering, Brakes and Suspension Systems.
		• discuss the engine auxiliary systems and engine emission control.
17155FE54	Air Pollution And Control Engineering	• An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
		• Ability to identify, formulate and solve air and noise pollution problems
		• Ability to design stacks and particulate air pollution control devices to meet applicable standards.
		• Ability to select control equipments.
		• Ability to ensure quality, control and preventive measures.
17155FE54B	Geographic Information System	• Have basic idea about the fundamentals of GIS.
		• Understand the types of data models.
		• Get knowledge about data input and topology.
		• Gain knowledge on data quality and standards.
		• Understand data management functions and data output
17150FE74A	Introduction To C Programming	• Develop simple applications using basic constructs
		• Develop applications using arrays and strings

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Write, test, and debug simple Python programs. • Implement Python programs with conditionals and loops. • Develop Python programs step-wise by defining functions and calling them.
17150FE74B	Data Structures And Algorithms	• Implement linear data structures and solve problems using them. • Implement and apply trees and graphs to solve problems. • Implement the various searching and sorting algorithms. • Use Python lists, tuples, dictionaries for representing compound data. • Read and write data from/to files in Python.
17153FE74A	Basic Circuit Theory	• Ability to introduce electric circuits and its analysis • Ability to impart knowledge on solving circuit equations using network theorems • Ability to introduce the phenomenon of resonance in coupled circuits. • Ability to introduce Phasor diagrams and analysis of three phase circuits
17153FE74B	Introduction To Renewable Energy Systems	• Ability to understand and analyze power system operation, stability, control and protection. • Ability to handle the engineering aspects of electrical energy generation and utilization. • Ability to understand the stand alone and grid connected renewable energy systems. • Ability to design of power converters for renewable energy applications. • Ability to acquire knowledge on wind electrical generators and solar energy systems. • Ability to design power converters used for hybrid renewable energy systems.
17154FE74A	Industrial Safety	• identify and prevent chemical, environmental mechanical, fire hazard through analysis • Apply proper safety techniques on safety engineering and management. o Explain the layout, construction and working of the components inside a thermal power plant. o Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
17154FE74B	Testing Of Materials	• Identify suitable testing technique to inspect industrial component • Ability to use the different technique and know its applications and limitations o Explain the concept of Life testing

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Explain the concept Reliability and techniques involved • Discuss the press working terminologies and elements of cutting dies
17155FE74A	Green Building Design	• Identify existing energy codes, green building codes and green rating systems. • Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design. • Identify and use construction materials and methods that more easily allow for salvage and re-use of building materials. • Understand the techniques and benefits of building performance testing, monitoring and metering. • Identify and make use of techniques for weatherization and sustainable remodeling of existing structures
17155FE74B	Waste Water Treatment	• Will have knowledge about adsorption and oxidation process. • Will gain idea about various methods available for water treatment. • Will appreciate the necessity of water and acquire knowledge of preliminary treatment. • Ability to design stacks and particulate air pollution control devices to meet applicable standards. • Ability to select control equipments.

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE OBJECTIVE B.TECH(P.T) (R-2017)

Course Code	Course Name	Course Outcomes
17148C11P	Transforms & Partial Differential Equations	• Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. • Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results. • Have gained a well founded knowledge of Fourier series, their different possible forms and the frequently needed practical harmonic analysis that an engineer may have to make from discrete data. • Have obtained capacity to formulate and identify certain boundary value problems encountered in engineering practices, decide on applicability of the Fourier series method of solution, solve them and interpret the results. • Have grasped the concept of expression of a function, under certain conditions, as a double integral leading to identification of transform pair, and specialization on Fourier transform pair, their properties, the possible special cases with attention to their applications.
17153C12P	Electrical Drives And Controls	• Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance • Explain the working principle and applications of electrical machines • Analyze the characteristics of analog electronic devices • Explain the basic concepts of digital electronics • Explain the operating principles of measuring instruments
17154C13P	Engineering Thermodynamics	• Apply the first law of thermodynamics for simple open and closed systems under steady • unsteady conditions. • Apply second law of thermodynamics to open and closed systems • calculate entropy and availability. • Apply Rankine cycle to steam power plant and compare few cycle improvement methods
17154C14P	Fluid Mechanics And Machinery	• Apply mathematical knowledge to predict the properties and characteristics of a fluid.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Can analyse and calculate major and minor losses associated with pipe flow in piping networks.
		• Can mathematically predict the nature of physical quantities
		• Can critically analyse the performance of pumps
		• Can critically analyse the performance of turbines.
17154C15P	Foundry And Welding Technology	• Apply mathematical knowledge to predict the properties and characteristics of a fluid.
		• Can analyse and calculate major and minor losses associated with pipe flow in piping networks.
		• Can mathematically predict the nature of physical quantities
		• Can critically analyse the performance of pumps
		• Can critically analyse the performance of turbines.
17148S21P	Numerical Methods	• The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where analytical methods fail to give solution.
		• When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.
		• The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.
		• Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.
17153C22	Electronics And Microprocessors	• Understand the current voltage characteristics of semiconductor devices,
		• Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation,

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

| | | • Design and analyze of electronic circuits, |
| | | • Evaluate frequency response |
		• To understand behavior of Electronics circuits
17154C23P	Thermal Engineering	• Apply thermodynamic concepts to different air standard cycles and solve problems. • Solve problems in single stage and multistage air compressors • Explain the functioning and features of IC engines, components and auxiliaries. • Calculate performance parameters of IC Engines. • Explain the flow in Gas turbines and solve problems.
17154C24P	Strength Of Materials	• Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes. • Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment. • Apply basic equation of simple torsion in designing of shafts and helical spring • Calculate the slope and deflection in beams using different methods. • Analyze and design thin and thick shells for the applied internal and external pressures.
17154C25P	Engineering Materials And Metallurgy	• Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification. • Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes. • Clarify the effect of alloying elements on ferrous and non-ferrous metals • Summarize the properties and applications of non metallic materials. • Explain the testing of mechanical properties. .
17148S31CP	Probability And Statistics	o Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. o Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. • Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. • Be capable of mathematically formulating certain practical problems in terms of partial

		differential equations, solve them and physically interpret the results. • Have gained a well founded knowledge of Fourier series, their different possible forms and the frequently needed practical harmonic analysis that an engineer may have to make from discrete data.
17154C32P	Kinematics Of Machinery	• Discuss the basics of mechanism • Calculate velocity and acceleration in simple mechanisms • Develop CAM profiles • Solve problems on gears and gear trains • Examine friction in machine elements
17154C33P	Machine Tool Technology	• Explain the mechanism of material removal processes. • Describe the constructional and operational features of centre lathe and other special purpose lathes. • Describe the constructional and operational features of shaper, planner, milling, drilling, • sawing and broaching machines. • Explain the types of grinding and other super finishing processes apart from gear manufacturing processes. • Summarize numerical control of machine tools and write a part program.
17154C34P	Engineering Metrology And Measurements	• Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification. • Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes. • Clarify the effect of alloying elements on ferrous and non-ferrous metals • Summarize the properties and applications of non metallic materials. • Explain the testing of mechanical properties. .
17154L35P	Computer Aided Simulation And Analysis Laboratory	• simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder • Cam follower mechanisms using MATLAB. • analyze the stresses and strains induced in plates, brackets and beams and heat transfer analysi • problems mode shape analysis of 3D components and beams • calculate the natural frequency and mode shape analysis of 2D components and beams.
17154C41P	Power Plant	• Explain the layout, construction and working

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

	Engineering	• of the components inside a thermal power plant. • Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants. • Explain the layout, construction and working of the components inside nuclear power plants. • Explain the layout, construction and working of the components inside Renewable energy power plants. • Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.
17154C42P	Dynamics Of Machinery	• simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder • Cam follower mechanisms using MATLAB. • analyze the stresses and strains induced in plates, brackets and beams and heat transfer analysi • problems mode shape analysis of 3D components and beams • calculate the natural frequency and mode shape analysis of 2D components and beams.
17154C43P	Design Of Machine Elements	• simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder • Cam follower mechanisms using MATLAB. • analyze the stresses and strains induced in plates, brackets and beams and heat transfer analysi • problems mode shape analysis of 3D components and beams • calculate the natural frequency and mode shape analysis of 2D components and beams.
17154L45P	Dynamics Laboratory	• Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of labequipments. • Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency • Damping coefficient, torsional frequency, critical speeds of shafts, • Balancing mass of rotating and reciprocating masses, and transmissibility ratio.
17154C51P	Heat And Mass	• Apply heat conduction equations to different

	Transfer	surface configurations under steady state and transient conditions and solve problems
		• Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
		• Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems
		• Explain basic laws for Radiation and apply these principles to radiative heat transfer
		• Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications
17154C52P	Design Of Transmission Systems	• apply the concepts of design to belts, chains and rope drives.
		• apply the concepts of design to spur, helical gears.
		• apply the concepts of design to worm and bevel gears.
		• apply the concepts of design to gear boxes .
		• apply the concepts of design to cams, brakes and clutches
17154C53P	Automobile Engineering	• discuss the engine auxiliary systems and engine emission control.
		• distinguish the working of different types of transmission systems.
		• explain the Steering, Brakes and Suspension Systems.
		• predict possible alternate sources of energy for IC Engines.
		• Acquired through the course and also from the given case studies
17154L55P	Heat Transfer Laboratory	• conduct tests on natural and forced convective heat transfer apparatus .
		• evaluate heat transfer coefficient.
		• conduct tests to evaluate the performance of parallel/counter flow heat exchanger
		• apparatus and reciprocating air compressor.
		• conduct tests to evaluate the performance of refrigeration and airconditioning test rigs
17158E54AP	Environmental Science And Engineering	• Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection.
		• One will obtain knowledge on the following after completing the course.
		• Public awareness of environmental is at infant stage.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in std. of living has lead to serious environmental disasters
17154E54BP	Composite Materials	• Summarize the various types of Fibers, Equations • manufacturing methods for Composite materials • Derive Flat plate Laminate equations • Analyze Lamina strength
17154C61P	Finite Elements Analysis	• Summarize the basics of finite element formulation. • Apply finite element formulations to solve one dimensional Problems. • Apply finite element formulations to solve two dimensional scalar Problems. • Apply finite element method to solve two dimensional Vector problems. • Apply finite element method to solve problems on iso parametric element and dynamic Problems.
17154C62P	Mechatronics	• Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical and Computer Systems for the Control of Mechanical, Electronic Systems and sensor technology. • Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing • Modes of Microprocessor and Microcontroller. • Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device Interfacing • Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.
17154C63P	Computer Integrated Manufacturing	• Explain the basic concepts of CAD, CAM and computer integrated manufacturing Systems • Summarize the production planning and control and computerized process planning • Differentiate the different coding systems used in group technology • Explain the concepts of flexible manufacturing system (FMS) and automated guided vehicle (AGV) system • Classification of robots used in industrial applications
17160E64AP	Principles Of	• Upon completion of the course, students

	Management	- will be able to have clear understanding of managerial functions like planning, organizing, staffing, - leading & controlling and have same basic knowledge on international aspect of management - The student would be able to apply the tools and techniques of quality management. - discuss the engine auxiliary systems and engine emission control. - distinguish the working of different types of transmission systems
17154E64BP	Nuclear Engineering	- Apply relativistic transformations of length, time, velocity and momentum (Lorentz transformations), expression for relativistic energy. Use these concepts to solve problems. - Understand basic nomenclature of nuclear physics, including how to find information on the Chart of the Nuclides, X Y reaction notation, and radioactive decay types. to calculate the energy released in nuclear reactions. - Compute decay constants from half-life and vice versa. Write decay equations, including decay with production, and solve the Bateman equations for simple decay chains.Describe the natural decay chains and environmental radiation. - Define basic nuclear terminology and describe the breadth of current and potential nuclear applications, including fission power, medical diagnostic systems and cancer treatment, and fusion systems. - Define the concept of cross-section, and define the concept of probability of interaction per unit path length (macroscopic cross section). Compute macroscopic cross-section of mixtures.
17154E64CP	Thermal Turbo Machines	- Each individual should be capable of analysing the physical flow situation of the problem at hand - Arrive at the governing equations. - Obtain analytical solution to linear and non-linear differential fluid flow governing equations for one dimension and two dimension flows, - Analytical solution to incompressible as well as compressible fluid. - Identification of flows likely to have shock and to develop tools to evaluate the shock region.
17148E64DP	Mathematics For	To possess knowledge on nanotechnology based

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

	Industrial Operations	applications in each industry • To provide details of contemporary industrial applications of nanotechnology • To provide an overview of future technological advancements and increasing role of nanotechnology in each industry • Ability to select control equipments. • Ability to ensure quality, control and preventive measures.
17154L65P	Mechatronics Laboratory	o Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic o and electrical systems. o Demonstrate the functioning of control systems with the help of PLC and microcontrollers. o to problems and challenges in the areas of Mechatronic engineering. o Discuss various Actuators and Mechatronics system using the knowledge and skills
17160S71P	Total Quality Management	• The student would be able to apply the tools and techniques of quality management. • discuss the engine auxiliary systems and engine emission control. • distinguish the working of different types of transmission systems. • Manufacturing and services processes. • practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.
17154C72P	Process Planning And Cost Estimation	• select the process, equipment and tools for various industrial products. • prepare process planning activity chart. • explain the concept of cost estimation. • compute the for different type of shop floor. • compute the for different type of job order cost
17154C73P	Applied Hydraulics And Pneumatics	• Apply the working principles of fluid power systems and hydraulic pumps. • Apply the working principles of hydraulic actuators and control components. • Design and develop hydraulic circuits and systems. • Apply the working principles of pneumatic circuits and power system and its components. • Identify various troubles shooting methods in fluid power systems.
17160E74AP	Quality Control And Reliability Engineering	• Summarize the concept of Quality and Process control for variables • Apply the process control for attributes • Explain the concept of sampling and to solve

		• problems • Explain the concept of Life testing • Explain the concept Reliability and techniques involved
17154E74BP	Vibration And Noise Control	• Summarize the Basics of Vibration • Summarize the Basics of Noise • Explain the Sources of Automotive Noise • Discuss the Control techniques for vibration • Describe the sources and control of Noise
17154E74DP	Industrial Engineering	• An ability to apply knowledge of mathematics, science, and engineering; An ability to design and conduct experiments, as well as to analyze and interpret data; • An ability design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;An ability to function on a multidisciplinary team; • An ability to identify, formulate, and solve engineering problems;An understanding of professional and ethical responsibility;An ability to communicate effectively; • The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social context; • An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
17154P75P	Project Work	• apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.use effectively oral, written and visual communication. • identify, analyze, and solve problems creatively through sustained critical investigation. • integrate information from multiple sources. • demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.
17154E44AP	Gas Dynamics And Jet Propulsion	• Apply the concept of compressible flows in variable area ducts.

		• Apply the concept of compressible flows in constant area ducts. • examine the effect of compression and expansion waves in compressible flow. • use the concept of gas dynamics in Jet Propulsion. • apply the concept of gas dynamics in Space Propulsion.
17154E44BP	Refrigeration And Air Conditioning	• Explain the basic concepts of Refrigeration • Explain the Vapor compression Refrigeration systems and to solve problems • Discuss the various types of Refrigeration systems • Calculate the Psychrometric properties and its use in psychrometric processes • Explain the concepts of Air conditioning and to solve problems
17160E44CP	Marketing Management	• Students will demonstrate strong conceptual knowledge in the functional area of marketing management. • Students will demonstrate effective understanding of relevant functional areas • marketing management and its application. • Students will demonstrate analytical skills in identification • Resolution of problems pertaining to marketing management. •
17154E44DP	Renewable Sources Of Energy	• Discuss the method of power generation from Solar Energy • Discuss the method of power generation from Wind Energy • Explain the method of power generation from Bio Energy • Explain the Tidal energy, Wave Energy, OTEC, Hydro energy, Geothermal Energy, Fuel Cells and Hybrid Systems.
17154E54CP	Robotics	• State the basic concepts and terminologies of robots • Know the Procedures for Forward and Inverse Kinematics, Dynamics for Various Robots • Derive the Forward and Inverse Kinematics, Dynamics for Various Robots • Apply the various programming techniques in industrial applications • Analyze the use of various types of robots in different applications
17154E54DP	Design Of Jigs, Fixtures And Press Tools	• Summarize the different methods of Locating Jigs and Fixtures and Clamping principles • Design and develop jigs and fixtures for given

		component
		• Discuss the press working terminologies and elements of cutting dies
		• Distinguish between Bending and Drawing dies.
		• Discuss the different types of forming techniques
17154E74CP	Unconventional Machining Process	• Explain the need for unconventional machining processes and its classification
		• Compare various thermal energy and electrical energy based unconventional machining processes.
		• Summarize various chemical and electro-chemical energy based unconventional machining processes.
		• Explain various nano abrasives based unconventional machining processes.
		• Distinguish various recent trends based unconventional machining processes.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE OBJECTIVE M.TECH(F.T) (R-2017)

Course code	Course name	Course outcomes
17248S11E	Advanced Engineering Mathematics	• Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems. • Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications. • Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in quality control systems. • Find the point and interval estimates, derive confidence intervals and understand the methods of estimation and analyze data statistically and interpretation of the results in inventory control and knowledge to ANOVA: One – way, Two – way with/without interactions, Latin Squares ANOVA technique. Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control.
17254C12	Theory of Metal Cutting	• Understand the basic structures of concept of tools and tool materials and Apply cutting mechanics to metal machining based on cutting force and power consumption. • Impart fundamental knowledge about forces and chips formed during the metal machining process. • Impart fundamental knowledge on tool materials, tool life, cutting fluids and tool wear mechanisms • Distinguish between orthogonal and oblique cutting and Understand the Heat distribution during machining. • Learn Importance of
17254C13	Advanced Manufacturing Processes	• Understand the basic structures of cutting tool materials and cutting parameters in non thermal energy advanced machining processes. • Understand the various input and output parameters that influence in the performance of newer electric energy based advanced machining processes. • Impart the knowledge about laser beam, electron beam, and Ion beam types advanced machining process and its characteristics.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Ability to understand the operation of micro devices, micro systems and their applications. • Ability to design the micro devices, micro systems using the micro fabrication process.
17254C14	Mechanical Metallurgy	• Understand the mechanical behavior of metals; • Protect the metals from hardness and toughness • Understand the environmental factors affecting the mechanical behavior of materials by fatigue damage. • Evaluate the high temperature properties of metals and fracture behavior of metals. • Design the metals for specific applications by creep behavior.
17254C15	Automated Computer Integrated Manufacturing Systems	• Become familiar on the basic concepts of Cad, Cam & Computer Integrated Manufacturing and its importance in the global competitive market. • Understand the material transfer mechanism in automated manufacturing, anatomy of industrial robots and their application in various areas of automated manufacturing and storage systems used • Understand the usage of group technology concept and clustering algorithms in modern manufacturing systems and Understand the concepts of Flexible manufacturing system. • Make the students to get knowledge about Computer Aided Process Planning approaches. • Get familiarizes with the concepts process control and monitoring and automatic data capture techniques.
17254CRS	Research Led Seminar	• The students will be getting the training to face the audience and to interact with the audience with confidence. • To tackle any problem during group discussion in the corporate interviews. • Generate ideas on how to build the research based teaching and to create a research-based learning environment. • This includes both research-oriented didactics and teaching students to use investigative approaches. • Analyze national frameworks, policies and funding that may help or hinder the development of research-based teaching in diverse types of institutions.
17254L19	CIM Lab	• Use parametric 3D CAD software tools in the correct manner for making geometric part models, assemblies

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• automated drawings of mechanical components and assemblies.
		• Evaluate design, analyze and optimize using commercial CAD, CAE software as black box for required mass properties/ stress, deflection / temperature distribution etc. under realistic loading and constraining conditions
		• Apply the concepts of machining for the purpose of selection of appropriate machining centers, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program
		• operate CNC milling and turning equipment.
17254C21	Production Management	• Develop knowledge on decision making and forecasting the role of a materials manager in an organization. • Develop aggregate capacity plans in operation environments. • Shall be able to manage the activities of materials manager like purchasing, inventory analysis, storage etc. in a scientific manner. • Shall be able to practice material planning through modern materials management tools like JIT. • Able to prepare job shop scheduling.
17254C22	MEMS and Nano Technology	• The students are expected to understand MEMS and Students will able to design MEMS and apply knowledge of Nano-technology • Students will be able to explain about fabrication processes and levels of micro system packaging • Students will be able to explain micro sensors, micro-actuators, their types and applications Students get knowledge about Nano materials and various Nano measurements and to familiarize about various equipments. • Bring out the importance of material characterization and various methods and Students will able to select special materials for MEMS • Students will able to calculate the static and dynamic behavior of simple mechanical Microsystems, e.g. cantilevers and membranes Students will able to perform special Nano finishing techniques
17254C23	Manufacturing Metrology and Quality Control	• Understand the methods of measurement and selection of measuring instruments ,standards of measurement • Identify and apply various measuring instruments • Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design • Recommend the Quality Control Techniques and

		Statistical Tools appropriately Analyze the Data collected
		• Develop an ability of problem solving and decision making by identifying and analyzing the cause for variation and recommend suitable corrective actions for quality improvement
17254L26	Automation Lab	• Study of sensors, Hydraulic and Pneumatic actuators and experimentation of its characterization for industrial applications. • Develop an understanding of plc ladder diagram related to industrial automation systems and measure its performance. • Develop ability to take measurements of speed , vibrations etc., • Develop pneumatic circuit /hydraulic circuit for industrial applications and measure its performance • Study of data acquisition system and its industrial applications
17254CRM	Research Methodology	• Discuss research methodology concepts, research problems, research designs, thesis preparations, publications and research methods. • Analyze and evaluate research works and to formulate a research problem to pursue research • Prepare a thesis or a technical paper, and present or publish them • Apply the various research methods followed in engineering research for formulation and • Design of own research problems and to utilize them in their research project.
17254CBR	Participation in Bounded Research	• Hands on exposure to problem solving tools in contemporary research • Evolve research intuitiveness and orientation • Familiarize with cutting edge research trends • An understanding of professional and ethical responsibility and communicate effectively.
172TECWR	Technical Writing/Seminar	• Participate actively in writing activities that model effective scientific and technical communication in the workplace. • Understand how to apply technical information and knowledge in practical documents. • Practice the unique qualities of professional writing style, including sentence conciseness, readability, clarity, accuracy, honesty, etc., • Collect, analyze, document, and report research clearly, concisely, logically, and ethically.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Develop professional work habits, including those necessary for effective collaboration and cooperation with other students, instructors, and Service.
17254C31	Metal Forming Process	• Student can be Understood the state of stress in various dimensions. • Students will able to select various forming process based on complexity and Importance of flow curve in metal forming process • Students will able to execute various stress evaluation methods at different shape and plane and Students will able to learn the design principles and design considerations of metal forming processes such as forging, rolling, extrusion etc. • Impart the knowledge to Different high speed energy forming process and its effect on stress and strain relationship. • Students will learn the latest forming technology such as HERF & hydro forming and Students will able to understand competent design, execution, and assessment of the methods used for solidification, thermal treatment.
17254CSR	Design Project /SOCIO Technical Project	• Apply knowledge of mathematics, science and engineering • Design and Conduct Experiments as Well as Analyze and Interpret Data. • Design a system, component or process to meet desired needs and identify, formulate and solve complex engineering problems creatively and innovatively. • The broad education necessary to understand the impact of engineering solutions in a global and societal context. • Use techniques, skills and modern engineering tools necessary for engineering industries
17254P35	Project Work Phase - I	• Demonstrate a depth of knowledge of manufacturing Engineering. • Demonstrate a through and systematic understanding of project contents. • Understand methodologies and professional way of documentation and communication. • Know the key stages in designing, analyzing and development of the project. • Extend or use the idea of his/her area of work and they are in a position to carry out the remaining phase-II work in a systematic way.
17254P41	Project Work Phase - II	• Continue the phase I work on the selected topic as per the formulated methodology under the same supervisor. • Solve the identified problem based on the formulated methodology.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Develop skills to analyze and discuss the test results, and make conclusions. • On completion of the project work student will be in a position to take up any challenging practical problems in the field of manufacturing and find better solutions to it. • Demonstrate knowledge of contemporary issues in their chosen field of research.
17254E16A	Materials Management and Logistics	• Identifying the scope for integrating materials management function over the logistics and supply chain operations. • Integrate the organization wide materials requirement to develop an overall plan (MRP). • Identify, study, compare, and evaluate alternatives, select and relate with a good supplier. • Analyzing the materials in storage, handling, packaging, shipping distributing and standardizing. • Apply various purchasing method and inventory controlling techniques into practice.
17254E16B	Financial Management	• Demonstrate an understanding of the overall role and importance of the finance accounting function and Identifying various providers of finance • Impart the knowledge to various elements of cost and its cost determination methods. • Understand the management working capital and Inventory valuation methods and Understanding the impact of Share Capital and Loan Capital on the organization. • Demonstrate basic finance management knowledge and capital budgeting. • Communicate effectively using standard business terminology and profit planning and analysis.
17254E16C	Manufacturing Information Systems	• Understand the general principles of Production Information Systems by: Illustrating how Production Information Systems is an integral part of the management of production systems. • To make them to understand design database terminologies and Creating relationships between tables and enforcing referential integrity • Develop a desktop database application by: Creating a new database, Defining Data Types that define the data being stored and Creating Tables in design view. • Distinguish information systems for various manufacturing structure modules. • Apply information systems in industry and Identify ways information systems & technology may improve an organization's performance, including improving

		organizational processes, decision-making, collaboration, and personal productivity.
17254E24A	Finite Element Application in Manufacturing	• Apply direct stiffness, Rayleigh-Ritz, Galerkin method to solve engineering problems and outline the requirements for convergence. • Analyze linear 1D problems like bars and trusses; 2D structural problems using CST element and analyze the axi-symmetric problems with triangular elements. • Write shape functions for 4 and 8 node quadrilateral, 6 node triangle elements and apply numerical integration to solve; 1D and 2D; stiffness integrations. • Knowledge on giving input of material and processing characteristics on analysis and developing code for 1 D analysis. • Making FE analysis on metal casting , metal cutting and welding etc.,
17254E24B	Lean Manufacturing	• Understand the concepts in Lean Manufacturing. • Understand the tools and methods of Lean Manufacturing. • Understand the TQM principles and value stream mapping procedures. • six sigma method to improve performance. • Making case study on Lean implementation at industries.
17254E24C	Design and Analysis of Experiments	• Understand the research types and proposals • Study about method of analysis , errors and problem solving approaches like logical , soft and creative • Development of models by use of analogy, heuristics and simulation. • Optimize process conditions by developing empirical models using experimental data. • Optimizing process by factorial design principles and Taguchi approach and also ability to write report
17254E25A	Advanced Metrology and Computer Aided Inspection	• Explain the significance of calibration and Identify measurement errors • Describe the surface measurement methods. • Study on interferometry. • Describe about CMM and Laser inspection. • Assess surface roughness and form errors by computer aided inspection techniques.
17254E25B	Maintenance Management	• Explain Centralized and decentralized maintenance organization structures, reliability and Availability, MTBF, MTTR • Understand basic models of maintenance systems, including various aspects of breakdown & prevention of breakdown in respect of the maintenance and their controls

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Understand spares management, costing and budgeting of equipment maintenance resources planning for flaming for maintenance facilities and their implications in real scenario.
		• Condition monitoring programs to ensure performance of equipments. Various practical techniques involved with different levels of use of these techniques
		• Cost and resources management for maintenance
17254E25C	Optimization Techniques	• Describe about optimization techniques like single and multi variable algorithms. • Explain about one dimensional minimization/elimination methods, interpolation methods. • Explain equality and inequality constraints for optimization like Direct and Indirect methods using penalty functions, Lagrange multipliers etc., • Explain unconstrained optimization methods like direct, unvaried, pattern, conjugate gradient, etc., • Explain genetic algorithms, neural network and fuzzy logic principles in Heuristics optimization.
17254E32A	Manufacturing Systems and Simulation	• Develop Manufacturing Models of Discrete event systems. • Generation of Uncertainty using Random numbers and Random Variants. • Input, Output Analysis: Verification & Valediction of Models and Optimization • Impart the concepts of modeling layers of society's critical infrastructure networks and knowledge of GPSS • Build tools to view and control simulations and their results.
17254E32B	Instrumentation and Control Engineering	• An understanding of basic concepts of measurement and its error, calibration. • an understanding of measuring devices to measure speed , frequency , acceleration and flow rate, pressure and temperature measurement devices. • Explain the working principle of various transducers • Analysis of failure in machineries and condition monitoring techniques. • Analysis by Data acquisition system and Programmable Logic Controls.
17254E32C	Artificial Intelligence and Neural Networks	• Understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations & understand the concept behind neural networks for learning non-linear vector functions. • Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning,

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		fuzzy inference systems, and fuzzy logic control and other machine intelligence applications of fuzzy logic.
		• Understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.
		• Identify and describe Fuzzy Logic, Neuro-modeling and Artificial Neural Network techniques in building intelligent machines and Apply Artificial Neural Network & Fuzzy Logic models to handle uncertainty and solve engineering problems.
		• Reveal different applications of these models such as Automobile Fuel Efficiency prediction, kinematics inverse mechanism and Soft Computing for Color Recipe Prediction to solve engineering and other problems.
17254E33A	Product Design and Development	• Understand the technical and business aspects of the product development process and Competence with a set of tools and methods for product design and development.
		• Skilled in implementation of gathering data from customers and establish technical specification and identify and evaluate the key factors and the interdependence of these factors in the design of effective operating systems in product design.
		• Impart the knowledge to product specification and concept generation.
		• Understanding the different approaches used across various PD methodologies and its tools, methods and techniques.
		• Understand the principles behind product modularization, to be able to understand intellectual property issues in product development.
17254E33B	Fluid Power Automation	• Impart the knowledge to basic fluid power terms, units and fluid power graphic symbols, components and Aware of the importance and the scope of hydraulics and pneumatics in the modern industry.
		• Recognize the suitable pump and actuators for particular application.
		• Select various control valves such as pressure control, flow control, direction control valves and use them in hydraulic and pneumatic circuit development.
		• Designing the hydraulic and pneumatic circuits using ladder diagram and Analyze the hydraulic and pneumatic circuit for energy efficiency.
		• Select the appropriate control system like electrical, electronics, and PLC to control the fluid power system and Trouble-shoot and identify maintenance problems associated with fluid power system

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

17254E34A	Advanced Material Technology	• Relate the mechanical properties of materials to their structure and solve realistic and/or fundamental problems relating to the mechanical behavior of materials for individual solutions and tests. • Express the information about fundamental conceptions of fracture mechanics with his/her own sentences and Calculates and interprets mechanical properties using Griffith equation. • Understand the students a thorough systematic approach to the selection of metals, ceramics, polymers, and composites required for mechanical design. Familiarize the students with material properties and materials fabrication processes and an approach for selecting a process capable of producing a component possessing the size, shape, properties, and cost dictated by the design. • Develop new materials and technologies and detect causes of the production defects and breaking of the metallic constructions during operation. • Acquired basic and advanced engineering knowledge about ceramics, polymers and polymers matrix composite and understand the mechanical, optical, thermal and electrical properties of these materials.
17254E34B	Industrial Ergonomics	• Analyze and calculate the level of risk in a job causing stress, fatigue and musculoskeletal disorders and design appropriate work systems. • Be aware of the application of Mannequins in Ergonomics in the past, understand the concept and importance of Anthropometry, gain practical experience in collecting anthropometric data and learn the applications of Anthropometry. • Design a system, component, or process to meet accepted human factors and workplace ergonomics standards within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. • Assess the occupational environmental factors like heat stress, noise, and vibration and RSPM level in the industry. • Understand how these separate systems interact to yield integrated physiological responses to challenges such as exercise, fasting and ascent to high altitude, and how they can sometimes fail.

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE OBJECTIVE M.TECH(P.T) (R-2017)

Course code	Course name	Course outcomes
17248S11EP	Advanced Engineering Mathematics	• Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems. • Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications. • Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in quality control systems. • Find the point and interval estimates, derive confidence intervals and understand the methods of estimation and analyze data statistically and interpretation of the results in inventory control and knowledge to ANOVA: One – way, Two – way with/without interactions, Latin Squares ANOVA technique. • Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control.
17254C12P	Theory of Metal Cutting	• Understand the basic structures of concept of tools and tool materials and Apply cutting mechanics to metal machining based on cutting force and power consumption. • Impart fundamental knowledge about forces and chips formed during the metal machining process. • Impart fundamental knowledge on tool materials, tool life, cutting fluids and tool wear mechanisms • Distinguish between orthogonal and oblique cutting and Understand the Heat distribution during machining. • Learn Importance of Chatter in various machining and avoidance of chatter.
17254C13P	Advanced Manufacturing Processes	• Understand the basic structures of cutting tool materials and cutting parameters in non thermal energy advanced machining processes. • Understand the various input and output parameters that influence in the performance of newer electric energy based advanced machining processes. • Impart the knowledge about laser beam, electron beam, and Ion beam types advanced machining process and its characteristics. • Ability to understand the operation of micro devices,

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• micro systems and their applications.
		• Ability to design the micro devices, micro systems using the micro fabrication process.
17254L14P	CIM Lab	• Use parametric 3D CAD software tools in the correct manner for making geometric part models, assemblies • automated drawings of mechanical components and assemblies. • Evaluate design, analyze and optimize using commercial CAD, CAE software as black box for required mass properties/ stress, deflection / temperature distribution etc. under realistic loading and constraining conditions • Apply the concepts of machining for the purpose of selection of appropriate machining centers, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program • operate CNC milling and turning equipment.
17254CRSP	Research Led Seminar	• The students will be getting the training to face the audience and to interact with the audience with confidence. • To tackle any problem during group discussion in the corporate interviews. • Generate ideas on how to build the research based teaching and to create a research-based learning environment. • This includes both research-oriented didactics and teaching students to use investigative approaches. • Analyze national frameworks, policies and funding that may help or hinder the development of research-based teaching in diverse types of institutions.
17254C21P	Production Management	• Develop knowledge on decision making and forecasting the role of a materials manager in an organization. • Develop aggregate capacity plans in operation environments. • Shall be able to manage the activities of materials manager like purchasing, inventory analysis, storage etc. in a scientific manner. • Shall be able to practice material planning through modern materials management tools like JIT. • Able to prepare job shop scheduling.
17254C22P	MEMS and Nano Technology	• The students are expected to understand MEMS and Students will able to design MEMS and apply knowledge of Nano-technology • Students will be able to explain about fabrication processes and levels of micro system packaging

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

Code	Subject	Course Outcomes
		• Students will be able to explain micro sensors, micro-actuators, their types and applications Students get knowledge about Nano materials and various Nano measurements and to familiarize about various equipments.
		• Bring out the importance of material characterization and various methods and Students will able to select special materials for MEMS
		• Students will able to calculate the static and dynamic behavior of simple mechanical Microsystems, e.g. cantilevers and membranes Students will able to perform special Nano finishing techniques
17254L24P	Automation Lab	• Study of sensors, Hydraulic and Pneumatic actuators and experimentation of its characterization for industrial applications.
		• Develop an understanding of plc ladder diagram related to industrial automation systems and measure its performance.
		• Develop ability to take measurements of speed , vibrations etc.,
		• Develop pneumatic circuit /hydraulic circuit for industrial applications and measure its performance
		• Study of data acquisition system and its industrial applications
17254CRMP	Research Methodology	• Discuss research methodology concepts, research problems, research designs, thesis preparations, publications and research methods.
		• Analyze and evaluate research works and to formulate a research problem to pursue research
		• Prepare a thesis or a technical paper, and present or publish them
		• Apply the various research methods followed in engineering research for formulation and
		• Design of own research problems and to utilize them in their research project.
17254CBRP	Participation in Bounded Research	• Hands on exposure to problem solving tools in contemporary research
		• Evolve research intuitiveness and orientation
		• Familiarize with cutting edge research trends
		• An understanding of professional and ethical responsibility and communicate effectively.
172TECWRP	Technical Writing/Seminar	• Participate actively in writing activities that model effective scientific and technical communication in the workplace.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• Understand how to apply technical information and knowledge in practical documents. • Practice the unique qualities of professional writing style, including sentence conciseness, readability, clarity, accuracy, honesty, etc., • Collect, analyze, document, and report research clearly, concisely, logically, and ethically. • Develop professional work habits, including those necessary for effective collaboration and cooperation with other students, instructors, and Service
17254C31P	**Mechanical Metallurgy**	• Understand the mechanical behavior of metals; • Protect the metals from hardness and toughness • Understand the environmental factors affecting the mechanical behavior of materials by fatigue damage. • Evaluate the high temperature properties of metals and fracture behavior of metals. • Design the metals for specific applications by creep behavior.
17254C32P	**Automated Computer Integrated Manufacturing Systems**	• Become familiar on the basic concepts of Cad, Cam & Computer Integrated Manufacturing and its importance in the global competitive market. • Understand the material transfer mechanism in automated manufacturing, anatomy of industrial robots and their application in various areas of automated manufacturing and storage systems used • Understand the usage of group technology concept and clustering algorithms in modern manufacturing systems and Understand the concepts of Flexible manufacturing system. • Make the students to get knowledge about Computer Aided Process Planning approaches. • Get familiarizes with the concepts process control and monitoring and automatic data capture techniques
17254CSRP	Design Project /SOCIO Technical Project	• Apply knowledge of mathematics, science and engineering • Design and Conduct Experiments as Well as Analyze and Interpret Data. • Design a system, component or process to meet desired needs and identify, formulate and solve complex engineering problems creatively and innovatively. • The broad education necessary to understand the impact of engineering solutions in a global and societal context. • Use techniques, skills and modern engineering tools necessary for engineering industries
17254C41P	Manufacturing Metrology and Quality Control	• Understand the methods of measurement and selection of

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• measuring instruments ,standards of measurement • Identify and apply various measuring instruments • Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design • Recommend the Quality Control Techniques and Statistical Tools appropriately • Analyze the Data collected
17254C42P	**Metal Forming Process**	• Student can be Understood the state of stress in various dimensions. • Students will able to select various forming process based on complexity and Importance of flow curve in metal forming process • Students will able to execute various stress evaluation methods at different shape and plane and Students will able to learn the design principles and design considerations of metal forming processes such as forging, rolling, extrusion etc. • Impart the knowledge to Different high speed energy forming process and its effect on stress and strain relationship. • Students will learn the latest forming technology such as HERF & hydro forming and Students will able to understand competent design, execution, and assessment of the methods used for solidification, thermal treatment.
17254P44P	Project Work Phase - I	• Demonstrate a depth of knowledge of manufacturing Engineering. • Demonstrate a through and systematic understanding of project contents. • Understand methodologies and professional way of documentation and communication. • Know the key stages in designing, analyzing and development of the project. • Extend or use the idea of his/her area of work and they are in a position to carry out the remaining phase-II work in a systematic way.
17254P61P	Project Work Phase - II	• Continue the phase I work on the selected topic as per the formulated methodology under the same supervisor. • Solve the identified problem based on the formulated methodology. • Develop skills to analyze and discuss the test results, and make conclusions. • On completion of the project work student will be in a position to take up any challenging practical problems in the field of manufacturing and find better solutions to it. • Demonstrate knowledge of contemporary issues in their

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

149

		chosen field of research.
17254E33AP	Materials Management and Logistics	• Identifying the scope for integrating materials management function over the logistics and supply chain operations.
		• Integrate the organization wide materials requirement to develop an overall plan (MRP).
		• Identify, study, compare, and evaluate alternatives, select and relate with a good supplier.
		• Analyzing the materials in storage, handling, packaging, shipping distributing and standardizing.
		• Apply various purchasing method and inventory controlling techniques into practice.
17254E33BP	Financial Management	• Demonstrate an understanding of the overall role and importance of the finance accounting function and Identifying various providers of finance
		• Impart the knowledge to various elements of cost and its cost determination methods.
		• Understand the management working capital and Inventory valuation methods and Understanding the impact of Share Capital and Loan Capital on the organization.
		• Demonstrate basic finance management knowledge and capital budgeting.
		• Communicate effectively using standard business terminology and profit planning and analysis.
17254E33CP	Manufacturing Information Systems	• Understand the general principles of Production Information Systems by: Illustrating how Production Information Systems is an integral part of the management of production systems.
		• To make them to understand design database terminologies and Creating relationships between tables and enforcing referential integrity
		• Develop a desktop database application by: Creating a new database, Defining Data Types that define the data being stored and Creating Tables in design view.
		• Distinguish information systems for various manufacturing structure modules.
		• Apply information systems in industry and Identify ways information systems & technology may improve an organization's performance, including improving organizational processes, decision-making, collaboration, and personal productivity.
17254E23AP	Finite Element Application in Manufacturing	• Apply direct stiffness, Rayleigh-Ritz, Galerkin method to solve engineering problems and outline the requirements for convergence.
		• Analyze linear 1D problems like bars and trusses; 2D

		• structural problems using CST element and analyze the axi-symmetric problems with triangular elements.
		• Write shape functions for 4 and 8 node quadrilateral, 6 node triangle elements and apply numerical integration to solve; 1D and 2D; stiffness integrations.
		• Knowledge on giving input of material and processing characteristics on analysis and developing code for 1 D analysis.
		• Making FE analysis on metal casting , metal cutting and welding etc.,
17254E23BP	Lean Manufacturing	• Understand the concepts in Lean Manufacturing. • Understand the tools and methods of Lean Manufacturing. • Understand the TQM principles and value stream mapping procedures. • six sigma method to improve performance. • Making case study on Lean implementation at industries.
17254E23CP	Design and Analysis of Experiments	• Understand the research types and proposals • Study about method of analysis , errors and problem solving approaches like logical , soft and creative • Development of models by use of analogy, heuristics and simulation. • Optimize process conditions by developing empirical models using experimental data. • Optimizing process by factorial design principles and Taguchi approach and also ability to write report
17254E43AP	Advanced Metrology and Computer Aided Inspection	• Explain the significance of calibration and Identify measurement errors • Describe the surface measurement methods. • Study on interferometry. • Describe about CMM and Laser inspection. • Assess surface roughness and form errors by computer aided inspection techniques.
17254E43BP	Maintenance Management	• Explain Centralized and decentralized maintenance organization structures, reliability and Availability, MTBF, MTTR • Understand basic models of maintenance systems, including various aspects of breakdown & prevention of breakdown in respect of the maintenance and their controls • Understand spares management, costing and budgeting of equipment maintenance resources planning for flaming for maintenance facilities and their implications in real scenario. • Condition monitoring programs to ensure performance of equipments. Various practical techniques involved with

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		• different levels of use of these techniques
		• Cost and resources management for maintenance
17254E43CP	Optimization Techniques	• Describe about optimization techniques like single and multi variable algorithms.
		• Explain about one dimensional minimization/elimination methods, interpolation methods.
		• Explain equality and inequality constraints for optimization like Direct and Indirect methods using penalty functions, Lagrange multipliers etc.,
		• Explain unconstrained optimization methods like direct, unvaried, pattern, conjugate gradient, etc.,
		• Explain genetic algorithms, neural network and fuzzy logic principles in Heuristics optimization.
17254E51AP	Manufacturing Systems and Simulation	• Develop Manufacturing Models of Discrete event systems.
		• Generation of Uncertainty using Random numbers and Random Variants.
		• Input, Output Analysis: Verification & Valediction of Models and Optimization
		• Impart the concepts of modeling layers of society's critical infrastructure networks and knowledge of GPSS
		• Build tools to view and control simulations and their results.
17**254E51BP**	Instrumentation and Control Engineering	• An understanding of basic concepts of measurement and its error, calibration.
		• an understanding of measuring devices to measure speed , frequency , acceleration and flow rate, pressure and temperature measurement devices.
		• Explain the working principle of various transducers
		• Analysis of failure in machineries and condition monitoring techniques.
		• Analysis by Data acquisition system and Programmable Logic Controls.
17254E51 CP	Artificial Intelligence and Neural Networks	• Understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations & understand the concept behind neural networks for learning non-linear vector functions.
		• Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic control and other machine intelligence applications of fuzzy logic.
		• Understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.
		• Identify and describe Fuzzy Logic, Neuro-modeling and

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Artificial Neural Network techniques in building intelligent machines and Apply Artificial Neural Network & Fuzzy Logic models to handle uncertainty and solve engineering problems. • Reveal different applications of these models such as Automobile Fuel Efficiency prediction, kinematics inverse mechanism and Soft Computing for Color Recipe Prediction to solve engineering and other problems.
17254E52AP	Product Design and Development	• Understand the technical and business aspects of the product development process and Competence with a set of tools and methods for product design and development. • Skilled in implementation of gathering data from customers and establish technical specification and identify and evaluate the key factors and the interdependence of these factors in the design of effective operating systems in product design. • Impart the knowledge to product specification and concept generation. • Understanding the different approaches used across various PD methodologies and its tools, methods and techniques. • Understand the principles behind product modularization, to be able to understand intellectual property issues in product development.
17254E52BP	Fluid Power Automation	• Impart the knowledge to basic fluid power terms, units and fluid power graphic symbols, components and Aware of the importance and the scope of hydraulics and pneumatics in the modern industry. • Recognize the suitable pump and actuators for particular application. • Select various control valves such as pressure control, flow control, direction control valves and use them in hydraulic and pneumatic circuit development. • Designing the hydraulic and pneumatic circuits using ladder diagram and Analyze the hydraulic and pneumatic circuit for energy efficiency. • Select the appropriate control system like electrical, electronics, and PLC to control the fluid power system and Trouble-shoot and identify maintenance problems associated with fluid power system
17254E53AP	Advanced Material Technology	• Relate the mechanical properties of materials to their structure and solve realistic and/or fundamental problems relating to the mechanical behavior of materials for individual solutions and tests. • Express the information about fundamental conceptions of fracture mechanics with his/her own sentences and

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Calculates and interprets mechanical properties using Griffith equation.
		• Understand the students a thorough systematic approach to the selection of metals, ceramics, polymers, and composites required for mechanical design. Familiarize the students with material properties and materials fabrication processes and an approach for selecting a process capable of producing a component possessing the size, shape, properties, and cost dictated by the design.
		• Develop new materials and technologies and detect causes of the production defects and breaking of the metallic constructions during operation.
		• Acquired basic and advanced engineering knowledge about ceramics, polymers and polymers matrix composite and understand the mechanical, optical, thermal and electrical properties of these materials.
17254E53BP	Industrial Ergonomics	• Analyze and calculate the level of risk in a job causing stress, fatigue and musculoskeletal disorders and design appropriate work systems.
		• Be aware of the application of Mannequins in Ergonomics in the past, understand the concept and importance of Anthropometry, gain practical experience in collecting anthropometric data and learn the applications of Anthropometry.
		• Design a system, component, or process to meet accepted human factors and workplace ergonomics standards within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
		• Assess the occupational environmental factors like heat stress, noise, and vibration and RSPM level in the industry.
		• Understand how these separate systems interact to yield integrated physiological responses to challenges such as exercise, fasting and ascent to high altitude, and how they can sometimes fail.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

PRIST
DEEMED TO BE
UNIVERSITY
NAAC ACCREDITED
THANJAVUR – 613 403 - TAMIL NADU

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

B.TECH - FULL TIME (UG - 2017)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
17147S11	COMMUNICATIVE ENGLISH	CO1	Read articles of a general kind in magazines and newspapers.							✓		
		CO2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.							✓		
		CO3	Comprehend conversations and short talks delivered in English							✓		
		CO4	Write short essays of a general kind and personal letters and emails in English.							✓		
17148S12	ENGINEERING MATHEMATICS – I	CO1	Use both the limit definition and rules of differentiation to differentiate functions.	✓								
		CO2	Apply differentiation to solve maxima and minima problems.		✓							
		CO3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.			✓						

Course Code	Course Name	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.				✓								✓
		CO5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.				✓								
		CO6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.	✓											
		CO7	Apply various techniques in solving differential equations.					✓							
17149S13	ENGINEERING PHYSICS	CO1	the students will gain knowledge on the basics of properties of matter and its applications,	✓											
		CO2	the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,		✓										
		CO3	the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,			✓									
		CO4	the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and												✓

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO5	the students will understand the basics of crystals, their structures and different crystal growth techniques.				✓								
17149S14	ENGINEERING CHEMISTRY	CO1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.				✓								
17154S15	ENGINEERING GRAPHICS	CO1	familiarize with the fundamentals and standards of Engineering graphics		✓										
		CO2	perform freehand sketching of basic geometrical constructions and multiple views of objects.			✓									
		CO3	project orthographic projections of lines and plane surfaces.								✓				
		CO4	draw projections and solids and development of surfaces.			✓									
		CO5	visualize and to project isometric and perspective sections of simple solids.				✓								
17150S16	PROBLEM SOLVING AND PYTHON PROGRAMMING	CO1	Develop algorithmic solutions to simple computational problems					✓							
		CO2	Read, write, execute by hand simple Python programs.					✓							
		CO3	Structure simple Python programs for solving problems.					✓							

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO4	Decompose a Python program into functions.					✓							
		CO5	Represent compound data using Python lists, tuples, dictionaries.					✓							
		CO6	Read and write data from/to files in Python Programs.					✓							
17150L17	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	CO1	Write, test, and debug simple Python programs.			✓									
		CO2	Implement Python programs with conditionals and loops.					✓							
		CO3	Develop Python programs step-wise by defining functions and calling them.				✓								
		CO4	Use Python lists, tuples, dictionaries for representing compound data.		✓										
		CO5	Read and write data from/to files in Python.	✓											
17150L18	PHYSICS AND CHEMISTRY LABORATORY	CO1	apply principles of elasticity, optics and thermal properties for engineering applications.			✓									
17147S21	TECHNICAL ENGLISH	CO1	Read technical texts and write area-specific texts effortlessly.										✓		
		CO2	Listen and comprehend lectures and talks in their area of specialisation successfully.										✓		
		CO3	Speak appropriately and effectively in varied formal and informal contexts.										✓		

		CO4	Write reports and winning job applications.									✓	
17148S22	ENGINEERING MATHEMATICS – II	CO1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	✓									
		CO2	Gradient, divergence and curl of a vector point function and related identities.		✓								
		CO3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.			✓							
		CO4	Analytic functions, conformal mapping and complex integration.									✓	
		CO5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.										✓
17149S23C	MATERIALS SCIENCE	CO1	the students will have knowledge on the various phase diagrams and their applications				✓						
		CO2	the students will acquire knowledge on Fe-Fe$_3$C phase diagram,various microstructures and alloys				✓						

Code	Course	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO3	the students will get knowledge on mechanical properties of materials and their measurement											✓	
		CO4	the students will gain knowledge on magnetic, dielectric and superconducting properties of materials											✓	
		CO5	the students will understand the basics of ceramics, composites and nanomaterials.											✓	
17149S24A	ENVIRONMENTAL SCIENCE AND ENGINEERING	CO1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.				✓								
		CO2	Public awareness of environmental is at infant stage.				✓								
		CO3	Ignorance and incomplete knowledge has lead to misconceptions				✓								
		CO4	Development and improvement in std. of living has lead to serious environmental disasters				✓								
17153S25D	BASIC ELECTRICAL ELECTRONICS AND INSTRUMENTATION ENGINEERING	CO1	Understand electric circuits and working principles of electrical machines				✓								
		CO2	Understand the concepts of various electronic devices				✓								

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO3	Choose appropriate instruments for electrical measurement for a specific application											✓	
17154S26D	ENGINEERING MECHANICS	CO1	illustrate the vectorial and scalar representation of forces and moments	✓											
		CO2	analyse the rigid body in equilibrium		✓										
		CO3	evaluate the properties of surfaces and solids										✓		
		CO4	calculate dynamic forces exerted in rigid body											✓	
		CO5	determine the friction and the effects by the laws of friction												✓
17154L27	ENGINEERING PRACTICES LABORATORY	CO1	fabricate carpentry components and pipe connections including plumbing works.			✓									
		CO2	use welding equipments to join the structures.			✓									
		CO3	Carry out the basic machining operations			✓									
		CO4	Make the models using sheet metal works			✓									
		CO5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings			✓									
		CO6	Carry out basic home electrical works and appliances			✓									
		CO7	Measure the electrical quantities			✓									

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO8	Elaborate on the components, gates, soldering practices.			✓									
17153L28D	**BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY**	CO1	Ability to determine the speed characteristic of different electrical machines			✓									
		CO2	Ability to design simple circuits involving diodes and transistors			✓									
		CO3	Ability to use operational amplifiers			✓									
17148S31C	**TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**	CO1	Understand how to solve the given standard partial differential equations.	✓											
		CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.		✓										
		CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.			✓									
		CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.											✓	

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.												✓
17154C32	ENGINEERING THERMODYNAMICS	CO1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions.	✓											
		CO2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability.		✓										
		CO3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods			✓									
		CO4	Derive simple thermodynamic relations of ideal and real gases								✓				
		CO5	Calculate the properties of gas mixtures and moist air and its use in psychometric processes											✓	
17154C33	FLUID MECHANICS AND MACHINERY	CO1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.	✓											
		CO2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks.		✓										
		CO3	Can mathematically predict the nature of physical quantities			✓									
		CO4	Can critically analyse the performance of pumps				✓								

Code	Course	CO	Outcome												
		CO5	Can critically analyse the performance of turbines.					✓							
17154C34	PRODUCTION TECHNOLOGY – I	CO1	Explain different metal casting processes, associated defects, merits and demerits			✓									
		CO2	Compare different metal joining processes.				✓								
		CO3	Summarize various hot working and cold working methods of metals.					✓							
		CO4	Explain various sheet metal making processes.						✓						
		CO5	Distinguish various methods of manufacturing plastic components.								✓				
17154C35	ELECTRICAL DRIVES AND CONTROLS	CO1	Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance	✓											
17154L36	PRODUCTION TECHNOLOGY LABORATORY – I	CO1	Demonstrate the safety precautions exercised in the mechanical workshop.			✓									
		CO2	Make the workpiece as per given shape and size using Lathe.				✓								
		CO3	Join two metals using arc welding.					✓							
		CO4	Use sheet metal fabrication tools and make simple tray and funnel.						✓						
		CO5	Use different moulding tools, patterns and prepare sand moulds.								✓				
17154L37	COMPUTER AIDED MACHINE	CO1	Follow the drawing standards, Fits and Tolerances			✓									

Subject Code	Subject Name	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11
	DRAWING	**CO2**	Re-create part drawings, sectional views and assembly drawings as per standards				✓							
17154L38	**ELECTRICAL ENGINEERING LABORATORY**	**CO1**	Ability to perform speed characteristic of different electrical machine			✓								
17154L39	**INTERPERSONAL SKILLS/LISTENING & SPEAKING**	**CO1**	Listen and respond appropriately.			✓								
		CO2	Participate in group discussions			✓								
		CO3	Make effective presentations			✓								
		CO4	Participate confidently and appropriately in conversations both formal and informal			✓								
17148C41 D	**STATISTICS AND NUMERICAL METHODS**	**CO1**	Apply the concept of testing of hypothesis for small and large samples in real life problems.	✓										
		CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.		✓									
		CO3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.			✓								
		CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.				✓							

Code	Course	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications							✓					
17154C42	THEORY OF MACHINES-I	CO1	Discuss the basics of mechanism	✓											
		CO2	Calculate velocity and acceleration in simple mechanisms		✓										
		CO3	Develop CAM profiles				✓								
		CO4	Solve problems on gears and gear trains							✓					
		CO5	Examine friction in machine elements							✓					
17154C43	PRODUCTION TECHNOLOGY – II	CO1	Explain the mechanism of material removal processes.	✓											
		CO2	Describe the constructional and operational features of centre lathe and other special purpose lathes.				✓								
		CO3	Describe the constructional and operational features of shaper, planner, milling, drilling,sawing and broaching machines.					✓							
		CO4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.							✓					
		CO5	Summarize numerical control of machine tools and write a part program.										✓		
17154C44	ENGINEERING METALLURGY	CO1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel									✓			

			Description	1	2	3	4	5	6	7	8	9	10	11	12
			classification.												
		CO2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.										✓		
		CO3	Clarify the effect of alloying elements on ferrous and non-ferrous metals										✓		
		CO4	Summarize the properties and applications of non metallic materials.										✓		
		CO5	Explain the testing of mechanical properties. .										✓		
17154C45	STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS	CO1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.	✓											
		CO2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.		✓										
		CO3	Apply basic equation of simple torsion in designing of shafts and helical spring			✓									
		CO4	Calculate the slope and deflection in beams using different methods.				✓								
		CO5	Analyze and design thin and thick shells for the applied internal and external pressures.						✓						
17154C46	THERMAL ENGINEERING - I	CO1	Apply thermodynamic concepts to different air standard cycles and	✓											

Code	Course	CO	Outcome	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
			solve problems.												
		CO2	Solve problems in single stage and multistage air compressors		✓										
		CO3	Explain the functioning and features of IC engines, components and auxiliaries.					✓							
		CO4	Calculate performance parameters of IC Engines.			✓									
		CO5	Explain the flow in Gas turbines and solve problems.				✓								
17154L47	PRODUCTION TECHNOLOGY LABORATORY – II	CO1	use different machine tools to manufacturing gears			✓									
		CO2	Ability to use different machine tools to manufacturing gears.			✓									
		CO3	Ability to use different machine tools for finishing operations			✓									
		CO4	Ability to manufacture tools using cutter grinder			✓									
		CO5	Develop CNC part programming			✓									
17154L48	STRENGTH OF MATERIALS AND FLUID MECHANICS AND MACHINERY LABORATORY	CO1	Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.					✓							
		CO2	Perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.					✓							

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO3	Use the measurement equipments for flow measurement.							✓					
		CO4	Perform test on different fluid machinery.							✓					
17154L 49	ADVANCED READING AND WRITING	CO1	Write different types of essays.										✓		
		CO2	Write winning job applications.										✓		
		CO3	Read and evaluate texts critically.												✓
		CO4	Display critical thinking in various professional contexts.												✓
17154C51	THERMAL ENGINEERING – II	CO1	Solve problems in Steam Nozzle	✓											
		CO2	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters.		✓										
		CO3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems.							✓					
		CO4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat Exchangers										✓		
		CO5	Solve problems using refrigerant table / charts and psychrometric charts										✓		
17154C52	DESIGN OF MACHINE ELEMENTS	CO1	Explain the influence of steady and variable stresses in machine component design.		✓										

Course Code	Course Name	CO	CO Statement												
		CO2	Apply the concepts of design to shafts, keys and couplings.				✓								
		CO3	Apply the concepts of design to temporary and permanent joints.										✓			
		CO4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.											✓		
		CO5	Apply the concepts of design to bearings.	✓												✓
17154C53	METROLOGY AND MEASUREMENTS	CO1	Describe the concepts of measurements to apply in various metrological instruments	✓												
		CO2	Outline the principles of linear and angular measurement tools used for industrial Applications			✓										
		CO3	Explain the procedure for conducting computer aided inspection				✓									
		CO4	Demonstrate the techniques of form measurement used for industrial components										✓			
		CO5	Discuss various measuring techniques of mechanical properties in industrial applications											✓		
17154C54	THEORY OF MACHINES-II	CO1	Calculate static and dynamic forces of mechanisms.	✓												
		CO2	Calculate the balancing masses and their locations of reciprocating and rotating masses.		✓											
		CO3	Compute the frequency of free			✓										

Course Code	Course Name	CO	Description												
			vibration.												
		CO4	Compute the frequency of forced vibration and damping coefficient.					✓							
		CO5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.								✓				
17154L56	THEORY OF MACHINES LABORATORY	CO1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.	✓											
		CO2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.		✓										
17154L57	THERMAL ENGINEERING LABORATORY	CO1	conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.	✓											
		CO2	conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.		✓										
		CO3	conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.			✓									

Course Code	Course Name	CO	Course Outcome												
		CO4	conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.				✓								
		CO5	conduct tests to evaluate the performance of refrigeration and airconditioning test rigs.						✓						
17154L58	METROLOGY AND MEASUREMENTS LABORATORY	CO1	Measure the gear tooth dimensions, angle using sine bar, straightness and flatness, thread parameters, temperature using thermocouple, force, displacement, torque and vibration.	✓											
		CO2	Calibrate the vernier, micrometer and slip gauges and setting up the comparator for the inspection.		✓										
17154C61	DESIGN OF TRANSMISSION SYSTEMS	CO1	apply the concepts of design to belts, chains and rope drives.		✓										
		CO2	apply the concepts of design to spur, helical gears.				✓								
		CO3	apply the concepts of design to worm and bevel gears.									✓			
		CO4	apply the concepts of design to gear boxes .									✓			
		CO5	apply the concepts of design to cams, brakes and clutches												✓
17154C62	COMPUTER AIDED DESIGN AND MANUFACTURING	CO1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics		✓										

Code	Subject	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO2	Explain the fundamentals of parametric curves, surfaces and Solids			✓									
		CO3	Summarize the different types of Standard systems used in CAD						✓						
		CO4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines							✓					
		CO5	Summarize the different types of techniques used in Cellular Manufacturing and FMS			✓									
17154C63	HEAT AND MASS TRANSFER	CO1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems	✓											
		CO2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems		✓										
		CO3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems		✓										
		CO4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems				✓								

Code	CO	Course Outcome	1	2	3	4	5	6	7
	CO5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications						✓	
17154C64	CO1	Summarize the basics of finite element formulation.	✓						
	CO2	Apply finite element formulations to solve one dimensional Problems.		✓					
	CO3	Apply finite element formulations to solve two dimensional scalar Problems.				✓			
FINITE ELEMENT ANALYSIS	CO4	Apply finite element method to solve two dimensional Vector problems.							✓
	CO5	Apply finite element method to solve problems on iso parametric element and dynamic Problems.							✓
17154C65	CO1	Explain the Fluid power and operation of different types of pumps.	✓						
	CO2	Summarize the features and functions of Hydraulic motors, actuators and Flow control Valves		✓					
HYDRAULICS AND PNEUMATICS	CO3	Explain the different types of Hydraulic circuits and systems				✓			
	CO4	Explain the working of different pneumatic circuits and systems						✓	
	CO5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.						✓	

Code	Subject	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17154E66A	**AUTOMOBILE ENGINEERING**	CO1	recognize the various parts of the automobile and their functions and materials.	✓											
		CO2	discuss the engine auxiliary systems and engine emission control.		✓										
		CO3	distinguish the working of different types of transmission systems.			✓									
		CO4	explain the Steering, Brakes and Suspension Systems.				✓								
		CO5	predict possible alternate sources of energy for IC Engines.	✓											
17154L67	**CAD / CAM LABORATORY**	CO1	Draw 3D and Assembly drawing using CAD software	✓											
		CO2	Demonstrate manual part programming with G and M codes using CAM		✓										
17154L68	**DESIGN AND FABRICATION PROJECT**	CO1	design and Fabricate the machine element or the mechanical product.							✓					
		CO2	demonstrate the working model of the machine element or the mechanical product.								✓				
17154L69	**PROFESSIONAL COMMUNICATION**	CO1	Make effective presentations				✓								
		CO2	Participate confidently in Group Discussions.						✓						
		CO3	Attend job interviews and be successful in them.						✓						
		CO4	Develop adequate Soft Skills required for the workplace							✓					

17154C71	**POWER PLANT ENGINEERING**	CO1	Explain the layout, construction and working of the components inside a thermal power plant.	✓									
		CO2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.		✓								
		CO3	Explain the layout, construction and working of the components inside nuclear power plants.			✓							
		CO4	Explain the layout, construction and working of the components inside Renewable energy power plants.				✓						
		CO5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.									✓	
17154C72	**PROCESS PLANNING AND COST ESTIMATION**	CO1	select the process, equipment and tools for various industrial products.	✓									
		CO2	prepare process planning activity chart.		✓								
		CO3	explain the concept of cost estimation.			✓							
		CO4	compute the job order cost for different type of shop floor.				✓						
		CO5	calculate the machining time for various machining operations.									✓	

Course Code	Course Name	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11
17154C73	MECHATRONICS	CO1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical andComputer Systems for the Control of Mechanical, Electronic Systems and sensor technology.	✓										
		CO2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing Modes of Microprocessor and Microcontroller.		✓									
		CO3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device Interfacing			✓								
		CO4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.						✓					
		CO5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies						✓					
17154E74D	UNCONVENTIONAL MACHINING PROCESSES	CO1	Explain the need for unconventional machining processes and its classification	✓										
		CO2	Compare various thermal energy and electrical energy based unconventional machining processes.		✓									

Course Code	Course Name	CO	Course Outcome												
		CO3	Summarize various chemical and electro-chemical energy based unconventional machining processes.				✓								
		CO4	Explain various nano abrasives based unconventional machining processes.										✓		
		CO5	Distinguish various recent trends based unconventional machining processes.												✓
17154E76A	ROBOTICS	CO1	Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors.	✓											
		CO2	Illustrate the different types of robot drive systems as well as robot end effectors.			✓									
		CO3	Apply the different sensors and image processing techniques in robotics to improve the ability of robots.				✓								
		CO4	Develop robotic programs for different tasks and familiarize with the kinematics motions of robot.							✓					
		CO5	Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots.										✓		
17155FE74 B	WASTE WATER TREATMENT	CO1	Will have knowledge about adsorption and oxidation process.	✓											

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO2	Will gain idea about various methods available for water treatment.		✓										
		CO3	Will appreciate the necessity of water and acquire knowledge of preliminary treatment.			✓									
17154L77	SIMULATION AND ANALYSIS LABORATORY	CO1	simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.	✓											
		CO2	analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.							✓					
		CO3	calculate the natural frequency and mode shape analysis of 2D components and beams.										✓		
17154L78	MECHATRONICS LABORATORY	CO1	Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.	✓											
		CO2	Demonstrate the functioning of control systems with the help of PLC and microcontrollers.		✓										
17154L79	TECHNICAL SEMINAR	CO1	To enrich the communication skills of the student and presentations of technical topics of interest, this course is introduced.	✓											

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
17154C81	PRINCIPLES OF MANAGEMENT	CO1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management							✓		
17154E82A	PRODUCTION PLANNING AND CONTROL	CO1	Upon completion of this course, the students can able to prepare production planning and control activities such as work study, product planning, production scheduling, Inventory Control.	✓								
		CO2	They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).		✓							
17154PW83	PROJECT WORK	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	✓								

DEPARTMENT OF MECHANICAL ENGINEERING

B.TECH - PART TIME (UG - 2017)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
17148H11P	TRANSFORMS AND PARTIAL DIFFERENTIAL	CO1	Understand how to solve the given standard partial differential equations.	✓								

Code	Subject	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
	EQUATIONS	CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.		✓										
		CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.			✓									
		CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.											✓	
		CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.												✓
17153H12P	**ELECTRICAL DRIVES AND CONTROLS**	CO1	Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance	✓											
17154H13P	**ENGINEERING THERMODYNAMICS**	CO1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions.	✓											

Course Code	Course Name	CO	Course Outcome									
		CO2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability.		✓							
		CO3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods			✓						
		CO4	Derive simple thermodynamic relations of ideal and real gases							✓		
		CO5	Calculate the properties of gas mixtures and moist air and its use in psychometric processes								✓	
17154H14P	FLUID MECHANICS AND MACHINERY	CO1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.	✓								
		CO2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks.		✓							
		CO3	Can mathematically predict the nature of physical quantities			✓						
		CO4	Can critically analyse the performance of pumps				✓					
		CO5	Can critically analyse the performance of turbines.					✓				
17154H15P	FOUNDRY AND WELDING TECHNOLOGY	CO1	Explain different metal casting processes, associated defects, merits and demerits			✓						
		CO2	Compare different metal joining processes.				✓					

Course Code	Course Name	CO	Description												
		CO3	Summarize various hot working and cold working methods of metals.								✓				
		CO4	Explain various sheet metal making processes.									✓			
		CO5	Distinguish various methods of manufacturing plastic components.											✓	
17148H21P	NUMERICAL METHODS	CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	✓											
		CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.			✓									
		CO3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.					✓							
		CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.						✓						
		CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications							✓					

Code	Subject	CO	Course Outcome												
17153H22P	ELECTRONICS AND MICROPROCESSORS	CO1	Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance	✓											
17154H23P	THERMAL ENGINEERING	CO1	Apply thermodynamic concepts to different air standard cycles and solve problems.	✓											
		CO2	Solve problems in single stage and multistage air compressors		✓										
		CO3	Explain the functioning and features of IC engines, components and auxiliaries.						✓						
		CO4	Calculate performance parameters of IC Engines.			✓									
		CO5	Explain the flow in Gas turbines and solve problems.				✓								
17154H24P	STRENGTH OF MATERIALS	CO1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.	✓											
		CO2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.		✓										
		CO3	Apply basic equation of simple torsion in designing of shafts and helical spring			✓									
		CO4	Calculate the slope and deflection in beams using different methods.				✓								

Course Code	Course Name	CO	Course Outcome								
		CO5	Analyze and design thin and thick shells for the applied internal and external pressures.					✓			
17154H25P	ENGINEERING MATERIALS AND METALLURGY	CO1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.							✓	
		CO2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.							✓	
		CO3	Clarify the effect of alloying elements on ferrous and non-ferrous metals							✓	
		CO4	Summarize the properties and applications of non metallic materials.							✓	
		CO5	Explain the testing of mechanical properties. .							✓	
17148H31CP	PROBABILITY AND STATISTICS	CO1	The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like disease modeling, climate prediction and computer networks etc.	✓							
17154H32P	KINEMATICS OF MACHINERY	CO1	Discuss the basics of mechanism	✓							
		CO2	Calculate velocity and acceleration in simple mechanisms		✓						
		CO3	Develop CAM profiles			✓					

Course Code	Course Name	CO	Course Outcome										
		CO4	Solve problems on gears and gear trains						✓				
		CO5	Examine friction in machine elements						✓				
17154H33P	MACHINE TOOL TECHNOLOGY	CO1	Explain the mechanism of material removal processes.	✓									
		CO2	Describe the constructional and operational features of centre lathe and other special purpose lathes.				✓						
		CO3	Describe the constructional and operational features of shaper, planner, milling, drilling,sawing and broaching machines.					✓					
		CO4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.						✓				
		CO5	Summarize numerical control of machine tools and write a part program.									✓	
17154H34P	ENGINEERING METROLOGY AND MEASUREMENTS	CO1	Describe the concepts of measurements to apply in various metrological instruments	✓									
		CO2	Outline the principles of linear and angular measurement tools used for industrial Applications				✓						
		CO3	Explain the procedure for conducting computer aided inspection					✓					

Code	Course	CO	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
		CO4	Demonstrate the techniques of form measurement used for industrial components										✓	
		CO5	Discuss various measuring techniques of mechanical properties in industrial applications											✓
17154L35P	COMPUTER AIDED SIMULATION AND ANALYSIS LABORATORY	CO1	simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.	✓										
		CO2	analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.						✓					
		CO3	calculate the natural frequency and mode shape analysis of 2D components and beams.										✓	
17154H41P	POWER PLANT ENGINEERING	CO1	Explain the layout, construction and working of the components inside a thermal power plant.	✓										
		CO2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.		✓									
		CO3	Explain the layout, construction and working of the components inside nuclear power plants.			✓								

Code	Course	CO	Outcome												
		CO4	Explain the layout, construction and working of the components inside Renewable energy power plants.				✓								
		CO5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.										✓		
17154H42P	DYNAMICS OF MACHINERY	CO1	Discuss the basics of mechanism	✓											
		CO2	Calculate velocity and acceleration in simple mechanisms		✓										
		CO3	Develop CAM profiles			✓									
		CO4	Solve problems on gears and gear trains					✓							
		CO5	Examine friction in machine elements					✓							
17154H43P	DESIGN OF MACHINE ELEMENTS	CO1	Explain the influence of steady and variable stresses in machine component design.		✓										
		CO2	Apply the concepts of design to shafts, keys and couplings.			✓									
		CO3	Apply the concepts of design to temporary and permanent joints.									✓			
		CO4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.										✓		
		CO5	Apply the concepts of design to bearings.												✓

Course Code	Course Name	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17154E44DP	RENEWABLE SOURCES OF ENERGY	CO1	Understand the need of energy conversion and the various methods of energy storage	✓											
		CO2	Identify Winds energy as alternate form of energy and to know how it can be tapped		✓										
		CO3	Understand the Geothermal &Tidal energy, its mechanism of production and its applications			✓									
17154L45P	DYNAMICS LABORATORY	CO1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.	✓											
		CO2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.		✓										
17154H51P	HEAT AND MASS TRANSFER	CO1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems	✓											
		CO2	Apply free and forced convective heat transfer correlations to internal and external flows through/over		✓										

189

Code	Subject	CO	Description												
			various surface configurations and solve problems												
		CO3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems			✓									
		CO4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems				✓								
		CO5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications										✓		
17154H52P	DESIGN OF TRANSMISSION SYSTEMS	CO1	apply the concepts of design to belts, chains and rope drives.		✓										
		CO2	apply the concepts of design to spur, helical gears.				✓								
		CO3	apply the concepts of design to worm and bevel gears.									✓			
		CO4	apply the concepts of design to gear boxes .									✓			
		CO5	apply the concepts of design to cams, brakes and clutches												✓

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17154H53P	AUTOMOBILE ENGINEERING	CO1	recognize the various parts of the automobile and their functions and materials.	✓											
		CO2	discuss the engine auxiliary systems and engine emission control.		✓										
		CO3	distinguish the working of different types of transmission systems.			✓									
		CO4	explain the Steering, Brakes and Suspension Systems.				✓								
		CO5	predict possible alternate sources of energy for IC Engines.	✓											
17154E54CP	ROBOTICS	CO1	Demonstrate knowledge of industrial robots, characteristics, end effectors and actuators.												
		CO2	Apply spatial transformation to obtain forward and inverse kinematics												
		CO3	Solve robot dynamics problems, generate joint trajectory for path planning												
		CO4	Describe working principle of various sensors and program different operations												
		CO5	Appreciate applications of robots in industry.												
17154L55P	HEAT TRANSFER LABORATORY	CO1	conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.	✓											

Subject Code	Subject	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO2	conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.		✓										
		CO3	conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.			✓									
		CO4	conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.				✓								
		CO5	conduct tests to evaluate the performance of refrigeration and airconditioning test rigs.					✓							
17154H61P	FINITE ELEMENT ANALYSIS	CO1	Summarize the basics of finite element formulation.	✓											
		CO2	Apply finite element formulations to solve one dimensional Problems.		✓										
		CO3	Apply finite element formulations to solve two dimensional scalar Problems.				✓								
		CO4	Apply finite element method to solve two dimensional Vector problems.											✓	
		CO5	Apply finite element method to solve problems on iso parametric element and dynamic Problems.											✓	

Course Code	Course Name	CO	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17154H62P	MECHATRONICS	CO1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical andComputer Systems for the Control of Mechanical, Electronic Systems and sensor technology.	✓											
		CO2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing Modes of Microprocessor and Microcontroller.		✓										
		CO3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device Interfacing			✓									
		CO4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.						✓						
		CO5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies						✓						
17154H63P	COMPUTER INTEGRATED MANUFACTURING	CO1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics		✓										

Code	Course	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10
		CO2	Explain the fundamentals of parametric curves, surfaces and Solids			✓							
		CO3	Summarize the different types of Standard systems used in CAD					✓					
		CO4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines							✓			
		CO5	Summarize the different types of techniques used in Cellular Manufacturing and FMS			✓							
17160E64AP	PRINCIPLES OF MANAGEMENT	CO1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management							✓			
17154L65P	MECHATRONICS LABORATORY	CO1	Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.	✓									
		CO2	Demonstrate the functioning of control systems with the help of PLC and microcontrollers.		✓								
17160H71P	TOTAL QUALITY MANAGEMENT	CO1	To get familiarized with the basic concept and framework of Total Quality management										

Course Code	Course Name	CO	Course Outcome										
		CO2	To Understand the contribution of Quality Gurus in TQM Journey										
		CO3	To grasp the nature and importance of various components that constitute TQM										
		CO4	To describe and discuss the role of techniques used in TQM										
17154H72P	PROCESS PLANNING AND COST ESTIMATION	CO1	select the process, equipment and tools for various industrial products.	✓									
		CO2	prepare process planning activity chart.		✓								
		CO3	explain the concept of cost estimation.			✓							
		CO4	compute the job order cost for different type of shop floor.				✓						
		CO5	calculate the machining time for various machining operations.									✓	
17154H73P	APPLIED HYDRAULICS AND PNEUMATICS	CO1	Explain the Fluid power and operation of different types of pumps.	✓									
		CO2	Summarize the features and functions of Hydraulic motors, actuators and Flow control Valves		✓								
		CO3	Explain the different types of Hydraulic circuits and systems				✓						
		CO4	Explain the working of different pneumatic circuits and systems									✓	

Subject Code	Subject Name	CO	Course Outcome	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
		CO5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.											✓	
17154E74CP	UNCONVENTIONAL MACHINING PROCESSES	CO1	Explain the need for unconventional machining processes and its classification	✓											
		CO2	Compare various thermal energy and electrical energy based unconventional machining processes.		✓										
		CO3	Summarize various chemical and electro-chemical energy based unconventional machining processes.			✓									
		CO4	Explain various nano abrasives based unconventional machining processes.											✓	
		CO5	Distinguish various recent trends based unconventional machining processes.												✓
17154P75P	PROJECT WORK	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	✓											

DEPARTMENT OF MECHANICAL ENGINEERING

M.TECH - FULL TIME (PG - 2017)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
17248S11E	ADVANCED ENGINEERING MATHEMATICS	CO1	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems	✓								
		CO2	Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations		✓							
		CO3	Illustrate Laplace transform and its application in different fields			✓						
		CO4	Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations				✓					
		CO5	Use Z-transform and its applications to solve difference equations					✓				
17254H12	THEORY OF METAL CUTTING	CO1	Apply cutting mechanics to metal machining based on cutting force and power consumption.	✓								
		CO2	Operate lathe, milling machines, drill press, grinding machines, etc.		✓							
		CO3	Select cutting tool materials and tool geometries for different	✓				✓				

Code	Course Name	CO	Course Outcome												
			metals.												
		CO4	Select appropriate machining processes and conditions for different metals.							✓					
		CO5	Learn machine tool structures and machining economics.							✓					
17254H13	ADVANCED MANUFACTURING PROCESSES	CO1	Able to understand different types of composite material characteristics, types of micro & macro machining processes.	✓											
		CO2	Understand the e-manufacturing & nano materials.			✓									
17254H14	MECHANICAL METALLURGY	CO1	Identify the properties of metals with respect to crystal structure and grain size				✓								
		CO2	Interpret the phase diagrams of materials							✓					
		CO3	Classify and Distinguish different types of cast irons, steels and non ferrous alloys	✓											
		CO4	Describe the concept of heat treatment of steels & strengthening mechanisms	✓											
		CO5	Explain the powder metallurgy process, types and manufacturing of composite materials										✓		
17254H15	AUTOMATED COMPUTER INTEGRATED	CO1	to produce useful research output in computer integrated manufacturing						✓						

Code	Course	CO	Outcome												
	MANUFACTURING SYSTEMS	CO2	use this knowledge to develop computer techniques						✓						
		CO3	Application of this knowledge to functionalise computer aided planning.					✓							
17254E16A	MATERIALS MANAGEMENT AND LOGISTICS	CO1	Understanding basics of materials management								✓				
		CO2	Understanding requirement analysis for material planning	✓											
		CO3	Ability to apply inventory management models	✓											
		CO4	Understanding purchasing practices						✓						
		CO5	Understanding storage in warehouse						✓						
17254HRS	RESEARCH LED SEMINAR	CO1	Understand research problem formulation.						✓						
		CO2	Analyze research related information			✓									
		CO3	Follow research ethics			✓									
		CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular										✓		

Code	Subject	CO	Outcome											
		CO5	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity						✓					
17254L17	CIM LAB	CO1	To impart the knowledge on training the students in the area of CAD/CAM				✓							
17254H21	PRODUCTION MANAGEMENT	CO1	Understand the role of operations management in achieving organizational competitiveness		✓									
		CO2	Appreciate the concepts of lean production and maintenance management in operations	✓										
		CO3	Comprehend key decision areas of operations and analyze data for effective decision making in operations management.		✓									
17254H22	MEMS AND NANO TECHNOLOGY	CO1	Ability to understand the operation of micro devices, micro systems and their applications	✓										
		CO2	Ability to design the micro devices, micro systems using the MEMS fabrication process.	✓										
		CO3	Gain a knowledge of basic approaches for various sensor design		✓									
		CO4	Gain a knowledge of basic approaches for various actuator design			✓								

Code	Subject	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17254H23	MANUFACTURING METROLOGY AND QUALITY CONTROL	CO1	They can choose appropriate method and instruments for inspection of various gear elements and thread elements. They can understand the standards of length, angles, they can understand the evaluation of surface finish and measure the parts with various comparators. The quality of the machine tool with alignment test can also be evaluated by them.				✓								
17254E24B	LEAN MANUFACTURING	CO1	The student will be able to practice the principles of lean manufacturing like customer focus, reduction of MUDA, just in time, Jidoka and Hoshin planning.	✓											
17254E25B	MAINTENANCE MANAGEMENT	CO1	Explain maintenance objectives and functions, factors influencing Plant Availability, Need for maintenance plan and organization, Functions of maintenance control and determine Failure probability, Survival probability and Age specific failure rates of equipments and components.		✓										

	CO													
	CO2	Determine the optimal overhaul/repair/replacement maintenance policy for an equipment subject to breakdown and optimal interval between preventive replacements for individual and group replacement of equipments.			✓									
	CO3	Explain different maintenance systems and the steps involved in establishing a maintenance plan and designing a technically sound preventive maintenance and lubrication program. (Comprehend)				✓								
	CO4	Determine the optimal inspection frequency for maximization of profit and minimization of down time and the critical path using CPM and PERT	✓											
	CO5	Explain the NUCREC method of prioritizing maintenance work, classification of spares and the costs associated with spares inventory, perform EOQ computations, explain MUSIC - 3D approach to spares management, determine the optimal number of spares to satisfy given service level and apply simulation technique for spares inventory.	✓											

Code	Subject	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17254HRM	RESEARCH METHODOLOGY	CO1	After completion of the syllabus students will able to get knowledge about the different research techniques and research report.	✓											
17254HBR	PARTICIPATION IN BOUNDED RESEARCH	CO1	After completion of the syllabus students will able to get knowledge about the project report.		✓										
17254L26	AUTOMATION LAB	CO1	To perform documentation			✓									
		CO2	To perform accounting operations				✓								
		CO3	To perform presentation skills					✓							
172TECWR	TECHNICAL WRITING/SEMINAR	CO1	Make effective presentations			✓									
		CO2	Participate confidently in Group Discussions.			✓									
		CO3	Attend job interviews and be successful in them.	✓											
		CO4	Develop adequate Soft Skills required for the workplace		✓										
17254H31	METAL FORMING PROCESS	CO1	Determine major process/processes of manufacturing used for given application.			✓									
		CO2	Explain when and why metal forming is chosen compared to other compatible methods				✓								
		CO3	Analyze effect of parameters influencing metal forming and compare hot working and cold working with applications	✓											

Code	Course	CO	Outcome												
		CO4	Explain capabilities and applications of bulk metal forming processes and sheet metal work.	✓											
		CO5	Outline tooling and equipments required for important metal forming processes.	✓											
17254E32B	INSTRUMENTATION AND CONTROL ENGINEERING	CO1	Ability to understand and analyse process control engineering problems.						✓						
17254E33B	FLUID POWER AUTOMATION	CO1	At the end of this course the students are familiarized in the area of hydraulics, pneumatic and fluid power components and its functions.							✓					
17254E34A	ADVANCED MATERIAL TECHNOLOGY	CO1	To impart knowledge on material selection methods and basics of advanced engineering materials.									✓			
		CO2	To introduce the basics of smart materials, composite materials, ceramics and glasses and modern											✓	
17254HSR	DESIGN PROJECT /SOCIO TECHNICAL PROJECT (SCAFFOLDED RESEARCH)	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.												✓
17254P35	PROJECT WORK PHASE I	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems	✓											

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
17254P41	PROJECT WORK PHASE II	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems	✓								

DEPARTMENT OF MECHANICAL ENGINEERING

M.TECH - PART TIME (PG - 2017)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
17248S11EP	ADVANCED ENGINEERING MATHEMATICS	CO1	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems	✓								
		CO2	Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations		✓							
		CO3	Illustrate Laplace transform and its application in different fields			✓						
		CO4	Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations				✓					
		CO5	Use Z-transform and its applications to solve difference equations					✓				
17254H12P	THEORY OF METAL CUTTING	CO1	Apply cutting mechanics to metal machining based on cutting force and power consumption.	✓								

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11
		CO2	Operate lathe, milling machines, drill press, grinding machines, etc.		✓									
		CO3	Select cutting tool materials and tool geometries for different metals.	✓				✓						
		CO4	Select appropriate machining processes and conditions for different metals.							✓				
		CO5	Learn machine tool structures and machining economics.							✓				
17254H13P	ADVANCED MANUFACTURING PROCESSES	CO1	Able to understand different types of composite material characteristics, types of micro & macro machining processes.	✓										
		CO2	Understand the e-manufacturing & nano materials.		✓									
17254L14P	CIM LAB	CO1	To impart the knowledge on training the students in the area of CAD/CAM				✓							
17254CRSP	RESEARCH LED SEMINAR	CO1	Understand research problem formulation.				✓							
		CO2	Analyze research related information		✓									
		CO3	Follow research ethics		✓									
		CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in									✓		

Code	Subject	CO	Description								
			general & engineering in particular								
		CO5	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity					✓			
17254H21P	PRODUCTION MANAGEMENT	CO1	Understand the role of operations management in achieving organizational competitiveness		✓						
		CO2	Appreciate the concepts of lean production and maintenance management in operations	✓							
		CO3	Comprehend key decision areas of operations and analyze data for effective decision making in operations management.		✓						
17254H22P	MEMS AND NANO TECHNOLOGY	CO1	Ability to understand the operation of micro devices, micro systems and their applications	✓							
		CO2	Ability to design the micro devices, micro systems using the MEMS fabrication process.	✓							
		CO3	Gain a knowledge of basic approaches for various sensor design		✓						

Code	Course	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO4	Gain a knowledge of basic approaches for various actuator design				✓								
17254E23BP	LEAN MANUFACTURING	CO1	The student will be able to practice the principles of lean manufacturing like customer focus, reduction of MUDA, just in time, Jidoka and Hoshin planning.	✓											
17254L24P	AUTOMATION LAB	CO1	To perform documentation				✓								
		CO2	To perform accounting operations					✓							
		CO3	To perform presentation skills						✓						
172TECWRP	TECHNICAL WRITING/SEMINAR	CO1	Make effective presentations				✓								
		CO2	Participate confidently in Group Discussions.				✓								
		CO3	Attend job interviews and be successful in them.	✓											
		CO4	Develop adequate Soft Skills required for the workplace		✓										
17254CRMP	RESEARCH METHODOLOGY	CO1	After completion of the syllabus students will able to get knowledge about the different research techniques and research report.	✓											
17254CBRP	PARTICIPATION IN BOUNDED RESEARCH	CO1	After completion of the syllabus students will able to get knowledge about the project report.		✓										
17254H31P	MECHANICAL METALLURGY	CO1	Identify the properties of metals with respect to crystal structure and grain size				✓								

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO2	Interpret the phase diagrams of materials								✓				
		CO3	Classify and Distinguish different types of cast irons, steels and non ferrous alloys	✓											
		CO4	Describe the concept of heat treatment of steels & strengthening mechanisms	✓											
		CO5	Explain the powder metallurgy process, types and manufacturing of composite materials												✓
17254H32P	AUTOMATED COMPUTER INTEGRATED MANUFACTURING SYSTEMS	CO1	to produce useful research output in computer integrated manufacturing							✓					
		CO2	use this knowledge to develop computer techniques						✓						
		CO3	Application of this knowledge to functionalise computer aided planning.					✓							
17254E33AP	MATERIALS MANAGEMENT AND LOGISTICS	CO1	Understanding basics of materials management								✓				
		CO2	Understanding requirement analysis for material planning	✓											
		CO3	Ability to apply inventory management models	✓											
		CO4	Understanding purchasing practices						✓						
		CO5	Understanding storage in warehouse						✓						

Code	Course Name	CO	Description										
17254CSRP	DESIGN PROJECT /SOCIO TECHNICAL PROJECT (SCAFFOLDED RESEARCH)	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.										✓
17254H41P	MANUFACTURING METROLOGY AND QUALITY CONTROL	CO1	They can choose appropriate method and instruments for inspection of various gear elements and thread elements. They can understand the standards of length, angles, they can understand the evaluation of surface finish and measure the parts with various comparators. The quality of the machine tool with alignment test can also be evaluated by them.				✓						
17254E43BP	MAINTENANCE MANAGEMENT	CO1	Explain maintenance objectives and functions, factors influencing Plant Availability, Need for maintenance plan and organization, Functions of maintenance control and determine Failure probability, Survival probability and Age specific failure rates of equipments and components.		✓								

			CO2	Determine the optimal overhaul/repair/replacement maintenance policy for an equipment subject to breakdown and optimal interval between preventive replacements for individual and group replacement of equipments.			✓							
			CO3	Explain different maintenance systems and the steps involved in establishing a maintenance plan and designing a technically sound preventive maintenance and lubrication program. (Comprehend)				✓						
			CO4	Determine the optimal inspection frequency for maximization of profit and minimization of down time and the critical path using CPM and PERT	✓									
			CO5	Explain the NUCREC method of prioritizing maintenance work, classification of spares and the costs associated with spares inventory, perform EOQ computations, explain MUSIC - 3D approach to spares management, determine the optimal number of spares to satisfy given service level and apply simulation technique for spares inventory.	✓									

Code	Course	CO	Outcome												
17254H42P	METAL FORMING PROCESS	CO1	Determine major process/processes of manufacturing used for given application.			✓									
		CO2	Explain when and why metal forming is chosen compared to other compatible methods				✓								
		CO3	Analyze effect of parameters influencing metal forming and compare hot working and cold working with applications	✓											
		CO4	Explain capabilities and applications of bulk metal forming processes and sheet metal work.	✓											
		CO5	Outline tooling and equipments required for important metal forming processes.	✓											
17254P35	PROJECT WORK PHASE I	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems	✓											
17254E51BP	INSTRUMENTATION AND CONTROL ENGINEERING	CO1	Ability to understand and analyse process control engineering problems.				✓								
17254E52BP	FLUID POWER AUTOMATION	CO1	At the end of this course the students are familiarized in the area of hydraulics, pneumatic and fluid power components and its functions.						✓						
17254E53AP	ADVANCED MATERIAL TECHNOLOGY	CO1	To impart knowledge on material selection methods and basics of advanced engineering materials.								✓				

		CO2	To introduce the basics of smart materials, composite materials, ceramics and glasses and modern											✓	
17254P41	**PROJECT WORK PHASE II**	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems	✓											

PRIST

DEEMED TO BE

UNIVERSITY

NAAC ACCREDITED THANJAVUR – 613 403 - TAMIL NADU

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE
AND
ENGINEERING
2017R

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

1.1.1 PROGRAMME OUTCOMES
B.TECH

Engineering Graduates will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of industrial problems.

PO 2: Problem analysis: Identify, formulates, and solve complex engineering problems. with high degree ofcompetence.

PO3: Conduct investigations of complex problems: Use research-based knowledge andresearch methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO4: Design/development of solutions: Design solutions for mechanical engineering problemsand design components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodern engineering use modern tools, software and equipment to analyze multidisciplinary.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge toassesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineeringsolutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities andnorms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member orleader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with theengineering community and with society at large, such as, being able to comprehend and write

PO 11: effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 12: Project management and finance: Demonstrate knowledge and understanding of theengineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 13: Life-long learning: Recognize the need for, and have the preparation and ability toengage in independent and life-long learning in the broadest context of technological change.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAMME OUTCOMES
M.TECH
M.TECH- COMPUTER SCIENCE AND ENGINEERING (Full Time - 2 Yrs; Part Time – 3Yrs)

PO1: **Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **Problem analysis**: Identify, formulate, review research literature, and analyze complexengineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problemsand design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge andresearch methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge toassess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **Environment and sustainability**: Understand the impact of the professional engineeringsolutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities andnorms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member orleader in diverse teams, and in multidisciplinary settings.

PO10: **Communication**: Communicate effectively on complex engineering activities with theengineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: **Project management and finance**: Demonstrate knowledge and understanding of theengineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability toengage in independent and life-long learning in the broadest context of technological change.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAMME SPECIFIC OUTCOMES

B.TECH

PSO1: To analyze, design and develop solutions by applying foundational concepts of electronics and communication engineering.

PSO2: To apply design principles and best practices for developing quality products for scientific and business applications.

PSO3: To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.

M.TECH

PSO1: To analyze, design and develop solutions by applying foundational concepts of electronics and communication engineering.

PSO2: To apply design principles and best practices for developing quality products for scientific and business applications.

PSO3: To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

17148S11P	Transforms And Partial Differential Equations	: • Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. •Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. • Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations.
17150C12P	Digital Systems	using basic logic gates • Implement combinational circuits using MSI devices • Implement sequential circuits like registers and counters • Simulate combinational and sequential circuits using HDL.
17150C13P	Data Structures And Algorithms	Analyze algorithms. • Determine algorithm correctness. •Choose appropriate data structures for the problems to be solved. • Design algorithms for problems from different domains. • Identify various research strategies on

17150C25P	Software Engineering	• Integrate various soft computing techniques forcomplex problems
17148S31P	Discrete Mathematics	Have knowledge of the concepts needed to test the logic of a program. • Have an understanding in identifying structures on many levels. • Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science. • Be aware of the counting principles • Be exposed to concepts and properties of algebraic structures such as groups, rings and fields
17150C32P	Operating System	Design algorithms for various computing problems. • Analyze the time and space complexity ofalgorithms. • Critically analyze the different algorithm designtechniques for a given problem. • Modify existing algorithms to improve efficiency.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

17150C33P	Artificial Intelligence	• Use appropriate search algorithms for any AIproblem • Represent a problem using first order and predicatelogic • Provide the apt agent strategy to solve a givenproblem • Design software agents to solve a problem Design applications for NLP that use Artificial Intelligence.
17150L35P	Operating Systems And Networking Lab	Compare the performance of various CPUScheduling Algorithms • Implement Deadlock avoidance and Detection
17150C41P	Principles Of Cryptography	Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems. • Perform administrative tasks on Linux Servers. ☐ Compare iOS and Android Operating Systems.
17150C42P	Web Technology	problems. • Analyze the time and space complexity of algorithms. • Critically analyze the different algorithm design techniques for a given problem. • Modify existing
17150C43P	C# And .Net Framework	Write various applications using C# Language in the .NET Framework. • Develop distributed applications using .NET Framework. • Create mobile applications using .NET compact Framework

Local Needs	Regional Needs	National Needs	Global Needs

17150E44DP	Advanced Databases	• Design and implement relational databases. • Design and implement parallel and distributed databases. • Design and implement XML databases, Active, Temporal and Deductive databases. • Implement the concept of database connectivity with the applications. • Design and implement NoSQL database
17150L45P	Internet Programming Lab	• Construct a basic website using HTML and Cascading Style Sheets. • Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms. • Develop server side programs using Servlets and JSP. • Construct simple web pages in PHP and to represent data in XML format. Use AJAX and web services to develop interactive web applications
17150C51P	Object Oriented Analysis And Design	• Develop Java programs using OOP principles • Develop Java programs with the concepts inheritance and interfaces • Build Java applications using exceptions and I/O streams • Develop Java applications with threads and generics classes • Develop interactive Java programs using swing
17150C52P	Software Quality Management	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17150C53P	Graphics And Multimedia	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17150E54AP	Soft Computing	• Apply suitable soft computing techniques for various applications. • Integrate various soft computing techniques for complex problems generics classes • Develop interactive Java programs using swing

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

17150E54BP	Principles Of Compiler Design	Classify the modern and futuristic database applications based on size and complexity • Map ER model to Relational model to perform database design effectively • Write queries using normalization criteria and optimize queries • Compare and contrast various indexing strategies in different database systems • Appraise how advanced databases differ from traditional databases
17150E54CP	Distributed Systems	• problem • Represent a problem using first order and predicate logic • Provide the apt agent strategy to solve a given problem • Design software agents to solve a problem
17150E54DP	Mobile Computing	• Explain the basics of mobile telecommunication systems • Illustrate the generations of telecommunication systems in wireless networks • Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network • Explain the functionality of Transport and Application layers Develop a mobile application using

17150L55P	Software Development Lab	• Apply suitable soft computing techniques for various applications. • Integrate various soft computing techniques for complex problems
17150C61P	Embedded Systems	processor. • Explain the concepts of embedded systems • Understand the Concepts of peripherals and interfacing of sensors. • Capable of using the system design techniques to develop firmware • Illustrate the code for constructing a system
17150C62P	Advanced Java Programming	Construct Web pages using HTML/XML and style sheets. • Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms. • Develop dynamic web pages using server side scripting.
		android/blackberry/ios/Windows SDK
17150L55P	Software Development Lab	• Apply suitable soft computing techniques for various applications. • Integrate various soft computing techniques forcomplex problems

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

17150C63P	Software Testing	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17150E64AP	Principles Of Management	Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems. • Perform administrative tasks on Linux Servers. • Compare iOS and Android Operating Systems.
17150E64BP	Unix Internals	• problem • Represent a problem using first order and predicate logic • Provide the apt agent strategy to solve a given problem • Design software agents to solve a problem
17150E64CP	Parallel Computing	processor. • Explain the concepts of embedded systems • Understand the Concepts of peripherals and interfacing of sensors.

Local Needs   **Regional Needs**   National Needs   **Global Needs**

		• Capable of using the system design techniques to develop firmware • Illustrate the code for constructing a system
17150E64DP	Programming Paradigms	• problem • Represent a problem using first order and predicate logic • Provide the apt agent strategy to solve a given problem • Design software agents to solve a problem
17150L65P	Java Programming Lab	Construct Web pages using HTML/XML and style sheets. • Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms. • Develop dynamic web pages using server side scripting. • Use PHP programming to develop web applications. • Construct web applications using AJAX and web services.
17150E74BP	Bio Informatics	Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems. • Perform administrative tasks on Linux Servers. • Compare iOS and A
17150E74CP	Software Project Management	project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17150E74DP	Digital Image Processing	digital image processing, such as digitization, sampling, quantization, and 2D-transforms. • Operate on images using the techniques of smoothing, sharpening and enhancement. • Understand the restoration concepts and filtering techniques. • Learn the basics of segmentation, features extraction, compression and recognition methods for color models
17150P75P	Project	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17248S11A	Higher Mathematics	Eigen values and eigenvectors, diagonalization of a

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. •Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients
17250C12	Modern Operating System	Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems. • Perform administrative tasks on Linux Servers. • Compare iOS and Android Operating Systems.
17250C13	Parallel And High Performance Computing	different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph
17250C14	Adhoc And Sensor Network	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks
17250C15	Advanced Data Structures And Algorithms	• Develop Java programs using OOP principles • Develop Java programs with the concepts inheritance and interfaces • Build Java applications using exceptions and I/O streams • Develop Java applications with threads and generics classes • Develop interactive
17250E16A	Multimedia Systems	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250E16B	Genetic Algorithms	Write various applications using C# Language in the .NET Framework. • Develop distributed applications using .NET Framework. • Create mobile applications using .NET compact

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

224

		Framework
17250E16C	Software Metrics	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks.
17250L17	Advanced Web Technologies Lab	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250C21	Middleware Technologies	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250C22	Object Oriented Software Engineering	• Develop Java programs using OOP principles • Develop Java programs with the concepts inheritance and interfaces • Build Java applications using exceptions and I/O streams • Develop Java applications with threads and generics classes • Develop interactive
17250C23	Digital Image Processing	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250E24A	Advanced Distributed Computing	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250E24B	Data Warehousing &Data Mining	• Design a Data warehouse system and perform business analysis with OLAP tools. • Apply suitable pre-processing and visualization techniques for data analysis • Apply frequent pattern and association rule mining techniques for data analysis Apply appropriate classification and clustering

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		techniques for data analysis
17250E24C	Artificial Neural Networks	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250E25A	Service Oriented Architecture	Understand XML technologies • Understand service orientation, benefits of SOA • Understand web services and WS standards • Use web services extensions to develop solutions • Understand and apply service modeling, service oriented analysis and design for application developmen
17250E25B	High Speed Networks	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250E25C	Embedded Systems	Describe the architecture and programming of ARM processor. • Explain the concepts of embedded systems • Understand the Concepts of peripherals and interfacing of sensors. • Capable of using the system design techniques to develop firmware • Illustrate the code for constructing a system
17250L26	.Net Technologies Lab	Write various applications using C# Language in the .NET Framework. • Develop distributed applications using .NET Framework. • Create mobile applications using .NET compact Framework
172TECWR	Technical Writing /Seminars	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks.
17250CRM	Research Methodology	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems • To implement intelligent databases and various data models.
17250CBR	Participation In Bounded Research	Identify the key activities in managing a software

Local Needs　　　**Regional Needs**　　　**National Needs**　　　**Global Needs**

		project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. Manage project schedule, estimate project cost and effort required
17250C31	Software Project Management	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E32A	Cloud Computing	Articulate the main concepts, key technologies, strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Explain the core issues of cloud computing such as security, privacy and interoperability. • Choose the appropriate technologies, algorithms and approaches for the related issues. • Facilitate Service Level Agreements (SLA).
17250E32B	Information Security	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E32C	Soft Computing	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

17250E33A	Advanced Database Technology	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E33B	Mobile Communication And Computing	Develop mobile applications using GUI and Layouts. • Develop mobile applications using Event Listener. • Develop mobile applications using Databases. • Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS. • Analyze and discover own mobile app for simple needs.
17250E33C	Green Computing	
17250E34A	Software Quality Assurance	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E34B	Bio-Informatics	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E34C	Wireless Application Protocols	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks
17250P35	Project Work Phase - I	On Completion of the project work students will be in a position to take up any challenging practical problems

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		and find solution by formulating proper methodology
17250P41	Project Work Phase - Ii	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17248S11A	Higher Mathematics	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks.
17250C12	Modern Operating System	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250C13	Parallel And High Performance Computing	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250C14	Adhoc And Sensor Network	• Develop Java programs using OOP principles • Develop Java programs with the concepts inheritance and interfaces • Build Java applications using exceptions and I/O streams • Develop Java applications with threads and generics classes • Develop interactive
17250C15	Advanced Data Structures And Algorithms	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250E16A	Multimedia Systems	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250E16B	Genetic Algorithms	• Design a Data warehouse system and perform business analysis with OLAP tools. • Apply suitable pre-processing and visualization techniques for data analysis

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		• Apply frequent pattern and association rule mining techniques for data analysis Apply appropriate classification and clustering techniques for data analysis
17250E16C	Software Metrics	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250L17	Advanced Web Technologies Lab	Understand XML technologies • Understand service orientation, benefits of SOA • Understand web services and WS standards • Use web services extensions to develop solutions • Understand and apply service modeling, service oriented analysis and design for application development
17250CRS	Research Led Seminar	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250C21	Middleware Technologies	Describe the architecture and programming of ARM processor. • Explain the concepts of embedded systems • Understand the Concepts of peripherals and interfacing of sensors. • Capable of using the system design techniques to develop firmware • Illustrate the code for constructing a system
17250C22	Object Oriented Software Engineering	Write various applications using C# Language in the .NET Framework. • Develop distributed applications using .NET Framework. • Create mobile applications using .NET compact Framework
17250C23	Digital Image Processing	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks.
17250E24A	Advanced Distributed Computing	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		database problems. • To implement intelligent databases and various data models.
17250E24B	Data Warehousing & Data Mining	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E24C	Artificial Neural Networks	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E25A	Service Oriented Architecture	Articulate the main concepts, key technologies, strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Explain the core issues of cloud computing such as security, privacy and interoperability. • Choose the appropriate technologies, algorithms and approaches for the related issues. • Facilitate Service Level Agreements (SLA).
17250E25B	High Speed Networks	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E25C	Embedded Systems	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		• Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250L26	.Net Technologies Lab	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
172TECWR	Technical Writing /Seminars	Develop mobile applications using GUI and Layouts. • Develop mobile applications using Event Listener. • Develop mobile applications using Databases. • Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS. • Analyze and discover own mobile app for simple needs.
17250CRM	Research Methodology	• Compare different process models. • Concepts of requirements engineering and Analysis Modeling.
17250CBR	Participation In Bounded Research	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance • Manage project schedule, estimate project cost and effort required
17250C31	Software Project Management	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E32A	Cloud Computing	Identify different issues in wireless ad hoc and sensor

Local Needs	Regional Needs	National Needs	Global Needs

		networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks
17250E32B	Information Security	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17250E32C	Soft Computing	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17250E33A	Advanced Database Technology	• Compare different process models. • Concepts of requirements engineering and Analysis Modeling.
17250E33B	Mobile Communication And Computing	To identify and understand security issues in ad hoc and sensor networks
17250E33C	Green Computing	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17250E34A	Software Quality Assurance	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society
17250E34B	Bio-Informatics	• Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E34C	Wireless Application Protocols	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks
17250P35	Project Work Phase - I	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17250P41	Project Work Phase - Ii	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17147S11	Communicative English	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

17148S12	Engineering Mathematics I	: • Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. •Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. • Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations.
17149S13	Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications • The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, • The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, • The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and • The students will understand the basics of crystals, their structures and different crystal growth techniques
17149S14	Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
17154S15	Engineering Graphics	Familiarize with the fundamentals and standards of Engineering graphics • Perform freehand sketching of basic geometrical constructions and multiple views of objects . • Project orthographic projections of lines and plane surfaces. • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.
17150S16	Problem Solving And Basics Of Python Programming	Develop algorithmic solutions to simple computational problems • Read, write, execute by hand simple Python programs. • Structure simple Python programs for solving problems.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		• Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries. • Read and write data from/to files in Python Programs
17150L17	Problem Solving And Basics Of Python Programming laboratory	• Write, test, and debug simple Python programs. • Implement Python programs with conditionals and loops. • Develop Python programs step-wise by defining functions and calling them. 28 • Use Python lists, tuples, dictionaries for representing compound data. • Read and write data from/to files in Python.
17149L18	Physics And Chemistry Laboratory	Apply principles of elasticity, optics and thermal properties for engineering applications. • The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
171VEA19	Technical English	Read technical texts and write area- specific texts effortlessly. • Listen and comprehend lectures and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.
17147S21	Engineering Mathematics – II	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. •Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
17148S22	Physics For Information Science	Gain knowledge on classical and quantum electron theories, and energy band structuues, • Acquire knowledge on basics of semiconductor physics and its applications in various devices, • Get knowledge on magnetic properties of materials and their applications in data storage, •Have the necessary understanding on the functioning of optical materials for optoelectronics, • Understand the basics of quantum structures and their applications in carbon electronics..
17149S23A	Environmental Science And Engineering	•Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		Protection. One will obtain knowledge on the following after completing the course. • Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in std. of living has lead to serious environmental disasters
17149S24A	Basic Electrical, Electronics And Measurement Engineering	Discuss the essentials of electric circuits and analysis. • Discuss the basic operation of electric machines and transformers •Introduction of renewable sources and common domestic loads. • Introduction to measurement and metering for electric circuits
17153S25A	Programming In C	Develop simple applications in C using basic constructs • Design and implement applications using arrays and strings • Develop and implement applications in C using functions and pointers. • Develop applications in C using structures. • Design applications using sequential and random access file processing.
17150S26A	Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works. Use welding equipments to join the structures. Carry out the basic machining operations Make the models using sheet metal works Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings Carry out basic home electrical works and appliances Measure the electrical quantities Elaborate on the components, gates, soldering practices.
17154L27	C Programming Laboratory	Develop C programs for simple applications making use of basic constructs, arrays and strings. • Develop C programs involving functions, recursion, pointers, and structures. • Design applications using sequential and random access file processing.
17150L28A	Discrete Mathematics	Have knowledge of the concepts needed to test the logic of a program. • Have an understanding in identifying structures onmany levels. • Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science. • Be aware of the counting principles • Be exposed to concepts and properties of algebraic

			structures such as groups, rings and fields
17150C33	Digital Principles And System Design		Simplify Boolean functions using KMap • Design and Analyze Combinational and Sequential Circuits • Implement designs using Programmable Logic Devices • Write HDL code for combinational and Sequential Circuits
17150C34	Data Structures		• Implement abstract data types for linear data structures. • Apply the different linear and non-linear data structures to problem solutions. • Critically analyze the various sorting algorithms.
17150S35	Object Oriented Programming		• Develop Java programs using OOP principles • Develop Java programs with the concepts inheritance and interfaces • Build Java applications using exceptions and I/O streams • Develop Java applications with threads and generics classes • Develop interactive Java programs using swing
17150S36	Communication Engineering		• Ability to comprehend and appreciate the significance and role of this course in the present contemporary world • Apply analog and digital communication techniques . • Use data and pulse communication techniques. • Analyze Source and Error control coding
17150L36	Data Structures Laboratory		Write functions to implement linear and non-linear data structure operations • Suggest appropriate linear / non-linear data structure operations for solving a given problem • Appropriately use the linear / non-linear data structure operations for a given problem • Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval
17150L37	Object Oriented Programming Laboratory		Develop and implement Java programs for simple applications that make use of classes, packages and interfaces. • Develop and implement Java programs with arraylist, exception handling and multithreading .• Design applications using file processing, generic programming and event handling.
17150L38	Digital Systems Laboratory		Implement simplified combinational circuits using basic logic gates • Implement combinational circuits using MSI devices • Implement sequential circuits like registers and counters • Simulate combinational and sequential circuits using HDL

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

Code	Subject	Course Outcomes
17150L39	Interpersonal Skills/Listening &Speaking	• Listen and respond appropriately. • Participate in group discussions • Make effective presentations • Participate confidently and appropriately in conversations both formal and informal
17148S41A	Probability And Queuing Theory	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. • Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. • Apply the concept of random processes in engineering disciplines. • Acquire skills in analyzing queueing models . • Understand and characterize phenomenon which evolve with respect to time in a probabilistic manne
17150C42	Computer Architecture	Understand the basics structure of computers, operations and instructions. • Design arithmetic and logic unit. • Understand pipelined execution and design control unit. • Understand parallel processing architectures . • Understand the various memory systems and I/O communication.
17150C43	Database Management Systems	Classify the modern and futuristic database applications based on size and complexity • Map ER model to Relational model to perform database design effectively • Write queries using normalization criteria and optimize queries • Compare and contrast various indexing strategies in different database systems • Appraise how advanced databases differ from traditional databases
17150C44	Design And Analysis Of Algorithms	Design algorithms for various computing problems. • Analyze the time and space complexity of algorithms. • Critically analyze the different algorithm design techniques for a given problem. • Modify existing algorithms to improve efficiency.
17150C45	Operating Systems	Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems. • Perform administrative tasks on Linux Servers. • Compare iOS and Android Operating Systems.
17150C46	Software Engineering	Identify the key activities in managing a software

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17150L47	Database Management Systems Laboratory	Use typical data definitions and manipulation commands. • Design applications to test Nested and Join Queries • Implement simple applications that use Views • Implement applications that require a Front-end Tool • Critically analyze the use of Tables, Views, Functions and Procedures
17150L48	Operating Systems Laboratory	Compare the performance of various CPU Scheduling Algorithms • Implement Deadlock avoidance and Detection Algorithms • Implement Semaphores • Create processes and implement IPC • Analyze the performance of the various Page Replacement Algorithms • Implement File Organization and File Allocation Strategies
17150L49	Advanced Reading And Writing	Write different types of essays. • Write winning job applications. 59 • Read and evaluate texts critically • Display critical thinking in various professional contexts
17148S51A	Algebra And Number Theory	• Apply the basic notions of groups, rings, fields which will then be used to solve related problems. • Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts. • Demonstrate accurate and efficient use of advanced algebraic techniques. • Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text. • Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.
17150C52	Computer Networks	• Understand the basic layers and its functions in computer networks. • Evaluate the performance of a network.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		• Understand the basics of how data flows from one node to another • . Analyze and design routing algorithms • . Design protocols for various functions in the network. • Understand the working of various application layer protocols.
17150C53	Microprocessors And Microcontrollers	• Understand and execute programs based on 8086 microprocessor. • Design Memory Interfacing circuits. • Design and interface I/O circuits • . Design and implement 8051 microcontroller based systems.
17150E66A	Database Management Systems	• Construct automata, regular expression for any pattern. • Write Context free grammar for any construct. • Design Turing machines for any language. • Propose computation solutions using Turing machines. • Derive whether a problem is decidable or not.
17150E66B	Object Oriented Analysis And Design	• Express software design with UML diagrams • Design software applications using OO concepts. Identify various scenarios based on software requirements • Transform UML based software design into pattern based design using design patterns • Understand the various testing methodologies for OO software
17150E66C	Microprocessors And Microcontrollers Laboratory	• Write ALP Programmes for fixed and Floating Point and Arithmetic operations • Interface different I/Os with processor • Generate waveforms using Microprocessors • Execute Programs in 8051 • Explain the difference between simulator and Emulator
17150E66D	Object Oriented Analysis And Design Laboratory	• Perform OO analysis and design for a given problem specification. • Identify and map basic software requirements in UML mapping. • Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns • •Test the compliance of the software with the SRS
17150E66E	Networks Laboratory	• Implement various protocols using TCP and UDP. • Compare the performance of different transport layer protocols. • Use simulation tools to analyze the performance of various network protocols. • Analyze various routing algorithms.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		• Implement error correction codes
17150C61	Internet Programming	• Construct a basic website using HTML and Cascading Style Sheets. • Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms. • Develop server side programs using Servlets and JSP. • Construct simple web pages in PHP and to represent data in XML format. • Use AJAX and web services to develop interactive web applications
17150C62	Artificial Intelligence	• Use appropriate search algorithms for any AI problem • Represent a problem using first order and predicate logic • Provide the apt agent strategy to solve a given problem • Design software agents to solve a problem • Design applications for NLP that use Artificial Intelligence.
17150C63	Mobile Computing	• Explain the basics of mobile telecommunication systems • Illustrate the generations of telecommunication systems in wireless networks • Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network • Explain the functionality of Transport and Application layers • Develop a mobile application using android/blackberry/ios/Windows SDK
17150C64	Compiler Design	• Understand the different phases of compiler • Design a lexical analyzer for a sample language. 72 • Apply different parsing algorithms to develop the parsers for a given grammar. • Understand syntax-directed translation and run-time environment. • Learn to implement code optimization techniques and a simple code generator. • Design and implement a scanner and a parser using LEX and YACC tools.
17150C65	Distributed Systems	• Elucidate the foundations and issues of distributed systems • Understand the various synchronization issues and global state for distributed systems. • Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems • Describe the agreement protocols and fault

Local Needs   **Regional Needs**   National Needs   **Global Needs**

		tolerance mechanisms in distributed systems • Describe the features of peer-to-peer and distributed shared memory systems
17150E66A	Data Warehousing And Data Mining	• Design a Data warehouse system and perform business analysis with OLAP tools. • Apply suitable pre-processing and visualization techniques for data analysis • Apply frequent pattern and association rule mining techniques for data analysis • Apply appropriate classification and clustering techniques for data analysis
17150E66B	Software Testing	Design test cases suitable for a software development for different domains. • Identify suitable tests to be carried out. • Prepare test planning based on the document • Document test plans and test cases designed. • Use automatic testing tools. • Develop and validate a test plan.
17150E66C	Embedded Systems	Describe the architecture and programming of ARM processor. • Explain the concepts of embedded systems • Understand the Concepts of peripherals and interfacing of sensors. • Capable of using the system design techniques to develop firmware • Illustrate the code for constructing a system
17150E66D	Graph Theory And Applications	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications.
17150E66E	Digital Signal Processing	Perform mathematical operations on signals. • Understand the sampling theorem and perform sampling on continuous-time signals to get discrete time signal by applying advanced knowledge of the sampling theory. • Transform the time domain signal into frequency domain signal and vice-versa. • Apply the relevant theoretical knowledge to design the digital IIR/FIR filters for the given analog specifications.
17150L61	Internet Programming Laboratory	Construct Web pages using HTML/XML and style sheets. • Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms. • Develop dynamic web pages using server side scripting. • Use PHP programming to develop web applications.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		• Construct web applications using AJAX and web services.
17150L62	Mobile Application Development Laboratory	Develop mobile applications using GUI and Layouts. • Develop mobile applications using Event Listener. • Develop mobile applications using Databases. • Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS. • Analyze and discover own mobile app for simple needs.
17150L63	Professional Communication	Make effective presentations • Participate confidently in Group Discussions. • Attend job interviews and be successful in them . • Develop adequate Soft Skills required for the workplace
17150S71	Principles Of Management	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management
17150C72	Cryptography And Network Security	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities • Apply the different cryptographic operations of symmetric cryptographic algorithms • Apply the different cryptographic operations of public key cryptography • Apply the various Authentication schemes to simulate different applications. • Understand various Security practices and System security standards
17150C73	Cloud Computing	Articulate the main concepts, key technologies, strengths and limitations of cloud computing. • Learn the key and enabling technologies that help in the development of cloud. • Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models. • Explain the core issues of cloud computing such as resource management and security. • Be able to install and use current cloud technologies. • Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud
17150E75A	Big Data Analytics	Work with big data tools and its analysis techniques • Analyze data by utilizing clustering and classification algorithms • Learn and apply different mining algorithms and recommendation systems for large volumes of data • Perform analytics on data streams • Learn NoSQL databases and management.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

17150E75B	Machine Learning Techniques	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches • Discuss the decision tree algorithm and indentity and overcome the problem of overfitting • Discuss and apply the back propagation algorithm and genetic algorithms to various problems • Apply the Bayesian concepts to machine learning •Analyse and suggest appropriate machine learning approaches for various types of problems
17150E75C	Software Project Management	Understand Project Management principles while developing software. • Gain extensive knowledge about the basic project management concepts, framework and the process models. • Obtain adequate knowledge about software process models and software effort estimation techniques. • Estimate the risks involved in various project activities. • Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles. • Learn staff selection process and the issues related to people management
17150E75D	Internet Of Things	Explain the concept of IoT. • Analyze various protocols for IoT. • Design a PoC of an IoT system using Rasperry Pi/Arduino •Apply data analytics and use cloud offerings related to IoT. • Analyze applications of IoT in real time scenario
17150E75E	Service Oriented Architecture	Understand XML technologies • Understand service orientation, benefits of SOA • Understand web services and WS standards • Use web services extensions to develop solutions • Understand and apply service modeling, service oriented analysis and design for application development
17150E76A	Multi Core Architectures And programming	Describe multicore architectures and identify their characteristics and challenges. • Identify the issues in programming Parallel Processors. • Write programs using OpenMP and MPI. • Design parallel programming solutions to common problems. • Compare and contrast programming for serial processors and programming for parallel processors
17150E76B	Human Computer Interaction	Design effective dialog for HCI • Design effective HCI for individuals and persons with disabilities. • Assess the importance of user feedback. • Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		Develop meaningful user interface.
17150E76C	C# And .Net Programming	Write various applications using C# Language in the .NET Framework. • Develop distributed applications using .NET Framework. • Create mobile applications using .NET compact Framework
17150E76D	Wireless Adhoc And Sensor Networks	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks.
17150E76E	Advanced Topics On Databases	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17150L77	Cloud Computing Laboratory	Configure various virtualization tools such as Virtual Box, VMware workstation. • Design and deploy a web application in a PaaS environment. • Learn how to simulate a cloud environment to implement new schedulers. •Install and use a generic cloud environment that can be used as a private cloud. • Manipulate large data sets in a parallel environment
17150L78	Security Laboratory	Develop code for classical Encryption Techniques to solve the problems. • Build cryptosystems by applying symmetric and public key encryption algorithms. • Construct code for authentication algorithms. • Develop a signature scheme using Digital signature standard. • Demonstrate the network security system using open source tools
17150E81A	DigitalImage Processing	Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms. • Operate on images using the techniques of smoothing, sharpening and enhancement. • Understand the restoration concepts and filtering techniques. • Learn the basics of segmentation, features extraction, compression and recognition methods for color models
17150E81B	Social Network Analysis	Develop semantic web related applications. • Represent knowledge using ontology.

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		• Predict human behaviour in social web and related communities • Visualize social networks
17150E81C	Information Security	Discuss the basics of information security • Illustrate the legal, ethical and professional issues in information security • Demonstrate the aspects of risk management. • Become aware of various standards in the Information Security System • Design and implementation of Security Techniques
17150E81D	Cyber Forensics	Understand the basics of computer forensics • Apply a number of different computer forensic tools to a given scenario • Analyze and validate forensics data • Identify the vulnerabilities in a given network infrastructure • Implement real-world hacking techniques to test system security
17150E81E	Soft Computing	• Apply suitable soft computing techniques for various applications. • Integrate various soft computing techniques for complex problems
17150E82A	Information Retrieval Techniques	Use an open source search engine framework and explore its capabilities • Apply appropriate method of classification or clustering. • Design and implement innovative features in a search engine. • Design and implement a recommender system.
17150E82B	Natural Language Processing	To tag a given text with basic Language features • To design an innovative application using NLP components • To implement a rule based system to tackle morphology/syntax of a language • To design a tag set to be used for statistical processing for real-time applications • To compare and contrast the use of different statistical approaches for different types of NLP applications.
17150E82C	Parallel Algorithms	Develop parallel algorithms for standard problems and applications. • Analyse efficiency of different parallel algorithms.
17150E82D	Speech Processing	Create new algorithms with speech processing • Derive new speech models • Perform various language phonetic analysis • Create a new speech identification system • Generate a new speech recognition system
17150E82E	Fundamentals Of Nano Science	• Will familiarize about the science of nanomaterials • Will demonstrate the preparation of nanomaterials • Will

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

		develop knowledge in characteristic nanomaterial
17150P83	Project Work	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17248S11A	Higher Mathematics	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks.
17250C12	Modern Operating System	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250C13	Parallel And High Performance Computing	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250C14	Adhoc And Sensor Network	• Develop Java programs using OOP principles • Develop Java programs with the concepts inheritance and interfaces • Build Java applications using exceptions and I/O streams • Develop Java applications with threads and generics classes • Develop interactive
17250C15	Advanced Data Structures And Algorithms	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250E16A	Multimedia Systems	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250E16B	Genetic Algorithms	• Design a Data warehouse system and perform business analysis with OLAP tools. • Apply suitable pre-processing and visualization techniques for data analysis

Local Needs	Regional Needs	National Needs	Global Needs

		• Apply frequent pattern and association rule mining techniques for data analysis Apply appropriate classification and clustering techniques for data analysis
17250E16C	Software Metrics	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems. • To implement intelligent databases and various data models.
17250L17	Advanced Web Technologies Lab	Understand XML technologies • Understand service orientation, benefits of SOA • Understand web services and WS standards • Use web services extensions to develop solutions • Understand and apply service modeling, service oriented analysis and design for application developmen
17250CRS	Research Led Seminar	Understand the basic concepts of graphs, and different types of graphs • Understand the properties, theorems and be able to prove theorems. • Apply suitable graph model and algorithm for solving applications
17250C21	Middleware Technologies	Describe the architecture and programming of ARM processor. • Explain the concepts of embedded systems • Understand the Concepts of peripherals and interfacing of sensors. • Capable of using the system design techniques to develop firmware • Illustrate the code for constructing a system
17250C22	Object Oriented Software Engineering	Write various applications using C# Language in the .NET Framework. • Develop distributed applications using .NET Framework. • Create mobile applications using .NET compact Framework
17250C23	Digital Image Processing	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks.
17250E24A	Advanced Distributed Computing	To develop in-depth understanding of relational databases and skills to optimize database performance in practice. • To understand and critique on each type of databases. • To design faster algorithms in solving practical database problems.

Local Needs	**Regional Needs**	**National Needs**	**Global Needs**

		• To implement intelligent databases and various data models.
17250E24B	Data Warehousing & Data Mining	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E24C	Artificial Neural Networks	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E25A	Service Oriented Architecture	Articulate the main concepts, key technologies, strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Explain the core issues of cloud computing such as security, privacy and interoperability. • Choose the appropriate technologies, algorithms and approaches for the related issues. • Facilitate Service Level Agreements (SLA).
17250E25B	High Speed Networks	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E25C	Embedded Systems	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and

Local Needs **Regional Needs** **National Needs** **Global Needs**

		maintenance. • Manage project schedule, estimate project cost and effort required
17250L26	.Net Technologies Lab	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
172TECWR	Technical Writing /Seminars	Develop mobile applications using GUI and Layouts. • Develop mobile applications using Event Listener. • Develop mobile applications using Databases. • Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS. • Analyze and discover own mobile app for simple needs.
17250CRM	Research Methodology	• Compare different process models. • Concepts of requirements engineering and Analysis Modeling.
17250CBR	Participation In Bounded Research	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250C31	Software Project Management	Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E32A	Cloud Computing	Identify different issues in wireless ad hoc and sensor networks .

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

250

		• To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks
17250E32B	Information Security	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17250E32C	Soft Computing	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17250E33A	Advanced Database Technology	• Compare different process models. • Concepts of requirements engineering and Analysis Modeling.
17250E33B	Mobile Communication And Computing	To identify and understand security issues in ad hoc and sensor networks
17250E33C	Green Computing	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17250E34A	Software Quality Assurance	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society
17250E34B	Bio-Informatics	• Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required
17250E34C	Wireless Application Protocols	Identify different issues in wireless ad hoc and sensor networks . • To analyze protocols developed for ad hoc and sensor networks . • To identify and understand security issues in ad hoc and sensor networks
17250P35	Project Work Phase - I	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17250P41	Project Work Phase - Ii	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
17150C14P	Computer Architecture And Organization	• To implement a rule based system to tackle morphology/syntax of a language • To design a tag set to be used for statistical
17150C15P	Object Oriented Programming	• Develop Java programs using OOP principles • Develop Java programs with the concepts inheritance and interfaces • Build Java applications using exceptions and I/O streams • Develop Java applications with threads and generics classes • Develop interactive Java programs using swing

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

17148S21P	Numerical Methods	: • Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. •Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. • Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations.
17150C22P	Microprocessors And Interfacing	• Understand and execute programs based on 8086 microprocessor. • Design Memory Interfacing circuits. • Design and interface I/O circuits . Design and implement 8051 microcontroller based systems
17150C23P	Database Management Systems	Classify the modern and futuristic database applications based on size and complexity • Map ER model to Relational model to perform database design effectively • Write queries using normalization criteria and optimize queries • Compare and contrast various indexing strategies in different database systems • Appraise how advanced databases differ from traditional databases
17150C24P	Design And Analysis Of Algorithm	Design algorithms for various computing problems. • Analyze the time and space complexity of algorithms. • Critically analyze the different algorithm design techniques for a given problem. • Modify existing algorithms to improve efficiency

Local Needs   **Regional Needs**   **National Needs**   **Global Needs**

Local Needs   Regional Needs   National Needs   Global Needs

Local Needs   Regional Needs   National Needs   Global Needs

Course Code	Title of the Course	COs	POS											
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17147S11	COMMUNICATIVE ENGLISH	Read articles of a general kind in magazines and newspapers								✓	✓	✓		✓
		Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English								✓	✓	✓		✓
		Comprehend conversations and short talks delivered in English								✓	✓	✓		✓
		Write short essays of a general kind and personal letters and emails in English.								✓	✓	✓		✓
17148S12	ENGINEERING MATHEMATICS – I	Use both the limit definition and rules of differentiation to differentiate functions.	✓	✓										
		Apply differentiation to solve maxima and minima problems	✓	✓	✓	✓	✓							
		Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus	✓	✓	✓	✓								

		Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables	✓	✓	✓	✓										
		Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	✓	✓												
		Determine convergence/divergence of improper integrals and evaluate convergent improper integrals	✓	✓	✓											
		Apply various techniques in solving differential equations.	✓	✓	✓											
17149S13	ENGINEERING PHYSICS	The students will gain knowledge on the basics of properties of matter and its applications	✓	✓	✓											
		The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,	✓	✓	✓	✓	✓									
		The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,	✓	✓	✓	✓	✓									
		The students will get knowledge on advanced physics concepts of quantum theory and its	✓	✓	✓	✓	✓									

Code	Course	Outcome														
		applications in tunneling microscopes														
		The students will understand the basics of crystals, their structures and different crystal growth techniques.	✓	✓	✓											
17149S14	ENGINEERING CHEMISTRY	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning	✓	✓	✓											
17150S16	PROBLEM SOLVING AND PYTHON PROGRAMMING	Develop algorithmic solutions to simple computational problems	✓	✓	✓			✓								
		Read, write, execute by hand simple Python programs	✓	✓	✓		✓	✓								✓
		Structure simple Python programs for solving problems	✓	✓	✓		✓	✓								✓
		Decompose a Python program into functions.	✓	✓	✓		✓	✓								✓
		Represent compound data using Python lists, tuples, dictionaries	✓	✓	✓		✓	✓								✓
		Read and write data from/to files in Python Programs	✓	✓	✓		✓	✓								✓
17154S15	ENGINEERING GRAPHICS	Familiarize with the fundamentals and standards of Engineering graphics	✓														
		Perform freehand sketching of basic geometrical constructions and multiple views of objects.		✓													
		Project orthographic projections of lines and plane surfaces			✓												

Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		Draw projections and solids and development of surfaces.			✓	✓				✓				
17150L17	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	Write, test, and debug simple Python programs.	✓											
		Implement Python programs with conditionals and loops.		✓	✓									
		Develop Python programs step-wise by defining functions and calling them		✓	✓									
		Use Python lists, tuples, dictionaries for representing compound data.			✓	✓								
		Read and write data from/to files in Python.			✓									
17149L18	PHYSICS AND CHEMISTRY LABORATORY	Apply principles of elasticity, optics and thermal properties for engineering applications.	✓	✓	✓			✓						✓
		The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.			✓	✓	✓							✓
171VEA19	VALUE EDUCATION	Students will understand the importance of value based living.						✓	✓					
		Students will gain deeper understanding about the purpose of their life.						✓	✓					
		Students will understand and start applying the essential steps to become good leaders.								✓			✓	✓
		Students will emerge as responsible citizens with clear						✓	✓	✓				

Code	Subject	Outcome												
		conviction to practice values and ethics in life.												
		Students will become value based professionals.					✓	✓	✓					
		Students will contribute in building a healthy nation					✓	✓	✓					
17147S21	TECHNICAL ENGLISH	Read technical texts and write area- specific texts effortlessly							✓	✓	✓		✓	
		Listen and comprehend lectures and talks in their area of specialisation successfully							✓	✓	✓		✓	
		Speak appropriately and effectively in varied formal and informal contexts.							✓	✓	✓		✓	
		Write reports and winning job applications.							✓	✓	✓		✓	
17148S22A	ENGINEERING MATHEMATICS – II	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	✓											
		Gradient, divergence and curl of a vector point function and related identities	✓		✓									
		Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification	✓	✓										
		Analytic functions, conformal mapping and complex integration	✓	✓	✓									
		Laplace transform and inverse transform of simple functions,	✓		✓									

Code	Course	Outcome														
		properties, various related theorems and application to differential equations with constant coefficients.														
17149S23A	PHYSICS FOR INFORMATION SCIENCE	Gain knowledge on classical and quantum electron theories, and energy band structures	✓	✓												
		Acquire knowledge on basics of semiconductor physics and its applications in various devices,	✓				✓									
		Get knowledge on magnetic properties of materials and their applications in data storage	✓		✓											
		Have the necessary understanding on the functioning of optical materials for optoelectronics		✓		✓	✓									
		Understand the basics of quantum structures and their applications in carbon electronics..			✓	✓										
17153S25A	BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING	Discuss the essentials of electric circuits and analysis.	✓	✓												
		Discuss the basic operation of electric machines and transformers	✓	✓												
		Introduction of renewable sources and common domestic loads.	✓	✓	✓											
		Introduction to measurement and metering for electric circuits.	✓	✓	✓											
17149S24A		Environmental Pollution or problems cannot be solved by								✓	✓	✓	✓		✓

Code	Course	Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	ENVIRONMENTAL SCIENCE AND ENGINEERING	mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.												
		Public awareness of environmental is at infant stage.	✓				✓		✓	✓	✓	✓		✓
		Ignorance and incomplete knowledge has lead to misconceptions			✓				✓	✓	✓	✓		✓
		Development and improvement in std. of living has lead to serious environmental disasters	✓						✓	✓	✓	✓		✓
17150S26A	PROGRAMMING IN C	Develop simple applications in C using basic constructs	✓	✓	✓									
		Design and implement applications using arrays and strings	✓	✓	✓									
		Develop and implement applications in C using functions and pointers.		✓	✓									
		Develop applications in C using structures.		✓	✓									
		Design applications using sequential and random access file processing.		✓	✓									
17154L27	ENGINEERING PRACTICES LABORATORY	Fabricate carpentry components and pipe connections including plumbing works.	✓							✓			✓	
		Use welding equipments to join the structures. Carry out the basic machining operations	✓		✓			✓		✓				

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
		Make the models using sheet metal works													
		Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings Carry out basic home electrical works and appliances	✓	✓	✓	✓		✓							
		Measure the electrical quantities Elaborate on the components, gates, soldering practices.	✓	✓	✓	✓	✓		✓	✓					
17150L28A	C - PROGRAMMING LAB	Develop C programs for simple applications making use of basic constructs, arrays and strings	✓	✓	✓										
		Develop C programs involving functions, recursion, pointers, and structures	✓	✓	✓	✓									
		Design applications using sequential and random access file processing	✓	✓	✓	✓	✓			✓					
17148C31A	DISCRETE MATHEMATICS	Have knowledge of the concepts needed to test the logic of a program	✓	✓	✓										
		Have an understanding in identifying structures on many levels	✓		✓	✓									
		Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	✓	✓	✓	✓									✓
		Be aware of the counting principles.	✓	✓	✓	✓	✓						✓		✓

261

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
		Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	✓	✓	✓	✓	✓	✓	✓			✓			
17150C32	DIGITAL PRINCIPLES AND SYSTEM DESIGN	Simplify Boolean functions using KMap	✓	✓	✓	✓		✓	✓	✓					
		Design and Analyze Combinational and Sequential Circuits	✓	✓	✓	✓	✓	✓	✓	✓					✓
		Implement designs using Programmable Logic Devices	✓	✓	✓	✓	✓	✓	✓	✓					✓
		Write HDL code for combinational and Sequential Circuits	✓	✓	✓	✓		✓	✓	✓					✓
17150C33	DATA STRUCTURES	Implement abstract data types for linear data structures.	✓	✓	✓							✓			
		Apply the different linear and non-linear data structures to problem solutions	✓	✓	✓							✓			
		Critically analyze the various sorting algorithms	✓	✓	✓							✓			
17150C34	OBJECT ORIENTED PROGRAMMING	Develop Java programs using OOP principles	✓	✓	✓	✓	✓								✓
		Develop Java programs with the concepts inheritance and interfaces	✓	✓	✓	✓	✓							✓	✓
		Build Java applications using exceptions and I/O streams	✓	✓	✓	✓	✓							✓	✓
		Develop Java applications with threads and generics classes	✓	✓	✓	✓	✓					✓		✓	✓
		Develop interactive Java programs using swings	✓	✓	✓	✓	✓	✓				✓		✓	✓
17150C35	COMMUNICATION ENGINEERING	Apply analog and digital communication techniques	3		2	1									✓

Code	Course	Course Outcome	1	2	3	4	5	6	7
		Use data and pulse communication techniques.			3			2	✓
		Analyze Source and Error control coding.			3			2	✓
		Ability to comprehend and appreciate the significance and role of this course in the present contemporary world				3			✓
17150L36	DATA STRUCTURES LABORATORY	Write functions to implement linear and non-linear data structure operations	✓						
		Suggest appropriate linear / non-linear data structure operations for solving a given problem	✓	✓	✓				
		Appropriately use the linear / non-linear data structure operations for a given problem	✓	✓	✓				
		Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval	✓	✓	✓	✓	✓		
17150L37	OBJECT ORIENTED PROGRAMMING LABORATORY	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces	✓	✓	✓				
		Develop and implement Java programs with arraylist, exception handling and multithreading	✓	✓	✓	✓			
		Design applications using file processing, generic programming and event handling.		✓	✓		✓		

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
17150L38	DIGITAL SYSTEMS LABORATORY	Implement simplified combinational circuits using basic logic gates	✓														
		Implement combinational circuits using MSI devices		✓	✓												
		Implement sequential circuits like registers and counters		✓	✓	✓	✓										
		Simulate combinational and sequential circuits using HDL			✓												
17150L39	INTERPERSONAL SKILLS/LISTENING&SPEAKING	Listen and respond appropriately										✓		✓			✓
		Participate in group discussions										✓		✓			✓
		Make effective presentations										✓		✓			✓
		Participate confidently and appropriately in conversations both formal and informal										✓		✓			✓
17148S41A	PROBABILITY AND QUEUING THEORY	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon	✓	✓	✓												
		Understand the basic concepts of one and two dimensional random variables and apply in engineering applications		✓	✓												
		Apply the concept of random processes in engineering disciplines		✓	✓												
		Acquire skills in analyzing queueing models.		✓	✓												
		Understand and characterize phenomenon which evolve with		✓	✓												

Code	Course	Course Outcome	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
		respect to time in a probabilistic manner															
17150C42	COMPUTER ARCHITECTURE	Understand the basics structure of computers, operations and instructions.	✓	✓	✓	✓											
		Design arithmetic and logic unit.	✓	✓	✓	✓											
		Understand pipelined execution and design control unit.	✓	✓	✓	✓											
		Understand parallel processing architectures.	✓	✓	✓	✓											
		Understand the various memory systems and I/O communication	✓	✓	✓	✓											
17150C43	DATABASE MANAGEMENT SYSTEMS	Classify the modern and futuristic database applications based on size and complexity	✓	✓		✓		✓	✓								
		Map ER model to Relational model to perform database design effectively	✓	✓													
		Write queries using normalization criteria and optimize queries	✓	✓	✓												
		Compare and contrast various indexing strategies in different database systems	✓	✓		✓		✓	✓								
		Appraise how advanced databases differ from traditional databases	✓	✓	✓	✓	✓	✓									
17150C44	DESIGN AND ANALYSIS OF ALGORITHMS	Design algorithms for various computing problems	✓			✓											
		Analyze the time and space complexity of algorithms.		✓	✓	✓											

Code	Course	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		Critically analyze the different algorithm design techniques for a given problem		✓	✓	✓	✓							
		Modify existing algorithms to improve efficiency.		✓	✓		✓	✓						
17150C45	OPERATING SYSTEMS	Analyze various scheduling algorithms.	✓	✓	✓	✓	✓	✓						
		Understand deadlock, prevention and avoidance algorithms.	✓	✓	✓	✓	✓							
		Compare and contrast various memory management schemes.	✓	✓	✓	✓	✓							
		Understand the functionality of file systems.	✓	✓	✓	✓	✓							
		Perform administrative tasks on Linux Servers.	✓	✓	✓	✓	✓	✓	✓				✓	✓
		Compare iOS and Android Operating Systems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150C46	SOFTWARE ENGINEERING	Identify the key activities in managing a software project.	✓	✓	✓	✓					✓	✓	✓	✓
		Compare different process models	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Concepts of requirements engineering and Analysis Modeling.	✓	✓	✓	✓		✓	✓	✓		✓		
		Apply systematic procedure for software design and deployment.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Compare and contrast the various testing and maintenance	✓	✓	✓	✓	✓	✓	✓	✓				
		Manage project schedule, estimate project cost and effort required.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150L47	DATABASE MANAGEMENT	Use typical data definitions and manipulation commands	✓	✓	✓						✓	✓	✓	✓

Code	Course	Course Outcome												
	SYSTEMS LABORATORY	Design applications to test Nested and Join Queries	✓	✓	✓						✓	✓	✓	✓
		Implement simple applications that use Views	✓	✓	✓						✓	✓	✓	✓
		Implement applications that require a Front-end Tool	✓	✓	✓						✓	✓	✓	✓
		Critically analyze the use of Tables, Views, Functions and Procedures	✓	✓	✓						✓	✓	✓	✓
17150L48	OPERATING SYSTEMS LABORATORY	Compare the performance of various CPU Scheduling Algorithms	✓	✓	✓		✓			✓	✓	✓		✓
		Implement Deadlock avoidance and Detection Algorithms	✓	✓	✓		✓			✓	✓	✓		✓
		Implement Semaphores	✓	✓	✓		✓			✓	✓	✓		✓
		Create processes and implement IPC	✓	✓	✓		✓			✓	✓	✓		✓
		Analyze the performance of the various Page Replacement Algorithms	✓	✓	✓		✓			✓	✓	✓		✓
		Implement File Organization and File Allocation Strategies	✓	✓	✓		✓			✓	✓	✓		✓
17150L49	ADVANCED READING AND WRITING	Write winning job applications.	✓								✓	✓		✓
		Read and evaluate texts critically.	✓								✓	✓		✓
		Display critical thinking in various professional contexts	✓								✓	✓		✓
		Write different types of essays.	✓					✓	✓	✓	✓	✓		✓
17150CRS	RESEARCH LED SEMINAR	Exposure to various research domains	✓	✓	✓	✓	✓							✓
		Acquaintance with languages of research	✓	✓	✓	✓								✓

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Development of research aptitude			✓	✓	✓										✓
17148S51A	ALGEBRA AND NUMBER THEORY	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.	✓	✓	✓												
		Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.	✓	✓	✓												
		Demonstrate accurate and efficient use of advanced algebraic techniques.	✓	✓	✓	✓	✓										
		Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text	✓	✓	✓	✓	✓										
		Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.	✓	✓	✓	✓	✓	✓									
17150C52	COMPUTER NETWORKS	Understand the basic layers and its functions in computer networks	✓	✓	✓	✓											✓
		Evaluate the performance of a network	✓	✓	✓	✓	✓									✓	✓
		Understand the basics of how data flows from one node to another.	✓	✓	✓	✓											✓

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		Analyze and design routing algorithms.	✓	✓	✓	✓	✓				✓	✓	✓	✓
		Design protocols for various functions in the network.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Understand the working of various application layer protocols.	✓	✓	✓	✓								
17150C53	MICROPROCESSORS AND MICROCONTROLLERS	Understand and execute programs based on 8086 microprocessor.	✓	✓	✓	✓	✓	✓						
		Design Memory Interfacing circuits.	✓	✓	✓	✓								
		Design and interface I/O circuits.	✓	✓	✓	✓								
		Design and implement 8051 microcontroller based systems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150C55	THEORY OF COMPUTATION	Construct automata, regular expression for any pattern.	✓	✓	✓									✓
		Write Context free grammar for any construct.	✓	✓	✓	✓								✓
		Design Turing machines for any language.	✓	✓	✓	✓		✓		✓			✓	✓
		Propose computation solutions using Turing machines.	✓	✓	✓	✓		✓		✓			✓	✓
		Derive whether a problem is decidable or not.	✓	✓	✓	✓		✓		✓			✓	✓
17150C56	OBJECT ORIENTED ANALYSIS AND DESIGN	Express software design with UML diagrams	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
		Design software applications using OO concepts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Identify various scenarios based on software requirements	✓	✓	✓	✓								

Course Code	Course Name	Course Outcome												
		Transform UML based software design into pattern based design using design patterns	✓	✓	✓	✓	✓	✓	✓					
		Understand the various testing methodologies for OO software	✓	✓	✓	✓	✓		✓	✓				✓
17150CRM	Research methodology	Understanding research questions and tools	✓	✓		✓								
		Experience in scientific writings	✓	✓	✓	✓								
		Practice in various aspects of scientific publications	✓	✓	✓	✓								
		Inculcation of research ethics	✓	✓	✓	✓				✓				
17150L57	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	Write ALP Programmes for fixed and Floating Point and Arithmetic operations	✓											
		Interface different I/Os with processor								✓				
		Generate waveforms using Microprocessors			✓									
		Execute Programs in 8051	✓				✓							
		Explain the difference between simulator and Emulator									✓			
17150L58	OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY	Perform OO analysis and design for a given problem specification.	✓	✓	✓	✓					✓			
		Identify and map basic software requirements in UML mapping.		✓	✓	✓					✓		✓	✓
		Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns		✓	✓	✓			✓		✓		✓	✓
		Test the compliance of the software with the SRS		✓	✓	✓	✓	✓	✓		✓		✓	✓

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17150L59	NETWORKS LABORATORY	Implement various protocols using TCP and UDP.	✓	✓	✓			✓						✓
		Compare the performance of different transport layer protocols.	✓		✓									✓
		Use simulation tools to analyze the performance of various network protocols.	✓	✓		✓	✓	✓					✓	✓
		Analyze various routing algorithms.	✓	✓			✓		✓			✓	✓	✓
		Implement error correction codes.	✓		✓	✓		✓	✓		✓	✓	✓	✓
17150C61	INTERNET PROGRAMMING	Construct a basic website using HTML and Cascading Style Sheets.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.	✓	✓	✓	✓	✓	✓					✓	✓
		Develop server side programs using Servlets and JSP.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Construct simple web pages in PHP and to represent data in XML format.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Use AJAX and web services to develop interactive web applications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150C62	ARTIFICIAL INTELLIGENCE	Use appropriate search algorithms for any AI problem	✓	✓	✓	✓								
		Represent a problem using first order and predicate logic	✓	✓	✓		✓	✓	✓					
		Provide the apt agent strategy to solve a given problem	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Code	Course	Course Outcome												
		Design software agents to solve a problem	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Design applications for NLP that use Artificial Intelligence.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150C63	MOBILE COMPUTING	Explain the basics of mobile telecommunication systems	✓	✓	✓	✓								
		Illustrate the generations of telecommunication systems in wireless networks	✓	✓	✓									
		Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network	✓	✓	✓	✓	✓							
		Explain the functionality of Transport and Application layers	✓	✓	✓	✓								
		Develop a mobile application using android/blackberry/ios/Windows SDK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150C64	COMPILER DESIGN	Understand the different phases of compiler.	✓	✓	✓	✓	✓							
		Design a lexical analyzer for a sample language.	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
		Apply different parsing algorithms to develop the parsers for a given grammar.	✓	✓	✓	✓				✓	✓	✓		
		Understand syntax-directed translation and run-time environment.	✓	✓	✓	✓	✓							
		Learn to implement code optimization techniques and a simple code generator.	✓	✓	✓	✓	✓	✓	✓					

272

Code	Course	Course Outcome												
		Design and implement a scanner and a parser using LEX and YACC tools.	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
17150C65	DISTRIBUTED SYSTEMS	Elucidate the foundations and issues of distributed systems	✓	✓	✓									
		Understand the various synchronization issues and global state for distributed systems.	✓	✓	✓	✓								
		Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems	✓	✓	✓	✓	✓							
		Describe the agreement protocols and fault tolerance mechanisms in distributed systems.		✓	✓	✓	✓	✓						
		Describe the features of peer-to-peer and distributed shared memory systems		✓	✓	✓	✓	✓						
17150L61	INTERNET PROGRAMMING LABORATORY	Construct Web pages using HTML/XML and style sheets.	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓
		Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.	✓	✓	✓	✓	✓		✓	✓	✓			✓
		Develop dynamic web pages using server side scripting.	✓	✓	✓	✓	✓		✓	✓	✓			✓
		Use PHP programming to develop web applications.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Construct web applications using AJAX and web services.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Code	Course	Outcome												
17150L62	MOBILE APPLICATION DEVELOPMENT LABORATORY	Develop mobile applications using GUI and Layouts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Develop mobile applications using Event Listener.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Develop mobile applications using Databases.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Analyze and discover own mobile app for simple needs.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150L63	MINI PROJECT	take up any challenging practical problems and find solution by formulating proper methodology	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		apply the knowledge of all related courses in providing hardware/software solutions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150L64	PROFESSIONAL COMMUNICATION	Make effective presentations	✓						✓		✓	✓	✓	✓
		Participate confidently in Group Discussions.	✓						✓	✓	✓	✓	✓	✓
		Attend job interviews and be successful in them.	✓					✓	✓	✓	✓	✓	✓	✓
		Develop adequate Soft Skills required for the workplace	✓		✓			✓	✓	✓	✓	✓	✓	✓
17150CBR	PARTICIPATION IN BOUNDED RESEARCH	Hands on exposure to problem solving tools in contemporary research	✓	✓	✓	✓								
		Evolution of research intuitiveness and orientation		✓	✓	✓								
		Familiarity with cutting edge research trends	✓	✓	✓	✓	✓							

Code	Course	Course Outcome												
17150C71	PRINCIPLES OF MANAGEMENT	to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management	✓						✓	✓	✓	✓	✓	✓	✓
		Understand the fundamentals of networks security, security architecture, threats and vulnerabilities	✓	✓					✓	✓	✓	✓	✓	✓	✓
17150C72	CRYPTOGRAPHY AND NETWORK SECURITY	Apply the different cryptographic operations of symmetric cryptographic algorithms	✓	✓	✓				✓						
		Apply the different cryptographic operations of public key cryptography	✓	✓	✓		✓		✓						
		Apply the various Authentication schemes to simulate different applications.	✓	✓	✓	✓	✓	✓	✓						✓
		Understand various Security practices and System security standards	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150C73	CLOUD COMPUTING	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.	✓			✓									
		Learn the key and enabling technologies that help in the development of cloud.	✓	✓	✓										
		Develop the ability to understand and use the architecture of compute and	✓	✓	✓	✓						✓			

		storage cloud, service and delivery models.												
		Explain the core issues of cloud computing such as resource management and security.	✓	✓	✓		✓	✓			✓			✓
		Be able to install and use current cloud technologies.	✓	✓	✓	✓	✓	✓			✓			✓
		Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.	✓	✓	✓	□	✓	✓	✓	✓	✓	✓	✓	✓
17150L77	CLOUD COMPUTING LABORATORY	Configure various virtualization tools such as Virtual Box, VMware workstation.	✓	✓	✓	✓	✓							
		Design and deploy a web application in a PaaS environment.	✓	✓	✓	✓	✓							
		Learn how to simulate a cloud environment to implement new schedulers.	✓	✓	✓	✓	✓				✓		✓	
		Install and use a generic cloud environment that can be used as a private cloud.	✓	✓	✓	✓	✓							✓
		Manipulate large data sets in a parallel environment.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150L78	SECURITY LABORATORY	Develop code for classical Encryption Techniques to solve the problems.	✓	✓	✓		✓							
		Build cryptosystems by applying symmetric and public key encryption algorithms.	✓	✓	✓	✓	✓							

Code	Subject	Course Outcome												
		Construct code for authentication algorithms.	✓	✓	✓	✓	✓	✓						✓
		Develop a signature scheme using Digital signature standard.	✓	✓	✓	✓	✓	✓					✓	✓
		Demonstrate the network security system using open source tools	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150P83	Project Work	Identify the problem by applying acquired knowledge.	✓	✓		✓			✓	✓	✓			
		Analyze and categorize executable project modules after considering risks.		✓	✓	✓		✓	✓		✓	✓		✓
		Choose efficient tools for designing project modules.			✓	✓	✓			✓	✓	✓	✓	✓
		Combine all the modules through effective team work after efficient testing.							✓	✓	✓	✓	✓	✓
17150E66A	DATA WAREHOUSING AND DATA MINING	Design a Data warehouse system and perform business analysis with OLAP tools.	✓	✓	✓									
		Apply suitable pre-processing and visualization techniques for data analysis	✓	✓	✓		✓							
		Apply frequent pattern and association rule mining techniques for data analysis	✓	✓	✓	✓	✓				✓			
		Apply appropriate classification and clustering techniques for data analysis	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
17150E66B	SOFTWARE TESTING	Design test cases suitable for a software development for different domains.	✓	✓	✓						✓			✓

		Identify suitable tests to be carried out.	✓	✓	✓	✓					✓			✓
		Prepare test planning based on the document.	✓	✓	✓	✓			✓		✓	✓		✓
		Document test plans and test cases designed	✓	✓	✓	✓	✓			✓	✓	✓		✓
		Use automatic testing tools. · Develop and validate a test plan.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150E66C	EMBEDDED SYSTEMS	Describe the architecture and programming of ARM processor.	✓	✓	✓	✓	✓							
		Explain the concepts of embedded systems	✓	✓	✓		✓							
		Understand the Concepts of peripherals and interfacing of sensors.	✓	✓	✓	✓	✓							
		Capable of using the system design techniques to develop firmware	✓	✓	✓	✓	✓							
		Illustrate the code for constructing a system	✓	✓	✓	✓	✓	✓	✓					
17150E66D	AGILE METHODOLOGIES	Realize the importance of interacting with business stakeholders in determining the requirements for a software system	✓	✓	✓				✓			✓		✓
		Perform iterative software development processes: how to plan them, how to execute them.	✓	✓	✓				✓					✓
		Point out the impact of social aspects on software development success.	✓	✓	✓		✓				✓			✓

Code	Course	Course Outcome												
		Develop techniques and tools for improving team collaboration and software quality.	✓	✓	✓	✓	✓			✓	✓		✓	✓
		Perform Software process improvement as an ongoing task for development teams.	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
		Show how agile approaches can be scaled up to the enterprise level.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150E66E	GRAPH THEORY AND APPLICATIONS	Understand the basic concepts of graphs, and different types of graphs	✓	✓	✓	✓	✓							
		Understand the properties, theorems and be able to prove theorems.	✓	✓	✓		✓		✓		✓			
		Apply suitable graph model and algorithm for solving applications.	✓	✓	✓	✓	✓				✓			
17150E66F	DIGITAL SIGNAL PROCESSING	Perform mathematical operations on signals.	✓	✓	✓	✓								
		Understand the sampling theorem and perform sampling on continuous-time signals to get discrete time signal by applying advanced knowledge of the sampling theory.	✓	✓	✓	✓								
		Transform the time domain signal into frequency domain signal and vice-versa.	✓	✓	✓	✓	✓							
		Apply the relevant theoretical knowledge to design the digital IIR/FIR filters for the given analog specifications.	✓	✓	✓	✓	✓	✓						

Code	Course	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17150E66G	INTELLECTUAL PROPERTY RIGHTS	Ability to manage Intellectual Property portfolio to enhance the value of the firm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150E75A	BIG DATA ANALYTICS	Work with big data tools and its analysis techniques	✓	✓	✓		✓				✓			
		Analyze data by utilizing clustering and classification algorithms	✓	✓	✓	✓	✓							✓
		Learn and apply different mining algorithms and recommendation systems for large volumes of data	✓	✓	✓	✓			✓	✓				✓
		Perform analytics on data streams	✓	✓	✓	✓	✓				✓		✓	✓
		Learn NoSQL databases and management.	✓	✓	✓	✓	✓						✓	✓
17150E75B	MACHINE LEARNING TECHNIQUES	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches	✓	✓	✓									
		Discuss the decision tree algorithm and indentity and overcome the problem of overfitting	✓	✓	✓	✓								
		Discuss and apply the back propagation algorithm and genetic algorithms to various problems	✓	✓	✓	✓	✓	✓		✓	✓			
		Apply the Bayesian concepts to machine learning	✓	✓	✓		✓			✓		✓		

Code	Subject	Course Outcome												
		Analyse and suggest appropriate machine learning approaches for various types of problems	✓	✓	✓	✓	✓							
17150E75C	COMPUTER GRAPHICS AND MULTIMEDIA	Design two dimensional graphics.	✓	✓	✓									
		Apply two dimensional transformations.	✓	✓	✓	✓	✓							
		Design three dimensional graphics.	✓	✓	✓	✓	✓							
		Apply three dimensional transformations.	✓	✓	✓	✓	✓		✓			✓		✓
		Apply Illumination and color models.	✓	✓	✓	✓	✓	✓				✓		✓
		Apply clipping techniques to graphics.	✓	✓	✓	✓					✓	✓		✓
		Understood Different types of Multimedia File Format	✓	✓	✓	✓	✓				✓			✓
		Design Basic 3d Scenes using Blender	✓	✓	✓	✓	✓				✓	✓		
17150E75D	SOFTWARE PROJECT MANAGEMENT	Understand Project Management principles while developing software.	✓	✓	✓									
		Gain extensive knowledge about the basic project management concepts, framework and the process models.	✓	✓	✓									
		Obtain adequate knowledge about software process models and software effort estimation techniques.	✓	✓	✓		✓			✓				✓
		Estimate the risks involved in various project activities.	✓	✓	✓	✓	✓			✓			✓	

Code	Subject	Course Outcome											
		Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.	✓	✓	✓	✓							
		Learn staff selection process and the issues related to people management	✓	✓	✓	✓	✓						
17150E75E	INTERNET OF THINGS	Explain the concept of IoT.	✓	✓	✓								
		Analyze various protocols for IoT.	✓	✓	✓	✓	✓						✓
		Design a PoC of an IoT system using Rasperry Pi/Arduino	✓	✓	✓			✓		✓		✓	✓
		Apply data analytics and use cloud offerings related to IoT.	✓	✓	✓	✓							
		Analyze applications of IoT in real time scenario	✓	✓	✓	✓	✓						
17150E75F	SERVICE ORIENTED ARCHITECTURE	Understand XML technologies	✓			✓							
		Understand service orientation, benefits of SOA	✓	✓	✓								
		Understand web services and WS standards	✓		✓					✓		✓	✓
		Use web services extensions to develop solutions	✓	✓	✓		✓					✓	✓
		Understand and apply service modeling, service oriented analysis and design for application development	✓	✓		✓	✓					✓	✓
17150E75G	TOTAL QUALITY MANAGEMENT	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	✓				✓	✓	✓	✓	✓	✓	✓

Code	Course	Outcome														
17150E76A	MULTI-CORE ARCHITECTURES AND PROGRAMMING	Describe multicore architectures and identify their characteristics and challenges.	✓	✓												
		Identify the issues in programming Parallel Processors.	✓	✓	✓											✓
		Write programs using OpenMP and MPI.	✓	✓	✓	✓							✓				✓
		Design parallel programming solutions to common problems.	✓	✓	✓		✓						✓				✓
		Compare and contrast programming for serial processors and programming for parallel processors.	✓	✓		✓	✓	✓					✓				✓
17150E76B	HUMAN COMPUTER INTERACTION	Design effective dialog for HCI	✓														
		Design effective HCI for individuals and persons with disabilities.	✓	✓													
		Assess the importance of user feedback.	✓		✓	✓	✓						✓				
		Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.	✓	✓	✓	✓	✓						✓				✓
		Develop meaningful user interface.	✓		✓	✓	✓										
17150E76C	C# AND .NET PROGRAMMING	Write various applications using C# Language in the .NET Framework.	✓														
		Develop distributed applications using .NET Framework.	✓	✓	✓		✓										

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		Create mobile applications using .NET compact Framework.	✓	✓	✓	✓	✓	✓		✓				
17150E76D	WIRELESS ADHOC AND SENSOR NETWORKS	To identify and understand security issues in ad hoc and sensor networks	✓											
		To analyze protocols developed for ad hoc and sensor networks	✓	✓	✓	✓	✓							✓
		Identify different issues in wireless ad hoc and sensor networks	✓	✓	✓							✓	✓	
17150E76E	ADVANCED TOPICS ON DATABASES	To develop in-depth understanding of relational databases and skills to optimize database performance in practice.	✓	✓	✓	✓								
		To understand and critique on each type of databases	✓	✓	✓	✓								✓
		To design faster algorithms in solving practical database problems	✓	✓	✓		✓			✓				✓
		To implement intelligent databases and various data models	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
17150E76F	FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT	Define, formulate and analyze a problem	✓	✓	✓									
		Solve specific problems independently or as part of a team	✓	✓	✓	✓								✓
		Gain knowledge of the Innovation & Product Development process in the Business Context	✓	✓	✓	✓						✓	✓	

Code	Course Name	Course Outcome												
		Work independently as well as in teams	✓	✓	✓	✓	✓				✓		✓	✓
		Manage a project from start to finish	✓	✓	✓		✓	✓	✓		✓			✓
17150E76G	HUMAN RIGHTS	Engineering students will acquire the basic knowledge of human rights.	✓	✓				✓	✓	✓	✓	✓		✓
17150E76H	DISASTER MANAGEMENT	Differentiate the types of disasters, causes and their impact on environment and society	✓											
		Assess vulnerability and various methods of risk reduction measures as well as mitigation.	✓					✓	✓	✓	✓	✓	✓	✓
17150E81A	DIGITAL IMAGE PROCESSING	Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.	✓											
		Operate on images using the techniques of smoothing, sharpening and enhancement	✓	✓	✓				✓					
		Understand the restoration concepts and filtering techniques.	✓	✓	✓	✓								✓
		Learn the basics of segmentation, features extraction, compression and recognition methods for color models.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
17150E81B	SOCIAL NETWORK ANALYSIS	Represent knowledge using ontology.	✓	✓	☐	✓	☐	✓	☐	✓	✓	☐	☐	☐
		Develop semantic web related applications.	✓	☐	✓	✓	✓	✓	✓	✓	☐	✓	✓	✓

Code	Subject	Course Outcome												
		Predict human behaviour in social web and related communities	✓	✓	✓	✓	✓	✓	✓	□	✓	✓	□	✓
		Visualize social networks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150E81C	INFORMATION SECURITY	Discuss the basics of information security	✓					✓		✓			✓	
		Illustrate the legal, ethical and professional issues in information security	✓	✓	✓							✓		✓	✓
		Demonstrate the aspects of risk management	✓	✓	✓	✓	✓	✓				✓	✓		✓
		Become aware of various standards in the Information Security System	✓	✓	✓			✓		✓		✓	✓	✓	✓
		Design and implementation of Security Techniques.	✓	✓	✓	✓	✓					✓	✓	✓	✓
17150E81D	SOFTWARE DEFINED NETWORKS	Analyze the evolution of software defined networks	✓	✓	✓										
		Express the various components of SDN and their uses	✓	✓	✓		✓	✓		✓			✓	✓	
		Explain the use of SDN in the current networking scenario	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	
		Design and develop various applications of SDN	✓	✓	✓	✓	✓	✓			✓			✓	✓
17150E81E	CYBER FORENSICS	Understand the basics of computer forensics	✓							✓			✓	
		Apply a number of different computer forensic tools to a given scenario	✓	✓	✓							✓		✓	
		Analyze and validate forensics data	✓	✓	✓	✓		✓		✓	✓	✓		✓	
		Identify the vulnerabilities in a given network infrastructure	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	

286

Code	Subject	Course Outcome												
		Implement real-world hacking techniques to test system security.	✓	✓	✓		✓	✓		✓		✓		✓
17150E81F	SOFT COMPUTING	Apply suitable soft computing techniques for various applications	✓		✓	✓	✓		✓					
		Integrate various soft computing techniques for complex problems	✓	✓	✓	✓	✓	✓				✓	✓	
17150E81G	PROFESSIONAL ETHICS IN ENGINEERING	To apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society	✓					✓	✓	✓	✓	✓		✓
17150E82A	INFORMATION RETRIEVAL TECHNIQUES	Use an open source search engine framework and explore its capabilities	✓											
		Apply appropriate method of classification or clustering.	✓	✓	✓									
		Design and implement innovative features in a search engine.	✓	✓	✓		✓				✓			
		Design and implement a recommender system.	✓	✓	✓	✓	✓							
17150E82B	GREEN COMPUTING	Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.	✓											
		Enhance the skill in energy saving practices in their use of hardware	✓	✓	✓		✓							✓
		Evaluate technology tools that can reduce paper waste and	✓	✓	✓	✓	✓		✓	✓	✓	✓		

Code	Subject	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		carbon footprint by the stakeholders.												
		Understand the ways to minimize equipment disposal requirements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17150E82C	GPU ARCHITECTURE AND PROGRAMMING	Implement efficient algorithms in GPUs for common application kernels, such as matrix multiplication	✓		✓									
		Write simple programs using OpenCL	✓	✓	✓			✓				✓		
		Identify efficient parallel programming patterns to solve problems	✓	✓	✓	✓	✓							
		Describe GPU Architecture	✓	✓	✓	✓	✓					✓		✓
		Write programs using CUDA, identify issues and debug them	✓	✓	✓	✓	✓	✓		✓	✓			✓
17150E82D	NATURAL LANGUAGE PROCESSING	To tag a given text with basic Language features	✓					✓						
		To design an innovative application using NLP components	✓	✓	✓							✓		✓
		To implement a rule based system to tackle morphology/syntax of a language	✓	✓	✓	✓		✓				✓		✓
		To design a tag set to be used for statistical processing for real-time applications	✓	✓	✓	✓		✓						✓
		To compare and contrast the use of different statistical approaches for different types of NLP applications	✓	✓			✓							✓

288

Code	Course	Outcome													
17150E82E	PARALLEL ALGORITHMS	Develop parallel algorithms for standard problems and applications.	✓	✓	✓	✓									
		Analyse efficiency of different parallel algorithms	✓	✓	✓	✓	✓					✓			
17150E82F	SPEECH PROCESSING	Create new algorithms with speech processing	✓												
		Derive new speech models	✓	✓	✓	✓					✓				
		Perform various language phonetic analysis	✓	✓	✓	✓	✓					✓	✓	✓	
		Create a new speech identification system	✓	✓	✓	✓	✓	✓				✓			✓
		Generate a new speech recognition system	✓	✓	✓	✓					✓				✓
17150E82G	FUNDAMENTALS OF NANO SCIENCE	Familiarize about the science of nano materials	✓						✓						
		Demonstrate the preparation of nano materials	✓	✓		✓	✓	✓	✓			✓			
		Develop knowledge in characteristic nano material	✓	✓	✓	✓	✓	✓	✓			✓			✓
1710P83	PROJECT WORK	Identify the problem by applying acquired knowledge	✓	✓		✓				✓	✓	✓			
		Analyze and categorize executable project modules after considering risks		✓	✓	✓	✓	✓	✓			✓	✓		✓
		Choose efficient tools for designing project modules								□	✓	✓	✓	✓	✓
		Combine all the modules through effective team work after efficient testing								✓	✓	✓	✓	✓	✓
		Elaborate the completed task and compile the project report									✓	✓			✓

Code	Course	Outcome	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
17150FE54 A	CLOUD COMPUTING	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.	✓					✓							
		Learn the key and enabling technologies that help in the development of cloud.	✓	✓	✓	✓	✓								
		Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.	✓	✓	✓	✓						✓			
		Explain the core issues of cloud computing such as resource management and security.	✓	✓	✓	✓		✓				✓			✓
		Be able to install and use current cloud technologies.	✓	✓	✓		✓					✓			✓
		Choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.	✓	✓	✓		✓								✓
17150FE54 B	DATABASE MANAGEMENT SYSTEMS	understand relational data model, evolve conceptual model of a given problem, its mapping to relational model and Normalization	✓												
		query the relational database and write programs with database connectivity	✓	✓	✓										✓
		understand the concepts of database security and information retrieval systems	✓	✓	✓	✓	✓					✓			✓
17152FE54 A	BASICS OF BIO MEDICAL	To learn the different bio potential and its propagation	✓												

Code	Course	Course Outcome														
	INSTRUMENTATION	To get Familiarize the different electrode placement for various physiological recording	✓	✓	✓											
		Students will be able design bio amplifier for various physiological recording	✓	✓	✓	✓						✓				✓
		Students will understand various technique non electrical physiogical measurements	✓	✓	✓	✓	✓	✓								✓
		Understand the different biochemical measurements	✓	✓	✓	✓								✓	✓	✓
17152FE54 B	SENSORS AND TRANSDUCERS	Expertise in various calibration techniques and signal types for sensors	✓													
		Apply the various sensors in the Automotive and Mechatronics applications	✓	✓	✓											
		Study the basic principles of various smart sensors.	✓	✓	✓	✓	✓								✓	
		Implement the DAQ systems with different sensors for real time applications	✓	✓	✓	✓	✓									
17153FE54 A	INDUSTRIAL NANO TECHNOLOGY	To elucidate on advantages of nanotechnology based applications in each industry	✓													
		To provide instances of contemporary industrial applications of nanotechnology	✓	✓	✓		✓	✓				✓				✓
		To provide an overview of future technological advancements and increasing role of nanotechnology in each industry	✓	✓	✓	✓	✓					✓				✓

Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
17153FE54 B	ENERGY CONSERVATION AND MANAGEMENT	To analyse the energy data of industries.	✓												✓
		Can carryout energy accounting and balancing	✓	✓	✓	✓		✓	✓		✓	✓			✓
		Can suggest methodologies for energy savings	✓	✓	✓	✓	✓	✓	✓	✓	✓			1	✓
17154FE54 A	RENEWABLE ENERGY SOURCES	Ability to classify the solar energy collectors and methodologies of storing solar energy.	✓												
		Knowledge in applying solar energy in a useful way.	✓	✓	✓										
		Knowledge in wind energy and biomass with its economic aspects.	✓	✓	✓	✓						✓			✓
		Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓
		Understanding the physics of solar radiation.	✓	✓	✓				✓		✓	✓	✓		✓
17154FE54 B	AUTOMOTIVE SYSTEMS	the students will be able to identify the different components in automobile engineering	✓			✓	✓	✓							✓
		Have clear understanding on different auxiliary and transmission systems usual.	✓	✓	✓	✓	✓		✓	✓		✓			✓
17155FE54 A		Basic concepts of air quality management.	✓												

Course Code	Course	Course Outcome	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
	AIR POLLUTION AND CONTROL ENGINEERING	Ability to identify, formulate and solve air and noise pollution problems.	✓	✓	✓										
		Ability to design stacks and particulate air pollution control devices to meet applicable standards		✓	✓										
		Ability to select control equipments		✓	✓	✓	✓			✓					
		Ability to ensure quality, control and preventive measures.		✓	✓		✓	✓		✓					
		Understand the types of data models.	✓	✓	✓				✓						
		Get knowledge about data input and topology.	✓	✓	✓			✓		✓					✓
		Gain knowledge on data quality and standards.	✓	✓	✓	✓	✓			✓			✓	✓	✓
		Understand data management functions and data output	✓	✓	✓				✓				✓		✓
17152FE74A	ROBOTICS	Apply the basic engineering knowledge for the design of robotics	✓	✓	✓	✓	✓								
		understand importance of robotics in today and future goods production	✓	✓	✓	✓									
		understand robot configuration and subsystems	✓	✓	✓										
		understand principles of robot programming and handle with typical robot	✓	✓	✓	✓									
		understand working of mobile robots	✓	✓	✓	✓									

Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12		
17152FE74 B	ELECTRONIC DEVICES	Analyze the characteristics of semiconductor diodes.	✓	✓	✓	✓										
		Analyze and solve problems of Transistor circuits using model parameters.	✓	✓	✓											
		Identify and characterize diodes and various types of transistors.	✓	✓	✓											
		Analyze the characteristics of special semiconductor devices.	✓	✓	✓											
		Analyze the characteristics of Power and Display devices.	✓	✓	✓											
17153FE74 A	BASIC CIRCUIT THEORY	Ability to introduce electric circuits and its analysis	✓	✓	✓	✓										
		Ability to impart knowledge on solving circuit equations using network theorems	✓	✓	✓	✓										
		Ability to introduce the phenomenon of resonance in coupled circuits.	✓	✓	✓	✓										
		Ability to introduce Phasor diagrams and analysis of three phase circuits	✓	✓	✓	✓										
17153FE74 B	INTRODUCTION TO RENEWABLE ENERGY SYSTEM	Ability to understand and analyze power system operation, stability, control and protection.	✓	✓	✓	✓										
		Ability to handle the engineering aspects of electrical energy generation and utilization.	✓	✓	✓											
		Ability to understand the stand alone and grid connected renewable energy systems.	✓	✓	✓	✓										

Code	Course	CO	1	2	3	4	5	6	7	8	9	10	11	12	13
		Ability to design of power converters for renewable energy applications.	✓	✓	✓	✓	✓								
		Ability to acquire knowledge on wind electrical generators and solar energy systems.	✓	✓	✓	✓									
		Ability to design power converters used for hybrid renewable energy systems.	✓	✓	✓	✓									
17154FE74A	INDUSTRIAL SAFETY	Illustrate and familiarize the basic concepts and scope of engineering safety.	✓	✓					✓	✓	✓				
		Understand the standards of professional conduct that are published by professional safety organizations and certification bodies.							✓	✓	✓				
		Illustrate the importance of safety of employees while working with machineries.							✓	✓	✓				
17154FE74B	TESTING OF MATERIALS	Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.	✓	✓	✓	✓									
		Identify, formulate and solve engineering problems of structural elements subjected to flexure.							✓	✓	✓				
		Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding			2										

Code	Course	Course Outcome												
		failure of structures due to unsuitable materials.													
17155FE74 A	WASTE WATER MANAGEMENT	Will have knowledge about adsorption and oxidation process.	✓	✓	✓	✓									
		Will gain idea about various methods available for water treatment.	✓	✓	✓	✓									
		Will appreciate the necessity of water and acquire knowledge of preliminary treatment.	✓	✓	✓	✓			✓						
17155FE74 B	GREEN BUILDING DESIGN	Students should be able to describe the importance and necessity of green building.	✓												
		Students should be able to assess a building on the norms available for green building.	✓	✓	✓	✓	✓	✓	✓	✓					
		Students should be able to design and assess building	✓	✓	✓										
17150FE74 A	INTRODUCTION TO C PROGRAMMING	Develop simple applications using basic constructs	✓	✓	✓										
		Develop applications using arrays and strings	✓	✓	✓	✓			✓		✓				✓
		Develop applications using functions and structures	✓	✓	✓	✓	✓				✓		✓	✓	✓
17150FE74 B	DATA STRUCTURES AND ALGORITHMS	Implement linear data structures and solve problems using them	✓	✓	✓										
		Implement and apply trees and graphs to solve problems.	✓	✓	✓	✓				✓	✓				✓
		Implement the various searching and sorting algorithms.	✓	✓	✓	✓	✓	✓					✓		✓

Course Code	Title of the Course	Course Objectives	POS											
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17148S11P	Transforms and Partial Differential Equations	Expand a function in terms of Fourier Series and apply it for solving engineering problems.	✓	✓	✓	✓								
		Gain knowledge on Fourier Transforms	✓	✓	✓	✓								
		Model and solve higher order partial differential equations	✓	✓	✓	✓								
		Apply the methods of solving PDE in practical problems	✓	✓	✓	✓								
		Handle problems in Z transforms and apply it to solve difference equations	✓	✓	✓	✓								
17152S12P	Digital Systems	Simplify Boolean functions using KMap	✓	✓	✓									
		Design and Analyze Combinational and Sequential Circuits	✓	✓	✓									
		Implement designs using Programmable Logic Devices	✓	✓	✓	✓								
		Write HDL code for combinational and Sequential Circuits	✓	✓	✓	✓	✓							
17150H13P	Data Structures and algorithms	Implement abstract data types for linear data structures	✓	✓	✓									
		Apply the different linear and non-linear data structures to problem solutions.	✓	✓	✓									

Code	Course	Course Outcome												
		Critically analyze the various sorting algorithms	✓	✓	✓	✓								
17150H14P	Computer Architecture and Organization	Understand the basics structure of computers, operations and instructions	✓	✓	✓									
		Design arithmetic and logic unit.	✓	✓	✓									
		Understand pipelined execution and design control unit.	✓	✓	✓									
		Understand parallel processing architectures.	✓	✓	✓	✓	✓	✓					✓	✓
17150H15P	Object Oriented Programming	Develop and implement Java programs for simple applications that	✓	✓	✓									
		make use of classes, packages and interfaces.	✓	✓	✓						✓			
		Develop and implement Java programs with arraylist, exception	✓	✓	✓						✓		✓	✓
17150H21P	Numerical Methods	Determine the solution of algebraic and transcentendal system of linear equations	✓	✓										
		To interpolate the values of unknown functions using Newton's Formula	✓	✓		✓								
		Estimate the numerical values of the derivatives and integrals of Unknown function	✓	✓		✓								
		Solve first and second order initial value problem	✓	✓	✓	✓								
		Solve Numerically boundary value problem	✓	✓	✓	✓								
17150H22P	Microprocessors and Interfacing	Understand and execute programs based on 8086/8085 microprocessor.	✓	✓	✓									
		Classify the instructions with the help of Addressing modes of 8085 with necessary programs	✓	✓	✓									
		Design Memory Interfacing circuits.	✓	✓	✓	✓	✓	✓						
		Design and interface I/O circuits.	✓	✓	✓	✓								
		Design and implement 8051 microcontroller based systems.	✓	✓	✓	✓	✓							✓

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14
17150H23P	Database Management Systems	Classify the modern and futuristic database applications based on size and complexity	✓	✓	✓											
		Map ER model to Relational model to perform database design effectively	✓	✓	✓											
		Write queries using normalization criteria and optimize queries	✓	✓	✓											
		Compare and contrast various indexing strategies in different database systems	✓	✓	✓	✓										✓
		Appraise how advanced databases differ from traditional databases.	✓	✓	✓	✓	✓									✓
17150H24P	Design and Analysis Of Algorithms	Design algorithms for various computing problems. Analyze the time and space complexity of algorithms.	✓	✓	✓	✓										
		Critically analyze the different algorithm design techniques for a given problem	✓	✓	✓	✓										✓
		Modify existing algorithms to improve efficiency	✓	✓	✓	✓										✓
17150H25P	Software Engineering	Identify the key activities in managing a software project.	✓	✓	✓											
		Compare different process models	✓	✓	✓											
		Understand Concepts of requirements engineering and Analysis Modeling.	✓	✓	✓											
		Apply systematic procedure for software design and deployment	✓	✓	✓	✓	✓									
		Compare and contrast the various testing and maintenance	✓	✓	✓	✓	✓									
		Manage project schedule, estimate project cost and effort requir	✓	✓	✓	✓	✓									
17148S31P	Discrete Mathematics	Have an understanding in identifying structures on many levels.	✓	✓	✓											
		Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	✓	✓	✓											
		Be aware of the counting principles.	✓	✓	✓											

Code	Subject	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
		Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	✓	✓	✓										
		Have knowledge of the concepts needed to test the logic of a program.	✓	✓	✓										✓
17150H32P	Operating System	Analyze various scheduling algorithms.	✓	✓	✓										
		Understand deadlock, prevention and avoidance algorithms.	✓	✓	✓										
		Perform administrative tasks on Linux Servers.	✓	✓	✓	✓	✓								
		Compare and contrast various memory management schemes.	✓	✓	✓	✓	✓								
		Understand the functionality of file systems.	✓	✓	✓	✓	✓	✓							✓
		Compare iOS and Android Operating Systems	✓	✓	✓	✓	✓	✓							✓
17150H33P	Artificial Intelligence	Identify problems that are amenable to solution by AI methods.	✓	✓	✓										
		Identify appropriate AI methods to solve a given problem.	✓	✓	✓	✓	✓								
		Formalise a given problem in the language/framework of different AI methods.	✓	✓	✓	✓	✓								
		Implement basic AI algorithms.	✓	✓	✓	✓	✓								✓
		Design and carry out an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.	✓	✓	✓	✓	✓								✓
17150H34P	Computer Networks	Identify the components required to build different types of networks	✓	✓	✓										
		Choose the required functionality at each layer for given application	✓	✓	✓										
		Identify solution for each functionality at each layer	✓	✓	✓	✓	✓					✓			✓

Code	Subject	Course Outcome												
		Trace the flow of information from one node to another node in the network	✓	✓	✓	✓	✓				✓			✓
17150L35P	Operating Systems and Networking	Analyze various scheduling algorithms.	✓	✓	✓									
		Understand deadlock, prevention and avoidance algorithms.	✓	✓	✓									
		Identify the components required to build different types of networks	✓	✓	✓	✓	✓							✓
		Choose the required functionality at each layer for given application	✓	✓	✓	✓	✓		✓		✓			✓
17150H41P	Principles Of Cryptography	Apply cryptographic algorithms for encrypting and decryption for secure data transmission	✓	✓	✓									
		Understand the importance of Digital signature for secure edocuments exchange	✓	✓	✓									
		Understand the program threats and apply good programming practice	✓	✓	✓			✓						
		Get the knowledge about the security services available for internet and web applications	✓	✓	✓	✓	✓							✓
		Understand data vulnerability and sql injection Gain the knowledge of security models and published standards	✓	✓	✓	✓	✓	✓						✓
17150H42P	Web Technology	Design simple web pages using markup languages like HTML and XHTML	✓	✓	✓									
		Design and implement 8051 microcontroller based systems.	✓	✓	✓									✓
		Create dynamic web pages using DHTML and java script that is easy to navigate and use.	✓	✓	✓		✓							✓
		Program server side web pages that have to process request from client side web pages	✓	✓	✓	✓	✓							✓
		Represent web data using XML and develop web pages using JSP	✓	✓	✓	✓	✓				✓		✓	✓

Course Code	Course Name	Course Outcome												
		Understand various web services and how these web services interact.	✓	✓	✓	✓	✓					✓		✓	✓
17150H43P	C# And .Net Framework	Write various applications using C# Language in the .NET Framework.	✓	✓	✓										✓
		Create mobile applications using .NET compact Framework.	✓	✓	✓	✓	✓					✓			✓
		Develop distributed applications using .NET Framework	✓	✓	✓	✓	✓					✓			✓
17150E44AP	Theory of Computation	Design Finite State Machine, Pushdown Automata, and Turing Machine.	✓	✓	✓	✓									
		Explain the Decidability or Undecidability of various problems	✓	✓	✓	✓	✓								
17150E44BP	Real Time Systems	Explain the basic concepts of real time Operating system design	✓	✓	✓										
		Use the system design techniques to develop software for embedded systems	✓	✓	✓		✓	✓							✓
		Differentiate between the general purpose operating system and the real time operating system	✓	✓	✓	✓	✓	✓							✓
17150E44CP	User Interface Design	Design Web pages using HTML/XML and style sheets	✓	✓	✓										✓
		Create user interfaces using Java frames and applets.	✓	✓	✓										✓
		Create dynamic web pages using server side scripting.	✓	✓	✓										✓
		Write Client Server applications.	✓	✓	✓		✓	✓							✓
		Use the frameworks JSP Strut, Hibernate, Spring	✓	✓	✓	✓	✓	✓							✓
17150E44DP	Advanced Databases	design a database using ER diagrams and map ER intoRelations and normalize the relations	✓	✓	✓										
		Acquire the knowledge of query evaluation to monitor the performance of the DBMS	✓	✓	✓										

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.	✓	✓	✓	✓	✓	✓									
17150L45P	Internet Programming Lab	Create 3D graphical scenes using open graphics library suits	✓	✓	✓												✓
		Implement image manipulation and enhancement	✓	✓	✓	✓	✓						✓				✓
		Create 2D animations using tools	✓	✓	✓	✓	✓						✓			✓	✓
17150H51P	Object Oriented Analysis and	Design and implement projects using OO concepts.	✓	✓	✓	✓							✓				✓
		Use the UML analysis and design diagrams.	✓	✓	✓	✓	✓						✓			✓	✓
		Apply appropriate design patterns.	✓	✓	✓	✓	✓						✓			✓	✓
		Create code from design.	✓	✓	✓	✓	✓						✓				
		Compare and contrast various testing techniques.	✓	✓	✓	✓	✓						✓			✓	✓
17150H52P	Software Quality Management	Perform functional and nonfunctional tests in the life cycle of the software product	✓	✓	✓								✓				
		Understand system testing and test execution process.	✓	✓	✓	✓	✓						✓			✓	✓
		Identify defect prevention techniques and software quality assurance metrics.	✓	✓	✓	✓	✓						✓			✓	✓
		Apply techniques of quality assurance for typical applications.	✓	✓	✓	✓	✓						✓			✓	✓
17150H53P	Graphics and Multimedia	Gain proficiency in 3D computer graphics API programming	✓	✓	✓	✓											
		Able to understand different realizations of multimedia tools	✓	✓	✓	✓											
		Able to develop interactive animations using multimedia tools	✓	✓	✓	✓	✓										✓
		Gain the knowledge of different media streams in multimedia transmission	✓	✓	✓	✓	✓						✓				✓
		Enhance the perspective of modern computer system with modeling,	✓	✓	✓	✓	✓										✓

Code	Course	Course Outcome	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
		analysis and interpretation of 2D and 3D visual information.												
17150E54AP	Soft Computing	Apply suitable soft computing techniques for various applications.	✓	✓	✓									
		Integrate various soft computing techniques for complex problems.	✓	✓	✓									
17150E54BP	Principles of Compiler Design	Design and implement a prototype compiler.	✓	✓	✓									
		Apply the various optimization techniques.	✓	✓	✓									
		Use the different compiler construction tools.	✓	✓	✓	✓	✓							
17150E54CP	Distributed Systems	Discuss trends in Distributed Systems.	✓	✓	✓									
		Apply network virtualization.	✓	✓	✓	✓	✓							
		Apply remote method invocation and objects	✓	✓	✓	✓	✓				✓		✓	✓
		Design process and resource management systems.	✓	✓	✓	✓	✓				✓		✓	✓
17150E54DP	Mobile Computing	Explain the basics of mobile telecommunication system	✓	✓	✓									
		Choose the required functionality at each layer for given application	✓	✓	✓									
		Identify solution for each functionality at each layer	✓	✓	✓									✓
		Use simulator tools and design Ad hoc networks	✓	✓	✓	✓	✓							✓
		Develop a mobile application.	✓	✓	✓	✓	✓							✓
17150L55P	Software Development Lab	Design and Implement various mobile applications using emulators.	✓	✓	✓								✓	✓
		Deploy applications to hand-held devices	✓	✓	✓	✓	✓				✓	✓	✓	✓
17150H61P	Embedded Systems	Able to design and control real time control systems	✓	✓	✓									
		Able to understand the functionality of 8085 microprocessor	✓	✓	✓									

Code	Course	Outcome														
		Able incorporate enhanced features in the embedded systems through software	✓	✓	✓	✓	✓									
		Able to rectify minor problems by troubleshooting	✓	✓	✓	✓	✓									
		Acquire the knowledge of real time operating system and implement real time functions	✓	✓	✓	✓	✓									
17150H62P	Advanced Java programming	Develop Java programs using OOP principles	✓	✓	✓											
		Develop Java programs with the concepts inheritance and interfaces	✓	✓	✓	✓	✓									
		Build Java applications using exceptions and I/O streams	✓	✓	✓	✓	✓									
		Develop Java applications with threads and generics classes	✓	✓	✓	✓	✓									
		Develop interactive Java programs using swings	✓	✓	✓	✓	✓									
17150H63P	Software Testing	Design test cases suitable for a software development for different domains.	✓	✓	✓											
		Identify suitable tests to be carried out	✓	✓	✓	✓							✓		✓	✓
		Prepare test planning based on the document.	✓	✓	✓	✓							✓		✓	✓
		Document test plans and test cases designed.	✓	✓	✓	✓	✓						✓		✓	✓
		Use automatic testing tools.	✓	✓	✓	✓	✓						✓		✓	✓
		Develop and validate a test plan.	✓	✓	✓	✓	✓						✓		✓	✓
17160E64AP	Principles of Management	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management	✓	✓	✓			✓	✓	✓	✓	✓	✓			✓
	Unix Internals	Explain UNIX Operating system and usage of file system.	✓	✓	✓											

305

Course Code	Course Name	Course Outcome												
		Apply Shell Commands for a given task using filter and pipe commands.	✓	✓	✓	✓	✓							
17150E64BP		Develop and implement the Shell scripts in VI editor.	✓	✓	✓	✓	✓	✓						
		Discuss the various techniques used for optimising the cache performance	✓	✓	✓	✓	✓	✓			✓			✓
		Design hierarchal memory system	✓	✓	✓	✓	✓	✓			✓		✓	✓
17150E64CP	Parallel Computing	optimize sequential code for fastest possible execution	✓	✓	✓	✓	✓	✓					✓	✓
		Develop, analyze and implement algorithms for parallel computers	✓	✓	✓	✓	✓				✓		✓	✓
17150E64DP	Programming paradigms	Identify and discuss the design principles of a given language or paradigms	✓	✓	✓	✓	✓							
		compare different programming languages from the point of view underlying design principles	✓	✓	✓	✓	✓			✓			✓	✓
17150L65P	Java Programming Lab	Create 3D graphical scenes using open graphics library suits	✓	✓	✓	✓	✓							
		Implement image manipulation and enhancement	✓	✓	✓	✓	✓							✓
		Create 2D animations using tools	✓	✓	✓	✓	✓							✓
17160S71P	Total Quality Management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
17150H72P	Grid Computing	Apply grid computing techniques to solve large scale scientific problems.	✓	✓	✓									
		Apply the concept of virtualization.	✓	✓	✓									
		Use the grid and cloud tool kits.	✓	✓	✓		✓							✓
		Apply the security models in the grid and the cloud environment.	✓	✓	✓	✓	✓				✓	✓		✓
17150H73P	Middleware Technologies	To understand how middleware facilitates the development of distributed applications in heterogenous environments	✓	✓	✓									

Code	Subject	Course Outcome													
		to learn the object oriented middleware basics through the example of cobra objects	✓	✓	✓										
		To understand the basics of web services that is the most often used middleare techniques	✓	✓	✓	✓	✓								✓
17150E74AP	High Speed Networks	Will be able to analyze the various parameters of networking	✓	✓	✓	✓									
		Will be able to understand the algorithm and technologies involved in internet and associated networks	✓	✓	✓	✓	✓					✓		✓	✓
17150E74BP	Bio Informatics	Knowledge and awareness of basic principles and concepts of biology, computer science and mathematics	✓	✓	✓			✓				✓		✓	
		Existing software effectively to extract information from large databases and to use this information in computer modeling	✓	✓	✓	✓	✓	✓				✓		✓	✓
17150E74CP	Software Project Management	Identify the key activities in managing a software project.	✓	✓	✓							✓		✓	✓
		Compare different process models.	✓	✓	✓							✓		✓	✓
		Concepts of requirements engineering and Analysis Modeling.	✓	✓	✓							✓		✓	✓
		Apply systematic procedure for software design and deployment.	✓	✓	✓	✓	✓					✓		✓	✓
		Compare and contrast the various testing and maintenance.	✓	✓	✓	✓	✓					✓		✓	✓
17150E74DP	Digital Image Processing	Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2Dtransforms.	✓	✓	✓										
		Operate on images using the techniques of smoothing, sharpening and enhancement	✓	✓	✓										
		Understand the restoration concepts and filtering techniques.	✓	✓	✓										✓

		Learn the basics of segmentation, features extraction, compression and recognition methods for color models	✓	✓	✓	✓	✓								✓
17150P75P	Project	To independently carry out research /investigation to identify and solve practical problems	✓	✓	✓	✓	✓				✓		✓	✓
		To write and present a report	✓	✓	✓	✓	✓				✓		✓	✓
		To identify the problem in the existing power system and to develop software / hardware solution by doing research.	✓	✓	✓	✓	✓	✓			✓		✓	✓
		To write and present a substantial technical report	✓	✓	✓	✓	✓	✓			✓		✓	✓

COMPUTER SCIENCE AND ENGINEERING

M.TECH (FT)- 2017R

Mapping of COs and POs

Course Code	Title of the Course	Course Objectives	POS									
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
17248S11A	Higher Mathematics	Have knowledge of the concepts needed to test the logic of a program	✓		✓	✓						
		Have gained knowledge which has application in expert system, in data base and a basic for the prolog language	✓	✓	✓	✓	✓				✓	
		Have an understanding in identifying patterns on many levels	✓	✓		✓	✓	✓	✓	✓		
17250H12	Modern Operating System	To have an overview of different types of operating systems.	✓		✓							
		To know the components of an operating system.	✓	✓	✓	✓		✓		✓		✓
		To have a thorough knowledge of process management.	✓	✓	✓	✓		✓		✓	✓	
17250H13	Parallel and High Performance Computing	To understand the models and parameters used.	✓		✓	✓	✓				✓	
		To understand the Matrix Algorithms and Design Issues		✓	✓	✓		✓	✓			✓

Code	Course	Outcome										
17250H14	Adhoc and Sensor Network	A broad overview of the state of wireless and ad hoc networking.	✓			✓	✓				✓	✓
		The overview of the physical, networking and architectural issues of ad hoc networks		✓	✓		✓			✓	✓	
17250H15	Advanced Data Structures and Algorithms	The Different Heap Structures, Search Structures and Multimedia Structures.	✓	✓			✓			✓		✓
		The various coding scheduling and algorithms.	✓	✓	✓		✓					
		The various multimedia structures.	✓	✓	✓	✓	✓	✓	✓		✓	✓
17250E16A	Multimedia Systems	To study the graphics techniques and algorithms.	✓	✓	✓		✓					
		To study the multimedia concepts and various I/O technologies	✓			✓	✓		✓		✓	✓
17250E16B	Genetic Algorithms	Understand and be able to apply fundamental GA theory	✓	✓	✓				✓			✓
		be able to implement or modify simple genetic algorithms.	✓				✓	✓		✓		
		be able to apply GAs to problems in the student's field.					✓	✓			✓	✓
17250E16C	Software Metrics	To introduce an integrated approach to software development incorporating quality management methodologies.	✓	✓	✓		✓					
		To study about the quality improvements in software					✓				✓	✓
		To understand the Software Quality software standards	✓	✓			✓		✓			✓

Code	Course	Outcome										
17250L17	Advanced Web Technologies Lab	On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies To create fully functional website/web application with MVC architecture	✓	✓	✓	✓	✓	✓	✓			
17250CRS	Research Led Seminar	Exposure to various research domains	✓	✓	✓		✓	✓		✓	✓	
		Acquaintance with languages of research	✓	✓	✓	✓		✓		✓		✓
		Development of research aptitude	✓	✓		✓						✓
17250H21	Middleware Technologies	To study the set of services that a middleware system constitutes of.	✓	✓	✓	✓	✓			✓	✓	
		To understand how middleware facilitates the development of distributed applications in heterogeneous environments.	✓	✓			✓	✓		✓	✓	✓
		To study how it helps to incorporate application portability, distributed application component interoperability and integration.	✓	✓		✓	✓	✓		✓	✓	
17250H22	Object Oriented Software Engineering	To learn about software prototyping, analysis and design.	✓	✓		✓	✓			✓	✓	
		To learn UML and its usage.	✓	✓	✓	✓		✓		✓		
		Case studies to apply the principles										

Code	Course	Objective										
17250H23	Digital Image Processing	To study the image fundamentals and mathematical transforms necessary for image processing.	✓	✓	✓		✓		✓		✓	✓
		To study the image enhancement techniques		✓		✓			✓	✓		✓
		To study image restoration procedures.		✓	✓							
		To study the image compression procedures.	✓		✓	✓						
		To study the image segmentation and representation techniques										
17250E24A	Advanced Distributed Computing	processing, distributed systems, operating system issues.	✓	✓		✓		✓				
		learn about distributed transaction	✓	✓	✓		✓	✓	✓			
		study about the distributed databases	✓	✓	✓	✓						
17250E24B	Data Warehousing & Data Mining	To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.	✓	✓	✓							
		To introduce the concept of data warehousing with special emphasis on architecture and design			✓	✓						
17250E24C	Artificial Neural Networks	To introduce the concepts of artificial neural networks such as biological neural networks, clustering and structures	✓	✓	✓	✓						

Course Code	Course Name	Course Outcome										
		To study the linear models for regression, classification, kernel methods and feed forward neural networks			✓	✓	✓					
17250E25A	Service Oriented Architecture	Understand SOA, service orientation and web services	✓	✓	✓							
		Analyzing and designing business based on SOA principles.			✓	✓						
		Learning the concepts of XML			✓	✓	✓					
17250E25B	High Speed Networks	Describe and interpret the basics of high speed networking technologies.	✓	✓								
		Apply the concept learnt in this course to optimize and troubleshoot high-speed network.		✓	✓	✓						
		Demonstrate the knowledge of network planning and optimization			✓	✓	✓		✓			
17250E25C	Embedded Systems	To introduce students to the embedded systems, its hardware and software.	✓	✓								
		To introduce devices and buses used for embedded networking.		✓	✓	✓						
		To explain programming concepts and embedded programming in C and C++.		✓	✓	✓	✓	✓	✓			
		To explain real time operating systems, inter-task communication and an exemplary case of MUCOS – IIRTOS		✓	✓	✓	✓					

17250L26	.NET Technologies Lab	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.	✓	✓	✓	✓	✓		✓	✓	✓	
		Develop dynamic web pages using server side scripting.	✓	✓	✓	✓	✓		✓	✓	✓	
		Use PHP programming to develop web applications.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
172TECWR	Technical Writing /Seminars	take up any challenging practical problems and find solution by formulating proper methodology	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		apply the knowledge of all related courses in providing hardware/software solutions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17250CRM	Research Methodology	Understanding research questions and tools	✓	✓	✓	✓	✓		✓			
		Experience in scientific writings	✓	✓	✓	✓	✓	✓	✓			
		Practice in various aspects of scientific publications	✓	✓	✓			✓	✓			

Course Code	Course	Outcome										
		Inculcation of research ethics	✓	✓		✓	✓			✓	✓	✓
17250CBR	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	✓	✓	✓	✓						
		Evolution of research intuitiveness and orientation		✓	✓	✓						
		Familiarity with cutting edge research trends	✓	✓	✓	✓	✓					
17250H31	Software Project Management	Understand Project planning and management.	✓	✓								
		Identify Client management and project definition.		✓	✓							
		Understand testing based approach to development.				✓	✓					
17250E32A	Cloud Computing	Identify cloud computing models, characteristics, and technologies.	✓	✓								
		Get knowledge about the different architectures in cloud.			✓	✓						
		Identify the information about service management and cloud securities				✓	✓	✓				
17250E32B	Information Security	To understand the basics of Information Security.	✓	✓								
		To know the legal, ethical and professional issues in Information Security.			✓	✓						
		To become aware of various standards in this area.				✓						

Code	Course	Objective											
		To know the technological aspects of Information Security.				✓	✓						
17250E32C	Soft Computing	To introduce the ideas of Neural networks, fuzzy logic and use of heuristics base on human experience.	✓	✓									
		To have a general understanding of soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy clustering techniques and genetic algorithms;		✓	✓								
		To Design and development of certain scientific and commercial application using computational neural network models, fuzzy models, fuzzy clustering applications and genetic algorithms in specified applications		✓	✓	✓							
17250E33A	Advanced Database Technology	Know the operations of parallel and distributed databases.	✓	✓									
		Understand the structure s and standards of object relational databases.		✓	✓	✓							
		Get familiar with the concepts of XML, Mobile and Multimedia Databases		✓	✓	✓							
17250E33B	Mobile Communication and Computing	Learning the basics of Wireless voice and data communications technologies.	✓	✓	✓	✓							
		Enhancing working knowledge on various		✓	✓	✓							

Code	Subject	Objective										
		telephone and satellite networks.										
		Studying the working principles of wireless LAN and its standards.	✓		✓	✓	✓					
		Studying various wireless operating systems				✓	✓					
17250E33C	Green Computing	Understanding scientific and social environment.	✓	✓								
		Minimizing energy consumption from the IT estate.		✓	✓							
		Purchasing green energy and using green suppliers.						✓				
		Reducing the paper and other consumables used.						✓	✓	✓		
		Minimizing equipment disposal requirements										
17250E34A	Software Quality Assurance	To introduce an integrated approach to software development incorporating quality management methodologies.	✓	✓								
		To study about the quality improvements in software			✓	✓	✓					
		To understand the Software Quality software standards					✓					
17250E34B	Bio-Informatics	Build a solid foundation and acquire the vocabulary you need to supervise or to communicate with others who use these tools.	✓	✓								
		To have ability to design drugs.		✓	✓	✓						
		To understand Evolutionary Trees and Phylogeny.				✓	✓		✓			
		Learn the key methods and tools used in bioinformatics							✓	✓		

Course Code	Course Name	Course Outcome										
17250E34C	Wireless Application Protocols	Be able to discuss current and emerging technology in Wireless technology.	✓	✓	✓							
		Understand fundamental trends of technological evolution of Wireless technology.			✓	✓						
		Have hands-on knowledge in developing simple and comprehensive WAP contents.				✓	✓					
		Be able to create simple Wireless applicaitions					✓					
17250P35	Project Work- Phase I	Identify the problem by applying acquired knowledge	✓	✓		✓			✓	✓	✓	
		Analyze and categorize executable project modules after considering risks		✓	✓	✓	✓	✓	✓		✓	✓
		Choose efficient tools for designing project modules							✓	✓	✓	
		Combine all the modules through effective team work after efficient testing							✓	✓	✓	✓
		Elaborate the completed task and compile the project report									✓	✓
17250P35	Project Work- Phase I	Identify the problem by applying acquired knowledge	✓	✓		✓			✓	✓	✓	

Course Code	Course	Outcome										
		Analyze and categorize executable project modules after considering risks		✓	✓	✓	✓	✓	✓		✓	✓
		Choose efficient tools for designing project modules								✓	✓	✓
		Combine all the modules through effective team work after efficient testing							✓	✓	✓	✓
17250CSR	Design/Socio Technical Project	Identify the problem by applying acquired knowledge	✓	✓		✓			✓	✓	✓	
		Analyze and categorize executable project modules after considering risks		✓	✓	✓	✓	✓	✓		✓	✓
		Choose efficient tools for designing project modules								✓	✓	✓
		Combine all the modules through effective team work after efficient testing							✓	✓	✓	✓
		Elaborate the completed task and compile the project report								✓		✓

17250P41	Project Work- Phase II	Identify the problem by applying acquired knowledge	✓	✓		✓			✓	✓	✓	
		Analyze and categorize executable project modules after considering risks		✓	✓	✓	✓	✓	✓		✓	✓
		Choose efficient tools for designing project modules								✓	✓	✓
		Combine all the modules through effective team work after efficient testing							✓	✓	✓	✓
		Elaborate the completed task and compile the project report									✓	✓

COMPUTER SCIENCE AND ENGINEERING

M.TECH (PT)- 2017R

Mapping of COs and POs

Course Code	Title of the Course	Course Objectives	POS											
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17248S11AP	Higher Mathematics	Have knowledge of the concepts needed to test the logic of a program	✓		✓	✓								
		Have gained knowledge which has application in expert system, in data base and a basic for the prolog language	✓	✓	✓	✓	✓				✓			
		Have an understanding in identifying patterns on many levels		✓		✓	✓	✓	✓	✓				
17250H12P	Adhoc and Sensor Network	A broad overview of the state of wireless and ad hoc networking.	✓			✓	✓				✓	✓		
		The overview of the physical, networking and architectural issues of ad hoc networks		✓	✓		✓		✓	✓				
17250H13P	Advanced Data Structures and Algorithms	The Different Heap Structures, Search Structures and Multimedia Structures.	✓	✓			✓			✓		✓		
		The various coding scheduling and algorithms.	✓	✓	✓		✓							
		The various multimedia structures.	✓	✓	✓	✓	✓	✓	✓		✓	✓		
17250L14P	Advanced Web Technologies Lab	On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies To create fully functional	✓	✓	✓	✓	✓	✓	✓					

Code	Course	Outcome												
		website/web application with MVC architecture												
17250HRSP	Research Led Seminar	Exposure to various research domains	✓	✓	✓		✓	✓		✓	✓			✓
		Acquaintance with languages of research	✓	✓	✓	✓		✓		✓		✓	✓	✓
		Development of research aptitude	✓	✓		✓						✓	✓	✓
17250H21P	Middleware Technologies	To study the set of services that a middleware system constitutes of.	✓	✓	✓	✓	✓			✓	✓			
		To understand how middleware facilitates the development of distributed applications in heterogeneous environments.	✓	✓			✓	✓		✓	✓	✓		
		To study how it helps to incorporate application portability, distributed application component interoperability and integration.	✓	✓		✓	✓	✓		✓	✓			
17250H22P	Digital Image Processing	To study the image fundamentals and mathematical transforms necessary for image processing.	✓	✓	✓		✓		✓		✓	✓		
		To study the image enhancement techniques		✓		✓			✓	✓		✓		
		To study image restoration procedures.		✓	✓									
		To study the image compression procedures.	✓			✓	✓							
		To study the image segmentation and representation techniques												
17250E23AP	Advanced Distributed Computing	processing, distributed systems, operating system issues.	✓	✓		✓		✓						
		learn about distributed transaction	✓	✓	✓		✓	✓	✓					
		study about the distributed databases	✓	✓	✓	✓								

322

Code	Course	Outcome	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
17250E23 BP	Data Warehousing & Data Mining	To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.	✓	✓	✓										
		To introduce the concept of data warehousing with special emphasis on architecture and design			✓	✓									
17250E23 CP	Artificial Neural Networks	To introduce the concepts of artificial neural networks such as biological neural networks, clustering and structures	✓	✓	✓										
		To study the linear models for regression, classification, kernel methods and feed forward neural networks			✓	✓	✓								
17250L24P	.NET Technologies Lab	Create Simple application using web controls	✓	✓	✓	✓	✓					✓	✓	✓	✓
		Work with States of ASP.NET Pages & Adrotator Control Use of calendar control, Treeview control & Validation controls	✓	✓	✓	✓	✓					✓	✓	✓	✓
172TECW RP	Technical Writing /Seminars	Understand professional writing by studying management communication	✓	✓	✓	✓	✓					✓	✓	✓	✓
17250CRM P	Research Methodology	Understanding research questions and tools	✓	✓	✓	✓	✓		✓						
		Experience in scientific writings	✓	✓	✓	✓	✓	✓	✓						
		Practice in various aspects of scientific publications	✓	✓	✓			✓	✓						
		Inculcation of research ethics	✓	✓		✓	✓			✓		✓			
17250CBR P	Participation in Bounded Research	Knowledge and awareness of basic principles and concepts of biology, computer science and mathematics	✓	✓	✓	✓			✓	✓	✓	✓			

Code	Course	Objective												
17250H31P	Modern Operating System	To have an overview of different types of operating systems.	✓		✓									
		To know the components of an operating system.	✓	✓	✓	✓		✓		✓		✓		
		To have a thorough knowledge of process management.	✓	✓	✓	✓		✓		✓	✓			
17250E32P	Parallel and High Performance Computing	To understand the models and parameters used.	✓		✓	✓	✓			✓				
		To understand the Matrix Algorithms and Design Issues		✓	✓	✓		✓	✓			✓		
17250E33 AP	Multimedia Systems	To study the graphics techniques and algorithms.	✓	✓	✓		✓							
		To study the multimedia concepts and various I/O technologies			✓	✓		✓		✓	✓			
17250E33 BP	Genetic Algorithms	Understand and be able to apply fundamental GA theory	✓	✓	✓					✓		✓		
		be able to implement or modify simple genetic algorithms.	✓			✓	✓			✓				
		be able to apply GAs to problems in the student's field.				✓	✓			✓	✓			
17250E33 CP	Software Metrics	To introduce an integrated approach to software development incorporating quality management methodologies.	✓	✓	✓		✓							
		To study about the quality improvements in software					✓			✓	✓			
		To understand the Software Quality software standards	✓	✓			✓		✓			✓		
17250CSR P	Design/Socio Technical Project	To write and present a report	✓			✓			✓					
		To identify the problem in the existing power system and to develop software / hardware solution by doing research.	✓		✓		✓			✓				✓
		To write and present a substantial technical report	✓			✓			✓	✓			✓	
17250H41 P	Object Oriented Software Engineering	To learn about software prototyping, analysis and design.	✓	✓		✓	✓			✓		✓		

Code	Course	Outcome													
		To learn UML and its usage.	✓	✓	✓	✓		✓		✓					
		Case studies to apply the principles													
17250H42P	Software Project Management	Understand Project planning and management.	✓	✓											
		Identify Client management and project definition.		✓	✓										
		Understand testing based approach to development.				✓	✓								
17250E43AP	Service Oriented Architecture	Understand SOA, service orientation and web services	✓	✓	✓										
		Analyzing and designing business based on SOA principles.			✓	✓									
		Learning the concepts of XML				✓	✓	✓							
17250E43BP	High Speed Networks	Describe and interpret the basics of high speed networking technologies.	✓	✓											
		Apply the concept learnt in this course to optimize and troubleshoot high-speed network.		✓	✓	✓									
		Demonstrate the knowledge of network planning and optimization				✓	✓	✓		✓					
17250E43CP	Embedded Systems	To introduce students to the embedded systems, its hardware and software.	✓	✓											
		To introduce devices and buses used for embedded networking.		✓	✓	✓									
		To explain programming concepts and embedded programming in C and C++.			✓	✓	✓	✓	✓	✓					
		To explain real time operating systems, inter-task communication and an exemplary case of MUCOS – IIRTOS			✓	✓	✓	✓							
17250P44P	Project Work-Phase I	To independently carry out research /investigation to identify and solve practical problems	✓				✓			✓					✓
		To write and present a report													

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
17250E51 AP	Cloud Computing	Identify cloud computing models, characteristics, and technologies.	✓	✓													
		Get knowledge about the different architectures in cloud.			✓	✓											
		Identify the information about service management and cloud securities				✓	✓	✓									
17250E51 BP	Information Security	To understand the basics of Information Security.	✓	✓													
		To know the legal, ethical and professional issues in Information Security.			✓	✓											
		To become aware of various standards in this area.				✓											
		To know the technological aspects of Information Security.				✓	✓										
17250E51 CP	Soft Computing	To introduce the ideas of Neural networks, fuzzy logic and use of heuristics base on human experience.	✓	✓													
		To have a general understanding of soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy clustering techniques and genetic algorithms;			✓	✓											
		To Design and development of certain scientific and commercial application using computational neural network models, fuzzy models, fuzzy clustering applications and genetic algorithms in specified applications				✓	✓	✓									
17250E52 AP	Advanced Database Technology	Know the operations of parallel and distributed databases.	✓	✓													
		Understand the structure s and standards of object relational databases.			✓	✓	✓										
		Get familiar with the concepts of XML, Mobile and Multimedia Databases				✓	✓	✓									

326

Code	Course	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17250E52 BP	Mobile Communication and Computing	Learning the basics of Wireless voice and data communications technologies.	✓	✓		✓								
		Enhancing working knowledge on various telephone and satellite networks.			✓	✓	✓							
		Studying the working principles of wireless LAN and its standards.	✓		✓	✓	✓							
		Studying various wireless operating systems				✓	✓							
17250E52 CP	Green Computing	Understanding scientific and social environment.	✓	✓										
		Minimizing energy consumption from the IT estate.		✓	✓									
		Purchasing green energy and using green suppliers.							✓					
		Reducing the paper and other consumables used.							✓	✓	✓			
		Minimizing equipment disposal requirements												
17250E53 AP	Software Quality Assurance	To introduce an integrated approach to software development incorporating quality management methodologies.	✓	✓										
		To study about the quality improvements in software			✓	✓	✓							
		To understand the Software Quality software standards					✓							
17250E53 BP	Bio-Informatics	Build a solid foundation and acquire the vocabulary you need to supervise or to communicate with others who use these tools.	✓	✓										
		To have ability to design drugs.		✓	✓	✓								
		To understand Evolutionary Trees and Phylogeny.				✓	✓		✓					
		Learn the key methods and tools used in bioinformatics							✓	✓				
17250E53 CP		Be able to discuss current and emerging technology in Wireless technology.	✓	✓	✓									

Code	Course	Course Outcome														
	Wireless Application Protocols	Understand fundamental trends of technological evolution of Wireless technology.			✓	✓										
		Have hands-on knowledge in developing simple and comprehensive WAP contents.				✓	✓									
		Be able to create simple Wireless applicaitions					✓									
17250P61P	Project Work-Phase II	To independently carry out research /investigation to identify and solve practical problems		✓	✓	✓							✓			✓
		To write and present a report	✓	✓	✓	✓	✓					✓		✓	✓	
		To identify the problem in the existing power system and to develop software / hardware solution by doing research.	✓	✓	✓	✓	✓	✓				✓		✓	✓	

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University (17UGBTGE)

Program Outcomes and Course outcomes of

<u>Department of Biotechnology</u>

REGULATION – 2017

	LOCAL
	REGIONAL
	NATIONAL
	GLOBAL

DEPARTMENT OF BIOTECHNOLOGY
B. Sc - BIOTECHNOLOGY
17UGBTGEC

REGULATION 2017

Programme offered:

S. No	Programme Name	PO and CO
1.	B. Sc Biotechnology	Yes
2.	M. Sc Biotechnology	Yes
3.	M. Phil Biotechnology	Yes

PROGRAMME OUTCOMES	
PO1	Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life
PO2	Understanding and better knowledge of the causes, types and control methods for environmental pollution by the students
PO3	The student will be able to discuss the mechanisms associated with gene expression system in prokaryotes and eukaryotes
PO4	Developed various communication skills such as reading, listening, speaking etc.,
PO5	Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments
PO6	Ethics: Convey and practice social, environmental and biological ethics
PO7	To get knowledge about research tools and learn to do review literature. Ability to carry out independent literature survey corresponding to the specific publications type and asses basic research tool
PROGRAM SPECIFIC OUTCOME	
PSO1	Graduates will exhibit contemporary knowledge in Biotechnology and students will be eligible for doing jobs in pharmaceutical and biotechnological Industry.
PSO2	An expert in biotechnology and allied fields (medical, microbial, Agricultural, environmental, plant and animal) for utilizing the practical skill to address biotechnological challenges.
PSO3	Graduates will be able to work individually as well as in team to survive in multidisciplinary environment.
PSO4	If students will engage themselves in the process of effective learning, it will give opportunities to utilize acquired knowledge for the catering the needs of science and technology as well as for the betterment of human mankind.
PSO5	Graduates will be able to understand the potentials, and impact of biotechnological innovations on environment and their implementation for finding sustainable solution to issues pertaining to environment, health sector, agriculture, etc.
PROGRAM EDUCATIONAL OBJECTIVES	
PEO1	To obtain detailed information about the fundamentals of Biotechnology, allied subjects and life skills
PEO2	To provide information about the molecular methods which involved in cellular processes of living systems such as microbes to higher order organisms for applied aspects. To address the emerging need for skilled scientific manpower with research ethics involving organisms

PEO3	To impart the basics and current molecular tools in the areas of Molecular Diagnostics, Fermentation Technology, Plant, Animal & Environmental Biotechnology are included to train the students for man power development and also sensitize them to scope for research. The practical subjects will provide information about the careers in the industry and applied research where biological system is employed
PEO4	To make the graduates of Biotechnology to learn and to adopt in a competitive world of technology update and contribute to all forms of life
PEO5	To enable them to excute a research objective through experimentation

POs/PEO	PO1	PO2	PO3	PO4	PO5
PEO1	*	*		*	
PEO2			*	*	*
PEO3		*		*	
PEO4	*	*			*
PEO5			*		

Semester	Course Code	Title of the Course	Cos
I	17110AEC11	Language-I (Tamil-I)	Learn the changes that have occurred in literature since the classical period.
			Make use of vocabulary systematically.
			Understand how to lead one's life realizing the modernity and its environment/atmosphere.
I	17111AEC11	Advanced English-I	Develop vocabulary
			Learn to edit and do proof reading
			Read and comprehend literature
I	17111AEC12	English-I	Read and comprehend literature
			Appreciate poetry and prose
			Familiarize students with fiction.
I	17117AEC13	Fundamentals of Biological system	Understand the physical, chemical, and mathematical basis of biology
			Appreciate the different scales of biological systems
			To understand the Basics in life sciences, evolution and organization of life, living and non-living things
			To understand the basics of biomolecules, carbohydrates, proteins, lipids and Nucleic acids

I	17117AEC14L	Fundamentals of Biological system Lab	The learners will acquire knowledge on the structure and functions relationship of biological system and as well their roll in various biological process
			To know the cellular organization of life, cell theory- cell organization-cell organelles- plant and animal cell
			To understanding the basic fundamentals of Biological System
I	17115AEC15	Biological Chemistry	The learners will acquire knowledge on the structure and functions relationship of proteins nucleic acid carbohydrates and as well their roll in various biological process
			They study the influence and role of structure in reactivity of bio-molecules
			Through this course the students are exposed to importance of biological macromolecules
I	17115AEC16L	Biological Chemistry Lab	Students will use current biochemical and molecular techniques to plan and carry out experiments.
			Biochemistry Majors will gain proficiency in basic laboratory techniques in both chemistry and biology, and be able to apply the scientific method to the processes of experimentation and hypothesis testing
			At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions
I	17120SEC01A	Skill Based Elective-I	Recognize when to use each of the Microsoft Office programs to create professional and academic documents.
			Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.
			Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.
I	17111SEC01L	Communicative English Lab-I	Learn grammar.
			Enrich vocabulary
			Understand the process of communication
			Develop listening skill
I	171INDCONS	Indian Constitution	Democratic values and citizenship Training and gained
			Awareness on fundamental Rights are established
			The functions of union Government and State Government are learnt
			The Power and functions of the Judiciary learnt thoroughly

			Appreciation of Democratic Parliamentary Rule is learnt
II	17110AEC21	Language-II (Tamil-II)	Know what devotion really is.
			Know the fruitfulness obtained through devotion
			Perceive the progress achieved in the society through devotion.
II	17111AEC21	Advanced English-II	Develop technological skills.
			Able to write in a variety of formats
			Read biographies and develop personality
II	17111AEC22	English-II	Appreciate different forms of literature
			Acquire language skills through literature
			Broadens the horizon of knowledge
II	17117AEC23	Cell Biology and Genetics	This paper will enable the students to learn the basics and lay strong foundation in understanding the composition of cells, how cells works is fundamental to living systems.
			The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy
			Students will be taught Mendelian genetics, their principles and gene interaction.
			This gives them a strong foundation on the basic unit of life.
II	17117AEC24L	Cell Biology and Genetics lab	Able to isolate the DNA, identify and distinguish different blood cells, to solve simple genetic problems and analyze Human karyotype
			The course teaches the students about genes at molecular level
			They learn about DNA, RNA and their replication, mutations, DNA repair mechanism
II	17116AEC25	Microbiology	This fundamental paper discusses the importance of microorganisms
			The course throws light on types of microorganisms in and around humans
			At the end of the course, the student has understanding on the metabolism and mechanism of microbial life
			Gain knowledge about metabolism.
II	17116AEC26L	Microbiology lab	Develop basic skill in aseptic techniques
			Understand various accessories for microbiology practicals

			Perform various staining techniques
			Cultivate bacteria with different cultivation technique
II	17117RLC27	Research LED Seminar	Exposure to various research domains
			Acquaintance with languages of research
			Development of research aptitude
II	17120SEC02A	Skill Based Elective – II	Identify the names and functions of the PowerPoint interface.
			Create, edit, save, and print presentations.
			Format presentations.
			Add a graphic to a presentation.
			Create and manipulate a simple slideshow with outlines and notes.
			Create slide presentations that include text, graphics, animation, and transitions.
II	17111SEC02L	Communicative English Lab-II	Learn grammar.
			Use a variety of reading strategies
			Enhance the skill of making grammatically correct sentences.
III	17110AEC31	Language-III (Tamil-III)	Achieve one's goal by following the ancestral path
			Learn to lead life of perfection by realizing the uncertainty in the life
			Attain happiness through honesty
III	17111AEC31	Advanced English-III	Understand phonetics.
			Develop writing skill
			Able to develop creative writing
III	17111AEC32	English-III	Enable to appreciate different types of prose
			Develop the conversational skills through one-act plays
			Enhance the skill of making grammatically correct sentences.
III	17117AEC33	Plant Physiology	Impart an insight into the various plant water relations
			Learning about the mineral nutrition in plants
			Understand the mechanism of various metabolic processes in plants

			Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.
III	17117AEC34L	Plant physiology Lab	Equip students with skills and techniques related to plant physiology so that they can design their own experiments
			Learn about the movement of sap and absorption of water in plant body.
			Understand the plant movements
III	17117AEC35	Immunology	The students may understanding the immune system, its components and various techniques used in bio manipulation.
			This course gives an overview on the immune system including organs, cells and receptors
			The students learns about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions
			The course develops in the student an appreciation for principles of immunology and its applications in treating human diseases
III	17117AEC36L	Immunology Lab	Identify the structure, function, and characteristics of immunoglobulins.
			Explain the principles of and perform serological tests.
			It's a paper which accomplishes the learning of techniques involved in understanding the immunological aspects of physiology and biological samples
III	17117RMC37	Research Methodology	Understanding research questions and tools
			Experience in scientific writings
			Practice in various aspects of scientific publications
			Inculcation of research ethics
III	17120SEC03A	Skill based Elective-III	Indicate the names and functions of the Excel interface components.
			Enter and edit data.
			Format data and cells.
			Construct formulas, including the use of built-in functions, and relative and absolute references.
			Create and modify charts.
			Preview and print worksheets
III	17111SEC03L	Communicative Eng-	Learn grammar.

		lish Lab-III	Enhance their fluency in English
			Develop speaking and writing skills
			Develop individual perspectives that demonstrate critical thinking skills
IV	17110AEC41	Language-IV (Tamil-IV)	Realize how the ancient people changed their lifestyle according to the ages
			Learn how to change one's lifestyle according to the needs of the future
			Accept the modern trends and its uses
IV	17111AEC41	Advanced English-IV	Develop writing skill.
			Comprehend and describe poems
			Learn interviewing skills
IV	17111AEC42	English-IV	Improve their ability to read and understand them
			Know the genius of Shakespeare
			Express in writing their views.
IV	17117AEC43	Animal physiology	To provide advanced undergraduate and introductory graduate students with a comprehensive overview of animal physiology from molecular, cellular and whole animal systems approaches.
			To critically evaluate clinical and research case problems relating to endocrinology and cell biology.
IV	17117AEC44L	Animal Physiology Lab	Have an enhanced knowledge and appreciation of mammalian physiology
			Understand the functions of important physiological systems including the cardiorespiratory, renal, reproductive and metabolic systems
			It trains the students with essentiality of molecules, cells, tissues and organs involved in the defense mechanism
IV	17117AEC45	Bioinformatics and biostatistics	Know the applications and limitations of different bioinformatics and statistical methods.
			Be able to perform and interpret bioinformatics and statistical analyses with real molecular biology data.
			Be able to describe statistical methods and probability distributions relevant for molecular biology data.

IV	17116AEC46L	Bioinformatics and Biostatistics Lab	This laboratory course will prepare the students for various applications of bioinformatics in life science research.
			The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems
			This course imparts the knowledge of basic statistical methods to solve problems
IV	17120SEC04A	Skill based Elective-IV	Examine database concepts and explore the Microsoft Office Access environment.
			Design a simple database.
			Build a new database with related tables.
			Manage the data in a table.
			Query a database using different methods.
			Design a form.
			Generate a report.
			Import and export data.
IV	17111SEC04L	Communicative English Lab-IV	Learn grammar.
			Enable to express their views in conversation
			Develop soft skills
			Enhance presentation skills
IV	171ENVTSTU	Environmental Studies	Understand ecosystem
			Know social issues and the environment
			Learn keep the environment eco-friendly
V	17117AEC51	Developmental Biology	Be able to list the types of characteristics that make an organism ideal for the study of developmental biology
			Be familiar with the events that lead up to and comprise the process of fertilization.
			Be able to compare and contrast the process of gastrulation in the various model organisms discussed

V	17117AEC52	Cell and Tissue culture	Fundamentals of plant tissue culture. Plant regeneration and organogenesis. Embryogenesis. Organ, anther and pollen culture. Ovary, ovule and embryo culture. Callus suspension culture.
			Protoplast, isolation, culture and fusion.
			Production of hybrids and cybrids.
V	17117AEC53	Enzyme and enzyme technology	The course will provide an overview of the key enzymes currently used in large scale industrial processes
			This course includes the isolation, purification and characterization of enzymes and their applications
			Discover the current and future trends of applying enzyme technology for the commercialization purpose of biotechnological products.
V	17117AEC54L	Developmental biology, tissue culture lab	Demonstrate a basic understanding of developmental terms and mechanisms.
			Utilize laboratory techniques to design and carry-out experimental studies.
			Conservation of endangered plant species
			Molecular, pharmacological and biochemical investigations of different aspects of plant growth and development such as in vitro flowering.
V	17117AEC55L	Enzyme and Enzyme Technology Lab	Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms
			Apply biochemical calculation for enzyme kinetics
			Compare methods for production, purification, characterization and immobilization of enzymes
			Discuss various application of enzymes that can benefit human life
V	17117DSC56A	Discipline Specific Elective -I rDNA Technology	Utilize the knowledge on creation of a genomic library
			Explain the significance of model organisms in recombinant DNA technology
			This course teaches rDNA technology techniques and their application in the field of genetic engineering They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries
V	17117DSC56B	Molecular Biology	Understand and apply the principles and techniques of molecular biology which prepares students for further education and/or employment in teaching, basic research, or the health professions

Semester	Code	Course	Outcomes
			Explain the concept of recombination, linkage mapping and elucidate the gene transfer mechanisms in prokaryotes and eukaryotes
			Know the terms and terminologies related to molecular biology and microbial
V	17117BRC57	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research
			Evolution of research intuitiveness and orientation
			Familiarity with cutting edge research trends
V	17120SEC05A	Skill based Elective-V	Work with the Photoshop workspace
			Navigate images
			Resize and crop images
			Make and work with selections
			Create new layers and perform other basic layer functions
			Transform images
V	17111SEC05L	Communicative English Lab-V	Develop corporate skills.
			Handle their day to day affairs well with their knowledge of language skills.
			Get a Job.
VI	17117AEC61	Plant and Animal Biotechnology	This course teaches organization and expression of plant and animal genome and plant and animal tissue culture
			Students learn about transgenic animal, their application in pharmaceutical industry, cloning and its importance.
			This course prepares the students in appreciating the its benefits and applications in biotechnological, pharmaceutical, medical and agricultural field
VI	17117SEC62	Applied Biotechnology	Evaluate and describe systems of product research, development, and production
			Analyze the potential for commercialization for innovations within the biotechnology industry
			The students will gain the basic knowledge of aquaculture and Students will solve a variety of problems using creative thinking skills and analytical skills in the lab.

VI	17117SEC63L	Plant, Animal and Applied Biotechnology Lab	The students should have knowledge on biotechnological analysis and the utilization of these knowledge about procedures and utilization of such knowledge to combine biotechnological methods to obtain analytical results
			The students will develop fundamental knowledge in Plant Molecular Biotechnology and its application in laboratory and industry settings.
			Describe mechanisms of plant pollination and differentiate between haploid and diploid cells and their role in sexual reproduction
VI	17117AEC64L	Environmental Biotechnology Lab	To present an overview of important environmental biotechnologies involved in treatment of pollutants and resource recovery
			The students will be able to demonstrate the use of environmental science principle in solving various environmental problems
			Describe the most commonly applied disinfection methods, and the steps typically involved in drinking water treatment process
VI	17117DSC65A	Discipline Specific Elective - II Environmental Biotechnology	Biofuels: Advantages, Energy from biomass, Biogas, Biohydrogen, Biosafety, Toxicity Bio magnification, Threshold Dose, Factor Affecting Toxicity.
			Students will gain about environmental pollutions, preventive measures.
			Explain the microbial processes and growth requirements undelaying the activated sludge process, nitrification, denitrification, enhanced phosphorus removal, and anaerobic digestion
VI	17117DSC65B	Environmental Management	The students in the course are exposed to the diversity, function, ecological adaptation of microorganisms within the environment
			This course gives the importance of microbial life to key ecosystem process and teaches the role of biotechnology to address environmental issues
VI	17117PRW67	Project Work	Understand basic concepts of research and its methodologies
			Identify appropriate research problem and parameters
			Prepare a research report
VI	17120SEC06A	Skill Based Elective – VI	Learn to create animated graphics, add sound and interactivity.
			Can develop Website
			CD based presentations
VI	17111SEC06L	Communicative English Lab-VI	Apply study skills
			Widen creative thinking
			Be a good team worker

			Make them proficient in English

DEPARTMENT OPF BIOTECHNOLOGY

M. Sc - BIOTECHNOLOGY

17PGBTGEC

PROGRAMME OUTCOMES	
PO1	Vital Thinking: Acquire knowledgeable actions after identifying the hypothesis that frame our idea and dealings, read-through out the degree to which these hypothesis are precise and suitable, and give the impression of being at our thoughts and assessments (academic, organizational and individual) from diverse perception.
PO2	Precious communication: Study about speak, read, write and listen noticeably in person and throughout electronic media in English and in one Indian language and build meaning of the globe by connecting people, thoughts books, media and technology.
PO3	Effectual citizenship: Reveal empathetic social concern and fairnesscentred national progress and the capability to act with andtake part in civic life through volunteering
PO4	Ethics: Be aware of diverse value systems including the individual, under the ethical dimensions of personal choice, and believe responsibility for them.
PO5	Environment and Sustainability: Analyze the importance of microbes for environmental clean-up and sustainable development.
PO6	Self-directed and life-long learning: To gain the talent to employ in self-determining and life-long learning in the broadest circumstance socio technological transforms.
PROGRAM SPECIFI COUTCOME	
PSO1	Upon master graduation, Microbiology majors will master a set of advanced skills, which would be useful to function effectively as professionals and to their continued development and learning within the field of Microbiology.
PSO2	Able to explain why microorganisms are ubiquitous in nature, inhabiting a multitude of habitats and occupying a wide range of ecological habitats.
PSO3	Able to cite examples of the vital role of microorganisms in biotechnology, fermentation, medicine and other industries important to human well-being.
PSO4	Able to demonstrate that microorganisms have an indispensible role in the environment, including elemental cycles, biodegradation etc
PSO5	Able to systematically collect record and analyze data, identify sources of error, interpret the result and reach logical conclusion.
PROGRAM EDUCATIONAL OBJECTIVES	
PEO1	To provide detailed knowledge of Microbiology and their application fields. To understand the beneficial and harmful role of microorganisms in the environment and in the industries.
PEO2	To understand the fundamentals of physiological reactions including metabolic pathways and biochemical reactions in microorganisms. To understand the fundamental concepts of immunology, biochemistry, biotechnology and genetics etc.

PEO3	To develop human resource and entrepreners in microbiology with the ability to independently start their own ventures or small biotech units in the field of biotechnology.
PEO4	Understand modern microbiology - practices and approaches with an emphasis in technology application in pharmaceutical, medical, industrial, environmental and agricultural areas.
PEO5	Gain experience with standard molecular tools and approaches utilized: manipulate genes, gene products and organisms. Become familiar with handling of Laboratory animals for the research purpose. Interpret differences in data distributions via visual displays.

MAPPING OF PEO AND PO

M.Sc., CURRICULUM MAPPING

PROGRAMME EDUCATIONAL OBJECTIVES VS PROGRAMME OURCOME

POs/PEO	PO1	PO2	PO3	PO4	PO5
PEO1	*	*	*	*	
PEO2	*			*	*
PEO3		*		*	
PEO4	*	*			*
PEO5	*		*		

Semester	Course Code	Title of the Course	COs
I	17217SEC11	General Microbiology	Students can gain the idea of how to identify the microorganisms based on the modern polyphasic approach.
	17217SEC12	Molecular genetics	After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.
	17217SEC13	Biochemistry	This paper in biochemistry has been designed to provide the student with a firm foundation in the biochemical aspects of cellular functions which forms a base for their future research.
	17217SEC14L	Microbiology & Molecular Genetics Lab	After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.
	17217DSC15A	Immunology	This course will provide the student insights into the various aspects of Immunology such as classical immunology, clinical immunology, Immunotherapy and diagnostic immunology.

		17217DSC15B	Biosafety and Biodiversity	To study the diversity of plants and animal life in a particular habitat, ethical issues and potential of biotechnology for the benefit of man kind
		17216RLC16	Research Led Seminar	Exposure to various research domains
				Acquaintance with languages of research
				Development of research aptitude
II		17217SEC21	Cell & Molecular Biology	Students after completion of this paper will be exceptionally well prepared to pursue careers in cellular and sub cellular biological research, biomedical research, or medicine or allied health fields.
		17217SEC22	Biophysics & Bioinformatics	This paper has been designed to give the students comprehensive training in the emerging and exciting upcoming filed of Systems Biology, which will help students to get career in both industry/R&D.
		17217SEC23	Industrial Biotechnology	This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment-friendly processes such as green manufacturing technologies and sustainable development.
		17217SEC24L	Molecular Biology & Industrial Biotechnology Lab	Students after completion of this paper will be exceptionally well prepared to pursue careers in cellular and sub cellular biological research, biomedical research, or medicine or allied health fields
		17217DSC25A	Endocrinology	To know the pathophysiological significance of the system with special reference to humans.
		17217DSC25B	Intellectual Property Rights	To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act. Further teacher will have to demonstrate with products and ask the student to identify the different types of IPR'
		17217RMC26	Research Methodology	Understanding research questions and tools
				Experience in scientific writings
				Practice in various aspects of scientific publications
				Inculcation of research ethics
		17217BRC27	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research
				Evolution of research intuitiveness and orientation
				Familiarity with cutting edge research trends
III		17217SEC31	Recombinant DNA tech-	Utilize the knowledge on creation of a genomic library

		nology	Explain the significance of model organisms in recombinant DNA technology
			This course teaches rDNA technology techniques and their application in the field of genetic engineering They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries
	17217SEC32	Plant Biotechnology	Understand the basic principles of plant kingdom and their economic importance.
			Explain the basics, methodology and applications of plant tissue culture.
			Conceptualize plant transformation, selection of desirable genes for crop improvement, design binary vector and procedure for generating GM crops.
	17217SEC33	Animal Biotechnology	To learn basic cell culture, type, subculture media preparation and applications
			To understand the difference between stem cell types and methods for producing transgenic animals
			To improve artificial embryo transfer and nuclear transfer methods and applications
	17217SEC34L	DNA technology & Animal biotechnology-lab	Describe the different types of blood groups and different types of blood cells and their function in the human body.
			Learn various techniques like Immunoelectrophoresis, ELISA, Immunoprecipitation etc.
			Culture and maintain animal cell cultures, various method of preservation and counting of viable cells.
	17217DSC34A	Nanobiotechnology	This course will act as a bridge between students from non-biology course at all levels
	17217DSC34B	Environmental biotechnology	This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also who is willing to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment- friendly processes such as green manufacturing technologies and sustainable development
IV	17217SRC37	Participation in Scaffold Research	Acquired detailed knowledge of antimicrobial agents, their mechanism of action
			Developed understanding of different types of disinfectants/antiseptics bactericidal and bacteriostatic actions
			Regulatory practices, biosensors and applications in Pharmaceuticals
			Quality Assurance and Validation
	17217PRW41	Project work	Experience from a master's project and international literature.

| | | | Develop ability to independently carry out a complete scientific process. |
| | | | Learn about how to write dissertations and proposals for the scientific community. |

School of Arts and Science
Department of Biotechnology

17MPBTGE
2017 Regulation
Program Outcomes and Course outcomes of
M. Phil., Mapping of COs and POs

Semester	Course Code	Title of the Course	COs
I	173BTC12	Advanced Biotech-nology	Understanding research questions and tools
			Experience in scientific writings
			Practice in various aspects of scientific publications
			Inculcation of research ethics
	173BTE13	Environmental Bio-technology	Develop and demonstrate the advanced genetic engineering and cloning techniques
			Explain the elaborate details of plant biotechnology like vector for gene transfer, Binary vector
			Demonstrate the advanced fermentation techniques and conventional fermentation versus biotransformation.

Semester	Course Code	Title of the Course	Cos	POS						
				PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	17110AEC11	Language-I (Tamil-I)	Learn the changes that have occurred in literature since the classical period.	*	*	*		*	*	*
			Make use of vocabulary systematically.	*	*	*	*	*	*	*
			Understand how to lead one's life realizing the modernity and its environment/atmosphere.	*	*	*		*	*	*
I	17111AEC11	Advanced English-I	Develop vocabulary	*	*		*	*	*	*
			Learn to edit and do proof reading	*	*	*	*		*	*
			Read and comprehend literature	*	*			*		
I	17111AEC12	English-I	Read and comprehend literature	*	*	*	*		*	*
			Appreciate poetry and prose	*	*		*	*		

			Familiarize students with fiction.	*	*	*	*	*	*	*
I	17117AEC13	Fundamentals of Biological system	Understand the physical, chemical, and mathematical basis of biology	*	*	*				*
			Appreciate the different scales of biological systems	*			*		*	
			To understand the Basics in life sciences, evolution and organization of life, living and non-living things	*	*	*		*		*
			To understand the basics of biomolecules, carbohydrates, proteins, lipids and Nucleic acids	*	*		*	*		*
I	17117AEC14L	Fundamentals of Biological system Lab	The learners will acquire knowledge on the structure and functions relationship of biological system and as well their roll in various biological process	*	*	*	*	*	*	*
			To know the cellular organization of life, cell theory- cell organization-cell organelles- plant and animal cell	*		*	*		*	*
			To understanding the basic fundamentals of Biological System	*	*	*	*	*	*	*
I	17115AEC15	Biological Chemistry	The learners will acquire knowledge on the structure and functions relationship of proteins nucleic acid carbohydrates and as well their roll in various biological process	*	*	*	*	*		*
			They study the influence and role of structure in reactivity of biomolecules	*		*	*	*		*
			Through this course the students are exposed to importance of biological macromolecules	*	*	*	*	*		*

Sem	Code	Course	Outcome							
I	17115AEC16L	Biological Chemistry Lab	Students will use current biochemical and molecular techniques to plan and carry out experiments.		*	*	*	*	*	*
			Biochemistry Majors will gain proficiency in basic laboratory techniques in both chemistry and biology, and be able to apply the scientific method to the processes of experimentation and hypothesis testing			*			*	*
			At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions	*	*	*	*	*		*
I	17120SEC01A	Skill Based Elective-I	Recognize when to use each of the Microsoft Office programs to create professional and academic documents.	*	*			*	*	*
			Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.	*	*	*		*	*	*
			Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.	*	*	*	*	*	*	*
I	17111SEC01L	Communicative English Lab-I	Learn grammar.	*	*	*	*		*	*
			Enrich vocabulary	*	*					
			Understand the process of communication	*	*			*		
			Develop listening skill	*		*		*	*	
I	171INDCONS	Indian Constitution	Democratic values and citizenship Training and gained	*	*	*	*		*	*
			Awareness on fundamental Rights are established	*		*	*	*	*	*
			The functions of union Government and State Government are learnt	*			*	*	*	*

Sem	Course Code	Course	Outcome	1	2	3	4	5	6	7
			The Power and functions of the Judiciary learnt thoroughly	*	*	*	*	*	*	*
			Appreciation of Democratic Parliamentary Rule is learnt	*	*	*	*	*	*	*
II	17110AEC21	Language-II (Tamil-II)	Know what devotion really is.	*	*		*	*	*	*
			Know the fruitfulness obtained through devotion	*	*	*		*	*	
			Perceive the progress achieved in the society through devotion.	*	*	*	*		*	*
II	17111AEC21	Advanced English-II	Develop technological skills.	*	*		*	*	*	*
			Able to write in a variety of formats		*		*		*	
			Read biographies and develop personality	*	*	*	*	*	*	*
II	17111AEC22	English-II	Appreciate different forms of literature	*	*	*	*		*	*
			Acquire language skills through literature	*	*			*	*	
			Broadens the horizon of knowledge	*	*				*	
II	17117AEC23	Cell Biology and Genetics	This paper will enable the students to learn the basics and lay strong foundation in understanding the composition of cells, how cells works is fundamental to living systems.	*				*	*	*
			The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy	*		*	*	*	*	
			Students will be taught Mendelian genetics, their principles and gene interaction.	*	*	*	*	*	*	*
			This gives them a strong foundation on the basic unit of life.	*	*		*	*		*

Sem	Course Code	Course Name	Course Outcome							
II	17117AEC24L	Cell Biology and Genetics lab	Able to isolate the DNA, identify and distinguish different blood cells, to solve simple genetic problems and analyze Human karyotype		*	*	*	*	*	*
			The course teaches the students about genes at molecular level	*	*	*	*	*	*	*
			They learn about DNA, RNA and their replication, mutations, DNA repair mechanism	*			*	*	*	*
II	17116AEC25	Microbiology	This fundamental paper discusses the importance of microorganisms	*		*			*	*
			The course throws light on types of microorganisms in and around humans	*			*	*	*	*
			At the end of the course, the student has understanding on the metabolism and mechanism of microbial life	*	*	*		*	*	*
II			Gain knowledge about metabolism.	*	*	*	*	*	*	*
II	17116AEC26L	Microbiology lab	Develop basic skill in aseptic techniques	*	*	*	*	*	*	*
			Understand various accessories for microbiology practicals	*		*	*	*	*	*
			Perform various staining techniques	*		*		*	*	*
II			Cultivate bacteria with different cultivation technique	*	*		*	*	*	*
II	17117RLC27	Research LED Seminar	Exposure to various research domains	*		*	*			*
			Acquaintance with languages of research	*	*	*	*	*	*	*
II			Development of research aptitude	*	*				*	*

	Course Code	Course Name	Outcome							
			Identify the names and functions of the PowerPoint interface.	*	*	*	*	*	*	*
			Create, edit, save, and print presentations.	*	*			*	*	*
			Format presentations.	*	*			*	*	*
	17120SEC02A	Skill Based Elective – II	Add a graphic to a presentation.	*	*			*	*	*
			Create and manipulate a simple slideshow with outlines and notes.	*	*			*	*	*
II			Create slide presentations that include text, graphics, animation, and transitions.	*	*	*	*	*	*	*
			Learn grammar.	*	*		*	*	*	*
	17111SEC02L	Communicative English Lab-II	Use a variety of reading strategies						*	
II			Enhance the skill of making grammatically correct sentences.	*	*		*	*	*	*
			Achieve one's goal by following the ancestral path	*	*	*		*	*	*
	17110AEC31	Language-III (Tamil-III)	Learn to lead life of perfection by realizing the uncertainty in the life	*	*		*	*	*	*
III			Attain happiness through honesty	*	*	*		*	*	*
			Understand phonetics.	*	*		*	*	*	*
	17111AEC31	Advanced English-III	Develop writing skill							
III			Able to develop creative writing	*	*	*	*	*	*	*
III	17111AEC32	English-III	Enable to appreciate different types of prose	*	*		*	*	*	*

			Develop the conversational skills through one-act plays		*				*	
			Enhance the skill of making grammatically correct sentences.	*	*				*	
III	17117AEC33	Plant Physiology	Impart an insight into the various plant water relations	*		*	*	*	*	*
			Learning about the mineral nutrition in plants	*		*	*	*	*	*
			Understand the mechanism of various metabolic processes in plants	*	*	*	*	*	*	*
			Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.	*	*		*	*	*	*
III	17117AEC34L	Plant physiology Lab	Equip students with skills and techniques related to plant physiology so that they can design their own experiments	*	*			*	*	*
			Learn about the movement of sap and absorption of water in plant body.	*	*	*		*	*	*
			Understand the plant movements	*	*		*	*	*	*
III	17117AEC35	Immunology	The students may understanding the immune system, its components and various techniques used in bio manipulation.	*	*	*	*	*	*	*
			This course gives an overview on the immune system including organs, cells and receptors	*	*	*		*	*	*
			The students learns about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions	*	*			*	*	*

			The course develops in the student an appreciation for principles of immunology and its applications in treating human diseases	*	*	*	*	*	*	*
III	17117AEC36L	Immunology Lab	Identify the structure, function, and characteristics of immunoglobulins.	*	*		*	*	*	*
			Explain the principles of and perform serological tests.	*	*	*	*	*	*	*
			It's a paper which accomplishes the learning of techniques involved in understanding the immunological aspects of physiology and biological samples	*	*			*	*	*
III	17117RMC37	Research Methodology	Understanding research questions and tools	*	*	*		*	*	*
			Experience in scientific writings	*	*	*	*	*	*	*
			Practice in various aspects of scientific publications	*	*	*	*	*	*	*
			Inculcation of research ethics	*	*		*	*	*	*
III	17120SEC03A	Skill based Elective-III	Indicate the names and functions of the Excel interface components.	*	*	*	*	*	*	*
			Enter and edit data.	*	*			*	*	*
			Format data and cells.	*	*			*	*	*
			Construct formulas, including the use of built-in functions, and relative and absolute references.	*	*	*		*	*	*
			Create and modify charts.	*	*			*	*	*
III			Preview and print worksheets	*	*			*	*	*
III	17111SEC03L	Communicative	Learn grammar.	*	*		*	*	*	

354

Sem	Course Code	Course	Course Outcome							
		English Lab-III	Enhance their fluency in English	*	*	*		*	*	
			Develop speaking and writing skills	*	*		*		*	
			Develop individual perspectives that demonstrate critical thinking skills		*			*	*	
IV	17110AEC41	Language-IV (Tamil-IV)	Realize how the ancient people changed their lifestyle according to the ages	*	*	*		*	*	*
			Learn how to change one's lifestyle according to the needs of the future	*	*			*	*	*
			Accept the modern trends and its uses	*	*	*		*	*	*
IV	17111AEC41	Advanced English-IV	Develop writing skill.	*	*			*	*	*
			Comprehend and describe poems	*		*		*	*	*
			Learn interviewing skills		*				*	
IV	17111AEC42	English-IV	Improve their ability to read and understand them	*	*		*	*	*	*
			Know the genius of Shakespeare		*				*	
			Express in writing their views.	*	*			*	*	
IV	17117AEC43	Animal physiology	To provide advanced undergraduate and introductory graduate students with a comprehensive overview of animal physiology from molecular, cellular and whole animal systems approaches.	*	*	*	*	*	*	*
			To critically evaluate clinical and research case problems relating to endocrinology and cell biology.	*	*		*	*	*	*

Sem	Course Code	Course Name	Course Outcome						
IV	17117AEC44L	Animal Physiology Lab	Have an enhanced knowledge and appreciation of mammalian physiology	*	*	*		*	*	*
			Understand the functions of important physiological systems including the cardiorespiratory, renal, reproductive and metabolic systems	*	*	*		*	*	*
			It trains the students with essentiality of molecules, cells, tissues and organs involved in the defense mechanism							
IV	17117AEC45	Bioinformatics and biostatistics	Know the applications and limitations of different bioinformatics and statistical methods.	*	*	*		*	*	*
			Be able to perform and interpret bioinformatics and statistical analyses with real molecular biology data.	*	*	*	*	*	*	*
IV			Be able to describe statistical methods and probability distributions relevant for molecular biology data.	*	*	*	*	*	*	*
IV	17116AEC46L	Bioinformatics and Biostatistics Lab	This laboratory course will prepare the students for various applications of bioinformatics in life science research.	*	*	*	*		*	*
			The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems	*	*		*		*	*
IV			This course imparts the knowledge of basic statistical methods to solve problems	*	*		*	*	*	*
IV	17120SEC04A	Skill based Elective-IV	Examine database concepts and explore the Microsoft Office Access environment.	*	*			*	*	*
IV			Design a simple database.	*	*		*		*	*

Sem	Code	Course	Outcome							
			Build a new database with related tables.	*	*			*	*	*
			Manage the data in a table.	*	*				*	*
			Query a database using different methods.	*	*	*		*	*	*
			Design a form.	*	*				*	*
			Generate a report.	*	*	*	*	*	*	*
			Import and export data.	*	*		*		*	*
IV	17111SEC04L	Communicative English Lab-IV	Learn grammar.	*	*		*	*	*	*
			Enable to express their views in conversation	*	*			*	*	*
			Develop soft skills	*	*	*		*	*	*
			Enhance presentation skills	*	*			*	*	
IV	171ENVTSTU	Environmental Studies	Understand ecosystem	*	*	*		*	*	*
			Know social issues and the environment	*	*	*	*	*	*	*
			Learn keep the environment eco-friendly	*	*	*	*	*	*	*
V	17117AEC51	Developmental Biology	Be able to list the types of characteristics that make an organism ideal for the study of developmental biology	*		*		*	*	*
			Be familiar with the events that lead up to and comprise the process of fertilization.	*	*	*		*	*	*

	Course Code	Course Name	Course Outcome							
			Be able to compare and contrast the process of gastrulation in the various model organisms discussed	*	*		*	*	*	*
V	17117AEC52	Cell and Tissue culture	Fundamentals of plant tissue culture. Plant regeneration and organogenesis. Embryogenesis. Organ, anther and pollen culture. Ovary, ovule and embryo culture. Callus suspension culture.	*	*	*		*	*	*
			Protoplast, isolation, culture and fusion.	*	*	*		*	*	*
			Production of hybrids and cybrids.	*	*	*		*	*	*
V	17117AEC53	Enzyme and enzyme technology	The course will provide an overview of the key enzymes currently used in large scale industrial processes	*	*			*	*	*
			This course includes the isolation, purification and characterization of enzymes and their applications	*	*			*	*	*
			Discover the current and future trends of applying enzyme technology for the commercialization purpose of biotechnological products.	*	*			*	*	*
V	17117AEC54L	Developmental biology, tissue culture lab	Demonstrate a basic understanding of developmental terms and mechanisms.	*		*		*	*	*
			Utilize laboratory techniques to design and carry-out experimental studies.	*		*	*	*	*	*
			Conservation of endangered plant species	*		*	*	*	*	*
			Molecular, pharmacological and biochemical investigations of different aspects of plant growth and development such as in vitro flowering.	*	*	*	*	*	*	*

Sem	Code	Course	Course Outcome							
V	17117AEC55L	Enzyme and Enzyme Technology Lab	Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms	*	*	*	*	*	*	*
			Apply biochemical calculation for enzyme kinetics	*	*	*	*	*	*	*
			Compare methods for production, purification, characterization and immobilization of enzymes	*		*	*	*	*	*
			Discuss various application of enzymes that can benefit human life	*	*	*		*	*	*
V	17117DSC56A	Discipline Specific Elective -I rDNA Technology	Utilize the knowledge on creation of a genomic library	*			*			*
			Explain the significance of model organisms in recombinant DNA technology	*	*	*	*	*	*	*
			This course teaches rDNA technology techniques and their application in the field of genetic engineering They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries	*	*	*		*	*	*
V	17117DSC56B	Molecular Biology	Understand and apply the principles and techniques of molecular biology which prepares students for further education and/or employment in teaching, basic research, or the health professions	*	*	*	*	*	*	*
			Explain the concept of recombination, linkage mapping and elucidate the gene transfer mechanisms in prokaryotes and eukaryotes	*	*	*	*	*	*	*
			Know the terms and terminologies related to molecular biology and microbial	*	*		*	*	*	*

Sem	Code	Course	Outcome							
V	17117BRC57	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	*		*		*	*	*
			Evolution of research intuitiveness and orientation	*	*	*	*	*	*	*
			Familiarity with cutting edge research trends	*	*	*		*	*	*
V	17120SEC05A	Skill based Elective-V	Work with the Photoshop workspace	*	*	*	*	*	*	*
			Navigate images	*	*				*	*
			Resize and crop images	*	*				*	*
			Make and work with selections	*	*	*		*	*	*
			Create new layers and perform other basic layer functions	*	*		*		*	*
			Transform images	*	*				*	*
V	17111SEC05L	Communicative English Lab-V	Develop corporate skills.	*	*		*	*	*	*
			Handle their day to day affairs well with their knowledge of language skills.	*	*		*	*	*	*
			Get a Job.	*	*			*	*	*
VI	17117AEC61	Plant and Animal Biotechnology	This course teaches organization and expression of plant and animal genome and plant and animal tissue culture	*		*		*	*	*
			Students learn about transgenic animal, their application in pharmaceutical industry, cloning and its importance.	*		*	*	*	*	*

Sem	Course Code	Course Name	Course Outcome							
			This course prepares the students in appreciating the its benefits and applications in biotechnological, pharmaceutical, medical and agricultural field	*		*	*	*	*	*
VI	17117SEC62	Applied Biotechnology	Evaluate and describe systems of product research, development, and production	*	*	*	*	*	*	*
			Analyze the potential for commercialization for innovations within the biotechnology industry	*	*	*	*	*	*	*
			The students will gain the basic knowledge of aquaculture and Students will solve a variety of problems using creative thinking skills and analytical skills in the lab.	*		*	*	*	*	*
VI	17117SEC63L	Plant, Animal and Applied Biotechnology Lab	The students should have knowlwdge on biotechnological analysis and the utilization of these knowledge about procedures and utilization of such knowledge to combine biotechnological methods to obtain analytical results	*	*			*	*	*
			The students will develop fundamental knowledge in Plant Molecular Biotechnology and its application in laboratory and industry settings.	*	*	*		*	*	*
			Describe mechanisms of plant pollination and differentiate between haploid and diploid cells and their role in sexual reproduction	*	*	*	*	*	*	*
VI	17117AEC64L	Environmental Biotechnology Lab	To present an overview of important environmental biotechnologies involved in treatment of pollutants and resource recovery	*	*		*	*	*	*
			The students will be able to demonstrate the use of environmental science principle in solving various environmental problems	*	*			*	*	*

Sem	Course Code	Course Name	Course Outcome							
			Describe the most commonly applied disinfection methods, and the steps typically involved in drinking water treatment process	*				*	*	*
VI	17117DSC65A	Discipline Specific Elective - II Environmental Biotechnology	Biofuels: Advantages , Energy from biomass, Biogas, Biohydrogen, Biosafety • Toxicity Bio magnification, Threshold Dose, Factor Affecting Toxicity.	*	*	*	*	*	*	*
			Students will gain about environmental pollutions, preventive measures.	*	*	*	*	*	*	*
			Explain the microbial processes and growth requirements undelaying the activated sludge process, nitrification, denitrification, enhanced phosphorus removal, and anaerobic digestion	*			*	*	*	*
VI	17117DSC65B	Environmental Management	The students in the course are exposed to the diversity, function, ecological adaptation of microorganisms within the environment	*	*	*	*	*	*	*
			This course gives the importance of microbial life to key ecosystem process and teaches the role of biotechnology to address environmental issues	*	*	*	*	*	*	*
VI	17117PRW67	Project Work	Understand basic concepts of research and its methodologies	*	*	*		*	*	*
			Identify appropriate research problem and parameters	*	*	*		*	*	*
			Prepare a research report	*	*			*	*	*
VI	17120SEC06A	Skill Based Elective – VI	Learn to create animated graphics, add sound and interactivity.	*	*		*	*	*	*
			Can develop Website	*	*				*	*
			CD based presentations	*	*			*	*	*
VI	17111SEC06L	Communicative	Apply study skills	*	*		*	*	*	*

Semester	Course Code	Title of the Course	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
		English Lab-VI	Widen creative thinking	*	*			*	*	
			Be a good team worker	*	*		*		*	
			Make them proficient in English	*	*			*	*	*

Semester	Course Code	Title of the Course	Cos	POS						
				PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	17110AEC11	Language-I (Tamil-I)	Learn the changes that have occurred in literature since the classical period.	1	2	1	0	1	2	1
			Make use of vocabulary systematically.	1	2	1	1	1	2	0

			Understand how to lead one's life realizing the modernity and its environment/atmosphere.	1	2	1	0	1	2	1
I	17111AEC11	Advanced English-I	Develop vocabulary	1	2	0	1	1	2	2
			Learn to edit and do proof reading	1	2	1	1	0	2	1
			Read and comprehend literature	1	2	0	0	1	0	0
I	17111AEC12	English-I	Read and comprehend literature	1	2	1	1	0	2	2
			Appreciate poetry and prose	1	2	0	1	1	0	0
			Familiarize students with fiction.	1	3	1	1	1	2	1
I	17117AEC13	Fundamentals of Biological system	Understand the physical, chemical, and mathematical basis of biology	3	1	1	0	0	0	2
			Appreciate the different scales of biological systems	2	0	0	2	0	2	0
			To understand the Basics in life sciences, evolution and organization of life, living and non-living things	2	1	3	0	3	0	3
			To understand the basics of biomolecules, carbohydrates, proteins, lipids and Nucleic acids	3	1	0	2	3	0	2
I	17117AEC14L	Fundamentals of Biological system Lab	The learners will acquire knowledge on the structure and functions relationship of biological system and as well their roll in various biological process	2	1	1	1	3	2	3
			To know the cellular organization of life, cell theory- cell organization-cell organelles- plant and animal cell	2	0	1	1	0	1	2

	Code	Course	Outcome							
			To understanding the basic fundamentals of Biological System	2	1	1	1	1	1	3
	117115AEC15	Biological Chemistry	The learners will acquire knowledge on the structure and functions relationship of proteins nucleic acid carbohydrates and as well their roll in various biological process	2	0	1	1	1	2	3
			They study the influence and role of structure in reactivity of biomolecules	3	1	1	1	1	0	3
I			Through this course the students are exposed to importance of biological macromolecules	2	0	1	1	1	0	3
I	17115AEC16L	Biological Chemistry Lab	Students will use current biochemical and molecular techniques to plan and carry out experiments.	2	1	2	1	1	0	3
			Biochemistry Majors will gain proficiency in basic laboratory techniques in both chemistry and biology, and be able to apply the scientific method to the processes of experimentation and hypothesis testing	3	0	1	0	1	0	3
I			At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions	0	1	2	1	1	3	3
	17120SEC01A	Skill Based Elective-I	Recognize when to use each of the Microsoft Office programs to create professional and academic documents.	0	0	1	0	0	2	3
			Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.	2	1	2	1	1	0	3
I			Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.	2	2	0	0	1	2	3

365

Sem	Course Code	Course Name	Outcome							
I	17111SEC01L	Communicative English Lab-I	Learn grammar.	2	2	1	0	1	2	3
			Enrich vocabulary	2	3	1	1	2	2	3
			Understand the process of communication	2	2	1	1	0	2	2
			Develop listening skill	2	2	0	0	0	0	0
I	171INDCONS	Indian Constitution	Democratic values and citizenship Training and gained	2	3	0	0	1	0	0
			Awareness on fundamental Rights are established	2	2	1	0	1	1	0
			The functions of union Government and State Government are learnt	2	1	1	1	0	2	1
			The Power and functions of the Judiciary learnt thoroughly	2	0	1	1	1	1	1
			Appreciation of Democratic Parliamentary Rule is learnt	2	0	0	3	1	1	1
II	17110AEC21	Language-II (Tamil-II)	Know what devotion really is.	2	1	2	2	1	1	1
			Know the fruitfulness obtained through devotion	1	1	2	2	1	2	1
			Perceive the progress achieved in the society through devotion.	1	2	0	1	2	2	1
II	17111AEC21	Advanced English-II	Develop technological skills.	1	2	1	0	2	2	0
			Able to write in a variety of formats	2	2	1	1	0	2	2
			Read biographies and develop personality	1	2	0	1	1	2	2
II	17111AEC22	English-II	Appreciate different forms of literature	0	2	0	1	0	2	0
			Acquire language skills through literature	2	2	1	1	1	2	1
			Broadens the horizon of knowledge	1	2	1	1	0	2	1

II	17117AEC23	Cell Biology and Genetics	This paper will enable the students to learn the basics and lay strong foundation in understanding the composition of cells, how cells works is fundamental to living systems.	1	2	0	0	2	2	0
			The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy	1	2	0	0	0	2	0
			Students will be taught Mendelian genetics, their principles and gene interaction.	3	0	0	0	2	2	1
			This gives them a strong foundation on the basic unit of life.	3	0	1	1	2	2	0
II	17117AEC24L	Cell Biology and Genetics lab	Able to isolate the DNA, identify and distinguish different blood cells, to solve simple genetic problems and analyze Human karyotype	3	1	1	1	1	1	1
			The course teaches the students about genes at molecular level	2	1	0	1	1	0	1
			They learn about DNA, RNA and their replication, mutations, DNA repair mechanism	0	1	1	1	2	1	1
II	17116AEC25	Microbiology	This fundamental paper discusses the importance of microorganisms	3	1	1	1	1	3	1
			The course throws light on types of microorganisms in and around humans	2	0	0	1	2	2	1
			At the end of the course, the student has understanding on the metabolism and mechanism of microbial life	3	0	1	0	0	2	1
II			Gain knowledge about metabolism.	2	0	0	1	1	1	1
II	17116AEC26L	Microbiology lab	Develop basic skill in aseptic techniques	2	1	1	0	1	2	1

			Understand various accessories for microbiology practicals	3	1	1	1	1	2	1
			Perform various staining techniques	2	1	1	1	1	1	1
			Cultivate bacteria with different cultivation technique	2	0	1	1	1	2	2
II	17117RLC27	Research LED Seminar	Exposure to various research domains	2	0	1	0	1	2	2
			Acquaintance with languages of research	3	0	1	1	0	0	2
			Development of research aptitude	3	1	1	1	1	1	1
II	17120SEC02A	Skill Based Elective – II	Identify the names and functions of the PowerPoint interface.	3	1	0	0	0	2	2
			Create, edit, save, and print presentations.	2	2	0	1	2	2	2
			Format presentations.	2	2	0	0	2	2	3
			Add a graphic to a presentation.	2	2	0	0	1	2	3
			Create and manipulate a simple slideshow with outlines and notes.	2	2	0	0	1	2	3
			Create slide presentations that include text, graphics, animation, and transitions.	3	3	0	0	1	2	2
II	17111SEC02L	Communicative English Lab-II	Learn grammar.	3	3	1	1	2	2	3
			Use a variety of reading strategies	1	1	0	2	2	2	2
			Enhance the skill of making grammatically correct sentences.	0	0	0	0	0	2	0
III	17110AEC31	Language-III (Tamil-	Achieve one's goal by following the ancestral path	1	2	0	1	2	2	1

		III)	Learn to lead life of perfection by realizing the uncertainty in the life	1	2	1	0	1	2	1
			Attain happiness through honesty	1	2	0	1	2	2	2
III	17111AEC31	Advanced English-III	Understand phonetics.	1	2	1	0	1	2	2
			Develop writing skill	2	2	0	2	2	2	1
			Able to develop creative writing	0	0	0	0	0	0	0
III	17111AEC32	English-III	Enable to appreciate different types of prose	2	2	1	1	1	2	2
			Develop the conversational skills through one-act plays	1	2	0	1	1	2	1
			Enhance the skill of making grammatically correct sentences.	0	3	0	0	0	2	0
III	17117AEC33	Plant Physiology	Impart an insight into the various plant water relations	1	3	0	0	0	2	0
			Learning about the mineral nutrition in plants	3	0	1	1	1	2	2
			Understand the mechanism of various metabolic processes in plants	2	0	1	1	1	3	2
			Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.	2	1	1	1	1	3	2
III	17117AEC34L	Plant physiology Lab	Equip students with skills and techniques related to plant physiology so that they can design their own experiments	3	0	1	1	1	2	2
III			Learn about the movement of sap and absorption of water in plant body.	3	1	0	0	1	1	3

Sem	Course code	Course name	Course outcome							
			Understand the plant movements	2	1	1	0	1	1	2
III	17117AEC35	Immunology	The students may understanding the immune system, its components and various techniques used in bio manipulation.	2	0	1	1	1	1	2
			This course gives an overview on the immune system including organs, cells and receptors	2	2	1	1	1	2	2
			The students learns about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions	2	2	1	0	1	2	2
			The course develops in the student an appreciation for principles of immunology and its applications in treating human diseases	2	2	0	0	1	2	2
III	17117AEC36L	Immunology Lab	Identify the structure, function, and characteristics of immunoglobulins.	2	2	0	1	1	1	2
			Explain the principles of and perform serological tests.	2	1	1	1	1	1	1
			It's a paper which accomplishes the learning of techniques involved in understanding the immunological aspects of physiology and biological samples	1	1	0	0	1	1	1
III	17117RMC37	Research Methodology	Understanding research questions and tools	3	2	1	0	1	3	1
			Experience in scientific writings	3	2	2	1		3	1
			Practice in various aspects of scientific publications	3	2	1	1	1	3	3
			Inculcation of research ethics	3	2	0	1	1	2	2
III	17120SEC03A	Skill based Elective-III	Indicate the names and functions of the Excel interface components.	1	3	1	1	2	2	3

			Enter and edit data.	2	3	0	0	1	2	3
			Format data and cells.	2	3	0	0	2	2	1
			Construct formulas, including the use of built-in functions, and relative and absolute references.	2	3	1	0	1	2	2
			Create and modify charts.	2	2	0	0	2	2	2
			Preview and print worksheets	2	2	0	0	1	2	1
III	17111SEC03L	Communicative English Lab-III	Learn grammar.	2	2	0	1	1	2	0
			Enhance their fluency in English	2	2	1	0	1	2	0
			Develop speaking and writing skills	2	2	0	1	0	2	0
			Develop individual perspectives that demonstrate critical thinking skills	0	2	0	0	1	1	0
IV	17110AEC41	Language-IV (Tamil-IV)	Realize how the ancient people changed their lifestyle according to the ages	2	3	1	0	1	1	1
			Learn how to change one's lifestyle according to the needs of the future	2	3	0	0	1	1	2
			Accept the modern trends and its uses	2	3	1	0	1	1	1
IV	17111AEC41	Advanced English-IV	Develop writing skill.	2	3	0	0	2	2	1
			Comprehend and describe poems	2	0	1	0	2	2	1
			Learn interviewing skills	0	3	0	0	0	2	0
IV	17111AEC42	English-IV	Improve their ability to read and understand them	2	2	0	1	1	2	1

371

			Know the genius of Shakespeare	0	2	0	0	0	2	0
			Express in writing their views.	2	2	0	0	1	2	0
IV	17117AEC43	Animal physiology	To provide advanced undergraduate and introductory graduate students with a comprehensive overview of animal physiology from molecular, cellular and whole animal systems approaches.	3	1	1	1	1	2	1
			To critically evaluate clinical and research case problems relating to endocrinology and cell biology.	3	1	0	1	1	2	2
IV	17117AEC44L	Animal Physiology Lab	Have an enhanced knowledge and appreciation of mammalian physiology	2	1	1	1	0	2	2
			Understand the functions of important physiological systems including the cardiorespiratory, renal, reproductive and metabolic systems	3	0	1	1	0	2	2
IV			It trains the students with essentiality of molecules, cells, tissues and organs involved in the defense mechanism	2	1	1	0	1	2	3
IV	17117AEC45	Bioinformatics and biostatistics	Know the applications and limitations of different bioinformatics and statistical methods.	2	1	1	0	1	2	3
			Be able to perform and interpret bioinformatics and statistical analyses with real molecular biology data.	1	0	0	0	0	2	1
IV			Be able to describe statistical methods and probability distributions relevant for molecular biology data.	3	1	1	0	1	2	1
IV	17116AEC46L	Bioinformatics and Biostatistics	This laboratory course will prepare the students for various applications of bioinformatics in life science research.	3	2	1	1	1	2	2

372

		Lab	The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems	3	1	1	1	1	2	2
			This course imparts the knowledge of basic statistical methods to solve problems	2	1	1	2	0	1	3
IV	17120SEC04A	Skill based Elective-IV	Examine database concepts and explore the Microsoft Office Access environment.	3	1	0	2	0	1	3
			Design a simple database.	1	2	0	2	1	1	3
			Build a new database with related tables.	2	3	0	0	2	2	3
			Manage the data in a table.	2	3	0	1	0	2	2
			Query a database using different methods.	2	3	0	0	2	2	2
			Design a form.	2	3	0	0	0	2	2
			Generate a report.	2	2	2	0	2	2	3
			Import and export data.	2	2	0	0	0	2	3
IV	17111SEC04L	Communicative English Lab-IV	Learn grammar.	2	2	1	1	2	2	3
			Enable to express their views in conversation	2	3	0	1	0	2	1
			Develop soft skills	1	2	0	1	1	2	1
			Enhance presentation skills	1	2	0	0	2	2	1
IV	171ENVTSTU	Environmental	Understand ecosystem	1	2	1	0	2	2	1

Sem	Course Code	Course Name	Course Outcome							
		Studies	Know social issues and the environment	2	3	0	0	1	2	0
			Learn keep the environment eco-friendly	3	1	1	0	2	1	2
V	17117AEC51	Developmental Biology	Be able to list the types of characteristics that make an organism ideal for the study of developmental biology	2	1	2	1	2	1	2
			Be familiar with the events that lead up to and comprise the process of fertilization.	2	1	2	1	2	2	2
			Be able to compare and contrast the process of gastrulation in the various model organisms discussed	2	0	1	0	1	1	2
V	17117AEC52	Cell and Tissue culture	Fundamentals of plant tissue culture. Plant regeneration and organogenesis. Embryogenesis. Organ, anther and pollen culture. Ovary, ovule and embryo culture. Callus suspension culture.	3	1	1	0	1	2	3
			Protoplast, isolation, culture and fusion.	2	1	0	1	2	2	3
			Production of hybrids and cybrids.	2	1	1	0	1	1	
V	17117AEC53	Enzyme and enzyme technology	The course will provide an overview of the key enzymes currently used in large scale industrial processes	3	3	1	0	1	3	2
			This course includes the isolation, purification and characterization of enzymes and their applications	3	2	1	3	1	3	3
			Discover the current and future trends of applying enzyme technology for the commercialization purpose of biotechnological products.	3	2	1	2	1	3	3
V	17117AEC54L	Developmental biology, tissue	Demonstrate a basic understanding of developmental terms and mechanisms.	2	1	0	0	3	1	2

		culture lab	Utilize laboratory techniques to design and carry-out experimental studies.	2	1	0	0	3	1	1
			Conservation of endangered plant species	3	1	0	0	3	2	2
			Molecular, pharmacological and biochemical investigations of different aspects of plant growth and development such as in vitro flowering.	3	0	1	0	1	2	3
V	17117AEC55L	Enzyme and Enzyme Technology Lab	Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms	2	0	1	1	1	2	2
			Apply biochemical calculation for enzyme kinetics	2	0	1	1	1	1	3
			Compare methods for production, purification, characterization and immobilization of enzymes	2	1	1	1	1	1	2
			Discuss various application of enzymes that can benefit human life	2	1	2	0	1	1	2
V	17117DSC56A	Discipline Specific Elective -I rDNA Technology	Utilize the knowledge on creation of a genomic library	2	1	2	1	2	1	2
			Explain the significance of model organisms in recombinant DNA technology	3	1	1	1	2	2	3
			This course teaches rDNA technology techniques and their application in the field of genetic engineering They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries	2	0	1	1	3	2	3
V	17117DSC56B	Molecular Biology	Understand and apply the principles and techniques of molecular biology which prepares students for further education and/or employment in teaching, basic research, or the health professions	2	0	0	1	0	0	2

			Explain the concept of recombination, linkage mapping and elucidate the gene transfer mechanisms in prokaryotes and eukaryotes	3	2	1	1	1	1	2
			Know the terms and terminologies related to molecular biology and microbial	2	2	1	0	1	1	2
V	17117BRC57	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	1	2	1	0	1	1	2
			Evolution of research intuitiveness and orientation	3	1	1	1	1	1	3
			Familiarity with cutting edge research trends	2	2	1	1	1	1	2
V	17120SEC05A	Skill based Elective-V	Work with the Photoshop workspace	2	0	0	1	1	1	2
			Navigate images	3	0	0	0	1	1	3
			Resize and crop images	3	0	1	0	1	2	2
			Make and work with selections	2	2	1	1	1	2	1
			Create new layers and perform other basic layer functions	2	2	1	0	1	2	1
			Transform images	2	3	1	1	1	2	2
V	17111SEC05L	Communicative English Lab-V	Develop corporate skills.	2	3	0	0	0	2	2
			Handle their day to day affairs well with their knowledge of language skills.	2	2	0	0	0	2	1
			Get a Job.	2	2	1	0	2	2	2

VI	17117AEC61	Plant and Animal Biotechnology	This course teaches organization and expression of plant and animal genome and plant and animal tissue culture	2	2	0	1	0	2	2
			Students learn about transgenic animal, their application in pharmaceutical industry, cloning and its importance.	2	3	0	0	0	2	1
			This course prepares the students in appreciating the its benefits and applications in biotechnological, pharmaceutical, medical and agricultural field	2	3	0	1	1	1	1
VI	17117SEC62	Applied Biotechnology	Evaluate and describe systems of product research, development, and production	1	2	0	1	2	1	2
			Analyze the potential for commercialization for innovations within the biotechnology industry	2	2	0	0	1	2	2
			The students will gain the basic knowledge of aquaculture and Students will solve a variety of problems using creative thinking skills and analytical skills in the lab.	3	0	1	0	1	2	3
VI	17117SEC63L	Plant, Animal and Applied Biotechnology Lab	The students should have knowlwdge on biotechnological analysis and the utilization of these knowledge about procedures and utilization of such knowledge to combine biotechnological methods to obtain analytical results	2	0	1	1	1	2	3
			The students will develop fundamental knowledge in Plant Molecular Biotechnology and its application in laboratory and industry settings.	2	0	1	2	1	2	2
VI			Describe mechanisms of plant pollination and differentiate between haploid and diploid cells and their role in sexual reproduction	2	1	0	2	1	3	2

VI	17117AEC64L	Environmental Biotechnology Lab	To present an overview of important environmental biotechnologies involved in treatment of pollutants and resource recovery	3	1	1	1	1	2	1
			The students will be able to demonstrate the use of environmental science principle in solving various environmental problems	2	1	1	1	1	2	1
			Describe the most commonly applied disinfection methods, and the steps typically involved in drinking water treatment process	2	0	1	1	1	2	1
VI	17117DSC65A	Discipline Specific Elective - II Environmental Biotechnology	Biofuels: Advantages , Energy from biomass, Biogas, Biohydrogen, Biosafety • Toxicity Bio magnification, Threshold Dose, Factor Affecting Toxicity.	3	0	0	1	1	1	1
			Students will gain about environmental pollutions, preventive measures.	1	1	0	0	1	2	3
			Explain the microbial processes and growth requirements undelaying the activated sludge process, nitrification, denitrification, enhanced phosphorus removal, and anaerobic digestion	2	1	1	0	1	2	3
VI	17117DSC65B	Environmental Management	The students in the course are exposed to the diversity, function, ecological adaptation of microorganisms within the environment	1	2	1	2	1	1	2
			This course gives the importance of microbial life to key ecosystem process and teaches the role of biotechnology to address environmental issues	1	2	1	2	1	1	2
VI	17117PRW67	Project Work	Understand basic concepts of research and its methodologies	1	1	0	1	1	1	2
			Identify appropriate research problem and parameters	2	1	0	0	1	1	3

			Prepare a research report	2	0	0	0	1	2	3
VI	17120SEC06A	Skill Based Elective – VI	Learn to create animated graphics, add sound and interactivity.	1	0	1	0	1	2	2
			Can develop Website	2	1	1	1	1	2	2
			CD based presentations	3	1	1	1	1	2	2
VI	17111SEC06L	Communicative English Lab-VI	Apply study skills	3	0	0	1	1	1	2
			Widen creative thinking	3	0	0	1	1	1	1
			Be a good team worker	3	2	1	2	1	1	1
			Make them proficient in English	1	1	1	3	1	1	1

1- Low, 2-Medium, 3- Higher, 0 No correlation

School of Arts and Science
Department of Biotechnology
17PGBTGEC
2017 Regulation
Program Outcomes and Course outcomes of
M.Sc., Mapping of COs and POs

Semester	Course Code	Title of the Course	COs	POS

				PO1	PO2	PO3	PO4	PO5	PO6
I	17217SEC11	General Microbiology	Students can gain the idea of how to identify the microorganisms based on the modern polyphasic approach.	*	*		*	*	*
	17217SEC12	Molecular genetics	After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.	*	*	*			*
	17217SEC13	Biochemistry	This paper in biochemistry has been designed to provide the student with a firm foundation in the biochemical aspects of cellular functions which forms a base for their future research.	*	*	*	*	*	*
	17217SEC14L	Microbiology & Molecular Genetics Lab	After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.	*	*			*	*
	17217DSC15A	Immunology	This course will provide the student insights into the various aspects of Immunology such as classical immunology, clinical immunology, Immunotherapy and diagnostic immunology.	*	*	*		*	*
	17217DSC15B	Biosafety and Biodiversity	To study the diversity of plants and animal life in a particular habitat, ethical issues and potential of biotechnology for the benefit of man kind	*	*		*	*	*
	17216RLC16	Research Led Seminar	Exposure to various research domains	*	*		*	*	*
			Acquaintance with languages of research	*	*	*	*	*	*
			Development of research aptitude	*	*	*	*	*	*

II	17217SEC21	Cell & Molecular Biology	Students after completion of this paper will be exceptionally well prepared to pursue careers in cellular and sub cellular biological research, biomedical research, or medicine or allied health fields.	*		*	*	*	*
	17217SEC22	Biophysics & Bioinformatics	This paper has been designed to give the students comprehensive training in the emerging and exciting upcoming filed of Systems Biology, which will help students to get career in both industry/R&D.	*			*	*	*
	17217SEC23	Industrial Biotechnology	This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment-friendly processes such as green manufacturing technologies and sustainable development.	*	*	*	*	*	*
	17217SEC24L	Molecular Biology & Industrial Biotechnology Lab	Students after completion of this paper will be exceptionally well prepared to pursue careers in cellular and sub cellular biological research, biomedical research, or medicine or allied health fields	*	*		*	*	*
	17217DSC25A	Endocrynology	To know the pathophysiological significance of the system with special reference to humans.	*			*	*	*

				*		*	*	*	*
	17217DSC25B	Intellectual Property Rights	To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act. Further teacher will have to demonstrate with products and ask the student to identify the different types of IPR'	*		*	*	*	*
	17217RMC26	Research Methodology	Understanding research questions and tools	*	*	*	*	*	*
			Experience in scientific writings	*	*	*	*	*	*
			Practice in various aspects of scientific publications	*	*	*	*	*	*
			Inculcation of research ethics	*	*	*	*	*	*
	17217BRC27	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	*				*	*
			Evolution of research intuitiveness and orientation	*				*	*
			Familiarity with cutting edge research trends	*			*	*	*
III	17217SEC31	Recombinant DNA technology	Utilize the knowledge on creation of a genomic library	*	*	*	*	*	*
			Explain the significance of model organisms in recombinant DNA technology	*	*	*	*	*	*
			This course teaches rDNA technology techniques and their application in the field of genetic engineering They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries	*	*	*	*	*	*
	17217SEC32	Plant Biotechnology	Understand the basic principles of plant kingdom and their economic importance.	*	*	*	*	*	*

Course Code	Course Name	Course Outcome						
		Explain the basics, methodology and applications of plant tissue culture.	*	*	*	*	*	*
		Conceptualize plant transformation, selection of desirable genes for crop improvement, design binary vector and procedure for generating GM crops.	*	*	*	*	*	*
17217SEC33	Animal Biotechnology	To learn basic cell culture, type, subculture media preparation and applications	*		*	*	*	*
		To understand the difference between stem cell types and methods for producing transgenic animals	*		*	*	*	*
		To improve artificial embryo transfer and nuclear transfer methods and applications	*		*	*	*	*
17217SEC34L	DNA technology & Animal biotechnology-lab	Describe the different types of blood groups and different types of blood cells and their function in the human body.	*	*		*	*	*
		Learn various techniques like Immunoelectrophoresis, ELISA, Immunoprecipitation etc.	*	*	*	*	*	*
		Culture and maintain animal cell cultures, various method of preservation and counting of viable cells.	*	*		*	*	*
17217DSC34A	Nanobiotechnology	This course will act as a bridge between students from non-biology course at all levels	*			*	*	*

	Code	Course	Outcome						
IV	17217DSC34B	Environmental biotechnology	This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also who is willing to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment- friendly processes such as green manufacturing technologies and sustainable development	*	*	*	*	*	*
	17217SRC37	Participation in Scaffold Research	Acquired detailed knowledge of antimicrobial agents, their mechanism of action	*			*	*	*
			Developed understanding of different types of disinfectants/antiseptics bactericidal and bacteriostatic actions	*		*	*	*	*
			Regulatory practices, biosensors and applications in Pharmaceuticals	*			*	*	*
			Quality Assurance and Validation	*	*	*	*	*	*
	17217PRW41	Project work	Experience from a master's project and international literature.	*			*	*	*
			Develop ability to independently carry out a complete scientific process.	*	*	*	*	*	*
			Learn about how to write dissertations and proposals for the scientific community.	*	*	*	*	*	*

School of Arts and Science
Department of Biotechnology
17PGBTGEC
2017 Regulation
Program Outcomes and Course outcomes of
M.Sc., Mapping of COs and POs

Semester	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
I	17217SEC11	General Microbiology	Students can gain the idea of how to identify the microorganisms based on the modern polyphasic approach.	3	1	0	1	2	2
	17217SEC12	Molecular genetics	After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.	2	0	0	1	2	2

	Code	Course	Description						
	17217SEC13	Biochemistry	This paper in biochemistry has been designed to provide the student with a firm foundation in the biochemical aspects of cellular functions which forms a base for their future research.	3	0	0	3	2	2
	17217SEC14L	Microbiology & Molecular Genetics Lab	After successful completion of the paper the students will get an overall view about genetic Make up of organisms and can take up a career in research.	2	2	1	0	1	2
	17217DSC15A	Immunology	This course will provide the student insights into the various aspects of Immunology such as classical immunology, clinical immunology, Immunotherapy and diagnostic immunology.	2	1	1	0	0	1
	17217DSC15B	Biosafety and Biodiversity	To study the diversity of plants and animal life in a particular habitat, ethical issues and potential of biotechnology for the benefit of man kind	3	1	1	2	2	1
	17216RLC16	Research Led Seminar	Exposure to various research domains	3	2	1	0	2	2
			Acquaintance with languages of research	3	2	2	0	0	1
			Development of research aptitude	2	1	1	2	2	1
II	17217SEC21	Cell & Molecular Biology	Students after completion of this paper will be exceptionally well prepared to pursue careers in cellular and sub cellular biological research, biomedical research, or medicine or allied health fields.	2	1	1	1	1	1
	17217SEC22	Biophysics & Bioinformatics	This paper has been designed to give the students comprehensive training in the emerging and exciting upcoming filed of Systems Biology, which will help students to get career in both industry/R&D.	2	1	1	2	1	1

Code	Course	Description						
17217SEC23	Industrial Biotechnology	This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment-friendly processes such as green manufacturing technologies and sustainable development.	2	1	0	1	1	1
17217SEC24L	Molecular Biology & Industrial Biotechnology Lab	Students after completion of this paper will be exceptionally well prepared to pursue careers in cellular and sub cellular biological research, biomedical research, or medicine or allied health fields	2	1	0	0	1	2
17217DSC25A	Endocrynology	To know the pathophysiological significance of the system with special reference to humans.	1	2	0	1	1	3
17217DSC25B	Intellectual Property Rights	To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act. Further teacher will have to demonstrate with products and ask the student to identify the different types of IPR'	2	2	1	1	2	2
17217RMC26	Research Methodology	Understanding research questions and tools	1	2	1	1	2	2
		Experience in scientific writings	3	1	1	0	2	1
		Practice in various aspects of scientific publications	3	1	1	0	2	1
		Inculcation of research ethics	3	1	1	1	2	1

Sem	Code	Course	Course Outcome						
	17217BRC27	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	3	0	0	2	1	2
			Evolution of research intuitiveness and orientation	3	1	0	3	1	1
			Familiarity with cutting edge research trends	2	1	0	3	1	1
III	17217SEC31	Recombinant DNA technology	Utilize the knowledge on creation of a genomic library	2	2	0	3	2	1
			Explain the significance of model organisms in recombinant DNA technology	1	1	0	1	1	1
			This course teaches rDNA technology techniques and their application in the field of genetic engineering They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries	1	1	1	1	1	1
	17217SEC32	Plant Biotechnology	Understand the basic principles of plant kingdom and their economic importance.	2	1	1	1	1	1
			Explain the basics, methodology and applications of plant tissue culture.	3	0	2	2	2	1
			Conceptualize plant transformation, selection of desirable genes for crop improvement, design binary vector and procedure for generating GM crops.	2	1	1	1	2	2
	17217SEC33	Animal Biotechnology	To learn basic cell culture, type, subculture media preparation and applications	2	1	2	1	1	2
			To understand the difference between stem cell types and methods for producing transgenic animals	2	2	2	1	1	2
			To improve artificial embryo transfer and nuclear transfer methods and applications	2	0	0	1	1	2

	Code	Course	Outcome						
	17217SEC34L	DNA technology & Animal biotechnology- lab	Describe the different types of blood groups and different types of blood cells and their function in the human body.	2	0	0	1	1	2
			Learn various techniques like Immunoelectrophoresis, ELISA, Immunoprecipitation etc.	2	1	1	1	1	2
			Culture and maintain animal cell cultures, various method of preservation and counting of viable cells.	3	0	1	1	1	2
	17217DSC34A	Nanobiotechnology	This course will act as a bridge between students from non-biology course at all levels	2	1	1	1	1	1
	17217DSC34B	Environmental biotechnology	This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also who is willing to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment- friendly processes such as green manufacturing technologies and sustainable development	3	0	1	0	2	1
IV	17217SRC37	Participation in Scaffold Research	Acquired detailed knowledge of antimicrobial agents, their mechanism of action	2	1	1	0	1	1
			Developed understanding of different types of disinfectants/antiseptics bactericidal and bacteriostatic actions	3	1	2	0	2	1
			Regulatory practices, biosensors and applications in Pharmaceuticals	2	1	0	1	2	1
			Quality Assurance and Validation	2	0	0	1	2	2

Course Code	Course	Course Outcome						
17217PRW41	Project work	Experience from a master's project and international literature.	1		0	1	2	2
		Develop ability to independently carry out a complete scientific process.	1	1	1	1	1	2
		Learn about how to write dissertations and proposals for the scientific community.	1		0	1	1	2

1- Low, 2-Medium, 3- Higher, 0 No correlation

School of Arts and Science

Department of Biotechnology

17MPBTGE

2017 Regulation

Program Outcomes and Course outcomes of

M. Phil., Mapping of COs and POs

Semester	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
I	1713BTC12	Advanced Biotechnology	Understanding research questions and tools	*		*		*	*
			Experience in scientific writings	*	*	*		*	*
			Practice in various aspects of scientific publications	*	*	*		*	*
			Inculcation of research ethics	*	*		*	*	*
	17193BTE13	Environmental Biotechnology	Develop and demonstrate the advanced genetic engineering and cloning techniques	*			*	*	*
			Explain the elaborate details of plant biotechnology like vector for gene transfer, Binary vector	*	*		*	*	*
			Demonstrate the advanced fermentation techniques and conventional fermentation versus biotransformation.	*	*	*		*	*

School of Arts and Science
Department of Biotechnology
17MPBTGE
2017 Regulation
Program Outcomes and Course outcomes of
M. Phil., Mapping of COs and POs

Semester	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
I	173BTC12	Advanced Biotechnology	Understanding research questions and tools	3	0	1	0	2	1
			Experience in scientific writings	2	1	1	0	1	1
			Practice in various aspects of scientific publications	3	1	2	0	2	1
			Inculcation of research ethics	2	1	0	1	2	1
	173BTE13	Environmental Biotechnology	Develop and demonstrate the advanced genetic engineering and cloning techniques	2	0	0	1	2	2
			Explain the elaborate details of plant biotechnology like vector for gene transfer, Binary vector	1	3	0	1	2	2
			Demonstrate the advanced fermentation techniques and conventional fermentation versus biotransformation.	1	1	1	1	1	2

392

DEPARTMENT OF CIVIL ENGINEERING
COURSE OBJECTIVE (R-2017)
B.TECH(F.T)-R-2017

Sem	Course Code	Title of the Course	COs
I	17147S11	Communicative English	• Read articles of a general kind in magazines and newspapers.
			• Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
			• Comprehend conversations and short talks delivered in English
			• Write short essays of a general kind and personal letters and emails in English
	17148S12	Engineering Mathematics – I	• Use both the limit definition and rules of differentiation to differentiate functions.
			• Apply differentiation to solve maxima and minima problems.
			• Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.

			• Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
			• Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
			• Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
			• Apply various techniques in solving differential equations.
	17149S13	Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications,
			• The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
			• The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
			• The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and
			• the students will understand the basics of crystals, their structures and different crystal growth techniques.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

17149S14	Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment • Techniques will facilitate better understanding of engineering processes and applications for further learning.	
17150S15	Engineering Graphics	• Familiarize with the fundamentals and standards of Engineering graphics • Perform freehand sketching of basic geometrical constructions and multiple views of objects. • Project orthographic projections of lines and plane surfaces. • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.	
17154S16	Problem Solving and Python Programming	• Develop algorithmic solutions to simple computational problems • Read, write, execute by hand simple Python programs. • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, and dictionaries. • Read and write data from/to files in Python Programs.	
17150L17	Problem	• Write, test, and debug simple Python programs.	

		Solving and Python Programming Laboratory	• Implement Python programs with conditionals and loops.
			• Develop Python programs step-wise by defining functions and calling them.
			• Use Python lists, tuples, dictionaries for representing compound data.
			• Read and write data from/to files in Python Programs.
	17149L18	Physics and Chemistry Laboratory	• Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications
			• The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
	171VEA19	Value Education	• To learn about philosophy of Life and Individual qualities
			• To learn and practice social values and responsibilities
			• To learn and practice mind culture, forces acting on the body.
II	17147S21	Technical English	• Read technical texts and write area- specific texts effortlessly.
			• Listen and comprehend lectures and talks in their area of specialisation successfully.

LOCAL NEEDS **REGIONAL NEEDS** **NATIONAL NEEDS** **GLOBAL NEEDS**

			• Speak appropriately and effectively in varied formal and informal contexts.
			• Write reports and winning job applications.
	17148S22A	Engineering Mathematics – II	• Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
			• Gradient, divergence and curl of a vector point function and related identities.
			• Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
			• Analytic functions, conformal mapping and complex integration.
			• Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
	17149S23D	Physics for Civil Engineering	• The students will have knowledge on the thermal performance of buildings,
			• the students will acquire knowledge on the acoustic properties of buildings,
			• the students will get knowledge on various lighting designs for buildings,
			• the students will gain knowledge on the properties and performance of engineering materials, and
			• The students will understand the hazards of buildings.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

	17153S24A	Environmental Science and Engineering	• Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
			• Public awareness of environmental is at infant stage.
			• Ignorance and incomplete knowledge has lead to misconceptions
			• Development and improvement in std. of living has lead to serious environmental disaster
	17149S25E	Basic Electrical and Electronics Engineering	• Ability to identify the electrical components and explain the characteristics of electrical machines.
			• ability to identify electronics components and understand the characteristics
	17154S26D	Engineering Mechanics	• Illustrate the vectorial and scalar representation of forces and moments
			• Analyse the rigid body in equilibrium
			• Evaluate the properties of surfaces and solids
			• Calculate dynamic forces exerted in rigid body
			• Determine the friction and the effects by the laws of friction
	17154L27	Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works.
			• Use welding equipments to join the structures.
			• Carry out the basic machining operations
			• Make the models using sheet metal works

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings
			• Carry out basic home electrical works and appliances
			• Measure the electrical quantities
			• Elaborate on the components, gates, soldering practices.
	17155L28E	Computer Aided Building Drawing	• The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer software's.
	171ICA29	Fundamentals of Indian constitution and Economy	• Describe the salient features of the constitution of India
			• Interpret, integrate and critically analyse the political economy of Indian international relations.
III	17148C31C	Transforms and Partial Differential Equations	• Understand how to solve the given standard partial differential equations.
			• Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
			• Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
			• Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems
	17155C32	Engineering Geology	• Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
			• Will get basics knowledge on properties of minerals.
			• Gain knowledge about types of rocks, their distribution and uses.
			• Will understand the methods of study on geological structure.
			• Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbour
	17155C33	Construction Materials	• Compare the properties of most common and advanced building materials.
			• Understand the typical and potential applications of lime, cement and aggregates
			• Know the production of concrete and also the method of placing and making of concrete elements.
			• Understand the applications of timbers and other materials

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

400

			• Understand the importance of modern material for construction.
	17155C34	Strength of Materials I	• Understand the concepts of stress and strain, principal stresses and principal planes.
			• Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
			• Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
			• Apply basic equation of torsion in design of circular shafts and helical springs, .
			• Analyze the pin jointed plane and space trusses
	17155C35	Fluid Mechanics	• Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
			• Understand and solve the problems related to equation of motion.
			• Gain knowledge about dimensional and model analysis.
			• Learn types of flow and losses of flow in pipes.
			• Understand and solve the boundary layer problems.
	17155C36	Surveying	• The use of various surveying instruments and mapping
			• Measuring Horizontal angle and vertical angle using different instruments
			• Methods of Levelling and setting Levels with different instruments
			• Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Concept and principle of modern surveying.
	17155L37	Surveying Laboratory	• Students completing this course would have acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry, Total Station and GPS and have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc.
	17155L38	Construction Materials Laboratory	• The students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.
	17155L39	Interpersonal Skills / Listening and Speaking	• Listen and respond appropriately.
			• Participate in group discussions
			• Make effective presentations
			• Participate confidently and appropriately in conversations both formal and informal
IV	17148S41C	Numerical Methods	• Understand the basic concepts and techniques of solving algebraic and transcendental equations.
			• Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			Apply the numerical techniques of differentiation and integration for engineering problems.
			Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
			Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
	17155C42	Construction Techniques and Practices	know the different construction techniques and structural systems
			Understand various techniques and practices on masonry construction, flooring, and roofing.
			Plan the requirements for substructure construction.
			Know the methods and techniques involved in the construction of various types of super structures
			Select, maintain and operate hand and power tools and equipment used in the building construction sites.
	17155C43	Strength of Materials II	Classify the soil and assess the engineering properties, based on index properties.
			Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
			find the load carrying capacity of columns and stresses induced in columns and cylinders
			Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.
17155C44	Applied Hydraulic Engineering		• Classify the soil and assess the engineering properties, based on index properties.
			• Able to identify a effective section for flow in different cross sections.
			• To solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
			• Understand the principles, working and application of turbines.
			• Understand the principles, working and application of pumps.
17155C45	Concrete Technology		• The various requirements of cement, aggregates and water for making concrete
			• The effect of admixtures on properties of concrete
			• The concept and procedure of mix design as per IS method
			• The properties of concrete at fresh and hardened state
			• The importance and application of special concretes.
17155C46	Soil Mechanics		• Classify the soil and assess the engineering properties, based on index properties.
			• Understand the stress concepts in soils
			• Understand and identify the settlement in soils.
			• Determine the shear strength of soil
			• Analyze both finite and infinite slopes.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

	17155L47	Strength of Materials Lab	• The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.
	17155L48	Hydraulic Engineering Lab	• The students will be able to measure flow in pipes and determine frictional losses. • The students will be able to develop characteristics of pumps and turbines.
	17155L49	Advanced Reading & Writing	• Write different types of essays. • Write winning job applications. • Read and evaluate texts critically.
	17155CRS	Research Led Seminar	• Exposure to various research domains • Acquaintance with languages of research • Development of research aptitude
V	17155C51	Design of Reinforced Cement Concrete Elements	• Understand the various design methodologies for the design of RC elements. • Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion. • Design the various types of slabs and staircase by limit state method. • Design columns for axial, uniaxial and biaxial eccentric loadings. • Design of footing by limit state method.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

	17155C52	Structural Analysis I	• Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
			• Analyze the continuous beams and rigid frames by slope defection method.
			• Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.
			• Analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
			• Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.
	17155C53	Water Supply Engineering	• An insight into the structure of drinking water supply systems, including water transport, treatment and distribution
			• The knowledge in various unit operations and processes in water treatment
			• An ability to design the various functional units in water treatment
			• An understanding of water quality criteria and standards, and their relation to public health
			• The ability to design and evaluate water supply project alternatives on basis of chosen criteria

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

Code	Course	Outcomes
17155E55C	Geographic Information System	• Have basic idea about the fundamentals of GIS. • Understand the types of data models. • Get knowledge about data input and topology. • Gain knowledge on data quality and standards. • Understand data management functions and data output
17155C56	Foundation Engineering	• Understand the site investigation, methods and sampling. • Get knowledge on bearing capacity and testing methods. • Design shallow footings. • Determine the load carrying capacity, settlement of pile foundation. • Determine the earth pressure on retaining walls and analysis for stability.
17155L57	Soil Mechanics Lab	• Students are able to conduct tests to determine both the index and engineering properties of soils and to characterize the soil based on their properties.
17155L58	Water and Waste Water Analysis Lab	• Quantify the pollutant concentration in water and wastewater • Suggest the type of treatment required and amount of dosage required for the treatment • Examine the conditions for the growth of micro-organisms
17155L59	Survey Camp	• Interpret the contours • Work in a teamwork

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Mark a road alignment of (L-section, Cross-section) a given gradient connecting any two stations on the map
			• Calculate the earth work
			• Prepare a topographical plan of a given area
	17155CRM	Research Methodology	• Ability to carry out independent literature survey corresponding to the specific publication type and assess basic experimental as well as conceptual set up.
VI	17155C61	Design of Steel Structural Elements	• Understand the concepts of various design philosophies
			• Design common bolted and welded connections for steel structures
			• Design tension members and understand the effect of shear lag.
			• Understand the design concept of axially loaded columns and column base connections.
			• Understand specific problems related to the design of laterally restrained and unrestrained steel beams.
	17155C62	Structural Analysis II	• Draw influence lines for statically determinate structures and calculate critical stress resultants.
			• Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.
			• Analyse of three hinged, two hinged and fixed arches.
			• Analyse the suspension bridges with stiffening girders
			• Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.
	17155C63	Irrigation	• Have knowledge and skills on crop water

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

		Engineering	requirements.
			• Understand the methods and management of irrigation.
			• Gain knowledge on types of Impounding structures
			• Understand methods of irrigation including canal irrigation.
			• Get knowledge on water management on optimization of water use.
	17155C64	Highway Engineering	• Get knowledge on planning and aligning of highway.
			• Geometric design of highways
			• Design flexible and rigid pavements.
			• Gain knowledge on Highway construction materials, properties, testing methods
			• Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.
	17155C65	Waste Water Engineering	• An ability to estimate sewage generation and design sewer system including sewage pumping stations
			• The required understanding on the characteristics and composition of sewage, self-purification of streams
			• An ability to perform basic design of the unit operations and processes that are used in sewage treatment
			• Understand the standard methods for disposal of sewage.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

	17155E66A	Ground Improvement Techniques	• Gain knowledge on methods and selection of ground improvement techniques.
			• Understand dewatering techniques and design for simple cases.
			• Get knowledge on insitu treatment of cohesionless and cohesive soils.
			• Understand the concept of earth renforcement and design of reinforced earth.
			• Get to know types of grouts and grouting technique.
	17155E66B	Introduction to soil dynamics and machine foundation	• Understand the theory and measurement of vibration.
			• Understand the concept of wave propagation in infinite medium and due to machine foundation.
			• Get knowledge on dynamic properties of soils and laboratory and field testing.
			• Design of foundation for different types of machines
			• Understand liquefaction, motion isolation and vibration control.
	17155E66C	Rock Engineering	• Classify the rocks, study the index properties of rock systems.
			• Understand the modes of rock failure, stares-strain characteristics, failure criteria.
			• Estimate the stresses in rocks.
			• Apply rock mechanics in engineering.
			• Get knowledge on rock stabilization.
	17155E66D	Urban planning and	• Describe basic issues in urban planning
			• Formulate plans for urban and rural development and

		development	• Plan and analyse socio economic aspects of urban and rural planning
			• Design of urban development projects.
			• Manage urban development projects.
	17155E66E	Building Technology	• To understand elements of building construction with respect to substructure and superstructure
			• To understand the construction of built forms from foundation to roof in various building practices
			• To gain in depth knowledge and understanding of different building materials used for construction
			• To understand the contextual relevance of natural and man made materials and their applicability in various construction practices
	17155E66F	Intellectual property rights	• Ability to manage Intellectual Property portfolio to enhance the value of the firm.
	17155L67	Highway Engineering Laboratory	• Student knows the techniques to characterize various pavement materials through relevant tests.
	17155L68	Irrigation and Environmental Engineering Drawing	• The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.
	17155L69	Professional communication	• Make effective presentations
			• Participate confidently in Group Discussions.
			• Attend job interviews and be successful in them.
			• Develop adequate Soft Skills required for the workplace

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

	17155CBR	Participation in Bounded Research	• Hands on exposure to problem solving tools in contemporary research
			• Evolution of research intuitiveness and orientation
			• Familiarity with cutting edge research trends
VII	17155C71	Estimation , Costing & Valuation Engineering	• Estimate the quantities for buildings,
			• Rate Analysis for all Building works, canals, and Roads and Cost Estimate.
			• Understand types of specifications, principles for report preparation, tender notices types.
			• Gain knowledge on types of contracts
			• Evaluate valuation for building and land.
	17155C72	Railways, Airports, Docks And Harbour Engineering	• Understand the methods of route alignment and design elements in Railway Planning and Constructions.
			• Understand the Construction techniques and Maintenance of Track laying and Railway stations.
			• Gain an insight on the planning and site selection of Airport Planning and design.
			• Analyze and design the elements for orientation of runways and passenger facility systems.
			• Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.
	17155C73	Structural Design and	• Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

		drawing	• Design and draw flat slab as per code provisions
			• Design and draw reinforced concrete and steel bridges
			• Design and draw reinforced concrete and steel water tanks
			• Design and detail the various steel trusses and cantry girders
	17155E75A	Pavement Engineering	• Get knowledge about types of rigid and flexible pavements.
			• Able to design of rigid pavements.
			• Able to design of flexible pavements.
			• Determine the causes of distress in rigid and flexible pavements.
			• Understand stailisation of pavements, testing and field control.
	17155E75B	Engineering Economics and Cost Analysis	• To provides the students with knowledge of basic economic problems and the relationship between engineering technology and economics.
			• To give knowledge to the students about various costs for determining the manufacturing of a product.
	17155E75C	Transport and Environment	• Understood the impact of Transportation projects on the environment.
			• Get knowledge on methods of impact analysis and their applications.
			• Understand environmental Laws on Transportation Projects and the mitigative measures adopted in the

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

			planning stage.
			• Predict and assess the impact of transportation projects.
	17155E75D	Industrial Structures	• Know the requirements of various industries and get an idea about the materials used and planning of various industrial components
			• Understand the functional requirements for industrial structures.
			Design special steel structures like bunkers, silos, crane girders, chimneys and pre-engineered buildings.
			• Design special RC structures like corbels, silos, bunkers, chimneys, plates and shells.
			Understand the principles of prefabrication and prestressing
	17155E75E	Environmental and social impact assessment	• carry out scoping and screening of developmental projects for environmental and social assessments
			• explain different methodologies for environmental impact prediction and assessment
			• Plan environmental impact assessments and environmental management plans
			• Evaluate environmental impact assessment reports
	17155E75F	Design of prestressed concrete	• Understand the behaviour of prestressed concrete members and able to analyze the prestressed concrete beams.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

		structures	• Design the prestressed concrete members for flexure and shear as per the relevant design code (IS 1343).
			• Analyze for deflection of prestressed concrete members and design the anchorage zone.
			• Analyze and design of composite beams and continuous beams.
			• Design of prestressed concrete structures - sleepers, Tanks, pipes and poles.
	17155E75G	Construction planning and scheduling	Understand basic concepts of construction planing.
			Schedule the construction activities.
			Forecast and control the cost in a construction.
			Understand the quality control and safety during construction.
			• Organize information in Centralized database Management systems.
	17155E75H	Municipal solid waste management	• Understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.
			• Reduction, reuse and recycling of waste.
			• ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.
			• knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Design and operation of sanitary landfill.
17155E75I	Total quality management		• <mark>The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.</mark>
17155L76	Creative and Innovation project (activity based –subject related)		• <mark>On completion of the design project students will have a better experience in designing various design problems related to Civil Engineering.</mark>
17155L77	Industrial Training (4weeks During VI Semester – Summer)		• <mark>The intricacies of implementation textbook knowledge into practice</mark>
			• <mark>The concepts of developments and implementation of new techniques</mark>
17155L78	Technical Seminar		• <mark>To effectively communicate by making an oral presentation</mark>
			• <mark>To study research papers for understanding of anew field, in the absence of a text book, to summarize and review them.</mark>
17155CSR	Design / Socio - Technical Project (Scaffolded Research)		• <mark>Sensitization of social needs for innovation</mark>
			• <mark>Team work towards interdisciplinary synchronous research strategy</mark>
			• <mark>Development of critical thinking and synergistic</mark>

			research approach.
VIII	17155E81A	Coastal Engineering	• Understand coastal engineering aspects of harbors methods to improve navigation • Understand the wave properties and analysis of wave. • Understand the concepts of sediment transport. • Design of shore defense structures. • Gain knowledge in modeling in coastal engineering.
	17155E81B	Participatory water resources management	• Gain knowledge on various processes involved in participatory water resource management. • Understand famers participation in water resources management. • Ware of the issues related to water conservation and watershed Development • Get knowledge in participatory water conservation • Understand concept, principle, approach of watershed management.
	17155E81C	Integrated water resources management	• Understand objectives, principles and evolution of integrated water resources management. • Have an idea of contextualizing IWRM • Gain knowledge in emerging issues in water management, flood, drought, pollution and poverty. • Understand the water resources development in India and wastewater reuse.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Gain knowledge on integrated development of water management.
17155E81D	Groundwater engineering		• Understand aquifer properties and its dynamics
			• Get an exposure towards well design and practical problems
			• Develop a model for groundwater management.
			• Students will be able to understand the importance of artificial recharge and groundwater quality concepts
			• Gain knowledge on conservation of groundwater.
17155E81E	Water resources system systems engineering		• Exposed to the economic aspects and analysis of water resources systems by which they will get an idea of comprehensive and integrated planning of a water resources project.
			• Understanding the concept of linear programming and apply in water resource system.
			• Understanding the concept of dynamic programming and apply in water resource system.
			• Develops simulation models.
			• developing skills in solving problems in operations research through LP, DP and Simulation techniques.
17155E81F	Geo-environmental engineering		• Assess the contamination in the soil
			• Understand the current practice of waste disposal
			• To prepare the suitable disposal system for particular waste.
			• Stabilize the waste and utilization of solid waste for soil improvement.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Select suitable remediation methods based on contamination.
	17155E81G	Hydrology and water resources engineering	• an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments,
			• ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge
			• ability to conduct Spatial analysis of rainfall data and design water storage reservoirs
			• Understand the concept and methods of ground water management.
	17155E81H	Professional ethics in engineering	• Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.
	17155E82A	Computer aided design of structures	• Understand the concepts of Computer-Aided Design, Software requirements and Hardware components in CAD system.
			• Acquire the knowledge in Computer Graphics and Computer aided drafting using Auto CAD software
			• Understand the fundamentals of finite element analysis and be able use software for modeling, analysis and design of structures.
			• Understand the concepts of Optimization techniques and its practical applications to structural engineering.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

	17155E82B	Maintenance, Repair and Rehabilitation of structures	• The importance of maintenance and assessment method of distressed structures.
			• The strength and durability properties ,their effects due to climate and temperature.
			• Recent development in concrete
			• The techniques for repair rand protection methods
			• Repair, rehabilitation and retrofitting of structures and demolition methods.
	17155E82C	Structural Dynamics and Earthquake Engineering	• Student will develop knowledge in the simulation and mathematical model development.
			• Students will be trained to identify, formulate and solve complicated problem.
			• Students will be able to understand the role of natural calamity in the damage of structures.
			• Students will be able to develop the skill to analyse data and to apply the same in the practical problems.
			• Students will be able to apply the developed methodologies for the safe and stable design of structures.
	17155E82D	Prefabricated structures	• The student will have good knowledge about design principles, layout of factory and stages of loading in precast construction.
			• Acquire knowledge about panel systems, slabs, connections used in precast construction and they will be in a position to design the elements.

Note: above the table, a bullet reads: "• Acquire the knowledge in Artificial Intelligence and Knowledge based expert systems."

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

		• Acquire knowledge about types of floor systems, stairs and roofs used in precast construction.
		• Acquire knowledge about types of walls used in precast construction, sealants, design of joints.
		• Acquire knowledge about components in industrial building.
17155E82E	Bridge engineering	• Identify loads on bridges and selection of type of bridge for the site condition
		• Analyze the super structure by various methods.
		• Design the trussed bridge and plate girder bridges
		• Design reinforced concrete slab and T beam bridges and prestressed concrete bridges
		• Decide the appropriate sub structural systems , bearings and expansion joints for the bridges.
17155E82F	Foundation of Nano science	• Will familiarize about the science of nanomaterials
		• Will demonstrate the preparation of nanomaterials
		• Will develop knowledge in characteristic nanomaterial
17155WP83	Project Work	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

DEPARTMENT OF CIVIL ENGINEERING
COURSE OBJECTIVES
M.TECH(F.T)

Sem	Course Code	Title of the Course	COs
I	17248S11E	Advanced Engineering Mathematics	• The course aim to develop the skills of the students in the areas of boundary value problems and transform techniques. The course will also serve as a prerequisite for post Graduate and specialized studies and research.
			• Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.
			• Have learnt the basics of Z – transform in its applicability to discretely varying functions, gained the skill to formulate certain problems in terms of differences equations.
	17255H12	Quality Control &Assurance in Construction	• To understand the elements of quality planning and the implication
			• To become aware of objectives and advantage of quality assurance

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• To be exposed to means of quality control
			• To study the relationship between quality control and assurance
17255H13	Theory of Plasticity and Elasticity		• Emphasis is placed on static problems with linear material and small deformation. Many basic 2-D problems (such as plane strain and plane stress) and 3-D problems.
17255H14	Structural Dynamics		• This course covers the methods for analyzing the stresses and deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading.
17255H15	Maintenance and Rehabilitation of Structures		• Introduction to the governmental quality assurance regulations for public works. Application of quality control concepts, statistical experimental design principles to the construction process to minimize project costs and improve quality.
17255E16A	Prestressed Concrete Structures		• This course introduces students to the fundamental principles of pre-stressed concrete behavior and design, So that they can act effectively to optimize existing forms of construction and apply fundamental concepts with confidence in unusual and challenging situations.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

	17255E16B	High Rise Structures	• This course covers the design criteria and loading pattern on high rise structures, behavior of structural systems and stability, design and analysis of tall buildings.
	17255E16C	Computer Aided Structural Design	• To learn design and preparation of structural drawing of concrete and steel structures (STADD-PRO).
	17255L17	Core Practical (Computer Programming Lab)	• To impart knowledge to analyze solve, design and Civil Engineering drawings using AutoCAD.
	17255CRS	Research Led Seminar	• Exposure to various research domains
			• Acquaintance with languages of research
			• Development of research aptitude
II	17255H21	Management Information System	• To bring about an exposure to information systems in a formal manner
			• To study the development of information systems
			• To study the means of applying information systems models to project management
			• To introduce system audit and to study its features

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

17255H22	Finite Element Analysis	• The finite element method is the most powerful structural analysis tool for the Civil Engineers. The basic formulation and programming technique are introduced. According to the same procedures, the different elements such as truss, beam, plate and shell are easily formulated.
17255H23	Advanced Concrete Structural Design	• To impart knowledge about the performance of concrete as structural material and the behavior, elastic and inelastic, of reinforced – concrete members and structures, designing structures safely, economically and efficiently.
17255E24B	Advanced Concrete Technology	• To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.
17255E24C	Steel,Concrete Composite Structures	• This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.
17255E25A	Optimization in Structural Design	• The structural analysis is formulated through the principle of optimization. Both the manual calculation and application of the computer are

			introduced for the analysis of truss and frame structures using optimization techniques.
17255E25C	Elements of Earthquake Engineering		• This course covers the theory and applications related to Earthquake Engineering. The broad subjects discussed in this course include earthquake response of linearly elastic and inelastic buildings, structural dynamics in building codes.
17255L26	Core practical(Software Lab – Finite Element Analysis-ANSYS)		• To impart knowledge to analyze solve, design and Civil Engineering drawings using FEA - ANSYS
172TECWR	Technical writing / Seminars		• Students will be able to produce a range of technical documents to a high professional standard, showing an awareness of audience, purpose and context.
17255CRM	Research Methodology		• Understanding research questions and tools
			• Experience in scientific writings
			• Practice in various aspects of scientific publications
			• Inculcation of research ethics
17255CBR	Participation in		• Hands on exposure to problem solving

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

		Bounded Research	• tools in contemporary research
			• Evolution of research intuitiveness and orientation
			• Familiarity with cutting edge research trends
III	17255H31	Advanced Steel Structures	• Introduction to steel structure, tensioned member, compressed member, beam, design of beam and column, bolt jointing, welding jointing and other joint design.
	17255E32A	Experimental Stress Analysis	• At the end of the semester students can learn about the strain gauges, strain rosetters, model analysis, calibration of photo elastic materials.
	17255E32B	Soil Structure Interaction	• This course deals with the soil-foundation interaction, analysis of beams and finite plates, elastic analysis of pile, load deflection for laterally loaded pile.
	17255E33A	Prefabricated Structures	• This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.
	17255E33B	Disaster Resistant Structures	• This course deals the philosophy of the design of disaster resistant structures such

LOCAL NEEDS　　　　REGIONAL NEEDS　　　　NATIONAL NEEDS　　　　GLOBAL NEEDS

			• as dams , bridges and emphasize about the rehabilitation , retrofitting and damage assessment of structures.
	17255E33C	Non Linear Analysis of Structures	• This course deals about the non – linearities, non-linear equations and non linear static analysis of plates, columns, trusses and frames
	17255E34A	Offshore Structures	• This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures
	17255E34B	Stability of Structures	• This course deals with the concept and characteristics of stability problems and behavior of torsional buckling and lateral buckling in beams and columns.
	17255E34C	Mechanics of Composite Materials	• This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.
	17255P35	Project Work Phase-I	• Sensitization of social needs for innovation
			• Team work towards interdisciplinary synchronous research strategy
	17255CSR	Design / Socio - Technical Project	• Development of critical thinking and synergistic research approach.
IV	17255P41	Project Work Phase-II	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			methodology.

DEPARTMENT OF CIVIL ENGINEERING
COURSE OBJECTIVES
B.TECH(P.T)

Sem	Course Code	Title of the Course	COs
I	17148S11P	Transforms & Partial Differential Equations	• Understand how to solve the given standard partial differential equations.
			• Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
			• Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
			• Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
			• Use the effective mathematical tools for

LOCAL NEEDS **REGIONAL NEEDS** **NATIONAL NEEDS** **GLOBAL NEEDS**

			the solutions of partial differential equations by using Z transform techniques for discrete time systems
I	17155H12P	Mechanics of Solids	• Understand the concepts of stress and strain, principal stresses and principal planes.
			• Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
			• Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
			• Apply basic equation of torsion in design of circular shafts and helical springs,.
			• Analyze the pin jointed plane and space trusses
I	17155H13P	Fluid Mechanics-I	• Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
			• Understand and solve the problems related to equation of motion.
			• Gain knowledge about dimensional and model analysis.
			• Learn types of flow and losses of flow in pipes.
			• Understand and solve the boundary layer problems.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

I	17155H14P	Surveying	• The use of various surveying instruments and mapping
			• Measuring Horizontal angle and vertical angle using different instruments
			• Methods of Levelling and setting Levels with different instruments
			• Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth
			• Concept and principle of modern surveying.
I	17155H15P	Irrigation Engineering	• Have knowledge and skills on crop water requirements.
			• Understand the methods and management of irrigation.
			• Gain knowledge on types of Impounding structures
			• Understand methods of irrigation including canal irrigation.
			• Get knowledge on water management on optimization of water use.
II	17148S21P	Numerical Methods	• Understand the basic concepts and techniques of solving algebraic and transcendental equations.
			• Appreciate the numerical techniques of interpolation and error approximations in

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			various intervals in real life situations.
			• Apply the numerical techniques of differentiation and integration for engineering problems.
			• Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
			• Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
II	17155H22P	Strength of Materials	• Classify the soil and assess the engineering properties, based on index properties.
			• Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
			• find the load carrying capacity of columns and stresses induced in columns and cylinders
			• Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
			• Determine the stresses due to Unsymmetrical bending of beams, locate

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

II	17155H23P	Fluid Mechanics-II	• the shear center, and find the stresses in curved beams.
			• Classify the soil and assess the engineering properties, based on index properties.
			• Able to identify a effective section for flow in different cross sections.
			• To solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
			• Understand the principles, working and application of turbines.
			• Understand the principles, working and application of pumps.
II	17155H24P	Concrete Technology	• The various requirements of cement, aggregates and water for making concrete
			• The effect of admixtures on properties of concrete
			• The concept and procedure of mix design as per IS method
			• The properties of concrete at fresh and hardened state
			• The importance and application of special concretes.
II	17155H25P	Soil Mechanics	• Classify the soil and assess the engineering properties, based on index properties.

			• Understand the stress concepts in soils
			• Understand and identify the settlement in soils.
			• Determine the shear strength of soil
			• Analyze both finite and infinite slopes.
III	17148S31P	Probability & Statistics	• Compute probabilities using classical, statistical and axiomatic approach.
			• Gain knowledge about conditional probability and applications of Baye's theorem
			• Understand the concept of random variables and solve the problems in mathematical expectations
III	17155H32P	Design of reinforced concrete structures-I	• The student shall be in a position to design the basic elements of reinforced concrete structures.
III	17155H33P	Structural Analysis I	• Students will be able to analysis trusses, frames and arches
			• Students will be able to analyse structures for moving loads and
			• Students will be able to will be conversant with classical methods of analysis.
III	17155H34P	Construction Materials and Practices	• Compare the properties of most common and advanced building materials.
			• Understand the typical and potential

			• applications of lime, cement and aggregates
			• Know the production of concrete and also the method of placing and making of concrete elements.
			• understand the applications of timbers and other materials
			• Understand the importance of modern material for construction.
III	17155L35P	Soil Mechanics Lab	• Students are able to conduct tests to determine both the index and engineering properties of soils and to characterize the soil based on their properties.
IV	17155H41P	Design of reinforced concrete structures-II	• The student shall have a comprehensive design knowledge related to various structural systems.
IV	17155H42P	Structural Analysis II	• The student will have the knowledge on advanced methods of analysis of structures including space and cable structures.
IV	17155H43P	Environmental Engineering	• an insight into the structure of drinking water supply systems, including water transport, treatment and distribution
			• the knowledge in various unit operations

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			and processes in water treatment
			• an ability to design the various functional units in water treatment
			• an understanding of water quality criteria and standards, and their relation to public health
			• the ability to design and evaluate water supply project alternatives on basis of chosen criteria
IV	17155E44AP	Hydrology	• an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments
			• ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge
IV	17155E44BP	Water resources Engineering	• ability to conduct Spatial analysis of rainfall data and design water storage reservoirs
			• Understand the concept and methods of ground water management.
IV	17155E44CP	Building Technology	• understand the typical and potential applications of lime, cement and aggregates
			• Know the production of concrete and also the method of placing and making of

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

			concrete elements.
			• understand the applications of timbers and other materials.
IV	17155E44DP	Contract laws and regulations	• Understanding contract law principles: Students can learn about the fundamental principles of contract law, such as offer, acceptance, consideration, and capacity.
			• Students can learn to analyze and interpret contracts, and identify potential legal issues.
			• Students can learn to draft clear and enforceable contracts.
			• Students can learn about the remedies available to parties in breach of contract, such as damages, specific performance, and rescission.
IV	17155L45P	Environmental Engineering Lab	• Quantify the pollutant concentration in water and wastewater
			• Suggest the type of treatment required and amount of dosage required for the treatment
			• Examine the conditions for the growth of micro-organisms
V	17155H51P	Design of Steel Structural Elements	• Understand the concepts of various design philosophies
			• Design common bolted and welded

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			connections for steel structures
			• Design tension members and understand the effect of shear lag.
			• Understand the design concept of axially loaded columns and column base connections.
V	17155H52P	Foundation Engineering	• Understand the site investigation, methods and sampling.
			• Get knowledge on bearing capacity and testing methods.
			• Design shallow footings.
			• Determine the load carrying capacity, settlement of pile foundation.
			• Determine the earth pressure on retaining walls and analysis for stability.
V	17155H53P	Industrial Waste Management	• understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.
			• Reduction, reuse and recycling of waste.
			• ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.
			• knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Design and operation of sanitary landfill.
V	17155H54AP	Computer Aided Analysis And Design	• At the end of the course the student acquires hands on experience in design and preparation of structural drawings for concrete / steel structures normally encountered in Civil Engineering practice.`
V	17155E54BP	Transportation Engineering	• Design flexible and rigid pavements. • Understand the concept of pavement management system, evaluation of distress and maintenance of pavements. • Analyze and design the elements for orientation of runways and passenger facility systems. • Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.
V	17155E54CP	Geology	• Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies. • Will get basics knowledge on properties of minerals. • Gain knowledge about types of rocks, their distribution and uses. • Will understand the methods of study on geological structure.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbour
V	17155E54DP	Highway Engineering	• Get knowledge on planning and aligning of highway.
			• Geometric design of highways
			• Design flexible and rigid pavements.
			• Gain knowledge on Highway construction materials, properties, testing methods
			• Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.
V	17155L55P	Computer Aided Building Drawing Laboratory	• The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, framed buildings using computer softwares.
VI	17155H61P	Estimation & Cost Evaluation	• Estimate the quantities for buildings,
			• Rate Analysis for all Building works, canals, and Roads and Cost Estimate.
			• Understand types of specifications, principles for report preparation, tender notices types.
			• Gain knowledge on types of contracts

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

Semester	Course Code	Course Name	Course Outcomes
VI	17155H62P	Ground Water Hydrology	• The students gain the knowledge needed on hydrologic cycle, hydrometeorology and formation of precipitation.
			• The students are able to apply the various methods of field measurements and empirical formulae for estimating the various losses of precipitation, stream flow, flood and Flood routing.
			• The students will know the basics of groundwater and hydraulics of subsurface flows.
VI	17155H63P	Construction Project Management	• The student should be able to plan construction projects, schedule the activities using network diagrams, determine the cost of the project, control the cost of the project by creating cash flows and budgeting and to use the project information as decision making tool.
VI	17155E64AP	Remote Sensing And GIS	• Principles of Remote Sensing and GIS
			• Analysis of RS and GIS data and interpreting the data for modeling applications
VI	17155E64BP	Railway Engineering	• Understand the methods of route alignment and design elements in Railway Planning and Constructions.
			• Understand the Construction techniques and Maintenance of Track laying and

			Railway stations.
VI	17155E64CP	Airport & Harbours	• Gain an insight on the planning and site selection of Airport Planning and design.
			• Analyze and design the elements for orientation of runways and passenger facility systems.
			• Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.
VI	17155E64DP	Electronic Surveying	• Understand the advantages of electronic surveying over conventional surveying methods
			• Understand the working principle of GPS, its components, signal structure, and error sources
			• Understand various GPS surveying methods and processing techniques used in GPS
VI	17155L65P	Concrete &Transportation Engineering Laboratory	• Student knows the techniques to characterize various pavement materials through relevant tests.
VII	17160S71P	Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

442

VII	17155H72P	Housing, Planning & Management	• The students should have a comprehensive knowledge of planning, design, evaluation,construction and financing of housing projects.
VII	17155H73P	Repair And Rehabilitation of Structures	• Students must gained knowledge on quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repairing of structures and demolition procedures.
VII	17155E74AP	Air Pollution Management	• an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
			• ability to identify, formulate and solve air and noise pollution problems
			• ability to design stacks and particulate air pollution control devices to meet applicable standards.
VII	17155E74BP	Pre Fabricated Structures	• The student shall be able to design some of the prefabricated elements and also have the knowledge of the construction methods in using these elements.
VII	17155E74CP	Bridge Structures	• To develop an understanding of an appreciation for basic concepts in proportioning and design of bridges in terms of aesthetics, geographical location and functionality.
			• To help the student develop an intuitive

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			feeling about the sizing of bridge elements,ie., develop a clear understanding of conceptual design
			• To understand the load flow mechanism and identify loads on bridges.
			• To carry out a design of bridge starting from conceptual design, selecting suitable bridge,geometry to sizing of its elements.
VII	17155E74DP	Prestressed Concrete Structures	• Student shall have a knowledge on methods of prestressing and able to design various prestressed concrete structural elements.
VII	17155P75P	Project Work	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

DEPARTMENT OF CIVIL ENGINEERING

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

COURSE OBJECTIVES
M.TECH – STRUCTURAL
ENGINEERING (P.T)

Sem	Course Code	Title of the Course	COs
I	17248S11EP	Advanced Engineering Mathematics	• The course aim to develop the skills of the students in the areas of boundary value problems and transform techniques. The course will also serve as a prerequisite for post Graduate and specialized studies and research.
			• Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.
			• Have learnt the basics of Z – transform in its applicability to discretely varying functions, gained the skill to formulate certain problems in terms of differences equations.
I	17255H12P	Quality Control &Assurance in Construction	• To understand the elements of quality planning and the implication
			• To become aware of objectives and advantage of quality assurance
			• To be exposed to means of quality control
I	17255H13P	Theory of Plasticity	• To study the relationship between quality

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

		and Elasticity	control and assurance
I	17255L14P	Core Practical (Computer Programming Lab)	• To learn design and preparation of structural drawing of concrete and steel structures (STADD-PRO).
I	17255CRSP	Research Led Seminar	• To impart knowledge to analyze solve, design and Civil Engineering drawings using AutoCAD.
			• Exposure to various research domains
			• Acquaintance with languages of research
			• Development of research aptitude
II	17255H21P	Management Information System	• To bring about an exposure to information systems in a formal manner
			• To study the development of information systems
			• To study the means of applying information systems models to project management
II	17255H22P	Finite Element Analysis	• To introduce system audit and to study its features
II	17255E23AP	Failure Analysis of Structures	• Ability to design structure to prevent failure from the internal defect that unit within the structure
			• Ability to design structure to prevent fatigue and creep
			• Ability to define different deformation and related theories

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

II	17255E23BP	Advanced Concrete Technology	• To impart knowledge about the performance of concrete as structural material and the behavior, elastic and inelastic, of reinforced – concrete members and structures, designing structures safely, economically and efficiently.
II	17255E23CP	Steel,Concrete Composite Structures	• To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.
II	17255L24P	Core practical(Software Lab – Finite Element Analysis-ANSYS)	• This course covers the theory and applications related to Earthquake Engineering. • The broad subjects discussed in this course include earthquake response of linearly elastic and inelastic buildings, structural dynamics in building codes.
II	172TECWRP	Technical writing / Seminars	• To impart knowledge to analyze solve, design and Civil Engineering drawings using FEA - ANSYS
II	17255CRMP	Research Methodology	• Understanding research questions and tools • Experience in scientific writings • Practice in various aspects of scientific publications
II	17255CBRP	Participation in Bounded Research	• Inculcation of research ethics • Hands on exposure to problem solving

			tools in contemporary research
			• Evolution of research intuitiveness and orientation
III	17255H31P	Structural Dynamics	• Emphasis is placed on static problems with linear material and small deformation. Many basic 2-D problems (such as plane strain and plane stress) and 3-D problems.
III	17255H32P	Maintenance and Rehabilitation of Structures	• This course covers the methods for analyzing the stresses and deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading.
III	17255E33AP	Prestressed Concrete Structures	• Introduction to the governmental quality assurance regulations for public works. Application of quality control concepts, statistical experimental design principles to the construction process to minimize project costs and improve quality.
III	17255E33BP	High Rise Structures	• This course introduces students to the fundamental principles of pre-stressed concrete behavior and design, So that they can act effectively to optimize existing forms of construction and apply fundamental concepts with confidence in unusual and challenging situations.
III	17255E33CP	Computer Aided	• This course covers the design criteria and

		Structural Design	loading pattern on high rise structures, behavior of structural systems and stability, design and analysis of tall buildings.
IV	17255H41P	Advanced Concrete Structural Design	• The finite element method is the most powerful structural analysis tool for the Civil Engineers. • The basic formulation and programming technique are introduced. According to the same procedures, the different elements such as truss, beam, plate and shell are easily formulated.
IV	17255H42P	Advanced Steel Structures	• Familiarity with cutting edge research trends
IV	17255E43AP	Optimization in Structural Design	• This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.
IV	17255E43BP	Design of industrial structures	• At the end of this course the student shall be able to design someof the strctures used in industries.
IV	17255E43CP	Elements of earthquake Engineering	• Students will be trained to identify, formulate and solve complicated problem. • Students will be able to understand the role of natural calamity in the damage of structures. • Students will be able to develop the skill

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

IV			• to analyse data and to apply the same in the practical problems.
			• Students will be able to apply the developed methodologies for the safe and stable design of structures.
IV	17255P44P	Project Work Phase-I	• This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.
			• Sensitization of social needs for innovation
			• Team work towards interdisciplinary synchronous research strategy
IV	17255CSR	Design / Socio - Technical Project	• Development of critical thinking and synergistic research approach.
V	17255E51AP	Experimental Stress Analysis	• Explain the measurement of strain under static and dynamic loads.
			• Create awareness about the fixing of gauges and temperature effects in bonded gauges and measure of stress in stress gauges.
			• Analysis of measuring circuits and strains of different strain gauge rosettes.
V	17255E51BP	Soil Structure Interaction	• Apply the knowledge of Two parameter Elastic Modeling to analyse the behavior of Soil under loading.
			• Categorized the behavior of beam under Elastic Foundation Soil Models.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			• Formulate the Plates on Elastic Continuum
			• Compare the behavior of pile under loading conditions.
V	17255E51CP	A Seismic Design of structures	• Understand the basics concepts of earthquake engineering.
			• Perform the static and dynamic seismic analysis of buildings.
			• Apply the concepts of ductile detailing for beam, column and beam
V	17255E52AP	Prefabricated Structures	• This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.
V	17255E52BP	Disaster Resistant Structures	• This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.
V	17255E52CP	Non Linear Analysis of Structures	• This course deals the philosophy of the design of disaster resistant structures such as dams , bridges and emphasize about the rehabilitation , retrofitting and damage assessment of structures.
V	17255E53AP	Offshore Structures	• This course deals about the non –

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

			linearities, non-linear equations and non linear static analysis of plates, columns, trusses and frames
V	17255E53BP	Stability of Structures	• This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures .
V	17255E53CP	Mechanics of Composite Materials	• This course deals with the concept and characteristics of stability problems and behavior of torsional buckling and lateral buckling in beams and columns.
VI	17255P61P	Project Work Phase-II	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

LOCAL NEEDS   **REGIONAL NEEDS**   **NATIONAL NEEDS**   **GLOBAL NEEDS**

DEPARTMENT OF CIVIL ENGINEERING
1.1.1 -CO-PO-PSO MAPPING

B.TECH (F.T)-2017R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
SEM 1	17147S11	Communicative English	Read articles of a general kind in magazines and newspapers.			✓							
			Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.			✓				✓			
			Comprehend conversations and short talks delivered in English			✓							
	17148S12	Engineering Mathematics – I	Use both the limit definition and rules of differentiation to differentiate functions.	✓									
			Apply differentiation to solve maxima and minima problems.	✓									
			Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.	✓									
			Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	✓									
			Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	✓									
			Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.	✓									
			Apply various techniques in solving differential equations.	✓									
	17149S13	Engineering Physics	the students will gain knowledge on the basics of properties of matter and its applications,	✓				✓					
			the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,	✓									

453

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,		✓										
		the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and	✓											
		the students will understand the basics of crystals, their structures and different crystal growth techniques.				✓	✓							
17149S14	Engineering Chemistry	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	✓	✓		✓	✓	✓						
17150S15	Engineering Graphics	familiarize with the fundamentals and standards of Engineering graphics	✓	✓		✓	✓	✓		✓	✓			
		Perform freehand sketching of basic geometrical constructions and multiple views of objects.	✓											
		Project orthographic projections of lines and plane surfaces.	✓											
		Draw projections and solids and development of surfaces.	✓											
		Visualize and to project isometric and perspective sections of simple solids.	✓											
17154S15	Problem Solving and Python Programming	Develop algorithmic solutions to simple computational problems	✓			✓	✓	✓						
		Read, write, execute by hand simple Python programs.												
		Structure simple Python programs for solving problems.												
		Decompose a Python program into functions.												
		Represent compound data using Python lists, tuples, and dictionaries.												
		Read and write data from/to files in Python Programs.												
17150L17	Problem Solving and Python Programming Laboratory	Develop algorithmic solutions to simple computational problems	✓			✓	✓	✓						
		Read, write, execute by hand simple Python programs.	✓											
		Structure simple Python programs for solving problems.	✓											
		Decompose a Python program into functions.	✓											
		Represent compound data using Python lists, tuples, and dictionaries.	✓											
		Read and write data from/to files in Python Programs.	✓											
17149L18	Physics and Chemistry Laboratory	Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications	✓			✓	✓	✓						
		The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.												

SEM	Code	Course	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
	171VEA19	Value Education	To learn about philosophy of Life and Individual qualities	✓											
			To learn and practice social values and responsibilities												
			To learn and practice mind culture, forces acting on the body.												
SEM 2	17147S21	Technical English	Read technical texts and write area- specific texts effortlessly.		✓			✓							
			Listen and comprehend lectures and talks in their area of specialisation successfully.		✓										
			Speak appropriately and effectively in varied formal and informal contexts.		✓										
			Write reports and winning job applications.						✓						
	17148S22A	Engineering Mathematics – II	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	✓											
			Gradient, divergence and curl of a vector point function and related identities.												
			Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	✓											
			Analytic functions, conformal mapping and complex integration.												
			Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.												
	17149S23D	Physics for Civil Engineering	The students will have knowledge on the thermal performance of buildings,	✓	✓	✓	✓	✓							
			the students will acquire knowledge on the acoustic properties of buildings,												
			The students will get knowledge on various lighting designs for buildings,		✓										
			The students will gain knowledge on the properties and performance of engineering materials, and		✓										
			The students will understand the hazards of buildings.	✓			✓								
	17149S24D	Basic Electrical and Electronics Engineering	Ability to identify the electrical components and explain the characteristics of electrical machines.	✓											
			Ability to identify electronics components and understand the characteristics												
	17153S25E	Environmental Science and Engineering	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.						✓		✓				
			Public awareness of environmental is at infant stage.												
			Ignorance and incomplete knowledge has lead to misconceptions						✓		✓				

SEM	Code	Subject	Course Outcome												
			Development and improvement in std. of living has lead to serious environmental disaster												
	17154S26D	Engineering Mechanics	illustrate the vectorial and scalar representation of forces and moments	✓	✓		✓	✓	✓		✓				
			analyse the rigid body in equilibrium		✓										
			evaluate the properties of surfaces and solids	✓				✓							
			calculate dynamic forces exerted in rigid body				✓				✓	✓			
			determine the friction and the effects by the laws of friction												
	17154L27	Engineering Practices Laboratory	Fabricate carpentry components and pipe connections including plumbing works.						✓						
			Use welding equipments to join the structures.												
			Carry out the basic machining operations					✓							
			Make the models using sheet metal works					✓	✓						
			Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings	✓											
			Carry out basic home electrical works and appliances												
			Measure the electrical quantities												
			Elaborate on the components, gates, soldering practices.												
	17155L28E	Computer Aided Building Drawing	The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer software's.	✓			✓								
	171ICA29	Fundamentals of Indian constitution and Economy	describe the salient features of the constitution of India	✓											
			interpret, integrate and critically analyse the political economy of Indian international relations.												
SEM 3	17148C31C	Transforms and Partial Differential Equations	Understand how to solve the given standard partial differential equations.	✓											
			Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	✓											
			Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	✓											
			Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	✓											
			Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems	✓											

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17155C32	Engineering Geology	Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.	✓	✓			✓			✓			✓	
		Will get basics knowledge on properties of minerals.												
		Gain knowledge about types of rocks, their distribution and uses.												
		Will understand the methods of study on geological structure.												
		Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbour												
17155C33	Construction Materials	Compare the properties of most common and advanced building materials.	✓				✓			✓			✓	
		understand the typical and potential applications of lime, cement and aggregates					✓			✓			✓	
		Know the production of concrete and also the method of placing and making of concrete elements.	✓	✓										
		understand the applications of timbers and other materials												
		Understand the importance of modern material for construction.												
17155C34	Strength of Materials I	Understand the concepts of stress and strain, principal stresses and principal planes.	✓	✓	✓	✓							✓	
		Determine Shear force and bending moment in beams and understand concept of theory of simple bending.		✓	✓									
		Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.	✓				✓						✓	
		Apply basic equation of torsion in design of circular shafts and helical springs, .												
		Analyze the pin jointed plane and space trusses												
17155C35	Fluid Mechanics	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.	✓			✓				✓			✓	
		Understand and solve the problems related to equation of motion.				✓								
		Gain knowledge about dimensional and model analysis.	✓							✓			✓	
		Learn types of flow and losses of flow in pipes.												
		Understand and solve the boundary layer problems.												
17155C36	Surveying	The use of various surveying instruments and mapping	✓	✓			✓			✓			✓	
		Measuring Horizontal angle and vertical angle using different instruments								✓			✓	
		Methods of Levelling and setting Levels with different instruments												
		Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth	✓	✓			✓							
		Concept and principle of modern surveying.												

SEM	Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
	17155L37	Surveying Laboratory	Students completing this course would have acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry, Total Station and GPS and have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc.	✓	✓		✓		✓			✓			
	17155L38	Construction Materials Laboratory	the students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.	✓	✓				✓						
	17155L39	Interpersonal Skills / Listening and Speaking	Listen and respond appropriately.	✓											
			Participate in group discussions	✓											
			Make effective presentations	✓											
			Participate confidently and appropriately in conversations both formal and informal	✓											
SEM 4	17148S41C	Numerical Methods	Understand the basic concepts and techniques of solving algebraic and transcendental equations.	✓											
			Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.	✓											
			Apply the numerical techniques of differentiation and integration for engineering problems.	✓											
			Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	✓											
			Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	✓											
	17155C42	Construction Techniques and Practices	know the different construction techniques and structural systems	✓			✓		✓		✓	✓			
			Understand various techniques and practices on masonry construction, flooring, and roofing.												
			Plan the requirements for substructure construction.				✓		✓		✓	✓			
			Know the methods and techniques involved in the construction of various types of super structures	✓											
			Select, maintain and operate hand and power tools and equipment used in the building construction sites.						✓		✓				
	17155C43	Strength of Materials II	Classify the soil and assess the engineering properties, based on index properties.	✓	✓	✓	✓	✓							✓
			Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.	✓	✓	✓									
			find the load carrying capacity of columns and stresses induced in columns and cylinders												

Code	Course	Course Outcome											
		Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure				✓	✓						
		Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.											✓
17155C44	Applied Hydraulic Engineering	Classify the soil and assess the engineering properties, based on index properties.	✓	✓		✓			✓	✓	✓		✓
		Able to identify a effective section for flow in different cross sections.							✓	✓			
		To solve problems in uniform, gradually and rapidly varied flows in steady state conditions.	✓	✓									
		Understand the principles, working and application of turbines.				✓					✓		✓
		Understand the principles, working and application of pumps.											
17155C45	Concrete Technology	The various requirements of cement, aggregates and water for making concrete	✓	✓		✓			✓	✓	✓		✓
		The effect of admixtures on properties of concrete				✓							✓
		The concept and procedure of mix design as per IS method	✓	✓					✓	✓			
		The properties of concrete at fresh and hardened state									✓		
		The importance and application of special concretes.											
17155C46	Soil Mechanics	Classify the soil and assess the engineering properties, based on index properties.	✓	✓					✓	✓	✓		✓
		Understand the stress concepts in soils							✓	✓			
		Understand and identify the settlement in soils.	✓	✓							✓		
		Determine the shear strength of soil											✓
		Analyze both finite and infinite slopes.											
17155L47	Strength of Materials Lab	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.	✓	✓	✓	✓	✓						✓
17155L48	Hydraulic Engineering Lab	The students will be able to measure flow in pipes and determine frictional losses.	✓		✓		✓	✓	✓	✓	✓		✓
		The students will be able to develop characteristics of pumps and turbines.					✓	✓		✓	✓		
17155L49	Advanced Reading & Writing	Write different types of essays.	✓										
		Write winning job applications.											
		Read and evaluate texts critically.	✓			✓							
17155CRS	Research Led Seminar	Exposure to various research domains	✓										
		Acquaintance with languages of research											
		Development of research aptitude											

SEM	Course Code	Course Name	Course Outcome												
SEM 5	17155C51	Design of Reinforced Cement Concrete Elements	Understand the various design methodologies for the design of RC elements.	✓	✓	✓	✓	✓							✓
			Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.		✓	✓									✓
			design the various types of slabs and staircase by limit state method.	✓	✓										
			Design columns for axial, uniaxial and biaxial eccentric loadings.				✓	✓							
			Design of footing by limit state method.												
	17155C52	Structural Analysis I	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method	✓	✓	✓	✓	✓					✓		✓
			Analyze the continuous beams and rigid frames by slope defection method.												
			Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.				✓						✓		✓
			Analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.	✓	✓										
			Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.		✓	✓							✓		✓
	17155C53	Water Supply Engineering	an insight into the structure of drinking water supply systems, including water transport, treatment and distribution			✓	✓	✓	✓				✓		
			the knowledge in various unit operations and processes in water treatment					✓							
			an ability to design the various functional units in water treatment												
			an understanding of water quality criteria and standards, and their relation to public health							✓			✓		
			the ability to design and evaluate water supply project alternatives on basis of chosen criteria			✓	✓						✓		
	17155E55C	Geographic Information System	Have basic idea about the fundamentals of GIS.	✓											
			Understand the types of data models.												
			Get knowledge about data input and topology.	✓											
			Gain knowledge on data quality and standards.												
			Understand data management functions and data output	✓			✓								
	17155C56	Foundation Engineering	Understand the site investigation, methods and sampling.		✓		✓			✓			✓		✓
			Get knowledge on bearing capacity and testing methods.										✓		
			Design shallow footings.		✓					✓					

Code	Course	Outcome											
		Determine the load carrying capacity, settlement of pile foundation.			✓								
		Determine the earth pressure on retaining walls and analysis for stability.						✓					✓
17155L57	Soil Mechanics Lab	Students are able to conduct tests to determine both the index and engineering properties of soils and to characterize the soil based on their properties.		✓		✓	✓						
17155L58	Water and Waste Water Analysis Lab	Quantify the pollutant concentration in water and wastewater		✓		✓				✓			✓
		Suggest the type of treatment required and amount of dosage required for the treatment								✓			
		Examine the conditions for the growth of micro-organisms		✓		✓							✓
17155L59	Survey Camp	Interpret the contours		✓	✓						✓		
		Work in a teamwork											
		Mark a road alignment of (L-section, Cross-section) a given gradient connecting any two stations on the map			✓						✓		
		Calculate the earth work		✓									
		Prepare a topographical plan of a given area		✓			✓						
17155CRM	Research Methodology	Ability to carry out independent literature survey corresponding to the specific publication type and assess basic experimental as well as conceptual set up.	✓										
17155C61	Design of Steel Structural Elements	Understand the concepts of various design philosophies	✓	✓	✓	✓	✓						✓
		Design common bolted and welded connections for steel structures			✓	✓							
		Design tension members and understand the effect of shear lag.		✓									✓
		Understand the design concept of axially loaded columns and column base connections.											✓
		Understand specific problems related to the design of laterally restrained and unrestrained steel beams.	✓										
17155C62	Structural Analysis II	Draw influence lines for statically determinate structures and calculate critical stress resultants.	✓	✓	✓	✓	✓				✓		✓
		Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.			✓	✓					✓		
		Analyse of three hinged, two hinged and fixed arches.						✓					✓
		Analyse the suspension bridges with stiffening girders	✓	✓									
		Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.											
17155C63	Irrigation Engineering	Have knowledge and skills on crop water requirements.	✓	✓			✓						

	Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
SEM 6			Understand the methods and management of irrigation.			✓									
			Gain knowledge on types of Impounding structures	✓	✓										
			Understand methods of irrigation including canal irrigation.												
			Get knowledge on water management on optimization of water use.			✓									
	17155C64	Highway Engineering	Get knowledge on planning and aligning of highway.		✓	✓	✓	✓				✓			
			Geometric design of highways				✓								
			Design flexible and rigid pavements.											✓	
			Gain knowledge on Highway construction materials, properties, testing methods					✓							
			Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.		✓	✓									
	17155C65	Waste Water Engineering	An ability to estimate sewage generation and design sewer system including sewage pumping stations	✓	✓		✓								
			The required understanding on the characteristics and composition of sewage, self-purification of streams				✓								
			An ability to perform basic design of the unit operations and processes that are used in sewage treatment	✓	✓										
			Understand the standard methods for disposal of sewage.				✓								
	17155E66A	Ground Improvement Techniques	Gain knowledge on methods and selection of ground improvement techniques.	✓			✓			✓					
			Understand dewatering techniques and design for simple cases.	✓											
			Get knowledge on insitu treatment of cohesionless and cohesive soils.							✓					
			Understand the concept of earth renforcement and design of reinforced earth.						✓						
			Get to know types of grouts and grouting technique.					✓							
	17155E66B	Introduction to soil dynamics and machine foundation	Understand the theory and measurement of vibration.	✓						✓					
			Understand the concept of wave propagation in infinite medium and due to machine foundation.	✓			✓	✓							
			Get knowledge on dynamic properties of soils and laboratory and field testing.												
			Design of foundation for different types of machines					✓							
			Understand liquefaction, motion isolation and vibration control.					✓							
	17155E66C	Rock Engineering	Classify the rocks, study the index properties of rock systems.	✓											
			Understand the modes of rock failure, stares-strain characteristics, failure criteria.	✓		✓	✓								
			Estimate the stresses in rocks.												

SEM	Code	Course	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
			Apply rock mechanics in engineering.				✔								
			Get knowledge on rock stabilization.			✔									
	17155E66D	Urban planning and development	Describe basic issues in urban planning	✔											
			Formulate plans for urban and rural development and	✔		✔									
			Plan and analyse socio economic aspects of urban and rural planning			✔	✔								
			Design of urban development projects.												
			Manage urban development projects.				✔								
	17155E66E	Building Technology	To understand elements of building construction with respect to substructure and superstructure	✔				✔							
			To understand the construction of built forms from foundation to roof in various building practices	✔	✔										✔
			To gain in depth knowledge and understanding of different building materials used for construction		✔	✔		✔							
			To understand the contextual relevance of natural and man made materials and their applicability in various construction practices												
	17155E66F	Intellectual property rights	Ability to manage Intellectual Property portfolio to enhance the value of the firm.	✔			✔								
	17155L67	Highway Engineering Laboratory	Student knows the techniques to characterize various pavement materials through relevant tests.	✔		✔			✔						
	17155L68	Irrigation and Environmental Engineering Drawing	The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.	✔	✔	✔									
	17155L69	Professional communication	Make effective presentations	✔		✔									
			Participate confidently in Group Discussions.												
			Attend job interviews and be successful in them.		✔		✔								
			Develop adequate Soft Skills required for the workplace												
	17155CBR	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	✔		✔		✔							
			Evolution of research intuitiveness and orientation										✔		
			Familiarity with cutting edge research trends		✔		✔								
SEM 7	17155C71	Estimation , Costing & Valuation Engineering	Estimate the quantities for buildings,	✔	✔							✔	✔		
			Rate Analysis for all Building works, canals, and Roads and Cost Estimate.												
			Understand types of specifications, principles for report preparation, tender notices types.	✔	✔										
			Gain knowledge on types of contracts									✔	✔		

Course Code	Course Name	Course Outcome											
		Evaluate valuation for building and land.											
17155C72	Railways, Airports, Docks And Harbour Engineering	Understand the methods of route alignment and design elements in Railway Planning and Constructions.		✓		✓			✓	✓			
		Understand the Construction techniques and Maintenance of Track laying and Railway stations.		✓					✓	✓			
		Gain an insight on the planning and site selection of Airport Planning and design.											
		Analyze and design the elements for orientation of runways and passenger facility systems.				✓			✓				
		Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.								✓			
17155C73	Structural Design and drawing	Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls	✓	✓	✓	✓		✓					
		Design and draw flat slab as per code provisions			✓	✓							
		Design and draw reinforced concrete and steel bridges	✓	✓									
		Design and draw reinforced concrete and steel water tanks											
		Design and detail the various steel trusses and cantry girders						✓					
17155E75 A	Pavement Engineering	Get knowledge about types of rigid and flexible pavements.		✓		✓			✓	✓			
		Able to design of rigid pavements.							✓	✓			
		Able to design of flexible pavements.		✓		✓							
		Determine the causes of distress in rigid and flexible pavements.							✓	✓			
		Understand stailisation of pavements, testing and field control.				✓							
17155E75 B	Engineering Economics and Cost Analysis	To provides the students with knowledge of basic economic problems and the relationship between engineering technology and economics.		✓		✓			✓	✓			
		To give knowledge to the students about various costs for determining the manufacturing of a product.							✓				
17155E75 C	Transport and Environment	Understood the impact of Transportation projects on the environment.		✓		✓			✓	✓			
		Get knowledge on methods of impact analysis and their applications.							✓	✓			
		Understand environmental Laws on Transportation Projects and the mitigative measures adopted in the planning stage.		✓		✓							
		Predict and assess the impact of transportation projects.							✓				
17155E75 D	Industrial Structures	Know the requirements of various industries and get an idea about the materials used and planning of various industrial components	✓	✓	✓	✓	✓						✓
		Understand the functional requirements for industrial structures.				✓	✓						✓

464

Course Code	Course Name	Course Outcome												
		Design special steel structures like bunkers, silos, crane girders, chimneys and pre-engineered buildings.			✓	✓								✓
		Design special RC structures like corbels, silos, bunkers, chimneys, plates and shells.	✓	✓										
		Understand the principles of prefabrication and prestressing												
17155E75 E	Environmental and social impact assessment	carry out scoping and screening of developmental projects for environmental and social assessments	✓			✓								
		explain different methodologies for environmental impact prediction and assessment			✓	✓						✓		
		plan environmental impact assessments and environmental management plans												
		evaluate environmental impact assessment reports												
17155E75 F	Design of prestressed concrete structures	Understand the behaviour of prestressed concrete members and able to analyze the prestressed concrete beams.		✓	✓	✓								
		Design the prestressed concrete members for flexure and shear as per the relevant design code (IS 1343).				✓	✓							
		Analyze for deflection of prestressed concrete members and design the anchorage zone.	✓	✓	✓	✓	✓							✓
		Analyze and design of composite beams and continuous beams.												
		Design of prestressed concrete structures - sleepers, Tanks, pipes and poles.												✓
17155E75 G	Construction planning and scheduling	Understand basic concepts of construction planing.	✓									✓	✓	
		Schedule the construction activities.										✓		
		Forecast and control the cost in a construction.												
		Understand the quality control and safety during construction.				✓		✓						
		Organize information in Centralized database Management systems.												
17155E75 H	Municipal solid waste management	understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.	✓			✓			✓					
		Reduction, reuse and recycling of waste.												
		ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.							✓					✓
		knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.				✓		✓						
		Design and operation of sanitary landfill.						✓			✓			

Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17155E75I	Total quality management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	✓						✓	✓				
17155L76	Creative and Innovation project (activity based –subject related)	On completion of the design project students will have a better experience in designing various design problems related to Civil Engineering.		✓		✓		✓						
17155L77	Industrial Training (4weeks During VI Semester – Summer)	The intricacies of implementation textbook knowledge into practice				✓		✓	✓					
		The concepts of developments and implementation of new techniques												
17155L78	Technical Seminar	To effectively communicate by making an oral presentation	✓			✓								
		To study research papers for understanding of anew field, in the absence of a text book, to summarize and review them.		✓			✓							
17155CSR	Design / Socio - Technical Project (Scaffolded Research)	Sensitization of social needs for innovation					✓		✓					
		Team work towards interdisciplinary synchronous research strategy	✓			✓	✓							
		Development of critical thinking and synergistic research approach.						✓		✓				
17155E81A	Coastal Engineering	Understand coastal engineering aspects of harbors methods to improve navigation	✓			✓	✓							
		Understand the wave properties and analysis of wave.												
		Understand the concepts of sediment transport.				✓			✓					
		Design of shore defense structures.						✓						✓
		Gain knowledge in modeling in coastal engineering.												
17155E81B	Participatory water resources management	Gain knowledge on various processes involved in participatory water resource management.	✓											
		Understand famers participation in water resources management.		✓										
		ware of the issues related to water conservation and watershed Development				✓								
		Get knowledge in participatory water conservation				✓			✓					
		Understand concept, principle , approach of watershed management.					✓							

Course Code	Course	Course Outcome										
17155E81C	Integrated water resources management	Understand objectives, principles and evolution of integrated water resources management.		✓		✓						
		Have an idea of contextualizing IWRM					✓		✓			
		Gain knowledge in emerging issues in water management, flood, drought, pollution and poverty.										
		Understand the water resources development in India and wastewater reuse.					✓		✓			
		Gain knowledge on integrated development of water management.		✓		✓						
17155E81D	Groundwater engineering	Understand aquifer properties and its dynamics		✓		✓						
		Get an exposure towards well design and practical problems										
		Develop a model for groundwater management.	✓									
		Students will be able to understand the importance of artificial recharge and groundwater quality concepts				✓						
		Gain knowledge on conservation of groundwater.			✓							✓
17155E81E	Water resources system systems engineering	Exposed to the economic aspects and analysis of water resources systems by which they will get an idea of comprehensive and integrated planning of a water resources project.		✓		✓						
		Understanding the concept of linear programming and apply in water resource system.	✓			✓						
		Understanding the concept of dynamic programming and apply in water resource system.	✓									
		Develops simulation models.				✓						
		developing skills in solving problems in operations research through LP, DP and Simulation techniques.			✓							✓
17155E81F	Geo-environmental engineering	Assess the contamination in the soil	✓			✓						
		Understand the current practice of waste disposal		✓	✓					✓		
		To prepare the suitable disposal system for particular waste.										
		Stabilize the waste and utilization of solid waste for soil improvement.		✓	✓			✓				
		Select suitable remediation methods based on contamination.										
17155E81G	Hydrology and water resources engineering	an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments,		✓		✓						✓

Code	Course	Outcome												
		ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge	✔			✔	✔							
		ability to conduct Spatial analysis of rainfall data and design water storage reservoirs		✔										
		Understand the concept and methods of ground water management.					✔							
17155E81H	Professional ethics in engineering	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.	✔			✔		✔						
17155E82A	Computer aided design of structures	Understand the concepts of Computer-Aided Design, Software requirements and Hardware components in CAD system.			✔									
		Acquire the knowledge in Computer Graphics and Computer aided drafting using Auto CAD software								✔				
		Understand the fundamentals of finite element analysis and be able use software for modeling, analysis and design of structures.				✔						✔		
		Understand the concepts of Optimization techniques and its practical applications to structural engineering.		✔										
		Acquire the knowledge in Artificial Intelligence and Knowledge based expert systems.												
17155E82B	Maintenance, repair and rehabilitation of structures	the importance of maintenance and assessment method of distressed structures.								✔				
		the strength and durability properties ,their effects due to climate and temperature.				✔						✔		
		recent development in concrete												
		the techniques for repair rand protection methods								✔				
		repair, rehabilitation and retrofitting of structures and demolition methods.				✔						✔		
17155E82C	Structural dynamics and earthquake engineering	Student will develop knowledge in the simulation and mathematical model development.								✔				
		Students will be trained to identify, formulate and solve complicated problem.	✔			✔						✔		
		Students will be able to understand the role of natural calamity in the damage of structures.							✔					✔
		Students will be able to develop the skill to analyse data and to apply the same in the practical problems.	✔							✔				✔

Course code	Course name	Course outcome	1	2	3	4	5	6	7	8	9	10
		Students will be able to apply the developed methodologies for the safe and stable design of structures.			✓						✓	
17155E82D	Prefabricated structures	The student will have good knowledge about design principles, layout of factory and stages of loading in precast construction.						✓				
		Acquire knowledge about panel systems, slabs, connections used in precast construction and they will be in a position to design the elements.	✓		✓						✓	
		Acquire knowledge about types of floor systems, stairs and roofs used in precast construction.				✓						✓
		Acquire knowledge about types of walls used in precast construction, sealants, design of joints.	✓					✓				✓
		Acquire knowledge about components in industrial building.			✓				✓			
17155E82E	Bridge engineering	Identify loads on bridges and selection of type of bridge for the site condition	✓					✓				
		Analyze the super structure by various methods.			✓				✓			
		Design the trussed bridge and plate girder bridges				✓						✓
		Design reinforced concrete slab and T beam bridges and prestressed concrete bridges	✓					✓				✓
		Decide the appropriate sub structural systems , bearings and expansion joints for the bridges.			✓				✓			
17155E82F	Foundation of nano science	Will familiarize about the science of nanomaterials				✓			✓			
		Will demonstrate the preparation of nanomaterials		✓				✓				
		Will develop knowledge in characteristic nanomaterial										✓
17155P83	Project Work	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.		✓	✓			✓				

DEPARTMENT OF CIVIL ENGINEERING
1.1.1 -CO-PO-PSO MAPPING

B.TECH (P.T)-2017R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
I	17148S11P	Transforms and Partial Differential Equations	Understand how to solve the given standard partial differential equations.	✓									
			Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	✓									
			Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	✓									
			Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	✓									
			Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems	✓									
	17155H12P	Mechanicsof solids I	Understand the concepts of stress and strain, principal stresses and principal planes.	✓	✓	✓	✓					✓	
			Determine Shear force and bending moment in beams and understand concept of theory of simple bending.		✓	✓							
			Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.	✓			✓					✓	
			Apply basic equation of torsion in design of circular shafts and helical springs, .										

			Analyze the pin jointed plane and space trusses											
	17155H13P	Fluid Mechanics-I	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.	✔		✔			✔			✔		
			Understand and solve the problems related to equation of motion.			✔								
			Gain knowledge about dimensional and model analysis.	✔					✔			✔		
			Learn types of flow and losses of flow in pipes.											
			Understand and solve the boundary layer problems.											
	17155H14P	Surveying	The use of various surveying instruments and mapping	✔	✔		✔		✔			✔		
			Measuring Horizontal angle and vertical angle using different instruments						✔			✔		
			Methods of Levelling and setting Levels with different instruments											
			Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth	✔	✔		✔							
			Concept and principle of modern surveying.											
	17155H15P	Irrigation Engineering	Have knowledge and skills on crop water requirements.	✔	✔		✔							
			Understand the methods and management of irrigation.				✔							
			Gain knowledge on types of Impounding structures	✔	✔									
			Understand methods of irrigation including canal irrigation.											
			Get knowledge on water management on optimization of water use.				✔							
II	17148S21P	Numerical Methods	Understand the basic concepts and techniques of solving algebraic and transcendental equations.	✔										
			Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.	✔										
			Apply the numerical techniques of differentiation and integration for engineering problems.	✔										

Course Code	Course Name	Course Outcome										
		Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	✓									
		Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	✓									
17155H22P	Strength of Materials	Classify the soil and assess the engineering properties, based on index properties.	✓	✓	✓	✓	✓					✓
		Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.	✓	✓	✓							
		find the load carrying capacity of columns and stresses induced in columns and cylinders										
		Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure				✓	✓					
		Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.										✓
17155H23P	Fluid Mechanics-II	Classify the soil and assess the engineering properties, based on index properties.	✓	✓		✓			✓	✓	✓	✓
		Able to identify a effective section for flow in different cross sections.							✓	✓		
		To solve problems in uniform, gradually and rapidly varied flows in steady state conditions.	✓	✓								
		Understand the principles, working and application of turbines.				✓					✓	✓
		Understand the principles, working and application of pumps.										
17155H24P	Concrete Technology	The various requirements of cement, aggregates and water for making concrete	✓	✓		✓			✓	✓	✓	✓
		The effect of admixtures on properties of concrete				✓						✓
		The concept and procedure of mix design as per IS method	✓	✓					✓	✓		
		The properties of concrete at fresh and hardened state									✓	
		The importance and application of special concretes.										

Sem	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
III	17155H25P	Soil Mechanics	Classify the soil and assess the engineering properties, based on index properties.	✔	✔							✔	✔	✔	✔
			Understand the stress concepts in soils									✔	✔		
			Understand and identify the settlement in soils.	✔	✔									✔	
			Determine the shear strength of soil												✔
			Analyze both finite and infinite slopes. Analyze both finite and infinite slopes.				✔						✔		
	17148S31P	Probability & Statistics													
	17155H32P	Design of reinforced concrete structures-I	The student shall be in a position to design the basic elements of reinforced concrete structures.	✔	✔							✔	✔		
	17155H33P	Structural Analysis I	Students will be able to analysis trusses, frames and arches	✔	✔	✔	✔	✔						✔	✔
			Students will be able to analyse structures for moving loads and		✔	✔	✔	✔							
			Students will be able to will be conversant with classical methods of analysis.	✔	✔	✔	✔							✔	✔
	17155H34P	Construction Materials and Practices	Compare the properties of most common and advanced building materials.	✔			✔		✔			✔			
			understand the typical and potential applications of lime, cement and aggregates				✔		✔			✔			
			Know the production of concrete and also the method of placing and making of concrete elements.	✔	✔										
			understand the applications of timbers and other materials	✔			✔								
			Understand the importance of modern material for construction.						✔		✔				
	17155L35P	Soil Mechanics Lab	Students are able to conduct tests to determine both the index and engineering properties of soils and to characterize the soil based on their properties.				✔		✔	✔					
IV	17155H41P	Design of reinforced concrete structures-II	The student shall have a comprehensive design knowledge related to various structural systems.	✔			✔		✔				✔		
	17155H42P	Structural Analysis II	The student will have the knowledge on advanced methods of analysis of structures including space and cable structures.		✔	✔	✔	✔							
	17155H43P	Environmental Engineering	an insight into the structure of drinking water supply systems, including water transport, treatment and distribution			✔	✔	✔	✔				✔		
			the knowledge in various unit operations and processes in water treatment						✔						
			an ability to design the various functional units in water treatment												

	Code	Subject	Course Outcome	1	2	3	4	5	6	7	8	9
			an understanding of water quality criteria and standards, and their relation to public health					✓			✓	
			the ability to design and evaluate water supply project alternatives on basis of chosen criteria		✓	✓					✓	
	17155E44A P	Hydrology	an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments		✓		✓					✓
			ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge	✓		✓	✓					
	17155E44B P	Water resources Engineering	ability to conduct Spatial analysis of rainfall data and design water storage reservoirs		✓	✓	✓					
			Understand the concept and methods of ground water management.				✓		✓	✓		
	17155E44C P	Building Technology	understand the typical and potential applications of lime, cement and aggregates		✓	✓	✓					
			Know the production of concrete and also the method of placing and making of concrete elements.	✓	✓	✓						
			understand the applications of timbers and other materials						✓	✓	✓	
	17155E44D P	Contract laws and regulations	understand the applications of timbers and other materials				✓	✓				
	17155L45P	Environmental Engineering Lab	Quantify the pollutant concentration in water and wastewater		✓		✓		✓			✓
			Suggest the type of treatment required and amount of dosage required for the treatment						✓			
			Examine the conditions for the growth of micro-organisms		✓		✓					✓
V	17155H51P	Design of Steel Structural Elements	Understand the concepts of various design philosophies	✓	✓	✓	✓	✓				✓
			Design common bolted and welded connections for steel structures			✓	✓					
			Design tension members and understand the effect of shear lag.		✓							✓
			Understand the design concept of axially loaded columns and column base connections.									✓

Code	Course	Outcome	1	2	3	4	5	6	7	8	9	10
		Understand specific problems related to the design of laterally restrained and unrestrained steel beams.	✓									
17155H52P	Foundation Engineering	Understand the site investigation, methods and sampling.		✓		✓			✓		✓	✓
		Get knowledge on bearing capacity and testing methods.									✓	
		Design shallow footings.		✓					✓			
		Determine the load carrying capacity, settlement of pile foundation.				✓						
		Determine the earth pressure on retaining walls and analysis for stability.							✓			✓
17155H53P	Industrial Waste Management	understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.	✓			✓			✓			
		Reduction, reuse and recycling of waste.										
		ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.							✓			✓
		knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.				✓		✓				
		Design and operation of sanitary landfill.					✓			✓		
17155H54P	Computer Aided Analysis And Design	At the end of the course the student acquires hands on experience in design and preparation of structural drawings for concrete / steel structures normally encountered in Civil Engineering practice.	✓			✓			✓			
17155E54P	Transportation Engineering	Design flexible and rigid pavements.		✓			✓					
		Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.				✓			✓			
		Analyze and design the elements for orientation of runways and passenger facility systems.			✓				✓		✓	
		Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.				✓			✓			✓
17155E54P	Geology	Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.			✓			✓				✓

Sem	Course Code	Course Name	Course Outcome							
			Will get basics knowledge on properties of minerals.	✓		✓			✓	
			Gain knowledge about types of rocks, their distribution and uses.		✓			✓		
			Will understand the methods of study on geological structure.		✓		✓	✓		✓
			Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbour		✓		✓		✓	
	17155E54P	Highway Engineering	Get knowledge on planning and aligning of highway.		✓		✓			✓
			Geometric design of highways	✓		✓			✓	
			Design flexible and rigid pavements.		✓		✓			
			Gain knowledge on Highway construction materials, properties, testing methods		✓		✓	✓		✓
			Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.		✓		✓		✓	
	17155L55P	Computer Aided Building Drawing Laboratory	The students will be able to draft the plan, elevation and sectional views of the buildings,industrial structures, framed buildings using computer softwares.	✓		✓	✓		✓	✓
VI	17155H61P	Estimation & Cost Evaluation	Estimate the quantities for buildings,	✓	✓			✓	✓	
			Rate Analysis for all Building works, canals, and Roads and Cost Estimate.							
			Understand types of specifications, principles for report preparation, tender notices types.	✓	✓					
			Gain knowledge on types of contracts					✓	✓	
			Evaluate valuation for building and land.							
	17155H62P	Ground Water Hydrology	The students gain the knowledge needed on hydrologic cycle, hydrometeorology and formation of precipitation.	✓	✓	✓	✓		✓	✓
			The students are able to apply the various methods of field measurements and empirical formulae for estimating the various losses of precipitation, stream flow, flood and Flood routing.					✓	✓	
			The students will know the basics of groundwater and hydraulics of subsurface flows.	✓	✓					

476

Sem	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
	17155H63P	Construction Project Management	The student should be able to plan construction projects, schedule the activities using network diagrams, determine the cost of the project, control the cost of the project by creating cash flows and budgeting and to use the project information as decision making tool.	✓	✓	✓	✓					✓	✓		
	17155E64AP	Remote Sensing And GIS	Principles of Remote Sensing and GIS	✓	✓										✓
			Analysis of RS and GIS data and interpreting the data for modeling applications	✓	✓	✓	✓						✓		
	17155E64BP	Railway Engineering	Understand the methods of route alignment and design elements in Railway Planning and Constructions.	✓	✓	✓		✓	✓	✓	✓	✓			
			Understand the Construction techniques and Maintenance of Track laying and Railway stations.					✓							✓
	17155E64CP	Airport & Harbours	Gain an insight on the planning and site selection of Airport Planning and design.	✓	✓										✓
			Analyze and design the elements for orientation of runways and passenger facility systems.	✓	✓	✓	✓						✓		
			Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.	✓	✓	✓		✓	✓	✓	✓	✓			
	17155E64DP	Electronic Surveying	Understand the advantages of electronic surveying over conventional surveying methods	✓	✓										✓
			Understand the working principle of GPS, its components, signal structure, and error sources	✓	✓	✓	✓						✓		
			Understand various GPS surveying methods and processing techniques used in GPS	✓	✓	✓		✓	✓	✓	✓	✓			
	17155L65P	Concrete &Transportation Engineering Laboratory	Student knows the techniques to characterize various pavement materials through relevant tests.	✓	✓	✓	✓						✓		
VII	17160S71P	Total Quality Management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	✓				✓	✓			✓			✓
	17155H72P	Housing, Planning & Management	The students should have a comprehensive knowledge of planning, design, evaluation,construction and financing of housing projects.		✓			✓	✓				✓	✓	

477

Course Code	Course Name	Course Outcome										
17155H73P	Repair And Rehabilitation of Structures	Students must gained knowledge on quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repairing of structures and demolition procedures.	✓		✓	✓				✓	✓	
17155E74P	Air Pollution Management	an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management	✓		✓	✓				✓		✓
		ability to identify, formulate and solve air and noise pollution problems		✓		✓	✓				✓	✓
		ability to design stacks and particulate air pollution control devices to meet applicable standards.	✓		✓	✓				✓	✓	
17155E74P	Pre Fabricated Structures	The student shall be able to design some of the prefabricated elements and also have the knowledge of the construction methods in using these elements.	✓		✓	✓				✓		✓
17155E74P	Bridge Structures	To develop an understanding of an appreciation for basic concepts in proportioning and design of bridges in terms of aesthetics, geographical location and functionality.	✓		✓	✓				✓	✓	
		To help the student develop an intuitive feeling about the sizing of bridge elements,ie., develop a clear understanding of conceptual design	✓		✓	✓				✓		✓
		To understand the load flow mechanism and identify loads on bridges.		✓		✓	✓				✓	✓
		To carry out a design of bridge starting from conceptual design, selecting suitable bridge,geometry to sizing of its elements.		✓		✓	✓					✓
17155E74P	Prestressed Concrete Structures	Student shall have a knowledge on methods of prestressing and able to design various prestressed concrete structural elements.		✓		✓	✓				✓	✓
17155P75P	Project Work	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	✓		✓	✓				✓	✓	

M.TECH (F.T)- STRUCTURAL ENGINEERING -2017R

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
I	17248S11E	Advanced Engineering Mathematics	The course aim to develop the skills of the students in the areas of boundary value problems and transform techniques. The course will also serve as a prerequisite for post Graduate and specialized studies and research.							✓	✓		
			Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.	✓									
			Have learnt the basics of Z – transform in its applicability to discretely varying functions, gained the skill to formulate certain problems in terms of differences equations.					✓		✓			✓
	17255H12	Quality Control &Assurance in Construction	To understand the elements of quality planning and the implication			✓			✓				
			To become aware of objectives and advantage of quality assurance			✓			✓		✓		
			To be exposed to means of quality control										
			To study the relationship between quality control and assurance				✓		✓		✓		
	17255H13	Theory of Plasticity and Elasticity	Emphasis is placed on static problems with linear material and small deformation. Many basic 2-D problems (such as plane strain and plane stress) and 3-D problems.	✓						✓			✓
	17255H14	Structural Dynamics	This course covers the methods for analyzing the stresses and deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading.					✓		✓			✓

Sem	Course Code	Course Title	Objective												
	17255H15	Maintenance and Rehabilitation of Structures	Introduction to the governmental quality assurance regulations for public works. Application of quality control concepts, statistical experimental design principles to the construction process to minimize project costs and improve quality.							✓		✓			
	17255E16A	Prestressed Concrete Structures	This course introduces students to the fundamental principles of pre-stressed concrete behavior and design, So that they can act effectively to optimize existing forms of construction and apply fundamental concepts with confidence in unusual and challenging situations.		✓			✓		✓					✓
	17255E16B	High Rise Structures	This course covers the design criteria and loading pattern on high rise structures, behavior of structural systems and stability, design and analysis of tall buildings.	✓				✓				✓			
	17255E16C	Computer Aided Structural Design	To learn design and preparation of structural drawing of concrete and steel structures (STADD-PRO).	✓				✓	✓					✓	
	17255L17	Core Practical (Computer Programming Lab)	To impart knowledge to analyze solve, design and Civil Engineering drawings using AutoCAD.		✓				✓					✓	
	17255CRS	Research Led Seminar	Exposure to various research domains			✓			✓					✓	
			Acquaintance with languages of research						✓						
			Development of research aptitude						✓				✓		
II	17255H21	Management Information System	To bring about an exposure to information systems in a formal manner			✓					✓				
			To study the development of information systems				✓								
			To study the means of applying information systems models to project management						✓		✓				
			To introduce system audit and to study its features			✓					✓				✓
	17255H22	Finite Element Analysis	The finite element method is the most powerful structural analysis tool for the Civil Engineers. The basic formulation and programming technique are introduced. According to the same procedures, the different elements such as truss, beam, plate and shell are easily formulated.					✓			✓				
	17255H23	Advanced Concrete Structural Design	To impart knowledge about the performance of concrete as structural material and the behavior, elastic and inelastic, of reinforced – concrete members and structures, designing structures safely, economically and efficiently.	✓					✓			✓			

Sem	Course Code	Course Name	Course Outcome											
	17255E24B	Advanced Concrete Technology	To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.				✓							
	17255E24C	Steel,Concrete Composite Structures	This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.		✓						✓	✓		
	17255E25A	Optimization in Structural Design	The structural analysis is formulated through the principle of optimization. Both the manual calculation and application of the computer are introduced for the analysis of truss and frame structures using optimization techniques.	✓	✓						✓			✓
	17255E25C	Elements of Earthquake Engineering	This course covers the theory and applications related to Earthquake Engineering. The broad subjects discussed in this course include earthquake response of linearly elastic and inelastic buildings, structural dynamics in building codes.		✓									
	17255L26	Core practical(Software Lab – Finite Element Analysis- ANSYS)	To impart knowledge to analyze solve, design and Civil Engineering drawings usingFEA - ANSYS			✓					✓			✓
	172TECWR	Technical writing / Seminars	To impart knowledge to analyze solve, design and Civil Engineering drawings usingFEA - ANSYS					✓						
	17255CRM	Research Methodology	Understanding research questions and tools								✓			
			Experience in scientific writings		✓									
			Practice in various aspects of scientific publications		✓						✓			✓
			Inculcation of research ethics	✓					✓		✓			✓
	17255CBR	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research						✓					
			Evolution of research intuitiveness and orientation		✓				✓				✓	
			Familiarity with cutting edge research trends											
III	17255H31	Advanced Steel Structures	Introduction to steel structure, tensioned member, compressed member, beam, design of beam and column, bolt jointing, welding jointing and other joint design.		✓						✓			✓
	17255E32A	Experimental Stress Analysis	At the end of the semester students can learn about the strain gauges, strain rosetters, model analysis, calibration of photo elastic materials.	✓										
	17255E32B	Soil Structure Interaction	This course deals with the soil-foundation interaction, analysis of beams and finite plates, elastic analysis of pile, load deflection for laterally loaded pile.	✓			✓		✓					

Sem	Course Code	Course Name	Description	1	2	3	4	5	6	7	8	9	10	11	12
	17255E33A	Prefabricated Structures	This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.				✓	✓			✓				
	17255E33B	Disaster Resistant Structures	This course deals the philosophy of the design of disaster resistant structures such as dams , bridges and emphasize about the rehabilitation , retrofitting and damage assessment of structures.		✓				✓						
	17255E33C	Non Linear Analysis of Structures	This course deals about the non – linearities, non-linear equations and non linear static analysis of plates, columns, trusses and frames	✓		✓									
	17255E34A	Offshore Structures	This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures .					✓							
	17255E34B	Stability of Structures	This course deals with the concept and characteristics of stability problems and behavior of torsional buckling and lateral buckling in beams and columns.	✓					✓						✓
	17255E34C	Mechanics of Composite Materials	This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.		✓										
	17255P35	Project Work Phase-I	Sensitization of social needs for innovation		✓		✓		✓						✓
			Team work towards interdisciplinary synchronous research strategy						✓						
	17255CSR	Design / Socio - Technical Project	Development of critical thinking and synergistic research approach.	✓				✓	✓						✓
IV	17255P41	Project Work Phase-II	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	✓		✓		✓	✓						✓

DEPARTMENT OF CIVIL ENGINEERING
1.1.1 -CO-PO-PSO MAPPING

M.TECH (P.T)- STRUCTURAL ENGINEERING-2017R

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
I	17248S11EP	Advanced Engineering Mathematics	The course aim to develop the skills of the students in the areas of boundary value problems and transform techniques. The course will also serve as a prerequisite for post Graduate and specialized studies and research.						✓			✓	
			Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.	✓							✓		✓
			Have learnt the basics of Z – transform in its applicability to discretely varying functions, gained the skill to formulate certain problems in terms of differences equations.					✓		✓		✓	
	17255H12P	Quality Control &Assurance in Construction	To understand the elements of quality planning and the implication			✓			✓				
			To become aware of objectives and advantage of quality assurance						✓		✓		✓
			To be exposed to means of quality control				✓		✓				
	17255H13P	Theory of Plasticity and Elasticity	To study the relationship between quality control and assurance	✓					✓		✓		✓
	17255L14P	Core Practical (Computer Programming Lab)	To learn design and preparation of structural drawing of concrete and steel structures (STADD-PRO).			✓				✓		✓	

483

Year	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
	17255CRSP	Research Led Seminar	To impart knowledge to analyze solve, design and Civil Engineering drawings using AutoCAD.				✓		✓		✓				
			Exposure to various research domains						✓	✓		✓			
			Acquaintance with languages of research						✓						
	17255H21P	Management Information System	Development of research aptitude			✓			✓		✓				
			To bring about an exposure to information systems in a formal manner			✓			✓		✓				
			To study the development of information systems				✓				✓			✓	
			To study the means of applying information systems models to project management			✓			✓		✓				
	17255H22P	Finite Element Analysis	To introduce system audit and to study its features			✓			✓		✓				
	17255E23AP	Failure Analysis of Structures	Ability to design structure to prevent failure from the internal defect that unit within the structure					✓		✓		✓			
II			Ability to design structure to prevent fatigue and creep			✓			✓		✓				
			Ability to define different deformation and related theories			✓									
	17255E23BP	Advanced Concrete Technology	To impart knowledge about the performance of concrete as structural material and the behavior, elastic and inelastic, of reinforced – concrete members and structures, designing structures safely, economically and efficiently.			✓									
	17255E23CP	Steel,Concrete Composite Structures	To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.		✓						✓				
	17255L24P	Core practical(Software Lab – Finite Element Analysis-ANSYS)	This course covers the theory and applications related to Earthquake Engineering. The broad subjects discussed in this course include earthquake response of linearly elastic and inelastic buildings, structural dynamics in building codes.			✓					✓		✓		
	172TECWRP	Technical writing / Seminars	To impart knowledge to analyze solve, design and Civil Engineering drawings using FEA - ANSYS						✓	✓		✓			
	17255CRMP	Research Methodology	Understanding research questions and tools		✓										
			Experience in scientific writings		✓						✓		✓		
			Practice in various aspects of scientific publications	✓				✓							

Sem	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10
	17255CBRP	Participation in Bounded Research	Inculcation of research ethics					✓					
			Hands on exposure to problem solving tools in contemporary research		✓				✓		✓		
			Evolution of research intuitiveness and orientation						✓		✓		
III	17255H31P	Structural Dynamics	Emphasis is placed on static problems with linear material and small deformation. Many basic 2-D problems (such as plane strain and plane stress) and 3-D problems.				✓		✓		✓		
	17255H32P	Maintenance and Rehabilitation of Structures	This course covers the methods for analyzing the stresses and deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading.				✓						
	17255E33AP	Prestressed Concrete Structures	Introduction to the governmental quality assurance regulations for public works. Application of quality control concepts, statistical experimental design principles to the construction process to minimize project costs and improve quality.		✓		✓		✓		✓		
	17255E33BP	High Rise Structures	This course introduces students to the fundamental principles of pre-stressed concrete behavior and design, So that they can act effectively to optimize existing forms of construction and apply fundamental concepts with confidence in unusual and challenging situations.	✓			✓		✓				
	17255E33CP	Computer Aided Structural Design	This course covers the design criteria and loading pattern on high rise structures, behavior of structural systems and stability, design and analysis of tall buildings.	✓				✓		✓			
	17255CSR	Design / Socio - Technical Project	Development of critical thinking and synergistic research approach.	✓				✓	✓		✓		
IV	17255H41P	Advanced Concrete Structural Design	The finite element method is the most powerful structural analysis tool for the Civil Engineers. The basic formulation and programming technique are introduced. According to the same procedures, the different elements such as truss, beam, plate and shell are easily formulated.	✓				✓		✓			
	17255H42P	Advanced Steel Structures	Familiarity with cutting edge research trends		✓			✓		✓			
	17255E43AP	Optimization in Structural Design	This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.	✓	✓								
	17255E43BP	Design of industrial structures	At the end of this course the student shall be able to design someof the strctures used in industries.			✓	✓	✓		✓			

Sem	Course Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11
	17255E43CP	Elements of earthquake Engineering	Students will be trained to identify, formulate and solve complicated problem.	✓	✓									
			Students will be able to understand the role of natural calamity in the damage of structures.				✓	✓						
			Students will be able to develop the skill to analyse data and to apply the same in the practical problems.				✓	✓		✓		✓		
			Students will be able to apply the developed methodologies for the safe and stable design of structures.					✓	✓					
	17255P44P	Project Work Phase-I	This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.		✓									
			Sensitization of social needs for innovation		✓			✓						
			Team work towards interdisciplinary synchronous research strategy								✓			
V	17255E51AP	Experimental Stress Analysis	Introduction to steel structure, tensioned member, compressed member, beam, design of beam and column, bolt jointing, welding jointing and other joint design.	✓										
	17255E51BP	Soil Structure Interaction	At the end of the semester students can learn about the strain gauges, strain rosetters, model analysis, calibration of photo elastic materials.	✓			✓							
	17255E51CP	Aseismic Design of structures								✓		✓		
	17255E52AP	Prefabricated Structures	This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.						✓					
	17255E52BP	Disaster Resistant Structures	This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.				✓			✓		✓		
	17255E52CP	Non Linear Analysis of Structures	This course deals the philosophy of the design of disaster resistant structures such as dams , bridges and emphasize about the rehabilitation , retrofitting and damage assessment of structures.	✓			✓			✓		✓		
	17255E53AP	Offshore Structures	This course deals about the non – linearities, non-linear equations and non linear static analysis of plates, columns, trusses and frames							✓				
	17255E53BP	Stability of Structures	This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures .	✓										

S.No	Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10
	17255E53CP	Mechanics of Composite Materials	This course deals with the concept and characteristics of stability problems and behavior of torsional buckling and lateral buckling in beams and columns.			✓				✓		✓	
VI	17255P61P	Project Work Phase-II	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	✓		✓			✓		✓	✓	

SCHOOL OF ENGINEERING

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
B.TECH - FULL TIME (UG - 2017)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
17147S11	COMMUNICATIVE ENGLISH	Read articles of a general kind in magazines and newspapers.
		Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
		Comprehend conversations and short talks delivered in English
		Write short essays of a general kind and personal letters and emails in English.
17148S12	ENGINEERING MATHEMATICS – I	Use both the limit definition and rules of differentiation to differentiate functions.
		Apply differentiation to solve maxima and minima problems.
		Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
		Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
		Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

Code	Course	Course Outcomes
		Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
		Apply various techniques in solving differential equations.
17149S13	ENGINEERING PHYSICS	the students will gain knowledge on the basics of properties of matter and its applications,
		the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
		the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
		the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and
		the students will understand the basics of crystals, their structures and different crystal growth techniques.
17149S14	ENGINEERING CHEMISTRY	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
17154S15	ENGINEERING GRAPHICS	familiarize with the fundamentals and standards of Engineering graphics
		perform freehand sketching of basic geometrical constructions and multiple views of objects.
		project orthographic projections of lines and plane surfaces.
		draw projections and solids and development of surfaces.
		visualize and to project isometric and perspective sections of simple solids.
17150S16	PROBLEM SOLVING AND PYTHON PROGRAMMING	Develop algorithmic solutions to simple computational problems
		Read, write, execute by hand simple Python programs.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Structure simple Python programs for solving problems.
		Decompose a Python program into functions.
		Represent compound data using Python lists, tuples, dictionaries.
		Read and write data from/to files in Python Programs.
17150L17	**PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY**	Write, test, and debug simple Python programs.
		Implement Python programs with conditionals and loops.
		Develop Python programs step-wise by defining functions and calling them.
		Use Python lists, tuples, dictionaries for representing compound data.
		Read and write data from/to files in Python.
17150L18	**PHYSICS AND CHEMISTRY LABORATORY**	apply principles of elasticity, optics and thermal properties for engineering applications.
17147S21	**TECHNICAL ENGLISH**	Read technical texts and write area- specific texts effortlessly.
		Listen and comprehend lectures and talks in their area of specialisation successfully.
		Speak appropriately and effectively in varied formal and informal contexts.
		Write reports and winning job applications.
17148S22	**ENGINEERING MATHEMATICS – II**	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
		Gradient, divergence and curl of a vector point function and related identities.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
		Analytic functions, conformal mapping and complex integration.
		Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
17149S23B	PHYSICS FOR ELECTRONICS ENGINEERING	gain knowledge on classical and quantum electron theories, and energy band structuues,
		acquire knowledge on basics of semiconductor physics and its applications in various devices,
		get knowledge on magnetic and dielectric properties of materials,
		have the necessary understanding on the functioning of optical materials for optoelectronics,
		understand the basics of quantum structures and their applications in spintronics and carbon electronics.
17149S24A	ENVIRONMENTAL SCIENCE AND ENGINEERING	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
		Public awareness of environmental is at infant stage.
		Ignorance and incomplete knowledge has lead to misconceptions
		Development and improvement in std. of living has lead to serious environmental disasters
17153S25C	CIRCUIT THEORY	Ability to analyse electrical circuits
		Ability to apply circuit theorems
		Ability to analyse transients
17154S26C	BASIC CIVIL AND MECHANICAL ENGINEERING	appreciate the Civil and Mechanical Engineering components of Projects.
		explain the usage of construction material and proper selection of construction materials.
		measure distances and area by surveying
		identify the components used in power plant cycle.
		demonstrate working principles of petrol and diesel engine.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		elaborate the components of refrigeration and Air conditioning cycle.
17154L27	EngineeringPracticesLaboratory	fabricate carpentry components and pipe connections including plumbing works.
		use welding equipments to join the structures.
		Carry out the basic machining operations
		Make the models using sheet metal works
		Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings
		Carry out basic home electrical works and appliances
		Measure the electrical quantities
		Elaborate on the components, gates, soldering practices.
17153L28C	ELECTRIC CIRCUITS LABORATORY	Understand and apply circuit theorems and concepts in engineering applications.
		Simulate electric circuits.
17149S31C	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	Understand how to solve the given standard partial differential equations.
		Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
		Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
		Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
		Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
17153C32	DIGITAL LOGIC CIRCUITS	Ability to design combinational and sequential Circuits.
		Ability to simulate using software package.
		Ability to study various number systems and simplify the logical expressions using Boolean functions
		Ability to design various synchronous and asynchronous circuits.
		Ability to introduce asynchronous sequential circuits and PLDs
		Ability to introduce digital simulation for development of application oriented logic circuits.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

17153C33	ELECTROMAGNETIC THEORY	Ability to understand the basic mathematical concepts related to electromagnetic vector fields.
		Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.
		Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.
		Ability to understand the different methods of emf generation and Maxwell's equations
		Ability to understand the basic concepts electromagnetic waves and characterizing parameters
		Ability to understand and compute Electromagnetic fields and apply them for design and analysis of electrical equipment and systems
17153C34	ELECTRICAL MACHINES – I	Ability to analyze the magnetic-circuits.
		Ability to acquire the knowledge in constructional details of transformers.
		Ability to understand the concepts of electromechanical energy conversion.
		Ability to acquire the knowledge in working principles of DC Generator.
		Ability to acquire the knowledge in working principles of DC Motor
		Ability to acquire the knowledge in various losses taking place in D.C. Machines
17153C35	ELECTRON DEVICES AND CIRCUITS	Explain the structure and working operation of basic electronic devices.
		Able to identify and differentiate both active and passive elements
		Analyze the characteristics of different electronic devices such as diodes and transistors
		Choose and adapt the required components to construct an amplifier circuit.
		Employ the acquired knowledge in design and analysis of oscillators
17153C36	POWER PLANT ENGINEERING	Explain the layout, construction and working of the components inside a thermal power plant.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
		Explain the layout, construction and working of the components inside nuclear power plants.
		Explain the layout, construction and working of the components inside Renewable energy power plants
		Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.
17153L37	ELECTRONICS LABORATORY	Ability to understand and analyse electronic circuits.
17153L38	ELECTRICAL MACHINES LABORATORY-I	Ability to understand and analyze DC Generator
		Ability to understand and analyze DC Motor
		Ability to understand and analyse Transformers.
17149C41C	NUMERICAL METHODS	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
		Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
		Apply the numerical techniques of differentiation and integration for engineering problems.
		Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations
		Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
17153C42	ELECTRICAL MACHINES – II	Ability to understand the construction and working principle of Synchronous Generator
		Ability to understand MMF curves and armature windings.
		Ability to acquire knowledge on Synchronous motor.
		Ability to understand the construction and working principle of Three phase Induction Motor

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Ability to understand the construction and working principle of Special Machines
		Ability to predetermine the performance characteristics of Synchronous Machines.
17153C43	**TRANSMISSION AND DISTRIBUTION**	To understand the importance and the functioning of transmission line parameters.
		To understand the concepts of Lines and Insulators.
		To acquire knowledge on the performance of Transmission lines.
		To acquire knowledge on Underground Cabilitys
		To become familiar with the function of different components used in Transmission and Distribution levels of power system and modelling of these components.
17153C44	**MEASUREMENTS AND INSTRUMENTATION**	To acquire knowledge on Basic functional elements of instrumentation
		To understand the concepts of Fundamentals of electrical and electronic instruments
		Ability to compare between various measurement techniques
		To acquire knowledge on Various storage and display devices
		To understand the concepts Various transducers and the data acquisition systems
		Ability to model and analyze electrical and electronic Instruments and understand the operational features of display Devices and Data Acquisition System.
17153C45	**LINEAR INTEGRATED CIRCUITS AND APPLICATIONS**	Ability to acquire knowledge in IC fabrication procedure
		Ability to analyze the characteristics of Op-Amp
		To understand the importance of Signal analysis using Op-amp based circuits.
		Functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits.
		To understand and acquire knowledge on the Applications of Op-amp
		Ability to understand and analyse, linear integrated circuits their Fabrication and Application.
17153C46	**CONTROL SYSTEMS**	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Ability to do time domain and frequency domain analysis of various models of linear system
		Ability to interpret characteristics of the system to develop mathematical model.
		Ability to design appropriate compensator for the given specifications.
		Ability to come out with solution for complex control problem
		Ability to understand use of PID controller in closed loop system.
17153L47	**ELECTRICAL MACHINES LABORATORY - II**	Ability to understand and analyze EMF and MMF methods
		Ability to analyze the characteristics of V and Inverted V curves
		Ability to understand the importance of Synchronous machines
		Ability to understand the importance of Induction Machines
		Ability to acquire knowledge on separation of losses
17153L48	**LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY**	Ability to understand and implement Boolean Functions.
		Ability to understand the importance of code conversion
		Ability to Design and implement 4-bit shift registers
		Ability to acquire knowledge on Application of Op-Amp TOTA
		Ability to Design and implement counters using specific counter IC.
17153C51	**POWER SYSTEM ANALYSIS**	Ability to model the power system under steady state operating condition
		Ability to understand and apply iterative techniques for power flow analysis
		Ability to model and carry out short circuit studies on power system
		Ability to model and analyze stability problems in power system
		Ability to acquire knowledge on Fault analysis.
		Ability to model and understand various power system components and carry out power flow, short circuit and stability studies.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

496

17153C52	**MICROPROCESSORS AND MICROCONTROLLERS**	Ability to acquire knowledge in Addressing modes & instruction set of 8085 & 8051.
		Ability to understand the importance of Interfacing
		Ability to explain the architecture of Microprocessor and Microcontroller
		Ability to write the assembly language programme
		Ability to develop the Microprocessor and Microcontroller based applications.
		Ability to need & use of Interrupt structure 8085 & 8051.
17153C53	**POWER ELECTRONICS**	Ability to analyse AC-AC and DC-DC and DC-AC converters.
		Ability to choose the converters for real time applications.
17154FE54 A	**RENEWABLE ENERGY SYSTEMS**	Ability to create awareness about renewable Energy Sources and technologies.
		Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.
		Ability to recognize current and possible future role of renewable energy sources.
		Ability to explain the various renewable energy resources and technologies and their applications.
		Ability to understand basics about biomass energy.
		Ability to acquire knowledge about solar energy.
17153C55	**DIGITAL SIGNAL PROCESSING**	Ability to understand the importance of Fourier transform, digital filters and DS Processors.
		Ability to acquire knowledge on Signals and systems & their mathematical representation
		Ability to understand and analyze the discrete time systems.
		Ability to analyze the transformation techniques & their computation.
		Ability to analyze the transformation techniques & their computation.
		Ability to acquire knowledge on programmability digital signal processor & quantization effects.
17153C56	**OBJECT ORIENTED PROGRAMMING**	Develop Java programs using OOP principles
		Develop Java programs with the concepts inheritance and interfaces

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Build Java applications using exceptions and I/O streams
		Develop Java applications with threads and generics classes
		Develop interactive Java programs using swings
17153L57	**CONTROL AND INSTRUMENTATION LABORATORY**	Ability to understand control theory and apply them to electrical engineering problems.
		Ability to analyze the various types of converters
		Ability to design compensators
		Ability to understand the basic concepts of bridge networks.
		Ability to the basics of signal conditioning circuits
		Ability to study the simulation packages.
17153L58	**OBJECT ORIENTED PROGRAMMING LABORATORY**	Develop and implement Java programs with arraylist, exception handling and multithreading .
		Design applications using file processing, generic programming and event handling.
17153L59	**PROFESSIONAL COMMUNICATION**	Make effective presentations
		Participate confidently in Group Discussions
		Attend job interviews and be successful in them
		Develop adequate Soft Skills required for the workplace
17153C61	**SOLID STATE DRIVES**	Ability to understand and suggest a converter for solid state drive.
		Ability to select suitability drive for the given application
		Ability to study about the steady state operation and transient dynamics of a motor load system.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Ability to analyze the operation of the converter/chopper fed dc drive
		Ability to analyze the operation and performance of AC motor drives
		Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive.
17153C62	**PROTECTION AND SWITCHGEAR**	Ability to understand and analyze Electromagnetic and Static Relays.
		Ability to suggest suitability circuit breaker
		Ability to find the causes of abnormal operating conditions of the apparatus and system.
		Ability to analyze the characteristics and functions of relays and protection schemes
		Ability to study about the apparatus protection, static and numerical relays.
		Ability to acquire knowledge on functioning of circuit breaker
17153C63	**EMBEDDED SYSTEMS**	Ability to understand and analyze Embedded systems.
		Ability to suggest an embedded system for a given application.
		Ability to operate various Embedded Development Strategies
		Ability to study about the bus Communication in processors.
		Ability to acquire knowledge on various processor scheduling algorithms.
		Ability to understand basics of Real time operating system.
17153E64E	**MODERN POWER CONVERTERS**	Ability to suggest converters for AC-DC conversion and SMPS
17153E65C	**POWER QUALITY**	Ability to understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.
		Ability to analyze the causes & Mitigation techniques of various PQ events.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Ability to study about the various Active & Passive power filters.
		Ability to understand the concepts about Voltage and current distortions, harmonics.
		Ability to analyze and design the passive filters.
		Ability to acquire knowledge on compensation techniques.
		Ability to acquire knowledge on DVR.
17153L66	POWER ELECTRONICS AND DRIVES LABORATORY	Ability to practice and understand converter and inverter circuits and apply software for engineering problems
		Ability to experiment about switching characteristics various switches
		Ability to analyze about AC to DC converter circuits
		Ability to analyze about DC to AC circuits.
		Ability to acquire knowledge on AC to AC converters
		Ability to acquire knowledge on simulation software
17153L67	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	Ability to understand and apply computing platform and software for engineering problems
		Ability to programming logics for code conversion.
		Ability to acquire knowledge on A/D and D/A
		Ability to understand basics of serial communication
		Ability to understand and impart knowledge in DC and AC motor interfacing
		Ability to understand basics of software simulators.
17153MP68	MINI PROJECT	On Completion of the mini project work students will be in a position to take up their final year project work and find solution by formulating proper methodology.
17153C71	HIGH VOLTAGE ENGINEERING	Ability to understand Transients in power system
		Ability to understand Generation and measurement of high voltage
		Ability to understand High voltage testing.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Ability to understand various types of over voltages in power system
		Ability to measure over voltages.
		Ability to test power apparatus and insulation coordination
17153C72	POWER SYSTEM OPERATION AND CONTROL	Ability to understand the day-to-day operation of electric power system.
		Ability to analyze the control actions to be implemented on the system to meet the minute to-minute variation of system demand.
		Ability to understand the significance of power system operation and control.
		Ability to acquire knowledge on real power-frequency interaction
		Ability to understand the reactive power-voltage interaction.
		Ability to design SCADA and its application for real time operation
17153C73	RENEWABLE ENERGY SYSTEMS	Ability to create awareness about renewable Energy Sources and technologies.
		Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.
		Ability to recognize current and possible future role of renewable energy sources.
		Ability to explain the various renewable energy resources and technologies and their applications.
		Ability to understand basics about biomass energy
		Ability to acquire knowledge about solar energy.
17154FE74 B	TESTING OF MATERIALS	Identify suitable testing technique to inspect industrial component
		ability to use the different technique and know its application and limitation
17153E75A	DISASTER MANAGEMENT	Differentiate the types of disasters, causes and their impact on environment and society
		Assess vulnerability and various methods of risk reduction measures as well as mitigation.
		Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

17153E76F	**TOTAL QUALITY MANAGEMENT**	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
17153L77	**POWER SYSTEM SIMULATION LABORATORY**	Ability to understand power system planning and operational studies.
		Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks
		Ability to analyze the power flow using GS and NR method
		Ability to find Symmetric and Unsymmetrical fault
		Ability to understand the economic dispatch
		Ability to analyze the electromagnetic transients.
17153L78	**RENEWABLE ENERGY SYSTEMS LABORATORY**	Ability to understand and analyze Renewable energy systems.
		Ability to train the students in Renewable Energy Sources and technologies.
		Ability to provide adequate inputs on a variety of issues in harnessing Renewable Energy.
		Ability to simulate the various Renewable energy sources.
		Ability to recognize current and possible future role of Renewable energy sources
		Ability to understand basics of Intelligent Controllers.
17153E81G	**PRINCIPLES OF MANAGEMENT**	Upon completion of the course, students will be ability to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management
17153E82F	**BIOMEDICAL INSTRUMENTATION**	Ability to understand the philosophy of the heart, lung, blood circulation and respiration system.
		Ability to provide latest ideas on devices of non-electrical devices.
		Ability to gain knowledge on various sensing and measurement devices of electrical origin.
		Ability to understand the analysis systems of various organ types.
		Ability to bring out the important and modern methods of imaging techniques and their analysis.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
		Ability to explain the medical assistance/techniques, robotic and therapeutic equipments.
17153P81	PROJECTWORK	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH - PART TIME (UG - 2017)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
17148S11P	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	Understand how to solve the given standard partial differential equations.
		Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
		Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
		Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
		Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
17153H12P	CONTROL SYSTEM	To understand the methods of representation of systems and getting their transfer function models
		To provide adequate knowledge in the time response of systems and steady state error analysis
		To give basic knowledge is obtaining the open loop and closed–loop frequency responses of systems
		To understand the concept of stability of control system and methods of stability analysis
		To study the three ways of designing compensation for a control system
17153H13P	CIRCUIT ANALYSIS AND NETWORKS	To study about various network theorems and the method of application to analyse a circuit.
		To know the concept of transfer function of a network and the nature of response to external inputs

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		To synthesize a network in different forms from the transfer function.
		To know the concept and design of frequency selective filters.
17153H14P	ELECTRONIC CIRCUITS	To acquaint the students with construction, theory and characteristics of the following electronic devices
		Bipolar transistor, Field Effect transistor, Multivibrators, Power control/regulator devices, Feedback amplifiers and oscillators
17153H15P	ELECTRICAL MACHINES – I	To introduce the concept of rotating machines and the principle of electromechanical energy conversion in single and multiple excited systems.
		To understand the generation of D.C. voltages by using different type of generators and study their performance.
		To study the working principles of D.C. motors and their load characteristics, starting and methods of speed control.
		To familiarize with the constructional details of different type of transformers, working principle and their performance.
		To estimate the various losses taking place in D.C. machines and transformers and to study the different testing method to arrive at their performance.
17148S21P	NUMERICAL METHODS	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
		Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
		Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
		Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications
17150S22P	COMPUTER ARCHITECTURE	Computer arithmetic and logic unit design.
		Input and output organizations and interfacing.
		Control Mechanism and CPU functioning.
		Pipeline architecture and vector processing.
		Various memories and their organization.
17153H23P	ELECTRICAL MACHINES-II	Construction and performance of salient and non – salient type synchronous generators.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Principle of operation and performance of synchronous motor.
		Construction, principle of operation and performance of induction machines.
		Starting and speed control of three-phase induction motors.
		Construction, principle of operation and performance of single phase induction motors and special machines.
17153H24P	DIGITAL ELECTRONICS	To study various number systems and to simplify the mathematical expressions using Boolean functions simple problems.
		To study implementation of combinational circuits
		To study the design of various synchronous and asynchronous circuits.
		To expose the students to various memory devices.
17153H25P	TRANSMISSION AND DISTRIBUTION	To develop expression for computation of fundamental parameters of lines.
		To categorize the lines into different classes and develop equivalent circuits for these classes.
		To analyze the voltage distribution in insulator strings and cables and methods to improve the same.
17148S31P	PROBABILITY AND STATISTICS	To develop expression for computation of fundamental parameters of lines.
		To categorize the lines into different classes and develop equivalent circuits for these classes.
		To analyze the voltage distribution in insulator strings and cables and methods to improve the same.
17152S32P	ANALOG INTEGRATED CIRCUITS	To study the IC fabrication procedure.
		To study characteristics; realize circuits; design for signal analysis using Op-amp Ics.
		To study the applications of Op-amp.
		To study internal functional blocks and the applications of special Ics like Timers, PLL circuits, regulator Circuits, ADCs.
17153H33P	POWER ELECTRONICS	To get an overview of different types of power semiconductor devices and their switching characteristics.
		To understand the operation, characteristics and performance parameters of controlled rectifiers
		To study the operation, switching techniques and basics topologies of DC-DC switching regulators.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

505

		To learn the different modulation techniques of pulse width modulated inverters and to understand harmonic reduction methods.
		To study the operation of AC voltage controller and Matrix converters.
17153H34P	**MEASUREMENTS AND INSTRUMENTATION**	Introduction to general instrument system, error, calibration etc.
		Emphasis is laid on analog and digital techniques used to measure voltage, current, energy and power etc.
		To have an adequate knowledge of comparison methods of measurement.
		Elaborate discussion about storage & display devices.
		Exposure to various transducers and data acquisition system.
17153L35P	**MACHINES LAB**	apply synchronous Motor
		apply Load test on three phase squirrel cage Induction motor
		applySpeed control of three phase slip ring Induction Motor
17153H41P	**PROTECTION AND SWITCHGEAR**	To expose the students to the various faults in power system and learn the various methods of protection scheme.
		To understand the current interruption in Power System and study the various switchgears
17153H42P	**HIGH VOLTAGE DC TRANSMISSION**	To study the performance of converters and modeling of DC line with controllers.
		To study about converter harmonics and its mitigation using active and passive filters
17153H43P	**SOLID STATE DRIVES**	To understand the stable steady-state operation and transient dynamics of a motor- load system.
		To study and analyze the operation of the converter / chopper fed dc drive and to solve simple problems.
		To study and understand the operation of both classical and modern induction motor drives.
		To understand the differences between synchronous motor drive and induction motor drive and to learn the basics of permanent magnet synchronous motor drives.
		To analyze and design the current and speed controllers for a closed loop solid-state d.c motor drive.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

7153E44C P	**BIOMEDICAL INSTRUMENTATION**	To provide an acquaintance of the physiology of the heart, lung, blood circulation and circulation respiration. Methods of different transducers used.
		To introduce the student to the various sensing and measurement devices of electrical origin.
		To provide the latest ideas on devices of non-electrical devices.
		To bring out the important and modern methods of imaging techniques.
		To provide latest knowledge of medical assistance / techniques and therapeutic equipments
17153L45P	**CONTROL SYSTEM & MEASUREMENTS LAB**	To provide a platform for understanding the basic concepts of linear control theory and its application to practical systems and To train the students in the measurement of displacement, resistance, inductance, torque and angle etc., and to give exposure to AC, DC bridges and transient measurement.
17153H51P	**POWER SYSTEM ANALYSIS**	To model steady-state operation of large-scale power systems and to solve the power flow problems using efficient numerical methods suitable for computer simulation.
		To model and analyse power systems under abnormal (fault) conditions.
		To model and analyse the dynamics of power system for small-signal and large signal disturbances and o design the systems for enhancing stability
17153H52P	**POWER QUALITY**	Ability to understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.
		Ability to analyze the causes & Mitigation techniques of various PQ events.
		Ability to study about the various Active & Passive power filters.
		Ability to understand the concepts about Voltage and current distortions, harmonics.
		Ability to analyze and design the passive filters.
		Ability to acquire knowledge on compensation techniques.
		Ability to acquire knowledge on DVR.
17153H53P	**SPECIAL ELECTRICAL MACHINES**	Construction, principle of operation and performance of synchronous reluctance motors.
		Construction, principle of operation and performance of stepping motors.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Construction, principle of operation and performance of switched reluctance motors.
		Construction, principle of operation and performance of permanent magnet brushless D.C. motors.
		Construction, principle of operation and performance of permanent magnet synchronous motors
17158E54A P	ENVIRONMENTAL SCIENCE AND ENGINEERING	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
		Public awareness of environmental is at infant stage.
		Ignorance and incomplete knowledge has lead to misconceptions
17153L55P	POWER ELECTRONICS & DRIVES LAB	Development and improvement in std. of living has lead to serious environmental disasters
17153H61P	UTILIZATION OF ELECTRICAL ENERGY	To ensure that the knowledge acquired is applied in various fields as per his job requirements.
		To orient the subject matter in the proper direction, visits to industrial establishments are recommended in order to familiarize with the new developments in different areas.
17153H62P	SOLID STATE RELAYS	Advantages of Static Relays
		Steady State and Transient Performance of Signal Driving Elements
		Static Relay Circuits for Generator Loss of Field
17153H63P	POWER SYSTEM OPERATION AND CONTROL	To get an overview of system operation and control.
		To understand & model power-frequency dynamics and to design power-frequency controller.
		To understand & model reactive power-voltage interaction and different methods of control for maintaining voltage profile against varying system load.
17160E64A P	PRINCIPLES OF MANAGEMENT	Upon completion of the course, students will be ability to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management
17153L65P	POWER SYSTEMS LAB	To simulate analysis and planning cases for a practical power system

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

17160S71P	TOTAL QUALITY MANAGEMENT	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
17153H72P	ELECTRICAL MACHINE DESIGN	Construction, principle of operation and performance of DC machine.
		Construction, operating Characteristics of single and three phase transformer.
		Design and operating characteristics of Induction motors.
		Construction, principle of operation, Design of synchronous machines and to have knowledge of machine design in CAD
17153H73P	POWER PLANT ENGINEERING	Explain the layout, construction and working of the components inside a thermal power plant.
		Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
		Explain the layout, construction and working of the components inside nuclear power plants.
		Explain the layout, construction and working of the components inside Renewable energy power plants
		Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.
17153E74A P	POWER SYSTEM TRANSIENTS	To study the generation of switching transients and their control using circuit – theoretical concept.
		To study the mechanism of lighting strokes and the production of lighting surges.
		To study the propagation, reflection and refraction of travelling waves.
		To study the impact of voltage transients caused by faults, circuit breaker action, load rejection on integrated power system.
17153P75P	PROJECTWORK	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

M.TECH(POWER SYSTEM) - FULL TIME (UG - 2017)

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
17248S11D	APPLIED MATHEMATICS FOR ELECTRICAL &ELECTRONICS ENGINEERING	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems
		Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations
		Illustrate Laplace transform and its application in different fields
		Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations
		Use Z-transform and its applications to solve difference equations
17272H12	SYSTEM THEORY	Basics of linear theory/linear algebra
		State-space models, Transition matrix properties, Minimal realization, Controllability, Observability.
		Internal Stability, Lyapunov Stability theorems for linear systems, Linear Feedback and Observers, Separation Principle.
17272H13	POWER SYSTEM MODELLING AND ANALYSIS	To review Deep concepts of Power System in the field of Power System.
		To address the underlying concepts and methods behind Advanced Power System
		To impart knowledge of advancement in the field of power system with insight experimental approach.
17272H14	ECONOMIC OPERATIONS OF POWER SYSTEMS-I	This course also introduces optimization methods and their application in practical power system operation problems.
		This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.
		The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

17272H15	HIGH VOLTAGE DIRECT CURRENT TRANSMISSION SYSTEM	In early invention of electric energy, dc power was used but due to limitations of low voltage dc systems, ac systems become popular.
		the factors such as are reactive power, stability, power control, etc, impose limitations on the amount of power to be transmitted over ac lines.
		There are still several limitations of HVDC transmission. Therefore, the transmission system is mixed of HVAC and HVDC systems
17272L17	POWER SYSTEM SIMULATION LABORATORY – I	Formation of Y bus, Z bus, line parameters and modeling of transmission lines.
		Power flow analysis: Gauss – Seidel Method.
		Power flow analysis: Newton Raphson method.
		Plain Decoupled and Fast Decoupled methods.
17272H21	EHV POWER TRANSMISSION	Students would be introduced to the issues in designing power transmission lines operating at EHV/UHV voltages especially about insulation design, corona losses, audible noise , insulation co-ordination, electric field under the lines, issues due to mechanical vibrations of overhead power transmission lines and their mitigation etc.
17272H22	ECONOMIC OPERATIONS OF POWER SYSTEMS-II	This course also introduces optimization methods and their application in practical power system operation problems.
		This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.
		The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.
17272H23	POWER SYSTEM PROTECTION	Discuss performance of protective relays, components of protection scheme and relay terminology over current protection.
		Explain the working of distance relays and the effects of arc resistance, power swings, line length and source impedance on performance of distance relays.
		Discuss pilot protection, construction, operating principles and performance ofdifferential relays and discuss protection of generators, motors, transformer and Bus Zone Protection.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Explain the construction and operation of different types of circuit breakers.
		Outline features of fuse, causes of overvoltages and its protection, also modern trends in Power System Protection.
17272E24B	POWER SYSTEM PLANNING AND RELIABILITY	Discuss primary components of power system planning, planning methodology for optimum power system expansion, various types of generation, transmission and distribution.
		Show knowledge of forecasting of future load requirements of both demand and energy by deterministic and statistical techniques using forecasting tools.
		Discuss methods to mobilize resources to meet the investment requirement for the power sector
		Understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions
		Discuss expansion of power generation and planning for system energy in the country, evaluation of operating states of transmission system, their associated contingencies and the stability of the system.
		Discuss principles of distribution planning, supply rules, network development and the system studies
		Discuss reliability criteria for generation, transmission, distribution and reliability evaluation and analysis, grid reliability, voltage disturbances and their remedies
		Discuss planning and implementation of electric – utility activities, market principles and the norms framed by CERC for online trading and exchange in the interstate power market.
17272E25A	WIND ENERGY CONVERSION SYSTEMS	Explain the basics of solar energy conversion systems.
		Design a standalone PV system.
		Describe different wind energy conversion systems.
17272L26	POWER SYSTEM SIMULATION LAB – II	To provide better understanding of power system analysis through digital simulation.
17272H31	ELECTRICAL TRANSIENTS IN POWER SYSTEMS	A quantitative foundation of the mechanism of lighting strokes and the production of lighting surges to understand how the various types of Transients in the system produced.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		Obtain the theoretic basis of the propagation, reflection and refraction of travelling waves for modeling of transmission line travelling waves
		Grasp the concepts of the impact of voltage transients caused by circuit breaker action, switching on integrated power system.
		Design of Insulations under the presence of transients and protection of power system against transient over voltages.
17272E32A	POWER ELECTRONICS APPLICATIONS IN POWER SYSTEMS	To understand basic power electronic devices and their role in power conversion
		· To study basic topologies of various converter
17272E33A	POWER CONDITIONING	Reliably identify the sources of various power quality problems.
		Explain about causes of harmonic and its distortion effect.
		Estimate the impact of various power quality problems on appliances.
		Educate the harmful effects of poor power quality and harmonics.
		Decide the compensators and filters to keep the power quality indices within the standards.
17272E34A	SOFTWARE FOR CONTROL SYSTEM DESIGN	Used for problem-solving and control system design
		Used for modeling plant dynamics, designing control algorithms, and running closed-loop simulations
17272P35	PROJECT WORK PHASE-I	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.
17272P44	PROJECT WORK PHASE-II	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

M.TECH (POWER SYSTEM) - PART TIME (UG - 2017)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
17248S11DP	APPLIED MATHEMATICS FOR ELECTRICAL &	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

	LECTRONICS ENGINEERING	Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations
		Illustrate Laplace transform and its application in different fields
		Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations
		Use Z-transform and its applications to solve difference equations
17272H12P	**SYSTEM THEORY**	Basics of linear theory/linear algebra
		State-space models, Transition matrix properties, Minimal realization, Controllability, Observability.
		Internal Stability, Lyapunov Stability theorems for linear systems, Linear Feedback and Observers, Separation Principle.
17272H13P	**POWER SYSTEM MODELLING AND ANALYSIS**	To review Deep concepts of Power System in the field of Power System.
		To address the underlying concepts and methods behind Advanced Power System
		To impart knowledge of advancement in the field of power system with insight experimental approach.
17272L14P	**POWER SYSTEM SIMULATION LAB – I**	Formation of Y bus, Z bus, line parameters and modeling of transmission lines.
		Power flow analysis: Gauss – Seidel Method.
		Power flow analysis: Newton Raphson method.
		Plain Decoupled and Fast Decoupled methods.
17272H21P	**EHV POWER TRANSMISSION**	Students would be introduced to the issues in designing power transmission lines operating at EHV/UHV voltages especially about insulation design, corona losses, audible noise , insulation co-ordination, electric field under the lines, issues due to mechanical vibrations of overhead power transmission lines and their mitigation etc.
17272H22P	**POWER SYSTEM PROTECTION**	Discuss pilot protection, construction, operating principles and performance ofdifferential relays and discuss protection of generators, motors, transformer and Bus Zone Protection.
		Explain the construction and operation of different types of circuit breakers.
		Outline features of fuse, causes of overvoltages and its protection, also modern trends in Power System Protection.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

Code	Course	Course Outcomes
17272E23B P	**POWER SYSTEM PLANNING AND RELIABILITY**	Discuss primary components of power system planning, planning methodology for optimum power system expansion, various types of generation, transmission and distribution.
		Show knowledge of forecasting of future load requirements of both demand and energy by deterministic and statistical techniques using forecasting tools.
		Discuss methods to mobilize resources to meet the investment requirement for the power sector
		Understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions
		Discuss expansion of power generation and planning for system energy in the country, evaluation of operating states of transmission system, their associated contingencies and the stability of the system.
		Discuss principles of distribution planning, supply rules, network development and the system studies
		Discuss reliability criteria for generation, transmission, distribution and reliability evaluation and analysis, grid reliability, voltage disturbances and their remedies
		Discuss planning and implementation of electric – utility activities, market principles and the norms framed by CERC for online trading and exchange in the interstate power market.
17272H31P	**ECONOMIC OPERATIONS OF POWER SYSTEMS-I**	This course also introduces optimization methods and their application in practical power system operation problems.
		This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.
		The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.
17272H32P	**HIGH VOLTAGE DIRECT CURRENT TRANSMISSION SYSTEM**	In early invention of electric energy, dc power was used but due to limitations of low voltage dc systems, ac systems become popular.
		the factors such as are reactive power, stability, power control, etc, impose limitations on the amount of power to be transmitted over ac lines.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

		There are still several limitations of HVDC transmission. Therefore, the transmission system is mixed of HVAC and HVDC systems
17272E33AP	ANALYSIS OF INVERTERS	To provide the electrical circuit concepts behind the different working modes of inverters so as to enable deep understanding of their operation.
		To equip with required skills to derive the criteria for the design of inverters for UPS, drives etc.,
		To analyse and comprehend the various operating modes of different configuration of inverters.
17272L34P	POWER SYSTEM SIMULATION LAB – II	To provide better understanding of power system analysis through digital simulation.
17272H41P	ECONOMIC OPERATIONS OF POWER SYSTEMS-II	This course also introduces optimization methods and their application in practical power system operation problems.
		This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.
		The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.
17272H42P	ELECTRICAL TRANSIENTS IN POWER SYSTEMS	A quantitative foundation of the mechanism of lighting strokes and the production of lighting surges to understand how the various types of Transients in the system produced.
		Obtain the theoretic basis of the propagation, reflection and refraction of travelling waves for modeling of transmission line travelling waves
		Grasp the concepts of the impact of voltage transients caused by circuit breaker action, switching on integrated power system.
		Design of Insulations under the presence of transients and protection of power system against transient over voltages.
17272E43AP	WIND ENERGY CONVERSION SYSTEMS	Explain the basics of solar energy conversion systems.
		Design a standalone PV system.
		Describe different wind energy conversion systems.
17272P44P	PROJECT WORK PHASE-I	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

516

Code	Course	Outcomes
17272E53A P	**SOFTWARE FOR CONTROL SYSTEM DESIGN**	Used for problem-solving and control system design
		Used for modeling plant dynamics, designing control algorithms, and running closed-loop simulations
17272E52A P	**POWER CONDITIONING**	Reliably identify the sources of various power quality problems.
		Explain about causes of harmonic and its distortion effect.
		Estimate the impact of various power quality problems on appliances.
		Educate the harmful effects of poor power quality and harmonics.
		Decide the compensators and filters to keep the power quality indices within the standards.
17272E51B P	**POWER SYSTEM DYNAMICS**	This course first introduces a student to power stability problems and the basic concepts of modeling and analysis of dynamical systems.
		Modeling of power system components - generators, transmission lines, excitation and prime mover controllers
		Stability of single machine and multi-machine systems is analyzed using digital simulation and small-signal analysis techniques.
		The impact of stability problems on power system planning, and operation is also brought out.
17272P61P	**PROJECT WORK PHASE-II**	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

LOCAL NEEDS   REGIONAL NEEDS   NATIONAL NEEDS   GLOBAL NEEDS

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH - FULL TIME (UG - 2017)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012
17147S11	COMMUNICATIVE ENGLISH	CO1	Read articles of a general kind in magazines and newspapers.					✓							
		CO2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.										✓		
		CO3	Comprehend conversations and short talks delivered in English									✓			

Subject Code	Subject Name	CO	Course Outcome															
		CO4	Write short essays of a general kind and personal letters and emails in English.											✓				
17148S12	ENGINEERING MATHEMATICS – I	CO1	Use both the limit definition and rules of differentiation to differentiate functions.															✓
		CO2	Apply differentiation to solve maxima and minima problems.		✓													
		CO3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.				✓											
		CO4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.										✓					
		CO5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.													✓		
		CO6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.				✓											
		CO7	Apply various techniques in solving differential equations.															✓
17149S13	ENGINEERING PHYSICS	CO1	the students will gain knowledge on the basics of properties of matter and its applications,						✓								

Code	Subject	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO2	the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,		✓										
		CO3	the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,			✓									
		CO4	the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and		✓									✓	
		CO5	the students will understand the basics of crystals, their structures and different crystal growth techniques.				✓								
17149S14	ENGINEERING CHEMISTRY	CO1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.								✓				
		CO1	familiarize with the fundamentals and standards of Engineering graphics						✓						
17154S15	ENGINEERING GRAPHICS	CO2	perform freehand sketching of basic geometrical constructions and multiple views of objects.		✓										
		CO3	project orthographic projections of lines and plane surfaces.											✓	
		CO4	draw projections and solids and development of surfaces.					✓							

Code	Course	CO	Description	1	2	3	4	5	6	7	8	9	10	11	12
		CO5	visualize and to project isometric and perspective sections of simple solids.			✓									
17150S16	PROBLEM SOLVING AND PYTHON PROGRAMMING	CO1	Develop algorithmic solutions to simple computational problems	✓											
		CO2	Read, write, execute by hand simple Python programs.		✓										
		CO3	Structure simple Python programs for solving problems.								✓				
		CO4	Decompose a Python program into functions.					✓							
		CO5	Represent compound data using Python lists, tuples, dictionaries.									✓			
		CO6	Read and write data from/to files in Python Programs.						✓						
17150L17	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	CO1	Write, test, and debug simple Python programs.												✓
		CO2	Implement Python programs with conditionals and loops.										✓		
		CO3	Develop Python programs step-wise by defining functions and calling them.							✓					
		CO4	Use Python lists, tuples, dictionaries for representing compound data.					✓							
		CO5	Read and write data from/to files in Python.						✓						
17150L18	PHYSICS AND CHEMISTRY LABORATORY	CO1	apply principles of elasticity, optics and thermal properties for engineering applications.		✓										

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
17147S21	**TECHNICAL ENGLISH**	**CO1**	Read technical texts and write area- specific texts effortlessly.													✓
		CO2	Listen and comprehend lectures and talks in their area of specialisation successfully.												✓	
		CO3	Speak appropriately and effectively in varied formal and informal contexts.					✓								
		CO4	Write reports and winning job applications.			✓										
17148S22A	**ENGINEERING MATHEMATICS – II**	**CO1**	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.					✓								✓
		CO2	Gradient, divergence and curl of a vector point function and related identities.											✓		
		CO3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	✓												
		CO4	Analytic functions, conformal mapping and complex integration.													✓
		CO5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.											✓		

Code	Course	CO	Course Outcome															
17149S23B	PHYSICS FOR ELECTRONICS ENGINEERING	CO1	gain knowledge on classical and quantum electron theories, and energy band structuues,						✓									
		CO2	acquire knowledge on basics of semiconductor physics and its applications in various devices,															
		CO3	get knowledge on magnetic and dielectric properties of materials,															✓
		CO4	have the necessary understanding on the functioning of optical materials for optoelectronics,									✓						
		CO5	understand the basics of quantum structures and their applications in spintronics and carbon electronics.	✓														
17149S24A	ENVIRONMENTAL SCIENCE AND ENGINEERING	CO1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.				✓											
		CO2	Public awareness of environmental is at infant stage.	✓														
		CO3	Ignorance and incomplete knowledge has lead to misconceptions												✓			
		CO4	Development and improvement in std. of living has lead to serious environmental disasters												✓			
17153S25C	CIRCUIT THEORY	CO1	Ability to analyse electrical circuits												✓			
		CO2	Ability to apply circuit theorems															
		CO3	Ability to analyse transients								✓							
17154S26C	BASIC CIVIL AND MECHANICAL ENGINEERING	CO1	appreciate the Civil and Mechanical Engineering components of Projects.				✓											
		CO2	explain the usage of construction material and proper selection of construction materials.															

Code	Course	CO	Description	1	2	3	4	5	6	7	8	9	10	11	12
		CO3	measure distances and area by surveying	✓											
		CO4	identify the components used in power plant cycle.				✓								
		CO5	demonstrate working principles of petrol and diesel engine.												✓
		CO6	elaborate the components of refrigeration and Air conditioning cycle.											✓	
17154L27	ENGINEERING PRACTICES LABORATORY	CO1	fabricate carpentry components and pipe connections including plumbing works.										✓		
		CO2	use welding equipments to join the structures.							✓					
		CO3	Carry out the basic machining operations							✓					
		CO4	Make the models using sheet metal works							✓					
		CO5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings											✓	
		CO6	Carry out basic home electrical works and appliances								✓				
		CO7	Measure the electrical quantities						✓						
		CO8	Elaborate on the components, gates, soldering practices.				✓								
17153L28C	ELECTRIC CIRCUITS LABORATORY	CO1	Understand and apply circuit theorems and concepts in engineering applications.	✓											
		CO2	Simulate electric circuits.											✓	
17149S31C	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	CO1	Understand how to solve the given standard partial differential equations.				✓								
		CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.											✓	
		CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.												✓

Course Code	Course Name	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.														✓	
		CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.													✓		
17153C32	DIGITAL LOGIC CIRCUITS	CO1	Ability to design combinational and sequential Circuits.			✓												
		CO2	Ability to simulate using software package.		✓													
		CO3	Ability to study various number systems and simplify the logical expressions using Boolean functions		✓													
		CO4	Ability to design various synchronous and asynchronous circuits.	✓														
		CO5	Ability to introduce asynchronous sequential circuits and PLDs	✓														
		CO6	Ability to introduce digital simulation for development of application oriented logic circuits.	✓														
17153C33	ELECTROMAGNETIC THEORY	CO1	Ability to understand the basic mathematical concepts related to electromagnetic vector fields.					✓										
		CO2	Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.													✓		
		CO3	Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.													✓		
		CO4	Ability to understand the different methods of emf generation and Maxwell's equations													✓		

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
		CO5	Ability to understand the basic concepts electromagnetic waves and characterizing parameters													✓
		CO6	Ability to understand and compute Electromagnetic fields and apply them for design and analysis of electrical equipment and systems	✓												
17153C34	ELECTRICAL MACHINES – I	CO1	Ability to analyze the magnetic-circuits.			✓										
		CO2	Ability to acquire the knowledge in constructional details of transformers.										✓			
		CO3	Ability to understand the concepts of electromechanical energy conversion.											✓		
		CO4	Ability to acquire the knowledge in working principles of DC Generator.			✓										
		CO5	Ability to acquire the knowledge in working principles of DC Motor													✓
		CO6	Ability to acquire the knowledge in various losses taking place in D.C. Machines					✓								
17153C35	ELECTRON DEVICES AND CIRCUITS	CO1	Explain the structure and working operation of basic electronic devices.	✓												
		CO2	Able to identify and differentiate both active and passive elements		✓								□		□	
		CO3	Analyze the characteristics of different electronic devices such as diodes and transistors	✓										✓		
		CO4	Choose and adapt the required components to construct an amplifier circuit.					✓								
		CO5	Employ the acquired knowledge in design and analysis of oscillators								✓					

Course Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
17153C36	POWER PLANT ENGINEERING	CO1	Explain the layout, construction and working of the components inside a thermal power plant.									✓				
		CO2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.			✓										
		CO3	Explain the layout, construction and working of the components inside nuclear power plants.												✓	
		CO4	Explain the layout, construction and working of the components inside Renewable energy power plants							✓						
		CO5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.			✓										
17153L37	ELECTRONICS LABORATORY	CO1	Ability to understand and analyse electronic circuits.	✓												
17153L38	ELECTRICAL MACHINES LABORATORY-I	CO1	Ability to understand and analyze DC Generator		✓											
		CO2	Ability to understand and analyze DC Motor										✓			
		CO3	Ability to understand and analyse Transformers.						✓							
17149C41C	NUMERICAL METHODS	CO1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.											✓		
		CO2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.							✓						
		CO3	Apply the numerical techniques of differentiation and integration for engineering problems.													✓

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
		CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations											✓		
		CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.							✓						
17153C42	ELECTRICAL MACHINES – II	CO1	Ability to understand the construction and working principle of Synchronous Generator				✓									
		CO2	Ability to understand MMF curves and armature windings.						✓							
		CO3	Ability to acquire knowledge on Synchronous motor.	✓												
		CO4	Ability to understand the construction and working principle of Three phase Induction Motor													✓
		CO5	Ability to understand the construction and working principle of Special Machines											✓		
		CO6	Ability to predetermine the performance characteristics of Synchronous Machines.						✓							
17153C43	TRANSMISSION AND DISTRIBUTION	CO1	To understand the importance and the functioning of transmission line parameters.			✓					▢					
		CO2	To understand the concepts of Lines and Insulators.					✓								✓
		CO3	To acquire knowledge on the performance of Transmission lines.										✓			
		CO4	To acquire knowledge on Underground Cabilitys		✓											

Code	Course	CO	Description												
		CO5	To become familiar with the function of different components used in Transmission and Distribution levels of power system and modelling of these components.												✓
17153C44	MEASUREMENTS AND INSTRUMENTATION	CO1	To acquire knowledge on Basic functional elements of instrumentation								✓				
		CO2	To understand the concepts of Fundamentals of electrical and electronic instruments				✓						☐		
		CO3	Ability to compare between various measurement techniques												
		CO4	To acquire knowledge on Various storage and display devices						☐						✓
		CO5	To understand the concepts Various transducers and the data acquisition systems								✓				
		CO6	Ability to model and analyze electrical and electronic Instruments and understand the operational features of display Devices and Data Acquisition System.	✓											☐
17153C45	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	CO1	Ability to acquire knowledge in IC fabrication procedure			✓			☐						
		CO2	Ability to analyze the characteristics of Op-Amp	✓										☐	
		CO3	To understand the importance of Signal analysis using Op-amp based circuits.									✓			
		CO4	Functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits.												
		CO5	To understand and acquire knowledge on the Applications of Op-amp									✓			
		CO6	Ability to understand and analyse, linear integrated circuits their Fabrication and Application.									✓			

529

Code	Subject	CO	Description													
17153C46	**CONTROL SYSTEMS**	**CO1**	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.													
		CO2	Ability to do time domain and frequency domain analysis of various models of linear system								✓					
		CO3	Ability to interpret characteristics of the system to develop mathematical model.					✓								
		CO4	Ability to design appropriate compensator for the given specifications.													
		CO5	Ability to come out with solution for complex control problem	✓							☐					
		CO6	Ability to understand use of PID controller in closed loop system.					✓								
17153L47	**ELECTRICAL MACHINES LABORATORY - II**	**CO1**	Ability to understand and analyze EMF and MMF methods													✓
		CO2	Ability to analyze the characteristics of V and Inverted V curves											✓		
		CO3	Ability to understand the importance of Synchronous machines										✓			
		CO4	Ability to understand the importance of Induction Machines							✓						
		CO5	Ability to acquire knowledge on separation of losses							✓						
17153L48	**LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY**	**CO1**	Ability to understand and implement Boolean Functions.							✓						
		CO2	Ability to understand the importance of code conversion							☐					✓	

Code	Course	CO	Outcome													
		CO3	Ability to Design and implement 4-bit shift registers							□	✓					
		CO4	Ability to acquire knowledge on Application of Op-Amp TOTA						✓	□						
		CO5	Ability to Design and implement counters using specific counter IC.						✓	□						
17153C51	POWER SYSTEM ANALYSIS	CO1	Ability to model the power system under steady state operating condition	✓												
		CO2	Ability to understand and apply iterative techniques for power flow analysis										✓			
		CO3	Ability to model and carry out short circuit studies on power system					✓								
		CO4	Ability to model and analyze stability problems in power system										✓			
		CO5	Ability to acquire knowledge on Fault analysis.												✓	
		CO6	Ability to model and understand various power system components and carry out power flow, short circuit and stability studies.											✓		
17153C52	MICROPROCESSORS AND MICROCONTROLLERS	CO1	Ability to acquire knowledge in Addressing modes & instruction set of 8085 & 8051.								✓					
		CO2	Ability to understand the importance of Interfacing			✓										
		CO3	Ability to explain the architecture of Microprocessor and Microcontroller		✓											
		CO4	Ability to write the assembly language programme		✓											
		CO5	Ability to develop the Microprocessor and Microcontroller based applications.	✓												
		CO6	Ability to need & use of Interrupt structure 8085 & 8051.	✓												
17153C53	POWER ELECTRONICS	CO1	Ability to analyse AC-AC and DC-DC and DC-AC converters.	✓												
		CO2	Ability to choose the converters for real time applications.							□		✓				

531

Course Code	Course Name	CO	Description														
17150FE54A	DATABASE MANAGEMENT SYSTEM	CO1	This course introduces the core principles and techniques required in the design and implementation of database systems.													✓	
		CO2	This introductory application-oriented course covers the relational database systems RDBMS - the predominant system for business, scientific and engineering applications at present.				✓						☐				
		CO3	It includes Entity-Relational model, Normalization, Relational model, Relational algebra, and data access queries as well as an introduction to SQL.														✓
		CO4	. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery						✓				☐				
		CO5	It also provides students with theoretical knowledge and practical skills.	✓										☐			
		CO6	use of databases and database management systems in information technology applications..		✓								☐		☐		
17153C55	DIGITAL SIGNAL PROCESSING	CO1	Ability to understand the importance of Fourier transform, digital filters and DS Processors.	✓											✓	
		CO2	Ability to acquire knowledge on Signals and systems & their mathematical representation				✓									
		CO3	Ability to understand and analyze the discrete time systems.							✓						
		CO4	Ability to analyze the transformation techniques & their computation.						✓							
		CO5	Ability to analyze the transformation techniques & their computation.		✓											
		CO6	Ability to acquire knowledge on programmability digital signal processor & quantization effects.												✓	
17153C56	OBJECT ORIENTED PROGRAMMING	CO1	Develop Java programs using OOP principles					✓								

Code	Subject	CO	Description												
		CO2	Develop Java programs with the concepts inheritance and interfaces			✓									
		CO3	Build Java applications using exceptions and I/O streams	✓											
		CO4	Develop Java applications with threads and generics classes		✓										
		CO5	Develop interactive Java programs using swings										✓		
17153L57	CONTROL AND INSTRUMENTATION LABORATORY	CO1	Ability to understand control theory and apply them to electrical engineering problems.				✓								
		CO2	Ability to analyze the various types of converters										✓		
		CO3	Ability to design compensators						✓						
		CO4	Ability to understand the basic concepts of bridge networks.												✓
		CO5	Ability to the basics of signal conditioning circuits										✓		
		CO6	Ability to study the simulation packages.					✓							
17153L58	OBJECT ORIENTED PROGRAMMING LABORATORY	CO1	Develop and implement Java programs with arraylist, exception handling and multithreading .			✓									
		CO2	Design applications using file processing, generic programming and event handling.					✓							

533

Code	Course	CO	Outcome														
17153L59	**PROFESSIONAL COMMUNICATION**	**CO1**	Make effective presentations		✓												
		CO2	Participate confidently in Group Discussions														✓
		CO3	Attend job interviews and be successful in them												✓		
		CO4	Develop adequate Soft Skills required for the workplace						✓								
17153C61	**SOLID STATE DRIVES**	**CO1**	Ability to understand and suggest a converter for solid state drive.			✓				☐							
		CO2	Ability to select suitability drive for the given application					✓									✓
		CO3	Ability to study about the steady state operation and transient dynamics of a motor load system.										✓				
		CO4	Ability to analyze the operation of the converter/chopper fed dc drive		✓												
		CO5	Ability to analyze the operation and performance of AC motor drives														✓
		CO6	Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive.										✓				
17153C62	**PROTECTION AND SWITCHGEAR**	**CO1**	Ability to understand and analyze Electromagnetic and Static Relays.					✓							☐	

Code	Subject	CO	Outcome													
		CO2	Ability to suggest suitability circuit breaker													
		CO3	Ability to find the causes of abnormal operating conditions of the apparatus and system.					□							✓
		CO4	Ability to analyze the characteristics and functions of relays and protection schemes							✓					
		CO5	Ability to study about the apparatus protection, static and numerical relays.	✓											□
		CO6	Ability to acquire knowledge on functioning of circuit breaker			✓		□							
17153C63	EMBEDDED SYSTEMS	CO1	Ability to understand and analyze Embedded systems.	✓									□		
		CO2	Ability to suggest an embedded system for a given application.							✓					
		CO3	Ability to operate various Embedded Development Strategies												
		CO4	Ability to study about the bus Communication in processors.							✓					
		CO5	Ability to acquire knowledge on various processor scheduling algorithms.							✓					
		CO6	Ability to understand basics of Real time operating system.												
17153E64E	MODERN POWER CONVERTERS	CO1	Ability to suggest converters for AC-DC conversion and SMPS						✓						

Course Code	Course Name	CO	Course Outcome														
17153E65C	POWER QUALITY	CO1	Ability to understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.				✓										
		CO2	Ability to analyze the causes & Mitigation techniques of various PQ events.														
		CO3	Ability to study about the various Active & Passive power filters.	✓							☐						
		CO4	Ability to understand the concepts about Voltage and current distortions, harmonics.				✓										
		CO5	Ability to analyze and design the passive filters.														✓
		CO6	Ability to acquire knowledge on compensation techniques.												✓		
		CO7	Ability to acquire knowledge on DVR.											✓			
17153L66	POWER ELECTRONICS AND DRIVES LABORATORY	CO1	Ability to practice and understand converter and inverter circuits and apply software for engineering problems							✓							
		CO2	Ability to experiment about switching characteristics various switches							✓							
		CO3	Ability to analyze about AC to DC converter circuits							✓							
		CO4	Ability to analyze about DC to AC circuits.							☐						✓	
		CO5	Ability to acquire knowledge on AC to AC converters							☐	✓						
		CO6	Ability to acquire knowledge on simulation software						✓	☐							
17153L67	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	CO1	Ability to understand and apply computing platform and software for engineering problems				✓			☐							
		CO2	Ability to programming logics for code conversion.	✓													
		CO3	Ability to acquire knowledge on A/D and D/A												✓		

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		CO4	Ability to understand basics of serial communication				✓											
		CO5	Ability to understand and impart knowledge in DC and AC motor interfacing													✓		
		CO6	Ability to understand basics of software simulators.															✓
17153MP68	MINI PROJECT	CO1	On Completion of the mini project work students will be in a position to take up their final year project work and find solution by formulating proper methodology.														✓	
17153C71	HIGH VOLTAGE ENGINEERING	CO1	Ability to understand Transients in power system												✓			
		CO2	Ability to understand Generation and measurement of high voltage			✓												
		CO3	Ability to understand High voltage testing.		✓													
		CO4	Ability to understand various types of over voltages in power system		✓													
		CO5	Ability to measure over voltages.	✓														
		CO6	Ability to test power apparatus and insulation coordination	✓														
17153C72		CO1	Ability to understand the day-to-day operation of electric power system.	✓														

Course Code	Course Name	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	POWER SYSTEM OPERATION AND CONTROL	CO2	Ability to analyze the control actions to be implemented on the system to meet the minute to-minute variation of system demand.					✓						▢			
		CO3	Ability to understand the significance of power system operation and control.											✓			
		CO4	Ability to acquire knowledge on real power-frequency interaction										✓				
		CO5	Ability to understand the reactive power-voltage interaction.											✓			
		CO6	Ability to design SCADA and its application for real time operation														✓
17153C73	**RENEWABLE ENERGY SYSTEMS**	CO1	Ability to create awareness about renewable Energy Sources and technologies.	✓													
		CO2	Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.			✓											
		CO3	Ability to recognize current and possible future role of renewable energy sources.							▢		✓					
		CO4	Ability to explain the various renewable energy resources and technologies and their applications.													✓	
		CO5	Ability to understand basics about biomass energy			✓							▢				
		CO6	Ability to acquire knowledge about solar energy.														✓
17154FE74B	**TESTING OF MATERIALS**	CO1	Identify suitable testing technique to inspect industrial component						✓			▢					
		CO2	ability to use the different technique and know its application and limitation	✓									▢				
17153E75A	**DISASTER MANAGEMENT**	CO1	Differentiate the types of disasters, causes and their impact on environment and society		✓								▢		▢		

Code	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.		✓											✓	
	CO3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.					✓									
17153E76F	CO1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.										✓				
17153L77	CO1	Ability to understand power system planning and operational studies.									✓					
	CO2	Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks				✓										
	CO3	Ability to analyze the power flow using GS and NR method													✓	
	CO4	Ability to find Symmetric and Unsymmetrical fault								✓						
	CO5	Ability to understand the economic dispatch				✓										
	CO6	Ability to analyze the electromagnetic transients.	✓													
17153L78	CO1	Ability to understand and analyze Renewable energy systems.		✓												
	CO2	Ability to train the students in Renewable Energy Sources and technologies.										✓				
	CO3	Ability to provide adequate inputs on a variety of issues in harnessing Renewable Energy.							✓							
	CO4	Ability to simulate the various Renewable energy sources.											✓			

Course Code	Course Name	CO	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO5	Ability to recognize current and possible future role of Renewable energy sources						✓						
		CO6	Ability to understand basics of Intelligent Controllers.												✓
17153E81G	PRINCIPLES OF MANAGEMENT	CO1	Upon completion of the course, students will be ability to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management											✓	
17153E82F	BIOMEDICAL INSTRUMENTATION	CO1	Ability to understand the philosophy of the heart, lung, blood circulation and respiration system.								✓				
		CO2	Ability to provide latest ideas on devices of non-electrical devices.				✓								
		CO3	Ability to gain knowledge on various sensing and measurement devices of electrical origin.								✓				
		CO4	Ability to understand the analysis systems of various organ types.		✓										
		CO5	Ability to bring out the important and modern methods of imaging techniques and their analysis.												✓
		CO6	Ability to explain the medical assistance/techniques, robotic and therapeutic equipments.											✓	
17153P81	PROJECTWORK	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.						✓						

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH - PART TIME (UG - 2017)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17148S11P	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	CO1	Understand how to solve the given standard partial differential equations.					✓					□		
		CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.										✓		
		CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.									✓			
		CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.										✓		
		CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.												✓
17153H12P	CONTROL SYSTEM	CO1	To understand the methods of representation of systems and getting their transfer function models		✓										

Code	Course	CO	Course Outcome													
		CO2	To provide adequate knowledge in the time response of systems and steady state error analysis				✓									
		CO3	To give basic knowledge is obtaining the open loop and closed–loop frequency responses of systems							☐		✓				
		CO4	To understand the concept of stability of control system and methods of stability analysis											✓		
		CO5	To study the three ways of designing compensation for a control system				✓					☐				
17153H13P	CIRCUIT ANALYSIS AND NETWORKS	CO1	To study about various network theorems and the method of application to analyse a circuit.													✓
		CO2	To know the concept of transfer function of a network and the nature of response to external inputs						✓			☐				
		CO3	To synthesize a network in different forms from the transfer function.		✓									☐		
		CO4	To know the concept and design of frequency selective filters.			✓						☐			☐	
17153H14P	ELECTRONIC CIRCUITS	CO1	To acquaint the students with construction, theory and characteristics of the following electronic devices		✓									✓		
		CO2	Bipolar transistor, Field Effect transistor, Multivibrators, Power control/regulator devices, Feedback amplifiers and oscillators					✓								
17153H15P	ELECTRICAL MACHINES – I	CO1	To introduce the concept of rotating machines and the principle of electromechanical energy conversion in single and multiple excited systems.								✓					

Course Code	Course Name	CO	Description	1	2	3	4	5	6	7	8	9	10	11	12
		CO2	To understand the generation of D.C. voltages by using different type of generators and study their performance.						✓						
		CO3	To study the working principles of D.C. motors and their load characteristics, starting and methods of speed control.			✓									
		CO4	To familiarize with the constructional details of different type of transformers, working principle and their performance.											✓	
		CO5	To estimate the various losses taking place in D.C. machines and transformers and to study the different testing method to arrive at their performance.						✓						
17148S21P	NUMERICAL METHODS	CO1	Apply the basic concepts of classifications of design of experiments in the field of agriculture.			✓									
		CO2	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	✓											
		CO3	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.		✓										
		CO4	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications							✓					
17150S22P	COMPUTER ARCHITECTURE	CO1	Computer arithmetic and logic unit design.					✓							
		CO2	Input and output organizations and interfacing.										✓		
		CO3	Control Mechanism and CPU functioning.						✓						
		CO4	Pipeline architecture and vector processing.												✓
		CO5	Various memories and their organization.											✓	

543

Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
17153H23P	ELECTRICAL MACHINES-II	CO1	Construction and performance of salient and non – salient type synchronous generators.							✓					
		CO2	Principle of operation and performance of synchronous motor.				✓								
		CO3	Construction, principle of operation and performance of induction machines.						✓						
		CO4	Starting and speed control of three-phase induction motors.	✓											
		CO5	Construction, principle of operation and performance of single phase induction motors and special machines.												✓
17153H24P	DIGITAL ELECTRONICS	CO1	To study various number systems and to simplify the mathematical expressions using Boolean functions simple problems.										✓		
		CO2	To study implementation of combinational circuits						✓						
		CO3	To study the design of various synchronous and asynchronous circuits.			✓			☐						
		CO4	To expose the students to various memory devices.					✓							✓
17153H25P	TRANSMISSION AND DISTRIBUTION	CO1	To develop expression for computation of fundamental parameters of lines.									✓			
		CO2	To categorize the lines into different classes and develop equivalent circuits for these classes.	✓											
		CO3	To analyze the voltage distribution in insulator strings and cables and methods to improve the same.												✓
17148S31P	PROBABILITY AND STATISTICS	CO1	To develop expression for computation of fundamental parameters of lines.									✓			
		CO2	To categorize the lines into different classes and develop equivalent circuits for these classes.					✓						☐	
		CO3	To analyze the voltage distribution in insulator strings and cables and methods to improve the same.												
17152S32P		CO1	To study the IC fabrication procedure.						☐						✓

Code	Subject	CO	Description													
	ANALOG INTEGRATED CIRCUITS	**CO2**	To study characteristics; realize circuits; design for signal analysis using Op-amp Ics.									✓				
		CO3	To study the applications of Op-amp.		✓											☐
		CO4	To study internal functional blocks and the applications of special Ics like Timers, PLL circuits, regulator Circuits, ADCs.					✓		☐						
17153H33P	**POWER ELECTRONICS**	**CO1**	To get an overview of different types of power semiconductor devices and their switching characteristics.		✓										☐	
		CO2	To understand the operation, characteristics and performance parameters of controlled rectifiers									✓				
		CO3	To study the operation, switching techniques and basics topologies of DC-DC switching regulators.													
		CO4	To learn the different modulation techniques of pulse width modulated inverters and to understand harmonic reduction methods.									✓				
		CO5	To study the operation of AC voltage controller and Matrix converters.									✓				
17153H34P	**MEASUREMENTS AND INSTRUMENTATION**	**CO1**	Introduction to general instrument system, error, calibration etc.													
		CO2	Emphasis is laid on analog and digital techniques used to measure voltage, current, energy and power etc.							✓						
		CO3	To have an adequate knowledge of comparison methods of measurement.				✓									
		CO4	Elaborate discussion about storage & display devices.													
		CO5	Exposure to various transducers and data acquisition system.	✓						☐						
17153L35P	**MACHINES LAB**	**CO1**	apply synchronous Motor				✓									
		CO2	apply Load test on three phase squirrel cage Induction motor													✓

Code	Course	CO	Outcome												
		CO3	applySpeed control of three phase slip ring Induction Motor										✓		
17153H41P	PROTECTION AND SWITCHGEAR	CO1	To expose the students to the various faults in power system and learn the various methods of protection scheme.									✓			
		CO2	To understand the current interruption in Power System and study the various switchgears					✓							
17153H42P	HIGH VOLTAGE DC TRANSMISSION	CO1	To study the performance of converters and modeling of DC line with controllers.					✓							
		CO2	To study about converter harmonics and its mitigation using active and passive filters					✓							
17153H43P	SOLID STATE DRIVES	CO1	To understand the stable steady-state operation and transient dynamics of a motor- load system.					☐						✓	
		CO2	To study and analyze the operation of the converter / chopper fed dc drive and to solve simple problems.					☐	✓						
		CO3	To study and understand the operation of both classical and modern induction motor drives.				✓	☐							
		CO4	To understand the differences between synchronous motor drive and induction motor drive and to learn the basics of permanent magnet synchronous motor drives.				✓	☐							
		CO5	To analyze and design the current and speed controllers for a closed loop solid-state d.c motor drive.	✓											
7153E44CP	BIOMEDICAL INSTRUMENTATION	CO1	To provide an acquaintance of the physiology of the heart, lung, blood circulation and circulation respiration. Methods of different transducers used.										✓		

546

Code	Course	CO	Description	1	2	3	4	5	6	7	8	9	10	11	12	13
		CO2	To introduce the student to the various sensing and measurement devices of electrical origin.				✓									
		CO3	To provide the latest ideas on devices of non-electrical devices.											✓		
		CO4	To bring out the important and modern methods of imaging techniques.													✓
		CO5	To provide latest knowledge of medical assistance / techniques and therapeutic equipments												✓	
17153L45P	CONTROL SYSTEM & MEASUREMENTS LAB	CO1	To provide a platform for understanding the basic concepts of linear control theory and its application to practical systems and To train the students in the measurement of displacement, resistance, inductance, torque and angle etc., and to give exposure to AC, DC bridges and transient measurement.										✓			
17153H51P	POWER SYSTEM ANALYSIS	CO1	To model steady-state operation of large-scale power systems and to solve the power flow problems using efficient numerical methods suitable for computer simulation.			✓										
		CO2	To model and analyse power systems under abnormal (fault) conditions.		✓											
		CO3	To model and analyse the dynamics of power system for small-signal and large signal disturbances and o design the systems for enhancing stability		✓											
17153H52P	POWER QUALITY	CO1	Ability to understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.	✓												
		CO2	Ability to analyze the causes & Mitigation techniques of various PQ events.	✓												

Code	Course	CO	Outcome	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
		CO3	Ability to study about the various Active & Passive power filters.	✓											
		CO4	Ability to understand the concepts about Voltage and current distortions, harmonics.					✓					☐		
		CO5	Ability to analyze and design the passive filters.										✓		
		CO6	Ability to acquire knowledge on compensation techniques.									✓			
		CO7	Ability to acquire knowledge on DVR.										✓		
17153H53P	SPECIAL ELECTRICAL MACHINES	CO1	Construction, principle of operation and performance of synchronous reluctance motors.												✓
		CO2	Construction, principle of operation and performance of stepping motors.		✓										
		CO3	Construction, principle of operation and performance of switched reluctance motors.				✓								
		CO4	Construction, principle of operation and performance of permanent magnet brushless D.C. motors.							☐		✓			
		CO5	Construction, principle of operation and performance of permanent magnet synchronous motors											✓	
17158E54AP	ENVIRONMENTAL SCIENCE AND ENGINEERING	CO1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.				✓								
		CO2	Public awareness of environmental is at infant stage.										✓		

Code	Course	CO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO3	Ignorance and incomplete knowledge has lead to misconceptions												✓
17153L55P	POWER ELECTRONICS & DRIVES LAB	CO1	Development and improvement in std. of living has lead to serious environmental disasters									✓			
17153H61P	UTILIZATION OF ELECTRICAL ENERGY	CO1	To ensure that the knowledge acquired is applied in various fields as per his job requirements.				✓								
		CO2	To orient the subject matter in the proper direction, visits to industrial establishments are recommended in order to familiarize with the new developments in different areas.										✓		
17153H62P	SOLID STATE RELAYS	CO1	Advantages of Static Relays												✓
		CO2	Steady State and Transient Performance of Signal Driving Elements											✓	
		CO3	Static Relay Circuits for Generator Loss of Field					✓							
17153H63P	POWER SYSTEM OPERATION AND CONTROL	CO1	To get an overview of system operation and control.			✓									
		CO2	To understand & model power-frequency dynamics and to design power-frequency controller.	✓											
		CO3	To understand & model reactive power-voltage interaction and different methods of control for maintaining voltage profile against varying system load.		✓										
17160E64AP	PRINCIPLES OF MANAGEMENT	CO1	Upon completion of the course, students will be ability to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management									✓			
17153L65P	POWER SYSTEMS LAB	CO1	To simulate analysis and planning cases for a practical power system					✓							

Code	Subject	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13
17160S71P	TOTAL QUALITY MANAGEMENT	CO1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.										✓			
17153H72P	ELECTRICAL MACHINE DESIGN	CO1	Construction, principle of operation and performance of DC machine.						✓							
		CO2	Construction, operating Characteristics of single and three phase transformer.													✓
		CO3	Design and operating characteristics of Induction motors.											✓		
		CO4	Construction, principle of operation, Design of synchronous machines and to have knowledge of machine design in CAD							✓						
17153H73P	POWER PLANT ENGINEERING	CO1	Explain the layout, construction and working of the components inside a thermal power plant.				✓									
		CO2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.						✓							
		CO3	Explain the layout, construction and working of the components inside nuclear power plants.		✓											
		CO4	Explain the layout, construction and working of the components inside Renewable energy power plants													✓
		CO5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.											✓		
17153E74AP	POWER SYSTEM TRANSIENTS	CO1	To study the generation of switching transients and their control using circuit – theoretical concept.						✓							

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO2	To study the mechanism of lighting strokes and the production of lighting surges.		✓										
		CO3	To study the propagation, reflection and refraction of travelling waves.												✓
		CO4	To study the impact of voltage transients caused by faults, circuit breaker action, load rejection on integrated power system.						✓						
17153P75P	PROJECTWORK	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.					✓							

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

M.TECH(POWER SYSTEM) - FULL TIME (UG - 2017)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17248S11D	APPLIED MATHEMATICS FOR ELECTRICAL &ELECTRONICS ENGINEERING	CO1	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems										✓		
		CO2	Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations				✓								
		CO3	Illustrate Laplace transform and its application in different fields										✓		
		CO4	Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations												✓
		CO5	Use Z-transform and its applications to solve difference equations											✓	
17272H12	SYSTEM THEORY	CO1	Basics of linear theory/linear algebra									✓			

Code	Course	CO	Description													
		CO2	State-space models, Transition matrix properties, Minimal realization, Controllability, Observability.			✓										
		CO3	Internal Stability, Lyapunov Stability theorems for linear systems, Linear Feedback and Observers, Separation Principle.		✓											
17272H13	POWER SYSTEM MODELLING AND ANALYSIS	CO1	To review Deep concepts of Power System in the field of Power System.		✓											
		CO2	To address the underlying concepts and methods behind Advanced Power System	✓												
		CO3	To impart knowledge of advancement in the field of power system with insight experimental approach.	✓												
17272H14	ECONOMIC OPERATIONS OF POWER SYSTEMS-I	CO1	This course also introduces optimization methods and their application in practical power system operation problems.	✓												
		CO2	This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.					✓						□		
		CO3	The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.												✓	

Course Code	Course Name	CO	Description	1	2	3	4	5	6	7	8	9	10	11	12
17272H15	HIGH VOLTAGE DIRECT CURRENT TRANSMISSION SYSTEM	CO1	In early invention of electric energy, dc power was used but due to limitations of low voltage dc systems, ac systems become popular.										✓		
		CO2	the factors such as are reactive power, stability, power control, etc, impose limitations on the amount of power to be transmitted over ac lines.											✓	
		CO3	There are still several limitations of HVDC transmission. Therefore, the transmission system is mixed of HVAC and HVDC systems												✓
17272L17	POWER SYSTEM SIMULATION LABORATORY – I	CO1	Formation of Y bus, Z bus, line parameters and modeling of transmission lines.	✓											
		CO2	Power flow analysis: Gauss – Seidel Method.			✓									
		CO3	Power flow analysis: Newton Raphson method.								☐		✓		
		CO4	Plain Decoupled and Fast Decoupled methods.											✓	
17272H21	EHV POWER TRANSMISSION	CO1	Students would be introduced to the issues in designing power transmission lines operating at EHV/UHV voltages especially about insulation design, corona losses, audible noise , insulation co-ordination, electric field under the lines, issues due to mechanical vibrations of overhead power transmission lines and their mitigation etc.			✓					☐				
17272H22	ECONOMIC OPERATIONS OF	CO1	This course also introduces optimization methods and their application in practical power system operation problems.												✓

Code	Course	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
	POWER SYSTEMS-II	**CO2**	This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.						✓			☐			
		CO3	The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.	✓									☐		
17272H23	**POWER SYSTEM PROTECTION**	**CO1**	Discuss performance of protective relays, components of protection scheme and relay terminology over current protection.		✓							☐		☐	
		CO2	Explain the working of distance relays and the effects of arc resistance, power swings, line length and source impedance on performance of distance relays.	✓										✓	
		CO3	Discuss pilot protection, construction, operating principles and performance ofdifferential relays and discuss protection of generators, motors, transformer and Bus Zone Protection.				✓								
		CO4	Explain the construction and operation of different types of circuit breakers.							✓					
		CO5	Outline features of fuse, causes of overvoltages and its protection, also modern trends in Power System Protection.						✓						
17272E24B	**POWER SYSTEM PLANNING AND RELIABILITY**	**CO1**	Discuss primary components of power system planning, planning methodology for optimum power system expansion, various types of generation, transmission and distribution.		✓										

Code	Subject	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO2	Show knowledge of forecasting of future load requirements of both demand and energy by deterministic and statistical techniques using forecasting tools.											✓	
		CO3	Discuss methods to mobilize resources to meet the investment requirement for the power sector						✓						
		CO4	Understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions			✓									
		CO5	Discuss expansion of power generation and planning for system energy in the country, evaluation of operating states of transmission system, their associated contingencies and the stability of the system.	✓											
		CO6	Discuss principles of distribution planning, supply rules, network development and the system studies		✓										
		CO7	Discuss reliability criteria for generation, transmission, distribution and reliability evaluation and analysis, grid reliability, voltage disturbances and their remedies								✓				
		CO8	Discuss planning and implementation of electric –utility activities, market principles and the norms framed by CERC for online trading and exchange in the interstate power market.						✓						
17272E25A	WIND ENERGY CONVERSION SYSTEMS	CO1	Explain the basics of solar energy conversion systems.									✓			
		CO2	Design a standalone PV system.						✓						
		CO3	Describe different wind energy conversion systems.												✓
17272L26	POWER SYSTEM SIMULATION LAB – II	CO1	To provide better understanding of power system analysis through digital simulation.										✓		

555

Course Code	Course Name	CO	Course Outcome															
17272H31	ELECTRICAL TRANSIENTS IN POWER SYSTEMS	CO1	A quantitative foundation of the mechanism of lighting strokes and the production of lighting surges to understand how the various types of Transients in the system produced.							✓								
		CO2	Obtain the theoretic basis of the propagation, reflection and refraction of travelling waves for modeling of transmission line travelling waves				✓											
		CO3	Grasp the concepts of the impact of voltage transients caused by circuit breaker action, switching on integrated power system.						✓									
		CO4	Design of Insulations under the presence of transients and protection of power system against transient over voltages.		✓													
17272E32A	POWER ELECTRONICS APPLICATIONS IN POWER SYSTEMS	CO1	To understand basic power electronic devices and their role in power conversion														✓
		CO2	· To study basic topologies of various converter													✓	
17272E33A	POWER CONDITIONING	CO1	Reliably identify the sources of various power quality problems.						✓								
		CO2	Explain about causes of harmonic and its distortion effect.							✓							
		CO3	Estimate the impact of various power quality problems on appliances.				✓										
		CO4	Educate the harmful effects of poor power quality and harmonics.						✓								
		CO5	Decide the compensators and filters to keep the power quality indices within the standards.		✓												
17272E34A	SOFTWARE FOR CONTROL SYSTEM DESIGN	CO1	Used for problem-solving and control system design						✓								
		CO2	Used for modeling plant dynamics, designing control algorithms, and running closed-loop simulations				✓										

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17272P35	PROJECT WORK PHASE-I	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.							✓					
17272P44	PROJECT WORK PHASE-II	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.		✓										

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

M.TECH (POWER SYSTEM) - PART TIME (UG - 2017)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17248S11DP	APPLIED MATHEMATICS FOR ELECTRICAL & LECTRONICS ENGINEERING	CO1	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems										✓		
		CO2	Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations				✓								
		CO3	Illustrate Laplace transform and its application in different fields										✓		
		CO4	Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations												✓
		CO5	Use Z-transform and its applications to solve difference equations											✓	
17272H12P	SYSTEM THEORY	CO1	Basics of linear theory/linear algebra									✓			
		CO2	State-space models, Transition matrix properties, Minimal realization, Controllability, Observability.			✓									

Code	Course	CO	Description														
		CO3	Internal Stability, Lyapunov Stability theorems for linear systems, Linear Feedback and Observers, Separation Principle.		✓													
17272H13P	POWER SYSTEM MODELLING AND ANALYSIS	CO1	To review Deep concepts of Power System in the field of Power System.		✓													
		CO2	To address the underlying concepts and methods behind Advanced Power System	✓														
		CO3	To impart knowledge of advancement in the field of power system with insight experimental approach.	✓														
17272L14P	POWER SYSTEM SIMULATION LAB – I	CO1	Formation of Y bus, Z bus, line parameters and modeling of transmission lines.	✓														
		CO2	Power flow analysis: Gauss – Seidel Method.					✓						✓			
		CO3	Power flow analysis: Newton Raphson method.											✓			
		CO4	Plain Decoupled and Fast Decoupled methods.									✓					
17272H21P	EHV POWER TRANSMISSION	CO1	Students would be introduced to the issues in designing power transmission lines operating at EHV/UHV voltages especially about insulation design, corona losses, audible noise , insulation co-ordination, electric field under the lines, issues due to mechanical vibrations of overhead power transmission lines and their mitigation etc.											✓			
17272H22P	POWER SYSTEM PROTECTION	CO1	Discuss pilot protection, construction, operating principles and performance ofdifferential relays and discuss protection of generators, motors, transformer and Bus Zone Protection.														✓
		CO2	Explain the construction and operation of different types of circuit breakers.		✓												

Subject Code	Subject Name	CO	Course Outcome												
		CO3	Outline features of fuse, causes of overvoltages and its protection, also modern trends in Power System Protection.				✓								
17272E23BP	POWER SYSTEM PLANNING AND RELIABILITY	CO1	Discuss primary components of power system planning, planning methodology for optimum power system expansion, various types of generation, transmission and distribution.							☐		✓			
		CO2	Show knowledge of forecasting of future load requirements of both demand and energy by deterministic and statistical techniques using forecasting tools.											✓	
		CO3	Discuss methods to mobilize resources to meet the investment requirement for the power sector				✓					☐			
		CO4	Understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions												✓
		CO5	Discuss expansion of power generation and planning for system energy in the country, evaluation of operating states of transmission system, their associated contingencies and the stability of the system.						✓			☐			
		CO6	Discuss principles of distribution planning, supply rules, network development and the system studies	✓									☐		
		CO7	Discuss reliability criteria for generation, transmission, distribution and reliability evaluation and analysis, grid reliability, voltage disturbances and their remedies		✓							☐		☐	
		CO8	Discuss planning and implementation of electric –utility activities, market principles and the norms framed by CERC for online trading and exchange in the interstate power market.	✓										✓	

Course Code	Course Name	CO	Description													
17272H31P	ECONOMIC OPERATIONS OF POWER SYSTEMS-I	CO1	This course also introduces optimization methods and their application in practical power system operation problems.					✓								
		CO2	This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.									✓				
		CO3	The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.								✓					
17272H32P	HIGH VOLTAGE DIRECT CURRENT TRANSMISSION SYSTEM	CO1	In early invention of electric energy, dc power was used but due to limitations of low voltage dc systems, ac systems become popular.			✓										
		CO2	the factors such as are reactive power, stability, power control, etc, impose limitations on the amount of power to be transmitted over ac lines.												✓	
		CO3	There are still several limitations of HVDC transmission. Therefore, the transmission system is mixed of HVAC and HVDC systems							✓						
17272E33AP	ANALYSIS OF INVERTERS	CO1	To provide the electrical circuit concepts behind the different working modes of inverters so as to enable deep understanding of their operation.			✓										
		CO2	To equip with required skills to derive the criteria for the design of inverters for UPS, drives etc.,	✓												
		CO3	To analyse and comprehend the various operating modes of different configuration of inverters.		✓											

Course Code	Course Name	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14
17272L34P	POWER SYSTEM SIMULATION LAB – II	CO1	To provide better understanding of power system analysis through digital simulation.									✓					
17272H41P	ECONOMIC OPERATIONS OF POWER SYSTEMS-II	CO1	This course also introduces optimization methods and their application in practical power system operation problems.					✓									
		CO2	This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.										✓				
		CO3	The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.						✓								
17272H42P	ELECTRICAL TRANSIENTS IN POWER SYSTEMS	CO1	A quantitative foundation of the mechanism of lighting strokes and the production of lighting surges to understand how the various types of Transients in the system produced.														✓
		CO2	Obtain the theoretic basis of the propagation, reflection and refraction of travelling waves for modeling of transmission line travelling waves											✓			
		CO3	Grasp the concepts of the impact of voltage transients caused by circuit breaker action, switching on integrated power system.								✓						
		CO4	Design of Insulations under the presence of transients and protection of power system against transient over voltages.				✓										
17272E43AP	WIND ENERGY CONVERSION SYSTEMS	CO1	Explain the basics of solar energy conversion systems.						✓								
		CO2	Design a standalone PV system.	✓													

Code	Course	CO	Outcome	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
		CO3	Describe different wind energy conversion systems.														✓
17272P44P	PROJECT WORK PHASE-I	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.										✓				
17272E53A P	SOFTWARE FOR CONTROL SYSTEM DESIGN	CO1	Used for problem-solving and control system design						✓								
		CO2	Used for modeling plant dynamics, designing control algorithms, and running closed-loop simulations							✓							
17272E52A P	POWER CONDITIONING	CO1	Reliably identify the sources of various power quality problems.				✓										
		CO2	Explain about causes of harmonic and its distortion effect.						✓								
		CO3	Estimate the impact of various power quality problems on appliances.		✓												
		CO4	Educate the harmful effects of poor power quality and harmonics.							✓							
		CO5	Decide the compensators and filters to keep the power quality indices within the standards.				✓										
17272E51B P	POWER SYSTEM DYNAMICS	CO1	This course first introduces a student to power stability problems and the basic concepts of modeling and analysis of dynamical systems.						✓								
		CO2	Modeling of power system components - generators, transmission lines, excitation and prime mover controllers		✓												
		CO3	Stability of single machine and multi-machine systems is analyzed using digital simulation and small-signal analysis techniques.							✓							

		CO4	The impact of stability problems on power system planning, and operation is also brought out.				✓												
17272P61P	**PROJECT WORK PHASE-II**	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.				✓												

SCHOOL OF COMEMRCE AND MANAGEMENT

DEPARTMENT OF COMMERCE

1.1.1 **-Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) of The Programmes**

LOCAL	
REGIONAL	
NATIONAL	
GLOBAL	

Criterion I – Curricular Aspects

2017

Program Outcomes and Course outcomes of

Department of Commerce

Programme offered:

S.No	Programme Name	PO and CO
1.	B.Com	Yes
2.	B.Com CA	Yes
3	M.Com	Yes

B.COM -17UGCOMGE

B.COM PROGRAMME EDUCATIONAL OBJECTIVES – PEO	
PEO1	To be capable of making a positive contribution to the accountancy in public practices, Govt commerce and industry.
PEO2	To be able to pursue research in their chosen field of marketing, finance and HR.
PEO3	To be able to demonstrate team spirits, skills and values continue to learn and adapt to change throughout their professional career.
PEO4	Possess wide spectrum of managerial skills along with competency building qualities in specific areas of business studies.
PEO5	Excel in contemporary knowledge of business and developing inclination towards lifelong learning.
PEO6	To develop a strong foundation for the students in the different areas of commerce.

PEO7	To develop the skills required for applying the concepts and techniques in the field of Commerce.
PEO8	To build a strong attitude in the minds of students to work efficiently and effectively.
PEO9	To make the students of B.Com to develop entrepreneurship skills.
PEO10	To make the students of B.Com to take the business decisions in an apt manner.
PEO11	To develop the students to work efficiently in different business environment.

B.COM PROGRAMME SPECIFIC OUTCOME-PSO

PSO1	To build a strong foundation of knowledge in different areas of Commerce.
PSO2	To develop the skill of applying concepts and techniques used in Commerce.
PSO3	To develop an attitude for working effectively and efficiently in a business environment.
PSO4	To integrate knowledge, skill and attitude that will sustain an environment of learning and creativity among the students.
PSO5	To expose students about entrepreneurship.
PSO6	To enable a student to be capable of making decisions at personal and professional level.

B.COM PROGRAMME OUTCOME-PO

PO1	Be critical of creative scholars.
PO2	Understanding across a broad range of business and commerce disciplines.
PO3	Have knowledge of applications commerce concepts principles.
PO4	Ethical, social and professional understanding.
PO5	Effective communication.

B.COM COURSES OUTCOME – CO

S.No	Semester	Course Code/Name	Course Outcome
17110 AEC 11	I	Tamil I	➢ Learn the changes occurred in literature since classical period. ➢ Make use of vocabulary systematically. ➢ Understand how to lead one's life realizing the

				modernity and its environment/atmosphere.
17132AEC11	I		Advanced English	➢ Develop vocabulary ➢ Read and comprehend literature ➢ Learn to edit and do proof read
17111AEC 12	I		English – I	➢ Read and comprehend literature ➢ Appreciate poetry and prose ➢ Familiarize students with fiction.
17161SEC 13	I		Basic Accounting	➢ Understanding the fundamental of financial accounting ➢ Develop the modern market economy ➢ Prepare the different kinds of financial statement ➢ Acquire conceptual knowledge of basics of accounting ➢ Identify and analyze the reasons for the difference between cash book and passbook balances ➢ Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP
17161SEC 14	I		Business Environment	➢ The course helped the students to understand the different types of environments which influence a business.
17161AEC 15	I		Marketing	➢ The course helped the students to know the principles and Practices of Marketing Mix and Marketing Research.
17161AEC 16	I		Business Economics	➢ The student learned the basic principles of Economics which help them in making logical business

				decisions.
17120SEC01AL	I	Packages Lab-I		➢ Understand document creation. (MS-WORD)
17111SEC01L	I	Communicative English Lab-I		➢ Understand grammar ➢ Develop listening skill
171INDCONS	I	Indian Constitution		➢ Democratic values and citizenship Training are gained. ➢ Awareness on Fundamental Rights are established. ➢ The functions of union Government and State Government are learnt. ➢ The power and functions of the Judiciary learnt thoroughly. ➢ Appreciation of Democratic Parliamentary Rule islearnt.
17110 AEC 21	II	Tamil-II		➢ Learn the changes occurred in literature since classical period. ➢ Make use of vocabulary systematically. ➢ Understand how to lead one's life realizing the modernity and its environment/atmosphere.
17132AEC21	II	Advanced English-II		➢ Develop vocabulary ➢ Read and comprehend literature ➢ Learn to edit and do proof read
17111AEC 22	II	English – II		➢ Read and comprehend literature ➢ Appreciate poetry and prose ➢ Familiarize students with fiction.
17161SEC 23	II	Business Accounting		➢ The students gained knowledge on accounting mechanism which is necessary for the

			preparation of the business accounting.
17161SEC 24		Ethics in Business	➢ The course helped the students to know the importance of ethical principles in day to day business activities.
17161AEC 25	II	Business Statistics	➢ The course sharpened the analytical skills of the students to the business data effectively.
17161AEC 26	II	Business Organization and Management	➢ The course guided the students to know the fundamentals and the special characteristics of various business organization and Management.
17161RLS27	II	Research Led Seminar	➢ Student-led seminars (SLS) are being used as a teaching-learning method
17120SEC02AL	II	Packages Lab-II	➢ Understand calculation and statement preparation (MS-EXCEL)
17111SEC02L	II	Communicative English Lab - II	➢ Understand grammar ➢ Develop reading skills
17110 AEC 31	III	Tamil-III	➢ Learn the changes occurred in literature since classical period. ➢ Make use of vocabulary systematically. ➢ Understand how to lead one's life realizing the modernity and its environment/atmosphere.
17132AEC31	III	Advanced English-III	➢ Develop vocabulary ➢ Read and comprehend literature ➢ Learn to edit and do proof read

17111AEC 32	III	English – III	➢ Read and comprehend literature ➢ Appreciate poetry and prose ➢ Familiarize students with fiction.
17161SEC 33	III	Cost Accounting	➢ The students gained knowledge on cost ascertainment and cost control.
17161SEC 34	III	Banking Theory Law and Practice	➢ The course helped the students to understand the basic important functions and principles and practices of Banking Theory Law in day to day business.
17161AEC 35	III	Business law For Managers	➢ The course helped ingaining knowledge of basis laws and rules governing the business.
17161AEC 36	III	Essentials of Business Communication	➢ The course helped the students in developing and improving their communicative Skills to sustain in the competitive Business World.
17161RMC37	III	Research Methodology	➢ Ability to carry out independent literature survey corresponding to the specific publication typeand assess basic computational frameworks used in mathematical researches.
17120SEC03AL	III	Packages Lab-III	➢ Understand power point presentation (Slide Presentation)
17111SEC03L	III	Communicative English Lab-III	➢ Understand grammar ➢ Develop speaking and writing skills

17110AEC 41	IV	Tamil – IV	➤ Learn the changes occurred in literature since classical period. ➤ Make use of vocabulary systematically. ➤ Understand how to lead one's life realizing the modernity and its environment/atmosphere.
17132AEC41	IV	Advanced English - IV	➤ Develop vocabulary ➤ Read and comprehend literature ➤ Learn to edit and do proof read
17111AEC 42	IV	English – IV	➤ Read and comprehend literature ➤ Appreciate poetry and prose ➤ Familiarize students with fiction.
17161SEC 43	IV	Corporate Accounting	➤ The course helped the students to familiarize with the basis accounting practices of corporate businesses.
17161SEC 44	IV	Advertising and sales Promotion	➤ The course helped the students to understand the importance of Advertising and Salesmanship in a highly competitive business world.
17161AEC 45	IV	Company Law and Secretarial Practice	➤ To course helped the students to learn the different terminologies in company law and secretarial practice.
17161AEC 46	IV	Office management	➤ The course helped the students to know the importance of Office Management in the present competitive world.
17120SEC04AL	IV	Package Lab – IV	➤ Understand database creation. (MS-ACCESS)
17111SEC04L	IV	Communicative English Lab - IV	➤ Understand grammar ➤ Develop language and

			presentation skills
171ENVTSTU	IV	Environmental studies	➢ Students will be aware of and able to analyze the potential of literature and fine arts to communicate assumptions of value about human relations with the biosphere.
17161SEC51	V	Advanced Corporate Accounting	➢ The course helped the students to gain expert knowledge on advanced corporate accounting.
17161SEC52	V	Financial Management	➢ The students gained rich knowledge on financial decisions making and compositions of different securities in the total capital structure.
17161SEC53	V	Financial Services	➢ This course helped the students to compare and analyze the performance of various financial services available in the financial marketing
17161SEC54	V	Computer Application in Business	➢ The course helped the students to gain knowledge on Computer Application for various business activities.
17161DSC55A (Or) 17161DSC55B	V	Income Tax Law and Practice (Or) Co-Operation Theory	➢ understand the basic elements of Income Tax theory, Law and Practice. ➢ (OR) ➢ Understand the basic principles of co-operation and their applications to the various co-operative organization.
17120SEC05AL	V	Package lab – V	➢ Understand Animation
17111SEC05L	V	Communicative	➢ Develop communicative

		English Lab – V	skills ➢ To get a job
17161BRC56	V	Participation in Bounded Research	➢ Understanding a bounded phenomenon are drawn and when a range of behaviors/profiles, experiences
17161SEC61	VI	Management Accounting	➢ The course helped the students to learn the analyzes and interpretation of financial statements and applications of Marginal costing and Standardcosting techniques.
17161SEC62	VI	Entrepreneurship and Small Business Management	➢ The course helped the students to learn the role of entrepreneurs and small businesses in the economic development of the country.
17161SEC63	VI	Auditing	➢ The course helped the students to learn the principles and practices of auditing of various business organizations.
17161DSC64A (Or) 17161DSC64B	VI	Principles of Insurance (Or) Cooperative Law and practice	➢ The students gained knowledge in insurance principles and practices on life and general insurance. ➢ (OR) ➢ understand all the important legal aspects of co-operative management from ➢ the incorporation stage to the winding up stage.
17161PRW66	VI	Project Work	➢ Students will acquire the ability to make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.

17120SEC06AL	VI	Package Lab – VI	➢ Create a simple animations techniques movie clip and graphic symbols.
17111SEC06L	VI	Communication English Lab - VI	➢ Develop communicative skills ➢ To be a good team worker

B.COM – CURRICULUM MAPPING

Programme Educational Objectives VS Programme Outcome

Programme Outcome-PO Programme Educational Outcome-PEO	PO1	PO2	PO3	PO4	P05
PEO1	*	*			
PEO2		*	*		*
PEO3			*	*	
PEO4				*	
PEO5					*

M.Com

M.COM -17PGCOMGE

M.COM PROGRAMME EDUCATIONAL OBJECTIVES – PEO	
PEO1	To Make plan for the promotion and development of Industry
PEO2	To produce professional Mangers, Accountants and innovative Businessman
PEO3	To act as good manager and have a creative and helpful in problem solving.
PEO4	To develop new ideas and applications to latest information technology and in the business and are able to implement these ideas in practice.
PEO5	To expose students to domestic and international monetary systems
PEO6	To enable students to understand principles & systems of note issue
PEO7	To familiarize with issues relating to conversion of currencies.

	M.COM PROGRAMME SPECIFIC OUTCOME-PSO
PSO1	To inculcate the knowledge of business and the techniques of managing the business with special focus on marketing, Insurance and banking theory law and practices.
PSO2	To impart the knowledge basic accounting principles and the latest¬ application oriented corporate accounting methods.
PSO3	To develop the decision making skill through costing methods and practical¬ application of management accounting principles.
PSO4	To enhance the horizon of knowledge in various field of commerce through¬ advertising and sales promotion, auditing and entrepreneurial development.
PSO5	To enhance the computer literacy and its applicability in business through¬ latest version on tally and e-commerce principles.
PSO6	To create awareness in application oriented research through research for¬ business decisions.
	M.COM PROGRAMME OUTCOME-PO
PO1	To acquaint a student with conventional as well as contemporary areas in the discipline of Commerce.
PO2	To enable a student well versed in national as well as international trends.
PO3	To enable the students for conducting business, accounting and auditing practices, role of regulatory bodies in corporate and financial sectors nature of various financial instruments.
PO4	To provide in-depth understanding of all core areas specifically Advanced Accounting, International Accounting, Management, Security Market Operations and Business Environment, Research Methodology and Tax planning.

Course outcomes (Cos)

M.Com

M.COM COURSES OUTCOME – CO			
S.No	**Semester**	**Course Code/Name**	**Course Outcome**
17261SEC11	I	Marketing research and Consumer Behavior	➢ The course helped the students to understand Marketing Research and Consumer Behaviour.
17261SEC12	I	Human Resource management	➢ The students provided basic knowledge of human resource management and its importance in the working of Organization.
17261SEC13	I	Services Marketing	➢ The course helped the students to identify the different types of services and their marketability.
17261SEC14	I	Advanced Cost Management	➢ The course helped the students to gain expert knowledge in Cost Management.
17261DSC15A (Or) 17261DSC15B	I	Strategic Management (Or) Organizational Behaviour	➢ The course helped the students to gain knowledge incorporate strategy formulation and SWOT analysis. ➢ (OR) ➢ The course helped the students to learn about the Organizational Behaviour in depth.
17261RLS16	I	Research Led Seminar	➢ Student-led seminars (SLS) are being used as a teaching-learning method.
17261SEC21	II	Quantitative Techniques For Decision Making	➢ The course helped the students to understand important quantitative techniques and their applications in solving business problems.
17261SEC22	II	Entrepreneurial Development in India	➢ The course helped the students to identify the current trends in Entrepreneurial Development and the innovation of new products and services through different project appraisal.
17261SEC23	II	Advanced Management	➢ The courses guided the

		Accounting	students in taking vital managerial decisions by using the available tools to the maximum efficiency of the business.
17261DSC24A (Or) 17261DSC24B	II	Corporate Legal Frame Work (Or) Industrial Relations and Labour law	➤ The students are now familiarized with theprinciples of legal and regulatory frame work ofcorporate business. ➤ (OR) ➤ The course helped the students to understand the provisions of labour and Industrial Related laws.
17261RMC25	II	Research Methodology	➤ Ability to develop research questions and the various research strategies, and compile research results in terms of journal manuscripts.
17261BRC26	II	Participation in Bounded Research	➤ Participatory research comprises a range of methodological approaches and techniques, all with the objective of handing power from the researcher to research participants, who are often community members or community-based organizations.
17261SEC31	III	Project Planning and Control	➤ The course helped the students to learn the issues relating to project management and control.
17261SEC32	III	Advanced Corporate Accounting	➤ The course helped the students to gain expert knowledge in Advanced Corporate Accounting.
17261SEC33	III	Investment Management	➤ Students are now aware of the scope of Investment Management and the role of SEBI in regulating securities market.
17261DSC34A (Or)	III	Indian Financial System (Or)	➤ The Course helped the students to understand the overall functioning of Indian

17261DSC34B		International Marketing	financial system. ➢ (OR) ➢ The course helped the students to learn the importance of International Marketing and the ➢ role of exporting assisting Institutions.
17261SRC36	III	Participation in Scaffold Research (Societal Project)	➢ **Practice research skills, including evaluation of sources, paraphrasing and summarizing relevant information, and citation of sources used.**
17261SEC41	IV	Income Tax Law and Tax Planning	➢ The course helped the students to know how to compute Income of an individual under various heads and to reduce the tax burden through idealtax planning schemes.
17261SEC42	IV	International Business	➢ The course helped the students to learn the importance of Global Business and the functioning of Multinational Corporation.
17261SEC43	IV	Co- Operation in India and Abroad	➢ The course helped the students to learn the basic principles of co-operation and their applications in India and Abroad.
17261DSC44A (Or) 17261DSC44B	IV	Information Technology and Computer Applications (Or) International Financial Management	➢ The course helped the students to understand the broad nature of application of Information Technology. ➢ (OR) ➢ The course helped the students to learn the finance function in the international context.
17261PRW45	IV	Project Work	➢ The Master of commerce is comprised of exact coursework followed by a full

			year of research. Courses often include advanced level group projects and/or individual research project.

M.COM – CURRICULUM MAPPING

Programme Educational Objectives VS Programme Outcome

Programme Outcome-POProgramme Educational Outcome-PEO	PO1	PO2	PO3	PO4
PEO1		*	*	
PEO2	*			*
PEO3		*	*	*
PEO4				*

B.COM CA -17UGCOMCA

B.COM CA PROGRAMME EDUCATIONAL OBJECTIVES – PEO	
PEO1	To provide a strong foundation in Accounting, Finance, Business Laws and Taxation to the learners.
PEO2	To Motivate them to pursue Higher Education like M. Com, M.B.A, C.A.
PEO3	To provide sufficient knowledge and skills to learners to seek employment or for managing business organization effectively.
PEO4	To provide essential courses and special guidance to become a successful entrepreneur.
PEO5	To nurture the learners with the intellectual, personal & societal skills for a holistic education.
PEO6	To enable every student to cope up with the latest developments in contemporary, national and global level through effective transaction of the curricular and co-curricular aspects.
PEO7	To impart quality and need based education, to sensitize the students to their

	changing roles in society through awareness raising activities.

B.COM CA PROGRAMME SPECIFIC OUTCOME-PSO	
PSO1	Graduates will gain a strong foundation of knowledge in different areas of Commerce and Computer Application courses.
PSO2	Graduates will be able to do pursue higher education and take-up jobs in the field of Commerce and Computer Applications.
PSO3	To develop an attitude for working effectively and efficiently in a business environment.
B.COM CA PROGRAMME OUTCOME-PO	
PO1	Graduates will be able to develop strong understanding of core Commerce and Computer Application courses.
PO2	Able to take up challenging career options in Commerce and IT sector.
PO3	Motivated to pursue higher education.
PO4	Gain updated knowledge to take up employment.
PO5	Become ethically and socially responsible commerce graduates with computer application knowledge.

Course outcomes (Cos)

B.Com (CA)

B.COM CA COURSE OUTCOME –CO			
S.No	**Semester**	**Course Code/Name**	**Course Outcome**
17110AEC11	I	Tamil -I	➢ Learn the changes occurred in literature since classical period. ➢ Make use of vocabulary systematically. ➢ Understand how to lead one's life realizing the modernity and its environment/atmosphere.

17111AEC11	I	Advanced English -I	➢ Develop vocabulary ➢ Read and comprehend literature ➢ Learn to edit and do proof reading
17111AEC12	I	English I	➢ Read and comprehend literature ➢ Appreciate poetry and prose ➢ Familiarize students with fiction.
17198SEC 13	I	Financial Accounting	➢ The course helped the students the principles and objectives of basic Financial accounting.
17198SEC 14	I	Business Management	➢ This course should be helped the students taking better decision making process.
17198AEC 15	I	Information Technology	➢ This course will be guided to the student business technologies around the world.
17198AEC 16	I	Operating System	➢ Students will be able to: Analyze the structure of OS and basic architectural components involved in OS design.
17120SEC01AL	I	Packages Lab-I	➢ Understand document creation. (MS-WORD)
17111AEC01L	I	Communicative English Lab-I	➢ Understand grammar ➢ Develop listening skill
171INDCONS	I	Indian Constitution	➢ Democratic values and citizenship Training are gained. ➢ Awareness on Fundamental Rights are established. ➢ The functions of union Government and State Government are learnt.

				➤ The power and functions of the Judiciary learnt thoroughly. Appreciation of Democratic Parliamentary Rule is learnt.
17110AEC21	II	Tamil -II		➤ Learn the changes occurred in literature since classical period. ➤ Make use of vocabulary systematically. ➤ Understand how to lead one's life realizing the modernity and its environment/atmosphere.
	II	Advanced English -II		➤ Develop vocabulary ➤ Read and comprehend literature ➤ Learn to edit and do proof read
17111AEC22	II	English II		➤ Read and comprehend literature ➤ Appreciate poetry and prose ➤ Familiarize students with fiction.
17198SEC 23	II	Advertising and Salesmanship		➤ The course helped the students to understand the importance of Advertising and Salesmanship in a highly competitive business world.
17198SEC 24	II	Business Law		➤ Students will demonstrate competent knowledge and understanding of substantive and, to the extent applicable, procedural law related to corporations
17198AEC 25	II	Programming in C		➤ After the completion of this course, the students will be able to develop applications.

17198AEC26L	II	Programming in C Lab	Understanding a functional hierarchical code organization. Ability to define and manage data structures based on problem subject domain
17198RLS27	II	Research Led seminar	➢ Students will be able to new technologies and research skill development.
17120SEC02AL	II	Package lab – II	➢ Understand calculation and statement preparation (MS-EXCEL)
17111SEC02L	II	Communicative English Lab -II	➢ Understand grammar ➢ Develop reading skills
17110AEC31	III	Tamil -III	➢ Learn the changes occurred in literature since classical period. ➢ Make use of vocabulary systematically. ➢ Understand how to lead one's life realizing the modernity and its environment/atmosphere.
17111AEC31	III	Advanced English -III	➢ Develop vocabulary ➢ Read and comprehend literature ➢ Learn to edit and do proof read
17111AEC 32	III	English – III	➢ Read and comprehend literature ➢ Appreciate poetry and prose ➢ Familiarize students with fiction.

17198SEC 33	III	Cost Accounting	➢ The students gained knowledge on cost ascertainment and cost control.
17198SEC 34	III	Banking Theory Law and	➢ The course helped the students to understand the

		Practice	basic important functions and principles and practices of Banking Theory Law in day to day business.
17198AEC 35	III	Programming in C++	➢ Apply C++ features to program design and implementation.
17198AEC 36L	III	Programming in C++ lab	➢ The course is to build students' conceptual and practical skills in building software projects in the C++ programming language to reasonably advanced level.
17198RMC37	III	Research Methodology	➢ Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computational frameworks used in mathematical researches.
17120SEC03AL	III	Package lab – III	➢ Understand power point presentation (Slide Presentation)
17111SEC03L	III	Communicative English Lab – III	➢ Understand grammar ➢ Develop speaking and writing skills
17110AEC 41	IV	Tamil – IV	➢ Learn the changes occurred in literature since classical period. ➢ Make use of vocabulary systematically. ➢ Understand how to lead

				one's life realizing the modernity and its environment/atmosphere.
17132AEC41	IV	Advanced English - IV		➢ Develop vocabulary ➢ Read and comprehend literature ➢ Learn to edit and do proof read
17111AEC 42	IV	English – IV		➢ Read and comprehend literature ➢ Appreciate poetry and prose ➢ Familiarize students with fiction.
17198SEC43	IV	Auditing		➢ This course helped the students that who to calculated financial activities
17198SEC44	IV	Business Statistics		➢ The ability to apply fundamental concepts in exploratory data analysis. Distinguish between different types of data
17198AEC45	IV	Visual Basic Programming		➢ This course will be helped the students understanding on database operations
17198AEC46L	IV	Visual Basic Programming Lab		➢ Visual Basic provides a huge number of graphics tools that students can be used to solve all sorts of problems.
17120SEC04A	IV	Package Lab – IV		➢ Understand database creation. (MS-ACCESS)
17111SEC04L	IV	Communicative English Lab -IV		➢ Understand grammar ➢ Develop language and

				presentation skills
171ENVTSTU	IV	Environmental Studies		➢ Students will be aware of and able to analyze the potential of literature and fine arts to communicate assumptions of value about human relations with the biosphere.
17198SEC51	V	Corporate Accounting		➢
17198SEC52	V	Business Economics		➢ Students learned through this course about economics structure, police and application
17198SEC53	V	Financial Management		➢ This course guided the student's various relationship among the financial movements ➢
17198SEC54	V	Software Engineering		➢ The student would understand the problem; plans; top-down design / stepwise refinement; recognition of similarities between problems leading to adaptation and reuse. ➢
17198DSC55A 17198DSC55B	V	Management Information System Investment Management		➢ Describe managing the digital firm evaluate the role of information system in today's competitive business environment. ➢ Understand the leadership role of management information systems in achieving business competitive advantage through informed decision

			making.
17198BRC56	V	Participation in Bounded Research	➢ Understanding a bounded phenomenon are drawn and when a range of behaviors/profiles, experiences
17120SEC06AL	V	Package Lab – VI	➢ Understand Animation
17111SEC05L	V	Communicative English lab V	➢ Develop communicative skills ➢ To get a job
17198SEC61	VI	Management Accounting	➢ The course helped the students to learn the analyzes and interpretation of financial statements and applications of Marginal costing and Standard costing techniques.
17198SEC62	VI	Income Tax Law and Practice	➢ This study material has been published to aid the students in preparing for the tax laws and practice paper of the CS Executive programme. ➢
17198SEC63	VI	Database Management System	➢ Understand database concept and structures and query language. ➢
17198DSC64A	VI	E- Commerce	➢ Understand and be able to use Assembly Language. ➢ Understand number systems and the ASCII character set as to how they relate to developing and writing Assembly Language programs. ➢ Understand the basic architectural structure, and

			the various hardware components including Input/output, Memory, and Control Systems.
			➢ Understand the purpose of each of the architecture registers.
			➢ Recognize the relationship of high-level programming language constructs to the equivalent Assembly Language instructions.
17198DSC64B		Web Designing	➢ Acquire knowledge about functionalities of world wide web Explore markup languages features and create interactive web pages using them Learn and design Client side validation using scripting languages Acquire knowledge about Open source JavaScript libraries Able to design front end web page and connect to the back end databases.
17198PRW66	VI	Project Work	➢ Students will acquire the ability to make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
17120SEC06AL	VI	Package Lab – VI	➢ Create a simple animations techniques movie clip and graphic symbols.
17111SEC06L	VI	Communicative English lab - VI	➢ Develop communicative skills ➢ To be a good team worker

B.COM CA – CURRICULUM MAPPING
Programme Educational Objectives VS Programme Outcome

Programme Outcome-PO Programme Educational Outcome-PEO	PO1	PO2	PO3	PO4	P05
PEO1	*	*			
PEO2		*	*		*
PEO3			*	*	
PEO4				*	
PEO5					*

.

				POS					
Sem	**Course Code**	**Title of the Course**	**COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**

<table>
<tr><td colspan="10" align="center">B.Com (2017 Regulations)</td></tr>
<tr><td rowspan="2">Sem</td><td rowspan="2">Course Code</td><td rowspan="2">Title of the Course</td><td rowspan="2">COs</td><td colspan="6" align="center">POS</td></tr>
<tr><td>PO1</td><td>PO2</td><td>PO3</td><td>PO4</td><td>PO5</td><td>PO6</td></tr>
<tr><td rowspan="15">I</td><td rowspan="3">17110AEC11</td><td rowspan="3">Tamil-I</td><td>CO:1 Learn the changes occurred in literature since classical period.</td><td>*</td><td>*</td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO:2 Make use of vocabulary systematically.</td><td>*</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO:3Understand how to lead one's life realizing the modernity and its environment/atmosphere.</td><td>*</td><td>*</td><td>*</td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">17111AEC11</td><td rowspan="3">Advanced English-I</td><td>CO:1 Develop vocabulary</td><td>*</td><td>*</td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO:2 Learn to edit and do proof reading</td><td>*</td><td>*</td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO:3Read and comprehend literature</td><td>*</td><td>*</td><td>*</td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">17111AEC12</td><td rowspan="3">English-I</td><td>CO:1 Read and comprehend literature</td><td>*</td><td>*</td><td>*</td><td></td><td></td><td></td></tr>
<tr><td>CO:2 Appreciate poetry and prose</td><td>*</td><td>*</td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO:3 Familiarize students with fiction.</td><td>*</td><td>*</td><td>*</td><td></td><td></td><td></td></tr>
<tr><td rowspan="6">17161SEC13</td><td rowspan="6">Basic Accounting</td><td>CO:1 Understanding the fundamental of financial accounting</td><td></td><td></td><td></td><td>*</td><td>*</td><td>*</td></tr>
<tr><td>CO:2 Develop the modern market economy</td><td></td><td></td><td></td><td>*</td><td>*</td><td></td></tr>
<tr><td>CO:3 prepare the different kinds of financial statement</td><td></td><td></td><td></td><td>*</td><td>*</td><td>*</td></tr>
<tr><td>CO:4 Acquire conceptual knowledge of basics of accounting</td><td></td><td></td><td></td><td>*</td><td>*</td><td></td></tr>
<tr><td>CO:5 Identify and analyze the reasons for the difference between cash book and pass book balances</td><td></td><td></td><td></td><td></td><td>*</td><td>*</td></tr>
<tr><td>CO:6 Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP</td><td></td><td></td><td></td><td>*</td><td>*</td><td>*</td></tr>
</table>

							*	*	
			CO:1 Discuss the supply and demand theory and its impact on insurance				*	*	
			CO:2 outline an how entity operate in the Business environment			*	*		
			CO:3 Explain the legal frame work that regulate the insurance industry					*	*
17161SEC14	Business Environment		CO:4 Understand relationship between environment and business; Applying the environmental analysis techniques in practice						*
			CO:5 Understand Economic, Socio-Cultural and Technological Environment				*		*
			CO:6 Know state policies Economic legislations and Economic reforms laid by the government						
			CO:1 Understand fundamental marketing concepts, theories and principles in areas of marketing policy				*		*
			CO:2 Apply the knowledge, concepts, tools necessary to understand challenges				*	*	*
			CO:3 Understand the marketing concepts and its evolution				*		*
17161AEC15	Marketing		CO:4 Analyze the market based on segmentation, targeting and positioning				*	*	*
			CO:5 Know the consumer behavior and their decision making process				*	*	*
			CO:6 Understand the rural markets and the contemporary issues in marketing				*	*	*
			Co:7 Make decisions on product, price , promotion mix and distribution				*		*
			CO:1 Apply the concept of opportunity cost.				*	*	*
			CO:2 understand the concepts of cost, nature of production and its relationship to Business operations.				*	*	*
17161AEC16	Business Economics		CO:3 Apply Economic theories to business decision				*		*
			CO:4 Use the theoretical concept of demand and supply analysis in practice				*	*	

Code	Course	Course Outcome						
		CO:5 Understand the cost concepts, theories of profit and business cycles				*	*	*
		CO:6 Use different demand forecasting techniques and apply different pricing techniques in business				*		*
		CO:7 Understand the importance of Fiscal policy				*		*
17111SEC01L	Package Lab I (Microsoft office)	CO:1 Recognize when to use each of the Microsoft Office programs to create professional and academic documents.						*
		CO:2 Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.					*	*
		CO: 3Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.					*	*
17111SEC01L	Communicative English Lab-I	CO:1 Learn grammar.	*	*	*			
		CO:2 Enrich vocabulary	*	*	*			
		CO:3 Understand the process of communication	*	*	*			
		CO:4 Develop listening skill	*	*	*			
171INDCONS	Indian Constitution	CO:1 Democratic values and citizenship Training are gained.			*			
		CO:2 Awareness on Fundamental Rights are established			*			
		CO:3 Learn the functions of union and State Governments		*	*			
		CO:4 In the power and functions of the Judiciary		*	*			
		CO:5 Understand the structure and composition of Indian Constitution		*	*			
		Co:6 Understand and analyze federalism in the Indian context		*	*			
		CO:7 Analyze Panchayat Raj institutions as a medium of decentralization		*	*			

Sem	Code	Course	Course Outcome						
II	17110AEC21	Tamil II	CO:1 Know what devotion really is.	*	*				
			CO:2 Know the fruitfulness obtained through devotion.	*	*				
			CO:3 Perceive the progress achieved in the society through devotion.	*		*			
	17111AEC21	Advanced English-II	CO:1 Develop technological skill.	*	*	*			
			CO:2 Able to write in a variety of formats	*	*	*			
			CO:3 Read biographies and develop personality	*	*	*			
	17111AEC22	English-II	CO:1 Appreciate different forms of literature		*	*			
			Co:2 Acquire language skills through literature	*		*			
			Co:3 Broadens the horizon of knowledge	*		*			
	17161SEC23	Business Accounting	CO:1 familiarize the concept of Branch account and its system				*	*	*
			CO:2 understand the Scope of departmental accounting				*	*	
			CO:3 Appreciate the need for negotiable instruments and procedure of accounting for bills honored and dishonored				*	*	
			CO:4 Differentiate Trade bills from Accommodation Bills				*	*	*
			CO:5 Understand the concept of Consignment and learn the accounting treatment of the various aspects of consignment				*	*	
			CO:6 Distinguish Joint Venture and Partnership and to learn the methods of maintaining records under Joint Venture				*	*	
			CO:7 Understand the meaning and features of Non-Profit Organizations				*	*	*
			CO:8 Learn to prepare Receipts & Payment Account, Income & Expenditure Account and Balance Sheet for Non-Profit Organizations				*	*	*
	17161SEC24	Ethics in Business	CO:1 Understand, and evaluate various organizational influences affecting ethical decisions			*	*		
			CO:2 Present and analyze ethical and moral issues			*	*		

594

Code	Course	CO						
		CO:3 Explore ethical theories			*	*		
		CO:4 Use contemporary and classical frameworks to analyze and suggest resolutions to ethical dilemmas.			*	*		
		CO:5 Identify and address common ethical issues that arise for individuals, managers, and organizations.			*	*		
		CO;6 ognize how individual differences and cognitive barriers can influence ethical judgment.			*	*		
		CO:7 Identify and prioritize personal values and apply those to making ethical decisions.			*	*		
17161AEC25	Business Statistics	CO:1 Critically evaluate the underlying assumptions of analysis tools				*	*	
		CO:2 Solve a range of problems using the techniques covered				*	*	
		CO:3 Conduct basic statistical analysis of data.				*	*	
		CO:4 Understand basic statistical concepts such as statistical collection, statistical series, tabular and graphical representation of data				*	*	
		CO:5 Calculate measures of central tendency, dispersion and asymmetry, correlation and regression analysis				*	*	
		CO:6 Choose a statistical method for solving practical problems				*	*	
17161AEC26	Business Organization and Management	CO: 1 Understand the dynamics of marketing in business				*	*	*
		CO:2 ability and confidence to tackle common practical financial problems of business.				*	*	*
		CO:3 Understand the scope of Business, and its importance.				*	*	*
		CO:4 Identify different forms of business organizations viz; Sole Proprietorship, Partnership, Joint Hindu Family Business & Co-operative Organizations.				*	*	

Sem	Code	Course	CO	PO1	PO2	PO3	PO4	PO5	PO6
			CO:5 Understand a Joint Stock Company and various formalities to promote a Company				*	*	
			CO:6 Learn various sources Industrial Financial resources and the means to raise them				*	*	*
	17111SEC02L	Package Lab II (power point)	CO:1. Identify the names and functions of the PowerPoint interface.		*	*			
			CO:2. Create, edit, save, and print presentations.		*	*			
			CO:3. Format presentations.		*	*			
			CO:4. Add a graphic to a presentation.		*	*			
			CO:5. Create and manipulate simple slide shows with outlines and notes.		*	*			
			CO:6. Create slide presentations that include text, graphics, animation, and transitions.		*	*			
	17111SEC02L	Communicative English Lab-II	CO:1 Learn grammar.	*	*	*			
			CO:2 Use a variety of reading strategies	*	*				
			CO:3 Enhance the skill of making grammatically correct sentences.	*	*	*			
			Co:4 Develop listening skill	*	*	*			
	17111RLC27	Research Led seminar	CO:1 Know the emerging areas in research	*	*	*			
			CO:2 learning experiences of students subject to research led teaching			*	*		
			CO:3 The institutional and organisation issues surrounding such learning environments			*	*		
			CO:4 The development of such teaching on the disciplinary (subject-based) requirements of curricula design			*	*		
			CO:5 The opportunity to develop high level transferable skills			*	*		
			CO:6 The possibility of a constructive alignment between the learning, teaching and assessment of the modules			*	*		
III	17110AEC31	Tamil III	CO:1 Achieve one's goal by following the ancestral path		*	*			

Code	Course	Course Outcome						
		CO:2 Learn to lead life of perfection by realizing the uncertainty in the life		*	*			
		CO:3 Attain happiness through honesty		*	*			
17111AEC31	Advanced English-III	CO:1 Understand phonetics.	*	*	*			
		CO:2 Develop writing skill	*	*	*			
		CO:3 Able to develop creative writing	*	*	*			
17111AEC32	English-III	CO:1 Enable to appreciate different types of prose	*	*				
		CO:2 Develop the conversational skills through one-act plays	*					
		CO:3 Enhance the skill of making grammatically correct sentences.	*	*	*			
17161SEC33	Cost Accounting	CO:1 Understand various costing systems and management systems				*	*	*
		CO:2 Analyse and provide recommendations to improve the operations of organisations				*	*	
		CO:3 Imbibe conceptual knowledge of cost accounting.				*	*	
		CO:4 Understand the significance of cost accounting in the modern economic environment				*	*	
		CO:5 Select the costs according to their impact on business				*	*	*
		CO:6 Apply cost accounting methods to evaluate and project business performance				*	*	*
17161SEC34	Banking Theory law and Practices	CO:1 Understanding of Banking Channels and Payments				*	*	
		CO:2 Practices on Banking Technology				*	*	*
		CO:3 Understanding of Core Banking				*	*	*
		CO:4 To gather knowledge on banking and financial system in India				*	*	*
		CO:5 Understand better customer relationship				*	*	*
		CO:6 To create awareness about modern banking services like e-banking, m-banking and internet banking				*	*	*

Course Code	Course Name	Course Outcome						
17161AEC35	Business Law for Managers	CO:1 Explain the concepts in business laws with respect to foreign trade			*	*	*	
		CO:2 Apply the global business laws to current business environment				*	*	
		CO:3 Demonstrate an understanding of the Legal Environment of Business.				*	*	
		CO:4 Communicate effectively using standard business and legal terminology.			*	*	*	
		CO:5 Demonstrate recognition of the requirements of the contract agreement			*	*	*	
		CO:6 Identify contract remedies				*	*	
		CO:7 Understand the various provisions of Company Law			*	*	*	
17161AEC36	Essentials of Business Communication	CO:1 Identify ethical, legal, cultural, and global issues affecting business communication.			*	*		
		CO:2 Utilize analytical and problem solving skills appropriate to business communication.	*		*	*	*	
		Co:3 Effective business writing	*	*	*			
		CO:4 Research approaches and information collection.			*	*		
		CO:5 Developing and delivering effective presentations			*	*		
		CO:6 Effective interpersonal communications	*		*			
		CO:7 Skills that maximise team effectiveness.			*	*		*
		CO:8 Good time management.					*	*
17111RMC37	Research Methodology	CO:1 Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.			*			
		CO:2 familiarize participants with basic of research and the research process.			*	*		
		CO:3 enable the participants in conducting research work and formulating research synopsis and report.			*			

Sem	Code	Course	CO							
			CO:4 Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.			*				
			CO:5 Have basic knowledge on qualitative research techniques			*				
			CO:6 Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis			*				
			CO:7 Have basic awareness of data analysis-and hypothesis testing procedures			*				
	17111SEC03L	Package lab III (Microsoft excel)	CO:1. Indicate the names and functions of the Excel interface components.		*	*				
			CO:2. Enter and edit data.		*					
			CO:3. Format data and cells.		*					
			CO:4. Construct formulas, including the use of built-in functions, and relative and absolute references.		*					
			CO:5. Create and modify charts.		*					
			CO:6. Preview and print worksheets.		*					
	17111SEC03L	Communicative English Lab-III	CO:1 Learn grammar.	*	*	*				
			CO:2 Enhance their fluency in English	*	*	*				
			CO:3 Develop speaking and writing skills	*	*	*				
			CO:4 Develop individual perspectives that demonstrate critical thinking skills	*	*	*				
IV	17110AEC41	Tamil IV	CO:1 Realize how the ancient people changed their life style according to the ages		*	*				
			CO:2 Learn how to change one's lifestyle according to the needs of the future		*	*				
			CO:3 Accept the modern trends and its uses		*	*				
	17111AEC41	Advanced English-IV	CO:1 Develop writing skill.	*	*	*				
			CO:2 Comprehend and describe poems	*	*	*				
			CO:3 Learn interviewing skills	*	*	*				

Course Code	Course Name	Course Outcomes						
17111AEC42	English-IV	CO:1 Improve their ability to read and understand them	*	*	*			
		CO:2 Know the genius of Shakespeare	*	*	*			
		CO:3 Express in writing their views.	*	*	*			
17161SEC43	Partnership Accounting	CO:1 Understand the concept of partnership				*	*	*
		CO:2 Understand the journal entries for the formation of partnership				*	*	*
		CO:3 Familiarize the concept of Branch account and its system				*	*	
		CO:4 Understand the Scope of departmental accounting				*	*	
		CO:5 Introduce the system of Hire Purchasing				*	*	
		CO:6 Understand partnership account from admission to dissolution				*	*	
17161SEC44	Advertising and Sales Promotion	CO:1 Understand the key principles and tools of integrated marketing communication				*	*	
		CO:2 Explain the environmental factors which influence consumer and organizational decision				*	*	*
		CO:3 Identify the elements of the communication process between buyers and sellers in business. making process				*	*	*
		CO:4 Identify the marketing mix components in relation to market segmentation				*	*	
		CO:5 Outline a marketing plan				*	*	
		CO:6 Utilize marketing research techniques to resolve into competitive marketing decisions.				*	*	*
17161AEC45	Company Law and Secretarial Practices	CO:1 Get a basic understanding of different type of meeting of board of directors.				*	*	
		CO:2 Use international trade terms and concepts when communicating.	*		*	*		
		CO:3 Demonstrate comprehensive knowledge and understanding of social and economic policy considerations arising in this area.				*	*	
		CO:4 Understanding of those areas of company law identified in the indicative syllabus above and form				*	*	

Code	Course	Course Outcome						
		a critical judgement on areas of controversy within the topics studied;						
		CO:5 Read and study primary and secondary sources of company law, with minimal staff guidance; critically analyse, interpret, evaluate and synthesise information from a variety of sources				*	*	*
		CO:6 Identify sources for research and further develop a strategy for research using standard and electronic research toolsC				*	*	
17120SEC04A	Packages Lab-IV	CO:1 Examine database concepts and explore the Microsoft Office Access environment.		*				
		CO:2. Design a simple database.		*				
		CO:3. Build a new database with related tables.		*				
		CO:4. Manage the data in a table.		*				
		CO:5. Query a database using different methods.		*				
		CO:6. Design a form.		*				
		CO:7. Generate a report.		*				
		CO:8. Import and export data.		*				
17111SEC04L	Communicative English Lab-IV	CO:1 Learn grammar.	*	*	*			
		CO:2 Enable to express their views in conversation	*	*				
		CO:3 Develop soft skills	*	*				
		CO:4 ce presentation skills	*	*				
171ENVTSTU	Environmental Studies	CO:1 Learn about environmental pollution.		*	*			
		CO:2 Familiarize with the social issues and the environment		*	*			
		CO:3 will be able to do independent research on human interactions with the environment.		*	*			
		CO:4 To recognize the physical, chemical, and biological components of the earth's systems and show how they function		*	*			
		CO:5 Analyze and evaluate ideological and philosophical approaches used to understand environmental relationships.		*	*			

Sem	Course code	Course name	Course Outcome						
			CO:6 Carry out an applied research project in the natural sciences.		*	*			
V	17161SEC51	Corporate accounting	Co:1 Find out how can a company dissolve.				*	*	
			CO:2 Understand Mutual funds investments.				*	*	*
			CO:3 Learn about Working format of companies.				*	*	
			CO:4 Enabling the students to understand the features of Shares and Debentures				*	*	
			CO:5 Develop an understanding about redemption of Shares and Debenture and its type				*	*	*
			CO:6 Exposure to the company final accounts				*	*	*
	17161SEC52	Financial Management	CO:1 Use business finance terms and concepts when communicating.	*				*	*
			CO:2 Demonstrate a basic understanding of financial management.				*	*	*
			CO:3 Provide introduction to Financial Management				*	*	*
			CO:4 Create an awareness about capital structure and theories of capital structure				*	*	
			CO:5 Make them understand the cost of capital in wide aspects				*	*	
			CO:6 Provide knowledge about dividend policies and various dividend models.				*	*	
			CO:7 Enable them to understand working capital management				*	*	
	17161SEC53	Financial Services	CO:1 Forecast a firm's future financing requirements				*	*	*
			CO:2 Design an optimal capital structure.				*	*	
			CO:3 Give an idea about fundamentals of financial services and players in financial sectors				*	*	
			CO:4 Create an awareness about merchant banking, issue management, capital markets and role of SEBI				*	*	
			CO:5 Provide knowledge about leasing and hire purchase concepts				*	*	*

Code	Course Name	Course Outcome					
		CO:6 Make them understand about different types of insurance and IRDA Act.			*	*	
17161AEC54	Computer Application in Business	Co1:Study the development of computers and their components in each stage.					*
		CO2 : Develop an idea of software, programming language and operating system.	*				
		CO3 : Study the concept of developing database and its maintenance using computers in a business Concern			*		*
		CO4 :Analyze the importance of management information system and networking in a business.			*	*	*
		CO5 : Be aware and perform various activities using computers in day to day life.			*	*	*
17161DSC55A	Co-operative law and practices	CO:1 Know about the company law in the India.			*	*	
		CO:2 Understand the use of the memorandum of association and article of association in a company, they also learn from this course			*	*	
		CO:3 Develop Professionals in the filed of Co-operation, Co-operative law and Management.			*	*	
		CO:4 Promote qualified, Skilled and professional manpower to manage the affairs of the Cooperative Institutions.			*	*	*
		CO:5 Enhance the Knowledge base of the in-service Personnel on the subject Co-operation, Co-operative law and Co-operative Management.			*	*	*
		CO:6 Enable the in-service personnel to develop skills on Co-operative Management Techniques			*	*	
17111BRC56	Participation in Bounded Research	CO:1 Do the allotted work in research		*			
		CO:2 Learn to do review of literature		*			
		CO:3 Demonstrate knowledge of research processes		*			
		CO:4 Perform literature reviews using print and online database		*			
		CO:5 Identify, explain, compare, and prepare the key elements of a research proposal/report		*			

Sem	Code	Course	Course Outcomes	1	2	3	4	5	6
			CO:6 Describe sampling methods, measurement scales and instruments, and appropriate uses of each			*			
	171SEC05A	Package lab V	CO:1 work with the Photoshop workspace		*				
			CO:2.Navigate images		*				
			CO:3.Resize and crop images		*				
			CO:4.Make and work with selections		*				
			CO:5.Create new layers and perform other basic layer functions		*				
			CO:6.Transform images		*				
	17111SEC05L	Communicative English Lab-V	CO:1 Develop corporate skills.		*	*			
			CO:2 Handle their day to day affairs well with their knowledge of language skills.	*	*	*			
VI	17161SEC61	Management Accounting	CO:1 Prepare analysis of various special decisions, using relevant costing and benefits				*	*	*
			CO:2 More effective planning and control systems				*	*	
			CO:3 The students thought and knowledge on management Accounting				*	*	
			CO:4 Helps to give proper idea on financial statement analysis in practical point of view				*	*	*
			CO:5 Introduce the concept of fund flow and cash flow statement				*	*	
			CO:6 Provide knowledge about budget control keeping in mind the scope of the concept				*	*	
			CO:7 Develop the know-how and concept of marginal costing with practical problems				*	*	*
	17161SEC62	Entrepreneurship and small Business Management	CO:1 Understand the systematic process to select the business ideas.				*	*	*
			CO:2 Write a business plan		*		*	*	*
			CO:3 Develop students about Entrepreneurship development				*	*	*
			CO:4 Create an awareness on various Entrepreneurship Development Programme				*	*	*

Course Code	Course Title	Course Outcomes						
		CO:5 Enable them to understand project formulation				*	*	*
		CO:6 Familiarize the students with EDP schemes				*	*	*
17161SEC63	Auditing	CO:1 Articulate knowledge of fundamental audit concepts				*	*	
		CO:2 Apply critical thinking skills and slove auditing Problems.				*	*	*
		CO:3 Apply and demonstrate the accounting knowledge and skills in Auditing.				*	*	*
		CO:4 Explain how analytical procedures are used as an audit tool.				*	*	
		CO:5 Illustrate effective internal controls				*	*	
		CO:6 Apply ethical standards to issues in auditing				*	*	
17161DSC64A	Income Tax Law & Practices	CO:1 File IT Return on individuals basis				*	*	*
		CO:2 Compute the total Income and Define tax complicacies and structure.				*	*	*
		CO:3 In order to familiarize the different know-how and heads of income with its components				*	*	*
		CO:4 It helps to build an idea about income from house property as a concept				*	*	*
		CO:5 It give more idea about the income from business or profession				*	*	*
		CO:6 Make the students familiarizes with the concept of depreciation and its provisions				*	*	*
17161DSC64B	Cooperation Theory	CO:1 Greater Social support			*	*	*	
		CO:2 More on-task behaviour				*	*	*
		CO:3 Develop Professionals in the filed of Co-operation, Co-operative law and Management.				*	*	*
		CO:4 Promote qualified, Skilled and professional manpower to manage the affairs of the Cooperative Institutions.				*	*	*
		CO:5 Enhance the Knowledge base of the in-service Personnel on the subject Co-operation, Co-operative law and Co-operative Management.				*	*	*

Code	Course	Course Outcome						
		CO:6 Enable the in-service personnel to develop skills on Co-operative Management Techniques				*	*	*
17161OEC	**Banking Services**	CO:1 To help to gather knowledge on banking and financial system in India						
		CO:2 To provide knowledge about commercial banks and its products				*	*	*
		CO;3 Aim to familiarize banking system in India				*	*	*
		CO:4 To enable them to understand better customer relationship			*	*	*	*
		CO:5 To create awareness about modern banking services like e-banking,m-banking and internet banking, ATM System				*	*	*
		CO:6 To introduce recent trends in banking system				*	*	*
		CO:7 To make the student understand the basic concept of banking and financial institutions and expose various types of risk based by banks				*	*	*
171PRW66	**Project Work**	CO:1 Develop plans with relevant people to achieve the project's goals						
		CO:2 Break work down into tasks and determine handover procedures						
		CO:3 Identify links and dependencies, and schedule to achieve deliverables						
		CO:4 Estimate and cost the human and physical resources required, and make plans to obtain the necessary resources						
		CO:5 Allocate roles with clear lines of responsibility and accountability.						
		CO:6 Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis						
171SBE06L	**Package lab VI**	CO:1. Learn to create animated graphics add sound and interactivity.		*				
		CO:2.Can develop Website		*				
		CO:3.CD based presentations		*				
17111SEC06L		CO:1 Get a job	*	*	*			

				PO1	PO2	PO3	PO4	PO5	PO6	PO7
		Communicative English Lab-VI	**CO:2 Apply study skills**	*	*					
			CO:3 Widen creative thinking	*	*	*				
			CO:4 Be a good team worker	*	*	*				
			CO:5 Make them proficient in English	*	*	*				

B.Com CA (2017 Regulations)										
Sem	**Course Code**	**Title of the Course**	**COs**	**POS**						
				PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
I	**17110AEC11**	**Tamil-I**	**CO:1 Learn the changes occurred in literature since classical period.**	*	*					
			CO:2 Make use of vocabulary systematically.	*	*					
			CO:3 Understand how to lead one's life realizing the modernity and its environment/atmosphere.	*	*					
	17111AEC12	**English-I**	**CO:1 Read and comprehend literature**	*	*					
			CO:2 Appreciate poetry and prose	*	*					
			CO:3 Familiarize students with fiction.	*	*					
	17198SEC13	**Financial Accounting**	**CO:1 Understanding the fundamental of financial accounting**		*	*	*		*	
			CO:2 Develop the modern market economy		*	*	*			
			CO:3 prepare the different kinds of financial statement		*	*	*		*	
			CO:4 Acquire conceptual knowledge of basics of accounting		*	*	*		*	
			CO:5 Identify and analyze the reasons for the difference between cash book and pass book balances		*	*			*	
			CO:6 Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP		*	*			*	

Code	Course	Course Outcomes							
17198SEC14	Business Management	CO:1 Apply conceptual learning skills in today's business environment.		*	*		*		
		CO:2 Analyze financial performance of an organization.		*	*		*		
		CO:3 Evaluate organizational decisions with consideration of the political, legal and ethical aspects of business.		*	*		*		
		CO:4 Understand relationship between environment and business; Applying the environmental analysis techniques in practice		*	*		*		
		CO:5 Assess strengths, weaknesses, opportunities and threats of the business environment.		*	*		*		
		CO:6 Know state policies Economic legislations and Economic reforms laid by the government		*	*		*		
17198AEC15	Information Technology	CO:1 Perform end user support including identifying and implementing solutions to user requests.		*	*		*	*	
		CO:2 Analyze technical requirements to determine resource requirements and the impact the solution will have on an organization.		*	*		*	*	
		CO:3 Design, plan, budget and propose an IT project for an identified need within a specific scope.		*	*		*	*	
		CO:4 Install technical hardware and software including network, database and security components.		*	*		*	*	
		CO:5 Perform routine maintenance to maintain the currency of an operating system, network, database and security needs.		*	*		*	*	
		CO:6 Identify and resolve technical problems using trouble-shooting and research techniques.		*	*		*	*	
		Co:7 Analyze and select application and operating system settings to create an optimal user environment.		*	*		*	*	
17198AEC16	Operating System	CO:1 Describe and explain the fundamental components of a computer operating system.		*	*		*		

				[ABET (a), **(i), (j), (k)] Assessment: Students will take midterm exams, final exams, and homework**					
				CO:2 Describe and explain the fundamental components of a computer operating system. **[ABET (a),** **(i), (j), (k)] Assessment: Students will take midterm exams, final exams, and homework.**	*	*		*	
				CO:3 Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems. [ABET (a), (i), (j), (k)] Assessment: Students will take midterm exams, final exams, and homework.	*	*	*	*	
				CO:4 Describe and extrapolate the interactions among the various components of computing systems. **[ABET (a), (i), (j), (k)] Assessment: Students will take midterm exams, final exams, and homework**	*	*		*	
				CO:5 Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems. [ABET (a), (c), (i), (j), (k)] Assessment: Students will design and implement the above OS components within NACHOS with C++.	*	*	*	*	
				CO:6 Illustrate, construct, compose and design solutions via C/C++ programs, and through NACHOS. **[ABET (a), (c), (i), (j), (k)] Assessment: Students will design and implement the above OS components within NACHOS**	*	*	*	*	
				CO:7 Measure, evaluate, and compare OS components through instrumentation for performance analysis. [ABET (b), (j)] Assessments: (1) Students will run experiments on their own implemented	*	*	*	*	

Sem	Code	Course	Course Outcome							
			OS components and the components provided by NACHOS and (2) Students will perform scientific analysis on the performance of the components and are asked to submit a short paper on their experimental results.							
	17111SEC01L	Communicative English Lab-I	CO:1 Learn grammar.	*	*					
			CO:2 Enrich vocabulary	*	*					
			CO:3 Understand the process of communication	*	*					
			CO:4 Develop listening skill	*	*					
	171INDCONS	Indian Constitution	CO:1 Democratic values and citizenship Training are gained.	*	*					
			CO:2 Awareness on Fundamental Rights are established	*	*					
			CO:3 Learn the functions of union and State Governments	*	*					
			CO:4 In the power and functions of the Judiciary	*	*					
			CO:5 Understand the structure and composition of Indian Constitution	*	*					
			Co:6 Understand and analyse federalism in the Indian contex	*	*					
			CO:7 Analyse Panchayathi Raj institutions as a medium of decentralization	*	*					
II	17110AEC21	Tamil II	CO:1 Know what devotion really is.	*	*					
			CO:2 Know the fruitfulness obtained through devotion.	*	*					
			CO:3 Perceive the progress achieved in the society through devotion.	*	*					
	17111AEC22	English-II	CO:1 Appreciate different forms of literature	*	*					
			Co:2 Acquire language skills through literature	*	*					
			Co:3 Broadens the horizon of knowledge	*	*					
	17198SEC23	Advertising and salemanship	CO:1 familiarize the concept of Advertising		*	*	*		*	
			CO:2 understand the Scope of Advertising		*	*	*		*	
			CO:3 Appreciate the need for Advertising		*	*	*		*	

Course Code	Course Name	Course Outcome						
		CO:4 Importance of Advertising	*	*	*		*	
		CO:5 Understand the concept of advertising management	*	*	*		*	
		CO:6 sales management concept	*	*	*		*	
		CO:7 Understand the meaning and features of Non-Profit Organisations	*	*	*		*	
		CO:8 salesmanagement process	*	*	*		*	
17198SEC24	Business Law	CO:1 Explain the concepts in business laws with respect to foreign trade	*			*		
		CO:2 Apply the global business laws to current business environment	*			*		
		CO:3 Demonstrate an understanding of the Legal Environment of Business.	*			*		
		CO:4 Communicate effectively using standard business and legal terminology.	*			*		
		CO:5 Demonstrate recognition of the requirements of the contract agreement	*			*		
		CO:6 Identify contract remedies	*			*		
		CO:7nderstand the various provisions of Company Law	*			*		
17198AEC25	Programming in C	CO:1 Understanding a functional hierarchical code organization.	*			*	*	
		CO:2Ability to define and manage data structures based on problem subject domain.	*			*	*	
		CO:3 Understanding a concept of object thinking within the framework of functional model.	*			*	*	
		CO:4 Understanding a concept of functional hierarchical code organization.	*			*	*	
		CO:5 • Understand operators, expressions and preprocessors.	*			*	*	
		CO:6 Understand arrays , it's declaration and uses.	*			*	*	
17198AEC26L	Programming in C Lab	CO: 1 Develop their programming skills.	*			*	*	
		CO:2 Declaration of variables and constants	*			*	*	

Code	Course	Course Outcome						
		CO:3 3. Be familiar with programming environment with C Program structure.		*			*	*	
		CO:4 Ability to work with textual information, characters and strings.		*			*	*	
		CO:5Understanding a defensive programming concept. Ability to handle possible errors during program execution		*			*	*	
171_SECO2	Skill based elective(power point)	CO:1. Identify the names and functions of the PowerPoint interface.		*	*		*		
		CO:2. Create, edit, save, and print presentations.		*	*		*		
		CO:3. Format presentations.		*	*		*		
		CO:4. Add a graphic to a presentation.		*	*		*		
		CO:5. Create and manipulate simple slide shows with outlines and notes.		*	*		*		
		CO:6. Create slide presentations that include text, graphics, animation, and transitions.		*	*		*		
17111SEC02L	Communicative English Lab-II	CO:1 Learn grammar.	*	*					
		CO:2 Use a variety of reading strategies	*	*					
		CO:3 Enhance the skill of making grammatically correct sentences.	*	*					
		Co:4 Develop listening skill	*	*					
17198RLC27	Research Led seminar	CO:1 Know the emerging areas in research	*	*					
		CO:2 learning experiences of students subject to research led teaching		*				*	
		CO:3 The institutional and organisation issues surrounding such learning environments		*				*	
		CO:4 The development of such teaching on the disciplinary (subject-based) requirements of curricula design		*				*	
		CO:5 The opportunity to develop high level transferable skills		*				*	
		CO:6 The possibility of a constructive alignment between the learning, teaching and assessment of the modules		*				*	

				PO1	PO2	PO3	PO4	PO5	PO6	PO7
III	**17110AEC31**	**Tamil III**	**CO:1 Achieve one's goal by following the ancestral path**	*	*					
			CO:2 Learn to lead life of perfection by realizing the uncertainty in the life	*	*					
			CO:3 Attain happiness through honesty	*	*					
	17111AEC32	**English-III**	**CO:1 Enable to appreciate different types of prose**	*	*					
			CO:2 Develop the conversational skills through one-act plays	*	*					
			CO:3 Enhance the skill of making grammatically correct sentences.	*	*					
	17198SEC33	**Cost Accounting**	**CO:1 Understand various costing systems and management systems**		*	*			*	
			CO:2 Analyse and provide recommendations to improve the operations of organisations		*	*			*	
			CO:3 Imbibe conceptual knowledge of cost accounting.		*	*			*	
			CO:4 Understand the significance of cost accounting in the modern economic environment		*	*			*	
			CO:5 Select the costs according to their impact on business		*	*			*	
			CO:6 Apply cost accounting methods to evaluate and project business performance		*	*			*	
	17198SEC34	**Banking Theory law and Practices**	**CO:1 Understanding of Banking Channels and Payments**		*	*		*		
			CO:2 Practices on Banking Technology		*	*		*		
			CO:3 Understanding of Core Banking		*	*		*		
			CO:4 To gather knowledge on banking and financial system in India		*	*		*		
			CO:5 Understand better customer relationship		*	*		*		
			CO:6 To create awareness about modern banking services like e-banking, m-banking and internet banking		*	*		*		
	17198AEC35	**Programming in C++**	**CO:1 To know the proper lines of C++, Encapsulation, Inheritance and Polymorphism.**		*		*	*		

Course Code	Course Name	Course Outcomes						
		CO:2 To explain the various data types, operations and functions of C++.	*		*	*		
		CO:3 To know the concept of constructors and destructors.	*		*	*		
		CO:4 To explain the concept of inheritances, types of inheritance and polymorphism, virtual Functions.	*			*		
		CO:5 To explain the types of streams, format and format of input and output operations.	*			*		
		CO:6 To Known the procedural and object oriented paradigmwith concepts of streams, classes, functions, data and objects.	*		*	*		
17198AEC36L	Programming in C++ Lab	CO:1 It provides a clear modular structure for programs which makes it good for defining abstract datatypes in which implementation details are hidden.						
		CO:2 More effort is put into the object-oriented analysis and design, which lowers the overall cost of development.	*		*	*		
		Co:3 Able to understand to write the program by using oops.	*		*	*		
		CO:4 Acquire the knowledge about extending the classes and objects.	*		*	*		
		CO:5 Able to develop the inheritance program.	*		*	*		
17198RMC37	Research Methodology	CO:1 Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.	*				*	
		CO:2 familiarize participants with basic of research and the research process.	*				*	
		CO:3 enable the participants in conducting research work and formulating research synopsis and report.	*				*	
		CO:4 Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.	*				*	

Sem	Course Code	Course Name	Course Outcome						
			CO:5 Have basic knowledge on qualitative research techniques		*				*
			CO:6 Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis		*				*
			CO:7 Have basic awareness of data analysis-and hypothesis testing procedures		*				*
	171_SECO3	Package lab III (Microsoft excel)Skil based elective	CO:1. Indicate the names and functions of the Excel interface components.		*				
			CO:2. Enter and edit data.		*				
			CO:3. Format data and cells.		*				
			CO:4. Construct formulas, including the use of built-in functions, and relative and absolute references.		*	*	*		*
			CO:5. Create and modify charts.		*				
			CO:6. Preview and print worksheets.		*				
	17111SEC03L	Communicative English Lab-III	CO:1 Learn grammar.	*	*				
			CO:2 Enhance their fluency in English	*	*				
			CO:3 Develop speaking and writing skills	*	*				
			CO:4 Develop individual perspectives that demonstrate critical thinking skills	*	*				
IV	17110AEC41	Tamil IV	CO:1 Realize how the ancient people changed their life style according to the ages	*	*				
			CO:2 Learn how to change one's lifestyle according to the needs of the future	*	*				
			CO:3 Accept the modern trends and its uses	*	*				
	17111AEC42	English-IV	CO:1 Improve their ability to read and understand them	*	*				
			CO:2 Know the genius of Shakespeare	*	*				
			CO:3 Express in writing their views.	*	*				
	17198SEC43	Auditing	CO:1 Articulate knowledge of fundamental audit concepts		*	*			*

		CO:2 Apply critical thinking skills and solve auditing Problems.		*	*			*	
		CO:3 Apply and demonstrate the accounting knowledge and skills in Auditing.		*	*			*	
		CO:4 Explain how analytical procedures are used as an audit tool.		*	*			*	
		CO:5 Illustrate effective internal controls		*	*			*	
		CO:6 Apply ethical standards to issues in auditing		*	*			*	
17198SEC44	**Business Statistics**	CO:1 Critically evaluate the underlying assumptions of analysis tools		*				*	
		CO:2 Solve a range of problems using the techniques covered		*				*	
		CO:3 Conduct basic statistical analysis of data.		*				*	
		CO:4 Understand basic statistical concepts such as statistical collection, statistical series, tabular and graphical representation of data		*				*	
		CO:5 Calculate measures of central tendency, dispersion and asymmetry, correlation and regression analysis		*				*	
		CO:6 Choose a statistical method for solving practical problems		*				*	
17198AEC45	**Visual Basic Programming**	CO:1 Students code visual programs by using Visual Basic work environment.		*	*		*		
		CO:2 Distinguish and compose events and methods.		*	*		*		
		CO:3 Distinguish and compose events and methods.		*	*		*		
		CO:4 Recognize and arrange control structures.		*	*		*		
		CO:5 Understand development of applications.		*	*		*		
		CO:6 Identify sources for research and further develop a strategy for research using standard and electronic research toolsC		*	*		*		
17198AEC46		CO:1 Understand an overview of computers and computer programming.		*	*		*		

Code	Course	CO							
	Visual Basic Programming Lab	CO:2 Understand Visual Basic applications.		*	*		*		
		CO:3 Understand how to perform operations and store results.		*	*		*		
		CO:4 Understand the concept of data-driven program execution flow control in Visual Basic programming		*	*		*		
		CO:5 Understand additional Visual Basic controls.		*	*		*		
		CO:6 Understand loops to do repetition.		*	*		*		
171_SECO4	**Packages Lab-IVSkill base elective**	CO:1 Examine database concepts and explore the Microsoft Office Access environment.		*			*		
		CO:2. Design a simple database.		*			*		
		CO:3. Build a new database with related tables.		*			*		
		CO:4. Manage the data in a table.		*			*		
		CO:5. Query a database using different methods.		*			*		
		CO:6. Design a form.		*			*		
		CO:7. Generate a report.		*			*		
		CO:8. Import and export data.		*			*		
17111SEC04L	**Communicative English Lab-IV**	CO:1 Learn grammar.	*	*					
		CO:2 Enable to express their views in conversation	*	*					
		CO:3 Develop soft skills	*	*					
		Co:4 ce presentation skills	*	*					
171ENVTSTU	**Environmental Studies**	CO:1 Learn about environmental pollution.		*			*		
		CO:2 Familiarize with the social issues and the environment		*			*		
		CO:3 will be able to do independent research on human interactions with the environment.		*			*		
		CO:4 To recognize the physical, chemical, and biological components of the earth's systems and show how they function		*			*		
		CO:5 Analyze and evaluate ideological and philosophical approaches used to understand environmental relationships.		*			*		

Sem	Code	Course	CO	1	2	3	4	5	6
			CO:6 Carry out an applied research project in the natural sciences.	*			*		
V	17198SEC51	Corporate accounting	Co:1 Find out how can a company dissolve.	*	*			*	
			CO:2 Understand Mutual funds investments.	*	*			*	
			CO:3 Learn about Working format of companies.	*	*			*	
			CO:4 Enabling the students to understand the features of Shares and Debentures	*	*			*	
			CO:5 Develop an understanding about redemption of Shares and Debenture and its type	*	*			*	
			CO:6 Exposure to the company final accounts	*	*			*	
	17198SEC52	Business Economics	CO:1 Apply the concept of opportunity cost.	*				*	
			CO:2 understand the concepts of cost, nature of production and its relationship to Business operations.	*				*	
			CO:3 Apply Economic theories to business decision	*				*	
			CO:4 Use the theoretical concept of demand and supply analysis in practice	*				*	
			CO:5 Understand the cost concepts, theories of profit and business cycles	*				*	
			CO:6 Use different demand forecasting techniques and apply different pricing techniques in business	*				*	
			CO:7 Understand the importance of Fiscal policy	*				*	
	17198SEC53	Financial Management	CO:1 Use business finance terms and concepts when communicating.	*			*	*	
			CO:2 Demonstrate a basic understanding of financial management.	*			*	*	
			CO:3 Provide introduction to Financial Management	*			*	*	
			CO:4 Create an awareness about capital structure and theories of capital structure	*			*	*	
			CO:5 Make them understand the cost of capital in wide aspects	*			*	*	
			CO:6 Provide knowledge about dividend policies and various dividend models.	*			*	*	

17161AEC54	**Software Engineering**	Co1:To identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		*	*			*	
		CO2 : To apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors		*	*		*		
		CO3 : An ability to communicate effectively with a range of audiences		*	*				
		CO4 :Analyze the importance of management information system and networking in a business.		*	*	*			
		CO5 : Be aware and perform various activities using computers in day to day life.		*	*	*			
17198DSC55A	**Investment Management**	CO:1 The knowledge and skills to select and employ base level tools for financial analysis.		*	*	*			
		CO:2 The knowledge and skills to analyze companies for investment purposes.		*	*	*			
		CO:3 The knowledge and skills to develop portfolio strategies for individual and institutional investors.		*	*	*			
		CO:4 The knowledge and to operate ethically as investment management professionals.		*	*	*			
		CO:5 Understand the various alternatives available for investment.		*	*	*			
		CO:6 Gain knowledge of the various strategies followed by investment practitioners		*	*	*			
17111BRC56	**Participation in Bounded Research**	CO:1 Do the allotted work in research		*				*	
		CO:2 Learn to do review of literature		*				*	
		CO:3 Demonstrate knowledge of research processes		*				*	
		CO:4 Perform literature reviews using print and online database		*				*	

Sem	Code	Course	Course Outcome						
			CO:5 Identify, explain, compare, and prepare the key elements of a research proposal/report		*			*	
			CO:6 Describe sampling methods, measurement scales and instruments, and appropriate uses of each		*	*		*	
	171_SECO5	Package lab V Skill based elective	CO:1 Work with the Photoshop workspace		*	*			
			CO:2.Navigate images		*	*			
			CO:3.Resize and crop images		*	*			
			CO:4. Make and work with selections		*	*			
			CO:5. Create new layers and perform other basic layer functions		*	*			
			CO:6.Transform images		*	*			
	17111SEC05L	Communicative English Lab-V	CO:1 Develop corporate skills.	*	*				
			CO:2 Handle their day to day affairs well with their knowledge of language skills.	*	*				
VI	17161SEC61	Management Accounting	CO:1 Prepare analysis of various special decisions, using relevant costing and benefits		*		*		*
			CO:2 More effective planning and control systems		*		*		*
			CO:3 The students thought and knowledge on management Accounting		*		*		*
			CO:4 Helps to give proper idea on financial statement analysis in practical point of view		*		*		*
			CO:5 Introduce the concept of fund flow and cash flow statement		*		*		*
			CO:6 Provide knowledge about budget control keeping in mind the scope of the concept		*		*		*
			CO:7 Develop the know-how and concept of marginal costing with practical problems		*		*		*
	17198SEC62	Income Tax Law & Practices	CO:1 File IT Return on individuals basis		*		*		*
			CO:2 Compute the total Income and Define tax complicacies and structure.		*		*		*
			CO:3 In order to familiarize the different know-how and heads of income with its components		*		*		*

Code	Course	CO	1	2	3	4	5	6
		CO:4 It helps to build an idea about income from house property as a concept	*		*		*	
		CO:5 It give more idea about the income from business or profession	*		*		*	
		CO:6 Make the students familiarizes with the concept of depreciation and its provisions	*		*		*	
17198SEC63	**Database Management System**	**CO:1 Understand database concepts and structures and query language**	*	*		*		
		CO:2 Understand the E R model and relational model	*	*		*		
		CO:3 Understand Functional Dependency and Functional Decomposition.	*	*		*		
		CO:4 Apply various Normalization techniques	*	*		*		
		CO:5 Understand query processing and techniques involved in query optimization.	*	*		*		
		CO:6 Understand the principles of storage structure and recovery management.	*	*		*		
17198DSC64	**Dicipline specific elective**	**CO:1 Demonstrate an understanding of the foundations and importance of E-commerce**	*		*			
		CO:2 Analyze the impact of E-commerce on business models and strategy	*		*			
		CO:3 Describe the infrastructure for E-commerce	*		*			
		CO:4 Discuss legal issues and privacy in E-Commerce	*		*			
		CO:5 Assess electronic payment systems	*		*			
		CO:6 Recognize and discuss global E-commerce issues	*		*			
171_GEC65	**General elective-I**	**CO:1 To help to gather knowledge on banking and financial system in India**	*		*			
		CO:2 To provide knowledge about commercial banks and its products	*		*			
		CO;3 Aim to familiarize banking system in India	*		*			
		CO:4 To enable them to understand better customer relationship	*		*			

Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7
		CO:5 To create awareness about modern banking services like e-banking,m-banking and internet banking, ATM System		*		*			
		CO:6 To introduce recent trends in banking system		*		*			
		CO:7 To make the student understand the basic concept of banking and financial institutions and expose various types of risk based by banks		*		*			
17198PRW66	Project Work	CO:1 Develop plans with relevant people to achieve the project's goals		*					*
		CO:2 Break work down into tasks and determine handover procedures		*					*
		CO:3 Identify links and dependencies, and schedule to achieve deliverables		*					*
		CO:4 Estimate and cost the human and physical resources required, and make plans to obtain the necessary resources		*					*
		CO:5 Allocate roles with clear lines of responsibility and accountability.		*					*
		CO:6 Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis		*					*
171_SECO6	Package lab VI Skill based elective	CO:1.Learn to create animated graphics add sound and interactivity.		*	*		*		
		CO:2. Can develop Website		*	*		*		
		CO:3.CD based presentations		*	*		*		
17111SEC06L	Communicative English Lab-VI	CO:1 Get a job	*	*		*			
		CO:2 Apply study skills	*	*					
		CO:3 Widen creative thinking	*	*					
		CO:4 Be a good team worker	*	*					
		CO:5 Make them proficient in English	*	*					

M.Com (2017 Regulations)

SEM	Course Code	Title of the Course	COs	POS						
				PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	17261SEC11	Marketing Research and Consumer Behaviour	CO:1 This specialization lays the neccessary groundwork for an overall successful marketing strategy	*	*				*	
			CO:2knowledge required to understand the state of your product before approaching the market strategy	*	*				*	
			CO:3Interpret development of marketing research	*	*				*	
			CO:4 Identify the major influences in Consumer Behaviour	*	*				*	
			CO:5theory of Consumer behaviour and relates it to the practice of marketing.	*	*				*	
			CO: 6 Demonstrate how knowledge of consumer behaviour can be applied to marketing.	*	*				*	
	17261SEC12	Human Resource Management	CO:1 Contribute to the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes	*	*			*		
			CO:2Develop, implement, and evaluate employee orientation, training, and development programs.	*	*			*		
			CO:3Understanding of the basic concepts,functions and processes of HRM	*	*			*		
			CO:4 develop a selection and interviewing program	*	*			*		
			CO:5 know formalize, Design and evaluate various Recruitment and Placement policies.	*	*			*		
			CO:6 Use methods of of collecting job analysis information.	*	*			*		
	17261SEC13	Services Marketing	CO:1 Focuses on services, service design, and service innovation, with the aim of developing empathy for customers and understanding the customer experience	*	*			*	*	
			CO:2 strategies that support broader marketing decisions.	*	*			*		

Code	Subject	Course Outcome							
		CO:3 Develop an understanding of the role of relationship marketing and customer service	*	*				*		
		CO:4 Demonstrate a knowledge of the extended marketing mix for services.	*	*				*	*	
		CO:5 Exhibit the capability to work effectively within a team environment.	*	*				*		
		CO:6 Develop and Justify marketing planning and Control Systems.	*	*				*		
17261SEC14	Advanced Cost Management	CO:1 Study of decision making and performance evaluation techniques in management accounting	*	*						
		CO:2 Understand decision making and performance evaluation techniques in management accounting.	*	*	*	*				
		CO:3 In modern competitive business environment, suitable business decision making is very crucial	*	*	*					
		CO:4 Identify relevant information for decision making purposes in order to produce financial analyses for a range of decisions such as product-mix, pricing, outsourcing and special orders.	*	*	*	*				
		CO:5 Use standard costs to prepare budgets for planning and control purposes.	*	*	*	*				
		CO:6 Understand the principles of standard costing.	*	*	*	*				
17261DSC15B	Oranizational Behaviour	CO:1xamine the differences and similarities between leadership, power, and management	*	*				*		
		CO:2 impact that a company's structure and design can have on its organizational behavior	*	*				*		
		CO:3 impact of culture on organizational behavior	*	*				*		
		CO:4 Analyze management issues as related to organizational behavior	*	*				*		
		CO:5Examine challenges of effective organizational communication	*	*				*		
		CO:6 Evaluate ethical issues as related to organizational behavior	*	*				*		
17261RLS16	Research Led Seminar	CO:1 Develop skills in data collection and complex analysis						*		

Sem	Course Code	Course Name	Course Outcomes								
			CO:2 Clarify terminology and approaches to different facets of research-based teaching	*	*						
			CO:3 Explore good practices in institution-driven, strategic approaches on how to integrate research and education missions	*	*						
			CO:4 Generate ideas on how to build the capacity of faculty members to implement researchbased teaching	*	*						
			CO:5 create a research-based learning environment	*	*						
			CO:6 Analyse national frameworks, policies and funding	*	*						
II	17261SEC21	Quantitative Techniques for Decision Making	CO:1 Employ basic statistical methods to decision making	*	*						
			CO:2 Understand how to apply basic models and theories in business	*	*		*				
			CO:3 Solve management problems effectively	*	*		*				
			CO:4 Use software tools to model decision problems.	*	*						
			CO:5 Clearly identify an otherwise unstructured business problem and its components	*	*		*				
			CO:6 Employ effective techniques for addressing the major challenges presented	*	*						
			CO:7 Provide a solution to the decision process	*	*		*				
	17261SEC22	Total Quality Management	CO:1 Given a product or a service type, the student manager will be able to enumerate and justify the dimensions of product quality or service quality for the same	*	*				*		
			CO:2 Given the quality gurus (Deming/ Juran/ Taguchi/ Crosby), the student manager will be able to justify their philosophies/ contributions in Quality Management.	*	*				*		
			CO:3 Given a quality problem/ failure mode, the student manager will be able to identify causes and	*	*				*		

Code	Course	Course Outcome							
		sub causes of the effect/ problem draw and justify Ishikawa Diagram.							
		CO:4 For a given type of organization, the student manager will be able to enlist and justify the four levels of benchmarking and/ or enlist and brief seven step benchmarking model	*	*			*		
		CO:5 The student manager will be able to differentiate between common and special cause of variation and/ or differentiate between attributes and variables and/ or construct and write formulae for control charts for variables and attributes.	*	*			*		
		CO:6 Critically appraise the organisational, communication and teamwork requirements for effective quality management	*	*			*		
17261SEC23	Advanced Management Accounting	CO:1 Activity based approaches to management and cost analysis	*	*	*	*			
		CO:2 Analysis of common costs in manufacturing and service industry	*	*	*	*			
		CO:3 Techniques for profit improvement, cost reduction, and value analysis	*	*	*	*			
		CO:4 Throughput accounting	*	*	*				
		CO:5 Target costing; cost ascertainment and pricing of products and services	*	*	*	*			
		CO:6 Pricing Decisions	*	*	*	*			
		CO:7 Budgets and Budgetary Control	*	*	*	*			
		CO:8 Evolution of standards, continuous - improvement; keeping standards meaningful and relevant; variance analysis	*	*	*	*			
		CO:6 Distinguish Joint Venture and Partnership and to learn the methods of maintaining records under Joint Venture	*	*	*	*			
		CO:7 Understand the meaning and features of Non-Profit Organisations	*	*	*				

Code	Course	CO									
		CO:8 Learn to prepare Receipts & Payment Account, Income & Expenditure Account and Balance Sheet for Non-Profit Organizations	*	*	*	*					
17261SEC24B	Retail Management	CO:1 The role that retailing plays in the distribution component of the marketing mix	*	*			*				
		CO:2 Understanding of the concept of social responsibility and the role it plays in retailin	*	*			*				
		CO:3 Aware of the moral and ethical dilemmas that face the retailing industry in today's business environment	*	*			*				
		CO:4 Development and understanding of implementing a retail strategy.	*	*			*				
		CO: 5 Understanding of the increased use of technology in the field of retailing	*	*			*				
		CO:6 Identify key roles within retail businesses	*	*			*				
17261RMC25	Research Methodology	CO:1 Demonstrate knowledge of research processes (reading, evaluating, and developing)	*	*		*					
		CO:2 Perform literature reviews using print and online databases	*	*		*					
		CO:3 Identify, explain, compare, and prepare the key elements of a research proposal/report	*	*		*					
		CO:4 Select and define appropriate research problem and parameters	*	*		*					
		CO:5 Prepare a project proposal (to undertake a project)	*	*		*					
		CO:6 Understand some basic concepts of research and its methodologies	*	*		*					
17261BRC26	Participation in Bounded Research	CO:1 Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.	*	*		*					
		CO:2 Have basic knowledge on qualitative research techniques	*	*		*					
		CO:3 Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis	*	*		*					

	Course Code	Course Name	Course Outcomes								
			CO:4 Have basic awareness of data analysis-and hypothesis testing procedures	*	*		*				
			CO:5 knowledge for enabling students to develop data analytics skills and meaningful interpretation to the data sets so as to solve the business/Research problem.	*	*		*				
			CO:6 Describe sampling methods, measurement scales and instruments, and appropriate uses of each	*	*		*				
III	17261SEC31	Project planning and Control	CO:1 Understand the How Subcontract Administration and Control are practiced in the Industry.	*	*			*			
			CO:2 Understand the contract management, Project Procurement, Service level Agreements and productivity	*	*			*			
			CO:3 Apply the risk management plan and analyse the role of stakeholders.	*	*			*			
			CO:4 Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.	*	*		*				
			CO:5 Understand the conceptual clarity about project organization	*	*			*			
			CO:6 Understand project characteristics and various stages of a project	*	*		*				
	17261SEC32	Advanced Corporate Accounting	CO:1 Critically analyse both older and newer MA methods and their effects in organisations	*	*	*	*				
			CO:2 knowledge and understanding about MA issues, including its problems and difficulties	*	*	*	*				
			CO:3 Part in the design and use of the management accounting system in organisations	*	*	*	*				
			CO:4 Updated concerning the more recent development in MA and the emergence of new methods	*	*	*	*				
			CO:5 More advanced level compared to the basic knowledge acquired on the Bachelor level	*	*	*	*				
			CO:6 Exposure to the company final accounts	*	*	*	*				

Code	Course	Course Outcome								
17261DSC34B	Indian Financial System	CO:1 Knowledge, understanding and skills in the area of international financial relations and tolls for its implementation	*	*	*			*		
		CO:2 Knowledge and understanding of characteristics, activities, principles and specifics of international financial relations	*	*				*		
		CO:3 Ability to summarize and critically evaluate results obtained by researchers in the field of international financial relations	*	*				*		
		CO:4 Ability to analyse and use various sources of information and data in the field and make assessment	*	*				*		
		CO:5 Use methods in the field of international finance in practice;	*	*				*		
		CO:6 Economic essence and currency classifications: the concept of currency and its basic classification; characteristics of currencies.	*	*				*		
17261OEC	Financial Services	CO:1 To introduces meaning and functions of Financial Intermediaries	*	*	*					
		CO:2 To understand the role of merchant bank qnd its services	*	*	*					
		CO:3 To provide information regarding management of mutual funds and Regulations	*	*	*					
		CO:4 To understand the role and functions of financial services Marketing	*	*	*			*		
		CO:5 To know the structure and types of debt Instruments	*	*	*					
		CO:6 To realize Foreign Exchange Market	*	*	*			*		
17261SRC36	Scaffold Research (Societal Project)	CO:1 to help students manage individual or team projects.	*	*			*			
		CO:2 Begin project-planning with a specific audience with a specific and pressing concern	*	*			*			
		CO:3 Let students design their own projects. Or require that projects iterate or counter existing cultural trends and patterns or that address	*	*			*			

629

	Code	Course	CO						
			compelling social concerns (e.g.technology addiction).						
			CO:4 Use concept-mapping before, during, and after the project is completed.	*	*			*	
			CO:5Give students the opportunities to use their specific gifts, skills, and backgrounds in completing the project.	*	*			*	
			CO:6 Help students brainstorm the opportunities for creative risk-taking at the beginning of a project.	*	*			*	
IV	17261SEC41	Income Tax Law and Tax Planning	CO:1 File IT Return on individuals basis	*	*		*		
			CO:2 Compute the total Income and Define tax complicacies and structure.	*	*		*		
			CO:3 In order to familiarize the different know-how and heads of income with its components	*	*		*		
			CO:4 It helps to build an idea about income from house property as a concept	*	*		*		
			CO:5 It give more idea about the income from business or profession	*	*		*		
			CO:6 Make the students familiarizes with the concept of depreciation and its provisions	*	*		*		
	17261SEC42	International Business	CO:1 Have developed an understanding of major issues related to international Business	*	*				*
			CO:2 Have developed skills in researching and analyzing trends in global markets and in modern marketing practice	*	*				*
			CO:3 An organization's ability to enter and compete in international markets.	*	*				*
			CO:4 Develop skills in researching and analyzing international Business opportunities	*	*				*
			CO:5 Develop a high level of analytical skills and critical thinking in an international Business contex	*	*				*
			CO:6 Explain the main institutions that shape the global marketplace;	*	*				*
	17261SEC43		CO:1 Know about the company law in the Abroad.	*	*				*

Code	Course	Course Outcome								
	Co- Operation in India and Abroad	CO:2 Understand the use of the memorandum of association and article of association in a company, they also learn from this course	*	*			*			
		CO:3 Develop Professionals in the filed of Co-operation, Co-operative law and Management.	*	*			*			
		CO:4 Promote qualified, Skilled and professional manpower to manage the affairs of the Cooperative Institutions.	*	*						
		CO:5 Enhance the Knowledge base of the in-service Personnel on the subject Co-operation, Co-operative law and Co-operative Management.	*	*			*			
		CO:6 Enable the in-service personnel to develop skills on Co-operative Management Techniques	*	*			*			
17261DSC44B	International Financial Management	CO:1 Understand international capital and foreign exchange market.	*	*		*		*		
		CO:2 Identify and appraise investment opportunities in the international environment.	*	*				*		
		CO:3 Identify risk relating to exchange rate fluctuations and develop strategies to deal with them	*	*				*		
		CO:4 Identify and evaluate foreign direct investment and international acquisition opportunities	*	*				*		
		CO:5 Develop strategies to deal with other types of country risks associated with foreign operations	*	*				*		
		CO:6 Express well considered opinion on issues relating to international financial management.	*	*	*			*		
17261PRW45	Project Work	CO:1 Develop plans with relevant people to achieve the project's goals	*	*		*				
		CO:2 Break work down into tasks and determine handover procedures	*	*		*				
		CO:3 Identify links and dependencies, and schedule to achieve deliverables	*	*		*				
		CO:4 Estimate and cost the human and physical resources required, and make plans to obtain the necessary resources	*	*		*				

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
			CO:5 Allocate roles with clear lines of responsibility and accountability.	*	*		*			
			CO:6 Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis	*	*		*			

2017										
Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	173RMG11	Research Methodology	Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.	*	*			*		
			Familiarize participants with basic of research and the research process.	*	*			*		
			Enable the participants in conducting research work and formulating research synopsis and report.	*	*			*		
			Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.	*	*			*		
			Have basic knowledge on qualitative research techniques	*	*		*			
			Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis	*	*		*			
			Have basic awareness of data analysis-and hypothesis testing procedures	*	*		*			
	173COC12	Advanced Functional Management	To help the students gain understanding of the functions and responsibilities of managers.	*	*		*			
			To know various tools from accounting and cost accounting this would facilitate the decision making	*	*		*			
			To explore the economics of information and network industries and to equip students with an	*	*		*			

Code	Subject	Course Outcome							
		understanding of how economics affect the business strategy of companies in these industries.							
		To provide the students with an understanding of fundamental legal issues pertaining to the business world to enhance their ability to manage businesses effectively.	*	*					*
		To use statistical techniques for analysis of research data	*	*					*
		To gain a solid understanding of human behavior in the workplace from an individual, group, and organizational perspective.	*	*					*
		To learn to study and design HRM system	*	*					*
		To understand the relationship between Operations & SCM and other business functions, such as Marketing, Finance, Accounting, and Human Resources.	*	*					*
173COC13	Marketing Management	To introduce the concept of Marketing Mix as a framework for Marketing Decision making.	*	*					*
		To emphasize the need, importance and process of Marketing Planning and Control.	*	*					*
		To sensitize the students to the dynamic nature of Marketing Function.	*	*			*		
		Understand fundamental marketing concepts, theories and principles in areas of marketing policy	*	*			*		
		Apply the knowledge, concepts, tools necessary to understand challenges	*	*					
		Understand the marketing concepts and its evolution	*	*			*		
		The course helped the students to know the principles and Practices of Marketing Mix and Marketing Research.	*	*			*		
1723COC13	Human Resource Management	To understand the role of HRM in an organization	*	*		*			*
		To learn to gain competitive advantage through people	*	*					*
		To learn to study and design HRM system	*	*					*

	Code	Course	Outcome							
			Contribute to the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes	*	*				*	
			Develop, implement, and evaluate employee orientation, training, and development programs.	*	*				*	
			Understanding of the basic concepts, functions and processes of HRM	*	*	*			*	
	173RPE14	Financial Management	To understand various concepts related to financial management.	*	*		*			
			To study in detail, various tools and techniques in the area of finance.	*	*		*			
			To develop the analytical skills this would facilitate the decision making in Business situations.	*	*		*			
			Create an awareness about capital structure and theories of capital structure	*	*		*			
			Make them understand the cost of capital in wide aspects	*	*		*			
			Provide knowledge about dividend policies and various dividend models.	*	*		*			
			Enable them to understand working capital management	*	*		*			

1.1.1 Curriculam developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University (2UGBTGE)

Program Outcomes and Course outcomes of

Department of Management
REGULATION – 2017

LOCAL	
REGIONAL	
NATIONAL	
GLOBAL	

SCHOOL OF COMMERCE AND MANAGEMENTDEPARTMENT OF MANAGEMENT

Programmed Offer

1	BBA	YES
2	MBA	YES

PROGRAM EDUCATIONAL OBJECTIVES

- To develop students professionally to handle business issues.
- To develop students to be a better team worker.
- To bridge the gap between theoretical and practical knowledge of the students byadopting innovative teaching pedagogy.
- To develop socially, ethically responsible business leaders.
- To sharpen soft and hard skills among the students.
- To promote entrepreneurial skills among students.

PROGRAM OUTCOMES

- Knowledge of Business, Management and Emerging Technologies
- Research and Business Intelligence
- Problem Solving and Decision Making
- Creativity and Innovation
- Intercultural Competence/Communication
- Teamwork
- Global Citizenship/Ethics (Collaborate, Negotiate and Resolve Conflicts)
- An Understanding of Business Functions
- Providing Global Perspectives
- Developing Critical and Analytical Thinking Abilities
- Interpersonal Skill Development
- Creating Social Sensitivity and Understanding CSR, Ethical and
- Sustainable Business Practices Demonstrate sensitivity to social, ethical and sustainability issues
- Developing Entrepreneurship Acumen

PROGRAM SPECIFIC OUTCOMES

- Acquiring Conceptual Clarity of Various Functional Areas
- Ability to analyze various functional issues affecting the organization
- Demonstrating ability to evolve strategies for organizational benefits
- Analysis and interpretation of the data which is used in Decision Making
- Demonstrate the ability to develop models / frameworks to reflect critically onspecific business contexts
- Demonstrate Effectively Oral and Written Communication
- Demonstrate Ability to work in Groups
  - Demonstrate understanding of social cues and contexts in social interaction
  - Develop Ethical Practices and Imbibe Values for Better Corporate Governance.
  - Understand ethical challenges and choices in a business setting
  - Analyze Global Environment and its Impact on Business

2017		BBA	
Sem	**Course Code**	**Title of the Course**	**COs**
I		Tamil I	CO:1 Learn the changes occurred in literature since classical period.
I	17110AEC11		CO:2 Make use of vocabulary systematically.
I			CO:3 Understand how to lead one's life realizing the modernity and its environment/atmosphere.
I		English I	CO:1 Develop vocabulary
I	17111AEC12		CO:2 zarLearn to edit and do proof reading
I			CO:3 Read and comprehend literature
I		Principles of Management	CO:1 Read and comprehend literature
I	17160SEC13		CO:2 Appreciate poetry and prose
I			CO:3 Familiarize students with fiction.
I		Managerial Economics	CO:1 Understanding the fundamental of financial accounting
I			CO:2 Develop the modern market economy
I			CO:3 prepare the different kinds of financial statement
I	17160SEC14		CO:4 Acquire conceptual knowledge of basics of accounting
I			CO:5 Identify and analyze the reasons for the difference between cash book and pass book balances
I			CO:6 Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP
I		Business Communication	CO:1 Discuss the supply and demand theory and its impact on insurance
I			CO:2 outline an how entity operate in the Business environment
I			CO:3 Explain the legal frame work that regulate the insurance industry
I	17160AEC15		CO:4 Understand relationship between environment and business; Applying the environmental analysis techniques in practice
I			CO:5 Understand Economic, Socio-Cultural and Technological Environment
I			CO:6 Know state policies Economic legislations and Economic reforms laid by the government
I		Business Mathematics and Statistics	CO:1 Understand fundamental marketing concepts, theories and principles in areas of marketing policy
I			CO:2 Apply the knowledge, concepts, tools necessary to understand challenges
I			CO:3 Understand the marketing concepts and its evolution
I	17160AEC16		CO:4 Analyze the market based on segmentation, targeting and positioning
I			CO:5 Know the consumer behavior and their decision making process 637

I			CO:6 Understand the rural markets and the contemporary issues in marketing
I			Co:7 Make decisions on product, price , promotion mix and distribution
I	17120SEC01AL	Skill Based Elective Course - I	CO:1 Apply the concept of opportunity cost.
I			CO:2 understand the concepts of cost, nature of production and its relationship to Business operations.
I			CO:3 Apply Economic theories to business decision
I			CO:4 Use the theoretical concept of demand and supply analysis in practice
I			CO:5 Understand the cost concepts, theories of profit and business cycles
I			CO:6 Use different demand forecasting techniques and apply different pricing techniques in business
I			CO:7 Understand the importance of Fiscal policy
I	17111SEC01L	Communicative English Lab - I	CO1: Recognize when to use each of the Microsoft Office programs to create professional and academic documents.
I			CO2: Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.
I			CO3: Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.
I	171ETHVALS	Ethics and Values	CO:1 Learn grammar.
I			CO:2 Enrich vocabulary
I			CO:3 Understand the process of communication
I			CO:4 Develop listening skill
II	17110AEC21	Tamil II	CO:1 Know what devotion really is.
II			CO:2 Know the fruitfulness obtained through devotion.
II			CO:3 Perceive the progress achieved in the society through devotion.
II	17111AEC22	English II	CO:1 Develop technological skill.
II			CO:2 Able to write in a variety of formats
II			CO:3 Read biographies and develop personality
II	17160SEC23	Core - III Financial Accounting	CO:1 Appreciate different forms of literature
II			Co:2 Acquire language skills through literature
II			Co:3 Broadens the horizon of knowledge
II	17160SEC24	Core - IV Organisational Behaviour	CO:1 familiarize the concept of Branch account and its system
II			CO:2 understand the Scope of departmental accounting
II			CO:3 Appreciate the need for negotiable instruments and procedure of accounting for bills honoured and dishonoured
II			CO:4 Differentiate Trade bills from Accommodation Bills
II		Allied-III Business Environment	CO:1 Understand, and evaluate various organizational influencesaffecting ethical decisions
II			CO:2 Present and analyze ethical and moral issues
II			CO:3 Explore ethical theories
II			CO:4 Use contemporary and classical frameworks to analyze and suggest resolutions to ethical dilemmas.

II	17160AEC25		CO:5 Identify and address common ethical issues that arise for individuals, managers, and organizations.
II			CO;6 ognize how individual differences and cognitive barriers can influence ethical judgment.
II			CO:7 Identify and prioritize personal values and apply those to making ethical decisions.
II	17160AEC26	Allied-IV Management Information System	CO:1 Critically evaluate the underlying assumptions of analysis tools
II			CO:2 Solve a range of problems using the techniques covered
II			CO:3 Conduct basic statistical analysis of data.
II			CO:4 Understand basic statistical concepts such as statistical collection, statistical series, tabular and graphical representation of data
II			CO:5 Calculate measures of central tendency, dispersion and asymmetry, correlation and regression analysis
II			CO:6 Choose a statistical method for solving practical problems
II	17160RLC27	Research Led Seminar	CO: 1 Understand the dynamics of marketing in business
II			CO:2 ability and confidence to tackle common practical financial problems of business.
II			CO:3 Understand the scope of Business, and its importance.
II			CO:4 Identify different forms of business organizations viz; Sole Proprietorship, Partnership, Joint Hindu Family Business & Co-operative Organizations.
II			CO:5 Understand a Joint Stock Company and various formalities to promote a Company
II			CO:6 Learn various sources Industrial Financial resources and the means to raise them
II	17120SEC02AL	Skill Based Elective Course - II	CO:1. Identify the names and functions of the **PowerPoint** interface.
II			CO:2. Create, edit, save, and print presentations.
II			CO:3. Format presentations.
II			CO:4. Add a graphic to a presentation.
II			CO:5. Create and manipulate simple slide shows with outlines and notes.
II			CO:6. Create slide presentations that include text, graphics, animation, and transitions.
II	17111SEC02L	Communicative English Lab - II	CO:1 Learn grammar.
II			CO:2 Use a variety of reading strategies
II			CO:3 Enhance the skill of making grammatically correct sentences.
II			Co:4 Develop listening skill
III	17110AEC31	Tamil III	CO:1 Achieve one's goal by following the ancestral path
III			CO:2 Learn to lead life of perfection by realizing the uncertainty in the life
III			CO:3 Attain happiness through honesty
III	17111AEC32	English III	CO:1 Understand phonetics.
III			CO:2 Develop writing skill
III			CO:3 Able to develop creative writing
III	17160SEC33	Core – V Management Accounting	CO:1 Enable to appreciate different types of prose
III			CO:2 Develop the conversational skills through one-act plays
III			CO:3 Enhance the skill of making grammatically correct sentence**639**

III	17160SEC34	Core – VI Marketing Management	CO:1 Understand various costing systems and management systems
III			CO:2 Analyse and provide recommendations to improve the operations of organisations
III			CO:3 Imbibe conceptual knowledge of cost accounting.
III	17160AEC35	Allied- V Business Law	CO:1 Understanding of Banking Channels and Payments
III			CO:2 Practices on Banking Technology
III			CO:3 Understanding of Core Banking
III			CO:4 To gather knowledge on banking and financial system in
			India
III	17160AEC36	Allied- VI Human Resource Management	CO:1 Explain the concepts in business laws with respect to foreign trade
III			CO:2 Apply the global business laws to current business environment
III			CO:3 Demonstrate an understanding of the Legal Environment of Business.
III			CO:4 Communicate effectively using standard business and legal terminology.
III	171CBMRM37	Research Methodology	CO:1 Identify ethical, legal, cultural, and global issues affecting business communication.
III			CO:2 Utilize analytical and problem solving skills appropriate to business communication.
III			Co:3 Effective **business** writing
III			CO:4 Research approaches and information collection.
III	17120SEC03AL	Skill Based Elective Course - III	CO:1 Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.
III			CO:2 familiarize participants with basic of research and the research process.
III			CO:3 enable the participants in conducting research work and formulating research synopsis and report.
III			CO:4 Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
III	17111SEC03L	Communicative English - III	CO:1. Indicate the names and functions of the **Excel** interface components.
III			CO:2. Enter and edit data.
III			CO:3. Format data and cells.
III			CO:4. Construct formulas, including the use of built-in functions, and relative and absolute references.
III			CO:5. Create and modify charts.
III			CO:6. Preview and print worksheets.
IV	17110AEC41	Tamil IV / Hindi IV/ Advanced English IV	CO:1 Realize how the ancient people changed their life style according to the ages
IV			CO:2 Learn how to change one's lifestyle according to the needs of the future
IV			CO:3 Accept the modern trends and its uses
IV	17111AEC42	English IV	CO:1 Develop writing skill.
IV			CO:2 Comprehend and describe poems
IV			CO:3 Learn interviewing skills
IV	17160SEC43	Core - VII Total Quality Management	CO:1 Improve their ability to read and understand them
IV			CO:2 Know the genius of Shakespeare
IV			CO:3 Express in writing their views.

IV	17160SEC44	Core - VIII Cost Accounting	CO:1 Understand the concept of partnership
IV			CO:2 Understand the journal entries for the formation of partnership
IV			CO:3 Familiarize the concept of Branch account and its system
IV	17160AEC45	Allied -VII Retail Management	CO:1 Understand the key principles and tools of integrated marketing communication
IV			CO:2 Explain the environmental factors which influence consumer and organizational decision
IV			CO:3 Identify the elements of the communication process
			between buyers and sellers in business. making process
IV	17160AEC46	Allied -VIII Industrial Relations and Labour Law	CO:1 Get a basic understanding of different type of meeting of board of directors.
IV			CO:2 Use international trade terms and concepts when communicating.
IV			CO:3 Demonstrate comprehensive knowledge and understanding of social and economic policy considerations arising in this area.
IV			CO:4 Understanding of those areas of company law identified in the indicative syllabus above and form a critical judgement on areas of controversy within the topics studied;
IV	17120SEC04AL	Skill Based Elective Course - IV	CO:1 Examine database concepts and explore the Microsoft Office Access environment.
IV			CO:2. Design a simple database.
IV			CO:3. Build a new database with related tables.
IV			CO:4. Manage the data in a table.
IV	17111SEC04L	Communicative English - IV	CO:1 Learn grammar.
IV			CO:2 Enable to express their views in conversation
IV			CO:3 Develop soft skills
IV			CO:4 ce presentation skills
IV	171ENVTSTU	Environmental Studies	CO:1 Learn about environmental pollution.
IV			CO:2 Familiarize with the social issues and the environment
IV			CO:3 will be able to do independent research on human interactions with the environment.
IV			CO:4 To recognize the physical, chemical, and biological components of the earth's systems and show how they function
IV			CO:5 Analyze and evaluate ideological and philosophical approaches used to understand environmental relationships.
IV			CO:6 Carry out an applied research project in the natural sciences.
V	17160SEC51	Core - IX Financial Management	Co:1 Find out how can a company dissolve.
V			CO:2 Understand Mutual funds investments.
V			CO:3 Learn about Working format of companies.
V			CO:4 Enabling the students to understand the features of Shares and Debentures
V			CO:5 Develop an understanding about redemption of Shares and Debenture and its type
V			CO:6 Exposure to the company final accounts
V	17160SEC52	Core - X Services Marketing	CO:1 Use business finance terms and concepts when communicating.
V			CO:2 Demonstrate a basic understanding of financial management.
V			CO:3 Provide introduction to Financial Management
V			CO:4 Create an awareness about capital structure and theories of capital structure

V			CO:5 Make them understand the cost of capital in wide aspects
V	17160SEC53	Core – XI Production and Operations Management	CO:1 Forecast a firm's future financing requirements
V			CO:2 Design an optimal capital structure.
V			CO:3 Give an idea about fundamentals of financial services and players in financial sectors
V			CO:4 Create an awareness about merchant banking, issue management, capital markets and role of SEBI
V			CO:5 Provide knowledge about leasing and hire purchase
			concepts
V			CO:6 Make them understand about different types of insurance and IRDA Act.
V	17160DSC54	Discipline Specific Elective - I	Co1:Study the development of computers and their components in each stage.
V			CO2 : Develop an idea of software, programming language and operating system.
V			CO3 : Study the concept of developing database and its maintenance using computers in a business Concern
V			CO4 :Analyze the importance of management information system and networking in a business.
V			CO5 : Be aware and perform various activities using computers in day to day life.
V	17160BRC55	Participation Bounded Research	CO:1 Know about the company law in the India.
V			CO:2 Understand the use of the memorandum of association and article of association in a company, they also learn from this course
V			CO:3 Develop Professionals in the filed of Co-operation, Co-operative law and Management.
V			CO:4 Promote qualified, Skilled and professional manpower to manage the affairs of the Cooperative Institutions.
V			CO:5 Enhance the Knowledge base of the in-service Personnel on the subject Co-operation, Co-operative law and Co-operative Management.
V	17120SEC05AL	Skill Based Elective Course - V	CO:1 Do the allotted work in research
V			CO:2 Learn to do review of literature
V			CO:3 Demonstrate knowledge of research processes
V			CO:4 Perform literature reviews using print and online database
V			CO:5 Identify, explain, compare, and prepare the key elements of a research proposal/report
V	17111SEC05L	Communicative English Lab- V	CO:1 work with the Photoshop workspace
V			CO:2. navigate images
V			CO:3. resize and crop images
V			CO:4. make and work with selections
V			CO:5. create new layers and perform other basic layer functions
VI	17160SEC61	Core - XII Strategic Management and Business Policy	CO:1 Prepare analysis of various special decisions, using relevant costing and benefits
VI			CO:2 More effective planning and control systems
VI			CO:3 The students thought and knowledge on management Accounting
VI			CO:4 Helps to give proper idea on financial statement analysis in practical point of view
VI			CO:5 Introduce the concept of fund flow and cash flow statement
VI		Core – XIII	CO:1 Understand the systematic process to select the business ideas.

VI	17160SEC62	Entrepreneurial Development	CO:2 Write a business plan
VI			CO:3 Develop students about Entrepreneurship development
VI			CO:4 Create an awareness on various Entrepreneurship Development Programme
VI	17160SEC63	Core – XIV Logistics and Supply Chain Management	CO:1 Articulate knowledge of fundamental audit concepts
VI			CO:2 Apply critical thinking skills and slove auditing Problems.
VI			CO:3 Apply and demonstrate the accounting knowledge and
			skills in Auditing.
VI	17160DSC64	Discipline Specific Elective – II	CO:1 File IT Return on individuals basis
VI			CO:2 Compute the total Income and Define tax complicacies and structure.
VI			CO:3 In order to familiarize the different know-how and heads of income with its components
VI	17160GEC65	General Elective - I	CO:1 Greater Social support
VI			CO:2 More on-task behaviour
VI			CO:3 Develop Professionals in the filed of Co-operation, Co-operative law and Management.
VI	17160PRW66	Project Work	CO:1 To help to gather knowledge on banking and financial system in India
VI			CO:2 To provide knowledge about commercial banks and its products
VI			CO;3 Aim to familiarize banking system in India
VI	17111SEC06L	Communicative English Lab - VI	CO:1 Develop plans with relevant people to achieve the project's goals
VI			CO:2 Break work down into tasks and determine handover procedures
VI			CO:3 Identify links and dependencies, and schedule to achieve deliverables

Skill Based Elective Courses

	Course Code	Course Title	COS
I	17120SEC01A	Fundamentals of Computers	To familiarize the students to the basic concepts of management in order to aid in understanding how an organization functions, and in understanding the complexity and wide variety of issues managers face in today's business firms.
I	17160SEC01B	Soft Skills – I	To provide an overview of theories and practices in organizational behaviour in individual, group and organizational level.
II	17120SEC02A	Ms office Packages Lab	To acquaint the students with the fundamental principles of financial, cost & Management Accounting. Enable the students to take decisions using management accounting tools and to exposes the students to various concepts and principles of accounting for making efficient decisions.
II	17160SEC02B	Soft Skills- II	To make the students aware of the various economic theories and principles - To equip them with the required tools and techniques for improving their decisionmaking skills.

III	17120SEC03A	Writing and Presentation Skills Lab	To create the knowledge of Legal perspective and its practices to improvise the business.
III	17160SEC03B	Soft Skills – III	This course mainly deals with the use of Statistical concepts in the resolution of managerial decision problems. As such the course will deal not only with some of the theoretical concepts in Statistics but will also be concerned with their application.
IV	17120SEC04A	General Aptitude and Personality Development Lab	Facilitate student to understand the operational nuances of a Finance Manager Comprehend the technique of making decisions related to finance function
IV	17160SEC04B	Soft Skills – IV	To provide knowledge about management issues related to staffing, training, performance, compensation, human factors consideration and compliance with human resource requirements.
V	17120SEC05A	Photoshop Lab	To understand fundamental concepts of Marketing in Modern Marketing Practices
V	17160SEC05B	Soft Skills – V	To provide a broad introduction to the field production and operations management and explain the concepts, strategies, tools and techniques for managing the transformation process that can lead to competitive advantage.

Department of Management

2017		MBA	
Sem	**Course Code**	**Title of the Course**	**COs**
I	17260C011	Management Concepts	CO:1 This specialization lays the neccessary groundwork for an overall successful marketing strategy
			CO:2knowledge required to understand the state of your product before approaching the market strategy
			CO:3Interpret development of marketing research
			CO:4 Identify the major influences in Consumer Behaviour
			CO:5theory of Consumer behaviour and relates it to the practice of marketing.
			CO: 6 Demonstrate how knowledge of consumer behaviour can be applied to marketing.
	17260C012	Organisational Behaviour	CO:1 Contribute to the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes
			CO:2Develop, implement, and evaluate employee orientation, training, and development programs.
			CO:3Understanding of the basic concepts,functions and processes of HRM
			CO:4 develop a selection and interviewing program
			CO:5 know formalize, Design and evaluate various Recruitment and Placement policies.
			CO:6 Use methods of of collecting job analysis information.
	17260C013	Accounting for Managers	CO:1 Focuses on services, service design, and service innovation, with the aim of developing empathy for customers and understanding the customer experience
			CO:2 strategies that support broader marketing decisions.
			CO:3 Develop an understanding of the role of relationship marketing and customer service
			CO:4 Demonstrate a knowledge of the extended marketing mix for services

			CO:5 Exhibit the capability to work effectively within a team environment.
			CO:6Develop and Justify marketing planning and Control Systems.
	17260C014	Economics for Managers	CO:1 Study of decision making and performance evaluation techniques in management accounting
			CO:2 Understand decision making and performance evaluation techniques in management accounting.
			CO:3 In modern competitive business environment, suitable business decision making is very crucial
			CO:4 Identify relevant information for decision making purposes in order to produce financial analyses for a range of decisions such as product-mix, pricing, outsourcing and special orders.
			CO:5 Use standard costs to prepare budgets for planning and control purposes.
			CO:6 Understand the principles of standard costing.
	17260C015	Legal Aspects of Business	CO:1xamine the differences and similarities between leadership, power, and management
			CO:2 impact that a company's structure and design can have on its organizational behavior
			CO:3 impact of culture on organizational behavior
			CO:4 Analyze management issues as related to organizational behavior
			CO:5Examine challenges of effective organizational communication
			CO:6 Evaluate ethical issues as related to organizational behavior
	17260C016	Statistics for Managers	CO:1 Develop skills in data collection and complex analysis
			CO:2 Clarify terminology and approaches to different facets of research-based teaching
			CO:3 Explore good practices in institution-driven, strategic approaches on how to integrate research and education missions
			CO:4 Generate ideas on how to build the capacity of faculty members to implement researchbased teaching
			CO:5 create a research-based learning environment
			CO:6 Analyse national frameworks, policies and funding
	17260P017	Managerial Skill Development - Lab	CO:1 Employ basic statistical methods to decision making
			CO:2 Understand how to apply basic models and theories in business
			CO:3 Solve management problems effectively
			CO:4 Use software tools to model decision problems.
			CO:5 Clearly identify an otherwise unstructured business problem and its components
			CO:6 Employ effective techniques for addressing the major challenges presented
			CO:7 Provide a solution to the decision process
II	17260C021	Financial Management	CO:1 Given a product or a service type, the student manager will be able to enumerate and justify the dimensions of product quality or service quality for the same
			CO:2 Given the quality gurus (Deming/ Juran/ Taguchi/ Crosby), the student manager will be able to justify their philosophies/ contributions in Quality Management.
			CO:3 Given a quality problem/ failure mode, the student manager will be able to identify causes and sub causes of the effect/ problem and justify Ishikawa Diagram.

			CO:4 For a given type of organization, the student manager will be able to enlist and justify the four levels of benchmarking and/ or enlist and brief seven step benchmarking model
	17260C022	Human Resources Management	CO:1 Activity based approaches to management and cost analysis
			CO:2 Analysis of common costs in manufacturing and service industry
			CO:3 Techniques for profit improvement, cost reduction, and value analysis
			CO:4 Throughput accounting
			CO:5 Target costing; cost ascertainment and pricing of products and services
			CO:6 Pricing Decisions
			CO:7 Budgets and Budgetary Control
			CO:8 Evolution of standards, continuous -improvement; keeping standards meaningful and relevant; variance analysis
			CO:6 Distinguish Joint Venture and Partnership and to learn the methods of maintaining records under Joint Venture
			CO:7 Understand the meaning and features of Non-Profit Organisations
			CO:8 Learn to prepare Receipts & Payment Account, Income & Expenditure Account and Balance Sheet for Non-Profit Organizations
	17260C023	Marketing Management	CO:1 The role that retailing plays in the distribution component of the marketing mix
			CO:2 Understanding of the concept of social responsibility and the role it plays in retailin
			CO:3 Aware of the moral and ethical dilemmas that face the retailing industry in today's business environment
			CO:4 Development and understanding of implementing a retail strategy.
			CO: 5 Understanding of the increased use of technology in the field of retailing
			CO:6 Identify key roles within retail businesses
	17260C024	Production & Operations Management	CO:1 Demonstrate knowledge of research processes (reading, evaluating, and developing)
			CO:2 Perform literature reviews using print and online databases
			CO:3 Identify, explain, compare, and prepare the key elements of a research proposal/report
			CO:4 Select and define appropriate research problem and parameters
			CO:5 Prepare a project proposal (to undertake a project)
			CO:6 Understand some basic concepts of research and its methodologies
	171CBMRM25	Research Methodology	CO:1 Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
			CO:2 Have basic knowledge on qualitative research techniques
			CO:3Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
			CO:4 Have basic awareness of data analysis-and hypothesis testing procedures
			CO:5 knowledge for enabling students to develop data analytics skills and meaningful interpretation to the data sets so as to solve the business/Research problem.

			CO:6 Describe sampling methods, measurement scales and instruments, and appropriate uses of each
	17260C026	Strategic Management	CO:1 Understand the How Subcontract Administration and Control are practiced in the Industry.
			CO:2 Understand the contract management, Project Procurement, Service level Agreements and productivity
			CO:3 Apply the risk management plan and analyse the role of stakeholders.
			CO:4 Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.
			CO:5 Understand the conceptual clarity about project organization
			CO:6 Understand project characteristics and various stages of a project
	17260P027	Data Analysis Lab	CO:1 Critically analyse both older and newer MA methods and their effects in organisations
			CO:2 knowledge and understanding about MA issues, including its problems and difficulties
			CO:3 Part in the design and use of the management accounting system in organisations
			CO:4 Updated concerning the more recent development in MA and the emergence of new methods
			CO:5 More advanced level compared to the basic knowledge acquired on the Bachelor level
			CO:6 Exposure to the company final accounts
	17161BRC27	Participation in Bounded Research	CO:1 Knowledge, understanding and skills in the area of international financial relations and tolls for its implementation
			CO:2 Knowledge and understanding of characteristics, activities, principles and specifics of international financial relations
			CO:3 Ability to summarize and critically evaluate results obtained by researchers in the field of international financial relations
			CO:4 Ability to analyse and use various sources of information and data in the field and make assessment
			CO:5 Use methods in the field of international finance in practice;
			CO:6 Economic essence and currency classifications: the concept of currency and its basic classification; characteristics of currencies.
III	17260C031	International Business Environment	CO:1 To introduces meaning and functions of Financial Intermediaries
			CO:2 To understand the role of merchant bank qnd its services
			CO:3 To provide information regarding management of mutual funds and Regulations
			CO:4 To understand the role and functions of financial services Marketing
			CO:5 To know the structure and types of debt Instruments
			CO:6 To realize Foreign Exchange Market
	17260C032	Operational Research	CO:1 to help students manage individual or team projects.
			CO:2 Begin project-planning with a specific audience with a specific and pressing concern

			CO:3 Let students design their own projects. Or require that projects iterate or counter existing cultural trends and patterns or that address compelling social concerns (e.g.technology addiction).
			CO:4 Use concept-mapping before, during, and after the project is completed.
			CO:5Give students the opportunities to use their specific gifts, skills, and backgrounds in completing the project.
			CO:6 Help students brainstorm the opportunities for creative risk-taking at the beginning of a project.
	17161SRC33	Participation in Scaffold Research	CO:1 File IT Return on individuals basis
			CO:2 Compute the total Income and Define tax complicacies and structure.
			CO:3 In order to familiarize the different know-how and heads of income with its components
			CO:4 It helps to build an idea about income from house property as a concept
			CO:5 It give more idea about the income from business or profession
			CO:6 Make the students familiarizes with the concept of depreciation and its provisions
IV	17260C041	Entrepreneurial Development	CO:1 Have developed an understanding of major issues related to international Business
			CO:2 Have developed skills in researching and analyzing trends in global markets and in modern marketing practice
			CO:3 An organization's ability to enter and compete in international markets.
			CO:4 Develop skills in researching and analyzing international Business opportunities
			CO:5 Develop a high level of analytical skills and critical thinking in an international Business contex
			CO:6 Explain the main institutions that shape the global marketplace;
	17261PRW44	Project Work	CO:1 Know about the company in the Abroad.
			CO:2 Understand the use of the memorandum of association and article of association in a company, they also learn from this course
			CO:3 Develop Professionals in the filed of Project

			SPECIALIZATIONS
	MARKETING		
2017		MBA	
Sem	**Course Code**	**Title of the Course**	**COs**
	17260EA33	Consumer Behaviour	The basic objective of this course is to develop an understanding about the consumer decision making process and its applications in marketing function of firms.

Sem	Course Code	Title of the Course	COs
III	17260EA34	Integrated Marketing Communication	Due to ever increasing business dealings the subject of International Marketing has gained utmost importance in recent times. The world these days, indeed has shrunk and foreign markets have particularly become important especially for a developing country like India. The major objective of this course is to provide an exposure to the area of Marketing in the International perspective.
	17260EA35	Brand Management	The objective of this course is to introduce students to the basic scope, benefits and types of brands; and understand the steps involved in designing an appropriate brand for the organization.
	17260EA36	Retail Management	The objective of this course is to introduce students to the basic scope, benefits and types of retailers; and understand the steps involved in designing an appropriate retail organization structure.
	17260EA37	Sales Management	The purpose of this paper is to acquaint the student with the concepts which are helpful in developing a sound sales policy and in organizing and managing sales force and marketing channels and to impart the knowledge about sales management procedure, and activities.
	17260EA38	Services Marketing	The objective of the course is to develop an understanding of services and service marketing with emphasis on various aspects of service marketing which make it different from goods marketing.
	17260EA39	Industrial Marketing	A broad range of job profiles are available for individuals with a degree in industrial marketing courses, and many top companies provide various job offers for students engaged in this course degree. A Market Analyst helps companies and organizations in decision making of products and services.
IV	17260EA42	Customer Relationship Management	The paper is designed to impart the skill based knowledge of Customer Relationship Management. The purpose of the syllabus is to not just make the students aware of the concepts and practices of CRM in modern businesses but also enable them to design suitable practices and programs for the company they would be working.
	17260EA43	International Marketing	The course has been developed so as to acquaint the students with environment, procedural, institutional and decisional aspects of International Marketing.
	17260EA44	Rural Marketing	The objective of this course is to explore the students to Rural Marketing environment so that they can understand consumer's and marketing characteristics of the same for understanding and contributing to the emerging challenges in the upcoming global economic scenario.

Human Resourse

2017		MBA	
Sem	**Course Code**	**Title of the Course**	**COs**
III	17260EB33	Knowledge Management	The goal of the course is to prepare studentso become familiar with the current theories, practices, tools and techniques in knowledge management (KM), and to assist students in pursuing a career in the information sector for profit and not for profit organizations. In addition, students will learn to determine the infrastructure requirements to manage the intellectual capital in organization.

Sem	Course Code	Title of the Course	COs
	17260EB34	Organizational Development & Change management	The objective of this paper is to prepare students as organizational change facilitators using the knowledge and techniques of behavioral science.
	17260EB35	Performance Management	The objective of this course is to help the students gain understanding of the functions of performance management system in the organization and provide them tools and techniques to be used in appraising the performance of the employees.
	17260EB36	Labour Legislations	This course will help the student to get exposure on Industrial Law. Understand the relations ship between the employee, employer, union and government and to have awareness of various industrial laws relating to employees.
	17260EB37	Compensation Reward Management	The course is designed to promote understanding of issues related to the compensation and rewarding human resources in the organizations and to impart skills in designing analyzing and restructuring reward management systems, policies and strategies.
	17260EB38	Cross Culture Management	The objective of this course is to develop a diagnostic and conceptual understanding of the cultural and related behavioral variables in the management of global organizations.
	17260EB39	Conflict and Negotiation Management	The course plan to develop an understanding of conflict dynamics and the art and science of negotiation. On the completion of syllabus, students will be in a position to answer the role that can be played by conflict resolution techniques such as mediation.
IV	17260EB42	Industrial Relation	This course will help the student to get exposure on Industrial Relations. Understand the relations ship between the employee, employer, union and government
	17260EB43	Training & Development	The objective of this course is to help the students gain understanding of the objectives of training in the organization and provide them tools and techniques to be used in training the employees. This paper will attempt to orient the students to tailor themselves to meet the specific needs of the organizations in training and development activities.
	17260EB44	Talent Management	This course will help the student to get exposure on Talent management. Understand the how to acquire talent employees and how to retain such employees in the organization for effective performance and achievement of goals.
	FINANCE		
2017		MBA	
Sem	**Course Code**	**Title of the Course**	**COs**
III	17260EC33	Security Analysis and Portfolio Management	The objective of this course is to impart knowledge to students regarding the theory and practice of Security Analysis and to give the students an in-depth knowledge of the theory and practice of Portfolio Management.
	17260EC34	Derivatives Management	To give an in-depth knowledge of the functioning of derivative securities market.
	17260EC35	Project Finance	

Sem	Course Code	Title of the Course	COs
	17260EC36	Financial Services and Institutions	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.
IV	17260EC37	International Finance	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.
	17260EC38	Insurance and Risk Management	To give the students an overall view of the international financial system – instruments and markets.
	17260EC39	Corporate Finance	To provide the basics of insurance contracts and to explain the various types of insurance policies.
IV	17260EC42	Micro Finance	Student will acquire Nuances involved in short term corporate financing, Good ethical practices
	17260EC43	Strategic Financial Management	To enable the students to understand the principles, practices and application in Micro Finance.
	17260EC44	Merchant Banking and Financial Services	To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.

Production and Operations

2017		MBA	

Sem	Course Code	Title of the Course	COs
III	17260ED33	Project Management	This course focuses on project management methodology that will increase the ability of students to initiate and manage projects more efficiently and effectively. Also they will learn key project management phases through an innovative model.
	17260ED34	Planning and control of operations	This course is designed to acquaint the student with the methods of planning and control
	17260ED35	Technology Management	This course helps to understand the dynamics of technological innovation and be familiar with how to formulate technology strategies
	17260ED36	Logistics Management	The objective of this course is to get the exposure of logistics management and to understand the relationship between the logistics and packaging.
	17260ED37	Supply Chain Management	The objective of this course is to get the exposure of supply chain management and to understand the relationship between the procurement and supply chain management
	17260ED38	Business Process Reengineering	The objectives of this course are to acquaint the student with understanding process orientation in business management and develop skills and abilities in re-engineering and business process for optimum performance.
	17260ED39	Material Management	To understand the working of a materials management department, Aspects of Stores management, Warehousing management and material requirement planning.
	17260ED42	Maintenance Management	To enable the students to understand the principles, practices and applications in Maintenance Management.

Sem	Course Code	Title of the Course	COs
IV	17260ED43	Service and Operation Management	To help understand how service performance can be improved by studying services operations management
	17260ED44	Product Design	To help Understand the application of structured methods to develop a product. Student gains knowledge on how a product is designed based on the needs of a customer

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Sem	Course Code	Title of the Course	COs
2017		MBA	
III	17260EE33	Purchasing and Procurement Management	The objective of this course is to impart knowledge to students regarding the theory and practice of Security Analysis and to give the students an in-depth knowledge of the theory and practice of Portfolio Management.
	17260EE34	Material Management	To give an in-depth knowledge of the functioning of derivative securities market.
	17260EE35	Inventory Management	
	17260EE36	Supply Chain Management	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.
	17260EE37	Logistics Management	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.
	17260EE38	Custom House Practice And Legalities	To give the students an overall view of the international financial system – instruments and markets.
	17260EE39	Export Trade And Documentation	To provide the basics of insurance contracts and to explain the various types of insurance policies.
IV	17260EE42	Quality Management	Student will acquire Nuances involved in short term corporate financing, Good ethical practices
	17260EE43	Air Cargo Logistics Management	To enable the students to understand the principles, practices and application in Micro Finance.
	17260EE44	Shipping And Ocean Freight Logistics Management	To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.

INTERNATIONAL BUSINESS

Sem	Course Code	Title of the Course	COs
2017		MBA	
III	17260EF33	International Marketing	The objective of this course is to impart knowledge to students regarding the theory and practice of Security Analysis and to give the students an in-depth knowledge of the theory and practice of Portfolio Management.
	17260EF34	International Human Resource Management	To give in-depth knowledge of the functioning of derivative

653

Sem	Course Code	Title of the Course	COs
	17260EF35	Cross Cultural Management	securities market.
	17260EF36	Global Logistics and Supply Chain Management	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.
	17260EF37	International Trade Procedures and Documentation	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.
			To give the students an overall view of the international financial system – instruments and markets.
	17260EF38	International Strategic Management	To provide the basics of insurance contracts and to explain the various types of insurance policies.
	17260EF39	Global Business Ethics and Corporate Governance	To give the students an overall view of the international financial system – instruments and markets.
IV	17260EF42	Management Of International Developmental Organizations	To enable the students to understand the principles, practices and application in Micro Finance.
			To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.
	17260EF43	Merger and Acquisitions	The course is to sensitize the students to issues pertaining to sustainable development and business ethics and enable development and business ethics and enable them to understand the implications of various statutory and policy guidelines concerning corporate governance for actual business decision making.
	17260EF44	International Financial Management	The course is to sensitize the students to issues pertaining to sustainable development and business ethics and enable development and business ethics and enable them to understand the implications of various statutory and policy guidelines concerning corporate governance for actual business decision making.

SYSTEM			
2017		MBA	

Sem	Course Code	Title of the Course	COs
III	17260EG33	Software Engineering	This course aims to understand the software engineering and apply the knowledge of a disciplined approach to the development of software and to the management of the software product lifecycle.
	17260EG34	Software Project Management	To give an in-depth knowledge of the functioning of derivative securities market.
	17260EG35	Relational Database Management	

Sem	Course Code	Title of the Course	COs
	17260EG36	E- Business Technology Management	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.
	17260EG37	Data Warehousing & Data Mining	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.
	17260EG38	Knowledge Management	To give the students an overall view of the international financial system – instruments and markets.
	17260EG39	Enterprise Resource Planning	To provide the basics of insurance contracts and to explain the various types of insurance policies.
IV	17260EG42	Information Storage & Management	Student will acquire Nuances involved in short term corporate financing, Good ethical practices
	17260EG43	Cloud Computing	To enable the students to understand the principles, practices and application in Micro Finance.
	17260EG44	Decision Support System And Intelligent Systems	To understand the components of DSS and IS. To know the appropriate model to be used for a problem

HOSPITAL MANAGEMENT

Sem	Course Code	Title of the Course	COs
2017		MBA	
III	17260EH33	Management Of Hospital Services	To enable the students gain insights into various aspects like importance, functions, policies and procedures, equipping, controlling, co-ordination, communication, staffing, reporting and documentation of both clinical and non clinical services in a hospital.
	17260EH34	Operations Management In Health Care	To give an in-depth knowledge of the functioning of derivative securities market.
	17260EH35	Marketing Management Of Hospital And Health Care Services	
	17260EH36	Community Health and Management of	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.
		National Health Programmes	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.
	17260EH37	Management of Clinical and Super Specialty	To give the students an overall view of the international financial system – instruments and markets.

Sem	Course Code	Title of the Course	COs
		Services in Hospitals	To provide the basics of insurance contracts and to explain the various types of insurance policies.
IV	17260EH38	Patient Care Management	Student will acquire Nuances involved in short term corporate financing, Good ethical practices
	17260EH39	Health Related Laws and Ethics	To enable the students to understand the principles, practices and application in Micro Finance.
	17260EH42	Medical Tourism	The Objective of the Course is to familiarize the learner with the importance, techniques and the procedures involved in the management of Hospital Waste.

TOURISM			
2017		MBA	

Sem	Course Code	Title of the Course	COs
III	17260EI33	Tourism Principles, Policies and Practices	To realize the potential of tourism industry in India. To understand the various elements of Tourism Management and familiarize with the Tourism policies in the national and international context**.**
	17260EI34	Tourism Products of India	To give an in-depth knowledge of the functioning of derivative securities market.
	17260EI35	Destination Planning and development	
	17260EI36	Travel agency and Tour operations	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.
	17260EI37	Hospitality Management	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.
	17260EI38	Indian culture and Heritage	To give the students an overall view of the international financial system – instruments and markets.
	17260EI39	Tourism Marketing	To provide the basics of insurance contracts and to explain the various types of insurance policies.
IV	17260EI42	Ecotourism	Student will acquire Nuances involved in short term corporate financing, Good ethical practices
	17260EI43	Event Management	To enable the students to understand the principles, practices and application in Micro Finance.
	17260EI44	E- Tourism	To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.

		AGRI BUSINESS MANAGEMENT	
2017		MBA	
Sem	**Course Code**	**Title of the Course**	**COs**
III	17260EJ33	Agribusiness Environment and Policy	To realize the potential of tourism industry in India. To understand the various elements of Tourism Management and familiarize with the Tourism policies in the national and international context**.**
	17260EJ34	Agricultural Marketing Management	To give an in-depth knowledge of the functioning of derivative securities market.
	17260EJ35	Farm Business Management	
	17260EJ36	Management of Agribusiness Cooperatives	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.
	17260EJ37	Food Retail Management	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.
	17260EJ38	Management of Agricultural Input Marketing	To give the students an overall view of the international financial system – instruments and markets.
	17260EJ39	Agri Supply Chain Management	To provide the basics of insurance contracts and to explain the various types of insurance policies.
	17260EJ42	Agriculture Economics	Student will acquire Nuances involved in short term corporate financing, Good ethical practices
IV	17260EJ43	Agricultural and Micro-Finance	To enable the students to understand the principles, practices and application in Micro Finance.
	17260EJ44	New Trends and Development in Agri-Sector	To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.

				POS					
2017		BBA							
Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
I	17110AEC11	Tamil I	CO:1 Learn the changes occurred in literature since classical period.	*	*				
			CO:2 Make use of vocabulary systematically.	*					
			CO:3Understand how to lead one's life realizing the modernity and its environment/atmosphere.	*	*	*			
	17111AEC12	English I	CO:1 Develop vocabulary	*	*				
			CO:2 zarLearn to edit and do proof reading	*	*				
			CO:3Read and comprehend literature	*	*	*			
	17160SEC13	Principles of Management	CO:1 Read and comprehend literature	*	*	*			
			CO:2 Appreciate poetry and prose	*	*				
			CO:3 Familiarize students with fiction.	*	*	*			
	17160SEC14	Managerial Economics	CO:1 Understanding the fundamental of financial accounting				*	*	*
			CO:2 Develop the modern market economy				*	*	
			CO:3 prepare the different kinds of financial statement				*	*	*
			CO:4 Acquire conceptual knowledge of basics of accounting				*	*	
			CO:5 Identify and analyze the reasons for the difference between cash book and pass book balances					*	*
			CO:6 Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP				*	*	*
	17160AEC15	Business Communication	CO:1 Discuss the supply and demand theory and its impact on insurance					*	*
			CO:2 outline an how entity operate in the Business environment		*	*			
			CO:3 Explain the legal frame work that regulate the insurance industry					*	*
			CO:4 Understand relationship between environment and business; Applying the environmental analysis techniques in practice						*

Code	Course	CO						
		CO:5 Understand Economic, Socio-Cultural and Technological Environment				*		*
		CO:6 Know state policies Economic legislations and Economic reforms laid by the government						
17160AEC16	Business Mathematics and Statistics	CO:1 Understand fundamental marketing concepts, theories and principles in areas of marketing policy				*		*
		CO:2 Apply the knowledge, concepts, tools necessary to understand challenges				*	*	*
		CO:3 Understand the marketing concepts and its evolution				*		*
		CO:4 Analyze the market based on segmentation, targeting and positioning				*	*	*
		CO:5 Know the consumer behavior and their decision making process				*	*	*
		CO:6 Understand the rural markets and the contemporary issues in marketing				*	*	*
		Co:7 Make decisions on product, price , promotion mix and distribution				*		*
17120SEC01AL	Skill Based Elective Course - I	CO:1 Apply the concept of opportunity cost.				*	*	*
		CO:2 understand the concepts of cost, nature of production and its relationship to Business operations.				*	*	*
		CO:3 Apply Economic theories to business decision				*		*
		CO:4 Use the theoretical concept of demand and supply analysis in practice				*	*	
		CO:5 Understand the cost concepts, theories of profit and business cycles				*	*	*
		CO:6 Use different demand forecasting techniques and apply different pricing techniques in business				*		*
		CO:7 Understand the importance of Fiscal policy				*		*
17111SEC01L	Communicative English Lab - I	CO1: Recognize when to use each of the Microsoft Office programs to create professional and academic documents.						*
		CO2: Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.					*	*
		CO3: Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.					*	*
171ETHVALS	Ethics and Values	CO:1 Learn grammar.	*	*	*			
		CO:2 Enrich vocabulary	*	*	*			
		CO:3 Understand the process of communication	*	*	*			

Sem	Course Code	Course Title	Course Outcome						
			CO:4 Develop listening skill	*	*	*			
II	17110AEC21	Tamil II	CO:1 Know what devotion really is.	*	*				
			CO:2 Know the fruitfulness obtained through devotion.	*	*				
			CO:3 Perceive the progress achieved in the society through devotion.	*		*			
	17111AEC22	English II	CO:1 Develop technological skill.	*	*	*			
			CO:2 Able to write in a variety of formats	*	*	*			
			CO:3 Read biographies and develop personality	*	*	*			
	17160SEC23	Core - III Financial Accounting	CO:1 Appreciate different forms of literature		*	*			
			Co:2 Acquire language skills through literature	*		*			
			Co:3 Broadens the horizon of knowledge	*		*			
	17160SEC24	Core - IV Organizational Behaviors	CO:1 familiarize the concept of Branch account and its system				*	*	*
			CO:2 understand the Scope of departmental accounting				*	*	
			CO:3 Appreciate the need for negotiable instruments and procedure of accounting for bills honored and dishonored				*	*	
			CO:4 Differentiate Trade bills from Accommodation Bills				*	*	*
	17160AEC25	Allied-III Business Environment	CO:1 Understand, and evaluate various organizational influences affecting ethical decisions			*	*		
			CO:2 Present and analyze ethical and moral issues			*	*		
			CO:3 Explore ethical theories			*	*		
			CO:4 Use contemporary and classical frameworks to analyze and suggest resolutions to ethical dilemmas.			*	*		
			CO:5 Identify and address common ethical issues that arise for individuals, managers, and organizations.			*	*		
			CO;6 ognize how individual differences and cognitive barriers can influence ethical judgment.			*	*		
			CO:7 Identify and prioritize personal values and apply those to making ethical decisions.			*	*		
	17160AEC26	Allied-IV Management Information System	CO:1 Critically evaluate the underlying assumptions of analysis tools				*	*	
			CO:2 Solve a range of problems using the techniques covered				*	*	
			CO:3 Conduct basic statistical analysis of data.				*	*	
			CO:4 Understand basic statistical concepts such as statistical collection, statistical series, tabular and graphical representation of data				*	*	

Sem	Course Code	Course Name	Course Outcome	1	2	3	4	5	6
			CO:5 Calculate measures of central tendency, dispersion and asymmetry, correlation and regression analysis				*	*	
			CO:6 Choose a statistical method for solving practical problems				*	*	
	17160RLC27	Research Led Seminar	CO: 1 Understand the dynamics of marketing in business				*	*	*
			CO:2 ability and confidence to tackle common practical financial problems of business.				*	*	*
			CO:3 Understand the scope of Business, and its importance.				*	*	*
			CO:4 Identify different forms of business organizations viz; Sole Proprietorship, Partnership, Joint Hindu Family Business & Co-operative Organizations.				*	*	
			CO:5 Understand a Joint Stock Company and various formalities to promote a Company				*	*	
			CO:6 Learn various sources Industrial Financial resources and the means to raise them				*	*	*
	17120SEC02AL	Skill Based Elective Course - II	CO:1. Identify the names and functions of the **PowerPoint** interface.		*	*			
			CO:2. Create, edit, save, and print presentations.		*	*			
			CO:3. Format presentations.		*	*			
			CO:4. Add a graphic to a presentation.		*	*			
			CO:5. Create and manipulate simple slide shows with outlines and notes.		*	*			
			CO:6. Create slide presentations that include text, graphics, animation, and transitions.		*	*			
	17111SEC02L	Communicative English Lab - II	CO:1 Learn grammar.	*	*	*			
			CO:2 Use a variety of reading strategies	*	*				
			CO:3 Enhance the skill of making grammatically correct sentences.	*	*	*			
			Co:4 Develop listening skill	*	*	*			
III	17110AEC31	Tamil III	CO:1 Achieve one's goal by following the ancestral path		*	*			
			CO:2 Learn to lead life of perfection by realizing the uncertainty in the life		*	*			
			CO:3 Attain happiness through honesty		*	*			
	17111AEC32	English III	CO:1 Understand phonetics.	*	*	*			
			CO:2 Develop writing skill	*	*	*			
			CO:3 Able to develop creative writing	*	*	*			
	17160SEC33		CO:1 Enable to appreciate different types of prose	*	*				

Code	Course	Course Outcome						
	Core – V Management Accounting	CO:2 Develop the conversational skills through one-act plays	*					
		CO:3 Enhance the skill of making grammatically correct sentences.	*	*	*			
17160SEC34	Core – VI Marketing Management	CO:1 Understand various costing systems and management systems				*	*	*
		CO:2 Analyse and provide recommendations to improve the operations of organisations				*	*	
		CO:3 Imbibe conceptual knowledge of cost accounting.				*	*	
17160AEC35	Allied- V Business Law	CO:1 Understanding of Banking Channels and Payments				*	*	
		CO:2 Practices on Banking Technology				*	*	*
		CO:3 Understanding of Core Banking				*	*	*
		CO:4 To gather knowledge on banking and financial system in India				*	*	*
17160AEC36	Allied- VI Human Resource Management	CO:1 Explain the concepts in business laws with respect to foreign trade			*	*	*	
		CO:2 Apply the global business laws to current business environment				*	*	
		CO:3 Demonstrate an understanding of the Legal Environment of Business.				*	*	
		CO:4 Communicate effectively using standard business and legal terminology.			*	*	*	
171CBMRM37	Research Methodology	CO:1 Identify ethical, legal, cultural, and global issues affecting business communication.			*	*		
		CO:2 Utilize analytical and problem solving skills appropriate to business communication.	*		*	*	*	
		Co:3 Effective **business** writing	*	*	*			
		CO:4 Research approaches and information collection.			*	*		
17120SEC03AL	Skill Based Elective Course - III	CO:1 Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.			*			
		CO:2 familiarize participants with basic of research and the research process.			*	*		
		CO:3 enable the participants in conducting research work and formulating research synopsis and report.			*			
		CO:4 Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.			*			
17111SEC03L	Communicative English - III	CO:1. Indicate the names and functions of the **Excel** interface components.			*	*		
		CO:2. Enter and edit data.			*			
		CO:3. Format data and cells.			*			

Sem	Course Code	Course Title	Course Outcome						
			CO:4. Construct formulas, including the use of built-in functions, and relative and absolute references.		*				
			CO:5. Create and modify charts.		*				
			CO:6. Preview and print worksheets.		*				
IV	17110AEC41	Tamil IV / Hindi IV/ Advanced English IV	CO:1 Realize how the ancient people changed their life style according to the ages		*	*			
			CO:2 Learn how to change one's lifestyle according to the needs of the future		*	*			
			CO:3 Accept the modern trends and its uses		*	*			
	17111AEC42	English IV	CO:1 Develop writing skill.	*	*	*			
			CO:2 Comprehend and describe poems	*	*	*			
			CO:3 Learn interviewing skills	*	*	*			
	17160SEC43	Core - VII Total Quality Management	CO:1 Improve their ability to read and understand them	*	*	*			
			CO:2 Know the genius of Shakespeare	*	*	*			
			CO:3 Express in writing their views.	*	*	*			
	17160SEC44	Core - VIII Cost Accounting	CO:1 Understand the concept of partnership				*	*	*
			CO:2 Understand the journal entries for the formation of partnership				*	*	*
			CO:3 Familiarize the concept of Branch account and its system				*	*	
	17160AEC45	Allied -VII Retail Management	CO:1 Understand the key principles and tools of integrated marketing communication				*	*	
			CO:2 Explain the environmental factors which influence consumer and organizational decision				*	*	*
			CO:3 Identify the elements of the communication process between buyers and sellers in business. making process				*	*	*
	17160AEC46	Allied -VIII Industrial Relations and Labour Law	CO:1 Get a basic understanding of different type of meeting of board of directors.				*	*	
			CO:2 Use international trade terms and concepts when communicating.	*		*	*		
			CO:3 Demonstrate comprehensive knowledge and understanding of social and economic policy considerations arising in this area.				*	*	
			CO:4 Understanding of those areas of company law identified in the indicative syllabus above and form a critical judgement on areas of controversy within the topics studied;				*	*	
	17120SEC04AL	Skill Based Elective Course - IV	CO:1 Examine database concepts and explore the Microsoft Office Access environment.		*				
			CO:2. Design a simple database.		*				

Sem	Code	Course	CO	1	2	3	4	5	6
			CO:3. Build a new database with related tables.		*				
			CO:4. Manage the data in a table.		*				
	17111SEC04L	Communicative English - IV	CO:1 Learn grammar.	*	*	*			
			CO:2 Enable to express their views in conversation	*	*				
			CO:3 Develop soft skills	*	*				
			CO:4 ce presentation skills	*	*				
	171ENVTSTU	Environmental Studies	CO:1 Learn about environmental pollution.		*	*			
			CO:2 Familiarize with the social issues and the environment		*	*			
			CO:3 will be able to do independent research on human interactions with the environment.		*	*			
			CO:4 To recognize the physical, chemical, and biological components of the earth's systems and show how they function		*	*			
			CO:5 Analyze and evaluate ideological and philosophical approaches used to understand environmental relationships.		*	*			
			CO:6 Carry out an applied research project in the natural sciences.		*	*			
V	17160SEC51	Core - IX Financial Management	Co:1 Find out how can a company dissolve.				*	*	
			CO:2 Understand Mutual funds investments.				*	*	*
			CO:3 Learn about Working format of companies.				*	*	
			CO:4 Enabling the students to understand the features of Shares and Debentures				*	*	
			CO:5 Develop an understanding about redemption of Shares and Debenture and its type				*	*	*
			CO:6 Exposure to the company final accounts				*	*	*
	17160SEC52	Core - X Services Marketing	CO:1 Use business finance terms and concepts when communicating.	*				*	*
			CO:2 Demonstrate a basic understanding of financial management.				*	*	*
			CO:3 Provide introduction to Financial Management				*	*	*
			CO:4 Create an awareness about capital structure and theories of capital structure				*	*	
			CO:5 Make them understand the cost of capital in wide aspects				*	*	
	17160SEC53	Core – XI Production and Operations Management	CO:1 Forecast a firm's future financing requirements				*	*	*
			CO:2 Design an optimal capital structure.				*	*	
			CO:3 Give an idea about fundamentals of financial services and players in financial sectors				*	*	

Course Code	Course Name	Course Outcomes					
		CO:4 Create an awareness about merchant banking, issue management, capital markets and role of SEBI				*	*
		CO:5 Provide knowledge about leasing and hire purchase concepts				*	*	*
		CO:6 Make them understand about different types of insurance and IRDA Act.				*	*
17160DSC54	Discipline Specific Elective - I	Co1:Study the development of computers and their components in each stage.						*
		CO2 : Develop an idea of software, programming language and operating system.	*					
		CO3 : Study the concept of developing database and its maintenance using computers in a business Concern				*		*
		CO4 :Analyze the importance of management information system and networking in a business.				*	*	*
		CO5 : Be aware and perform various activities using computers in day to day life.				*	*	*
17160BRC55	Participation Bounded Research	CO:1 Know about the company law in the India.				*	*
		CO:2 Understand the use of the memorandum of association and article of association in a company, they also learn from this course				*	*
		CO:3 Develop Professionals in the filed of Co-operation, Co-operative law and Management.				*	*
		CO:4 Promote qualified, Skilled and professional manpower to manage the affairs of the Cooperative Institutions.				*	*	*
		CO:5 Enhance the Knowledge base of the in-service Personnel on the subject Co-operation, Co-operative law and Co-operative Management.				*	*	*
17120SEC05AL	Skill Based Elective Course - V	CO:1 Do the allotted work in research		*			
		CO:2 Learn to do review of literature		*			
		CO:3 Demonstrate knowledge of research processes		*			
		CO:4 Perform literature reviews using print and online database		*			
		CO:5 Identify, explain, compare, and prepare the key elements of a research proposal/report		*			
17111SEC05L	Communicative English Lab- V	CO:1 work with the Photoshop workspace	*				
		CO:2. navigate images	*				
		CO:3. resize and crop images	*				
		CO:4. make and work with selections	*				
		CO:5. create new layers and perform other basic layer functions	*				

Sem	Course Code	Course Title	Course Outcomes						
VI	17160SEC61	Core - XII Strategic Management and Business Policy	CO:1 Prepare analysis of various special decisions, using relevant costing and benefits				*	*	*
			CO:2 More effective planning and control systems				*	*	
			CO:3 The students thought and knowledge on management Accounting				*	*	
			CO:4 Helps to give proper idea on financial statement analysis in practical point of view				*	*	*
			CO:5 Introduce the concept of fund flow and cash flow statement				*	*	
	17160SEC62	Core – XIII Entrepreneurial Development	CO:1 Understand the systematic process to select the business ideas.				*	*	*
			CO:2 Write a business plan		*		*	*	*
			CO:3 Develop students about Entrepreneurship development				*	*	*
			CO:4 Create an awareness on various Entrepreneurship Development Programme				*	*	*
	17160SEC63	Core – XIV Logistics and Supply Chain Management	CO:1 Articulate knowledge of fundamental audit concepts				*	*	
			CO:2 Apply critical thinking skills and slove auditing Problems.				*	*	*
			CO:3 Apply and demonstrate the accounting knowledge and skills in Auditing.				*	*	*
	17160DSC64	Discipline Specific Elective – II	CO:1 File IT Return on individuals basis				*	*	*
			CO:2 Compute the total Income and Define tax complicacies and structure.				*	*	*
			CO:3 In order to familiarize the different know-how and heads of income with its components				*	*	*
	17160GEC65	General Elective - I	CO:1 Greater Social support			*	*	*	
			CO:2 More on-task behaviour				*	*	*
			CO:3 Develop Professionals in the filed of Co-operation, Co-operative law and Management.				*	*	*
	17160PRW66	Project Work	CO:1 To help to gather knowledge on banking and financial system in India						
			CO:2 To provide knowledge about commercial banks and its products				*	*	*
			CO;3 Aim to familiarize banking system in India				*	*	*
	17111SEC06L	Communicative English Lab - VI	CO:1 Develop plans with relevant people to achieve the project's goals						
			CO:2 Break work down into tasks and determine handover procedures						
			CO:3 Identify links and dependencies, and schedule to achieve deliverables						

Course Code	Course Title	COS	POS					
			PO1	PO2	PO3	PO4	PO5	PO6
17120SEC01A	Fundamentals of Computers	To familiarize the students to the basic concepts of management in order to aid in understanding how an organization functions, and in understanding the complexity and wide variety of issues managers face in today's business firms.						
17160SEC01B	Soft Skills – I	To provide an overview of theories and practices in organizational behavior in individual, group and organizational level.	*	*				
17120SEC02A	Ms office Packages Lab	To acquaint the students with the fundamental principles of financial, cost & Management Accounting. Enable the students to take decisions using management accounting tools and to exposes the students to various concepts and principles of accounting for making efficient decisions.	*					
17160SEC02B	Soft Skills- II	To make the students aware of the various economic theories and principles - To equip them with the required tools and techniques for improving their decision-making skills.	*	*	*			
17120SEC03A	Writing and Presentation Skills Lab	To create the knowledge of Legal perspective and its practices to improvise the business.	*	*				
17160SEC03B	Soft Skills – III	This course mainly deals with the use of Statistical concepts in the resolution of managerial decision problems. As such the course will deal not only with some of the theoretical concepts in Statistics but will also be concerned with their application.	*	*				
17120SEC04A	General Aptitude and Personality Development Lab	Facilitate student to understand the operational nuances of a Finance Manager Comprehend the technique of making decisions related to finance function	*	*	*			

17160SEC04B	Soft Skills – IV	To provide knowledge about management issues related to staffing, training, performance, compensation, human factors consideration and compliance with human resource requirements.	*	*	*			
17120SEC05A	Photoshop Lab	To understand fundamental concepts of Marketing in Modern Marketing Practices	*	*				
17160SEC05B	Soft Skills – V	To provide a broad introduction to the field production and operations management and explain the concepts, strategies, tools and techniques for managing the transformation process that can lead to competitive advantage.	*	*	*			

2017		MBA							
		Title of the Course		**POS**					
Sem	**Course Code**		**COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
I	17260C011	Management Concepts	CO:1 This specialization lays the neccessary groundwork for an overall successful marketing strategy	*	*				*
			CO:2knowledge required to understand the state of your product before approaching the market strategy	*	*				*
			CO:3Interpret development of marketing research	*	*				*
			CO:4 Identify the major influences in Consumer Behaviour	*	*				*
			CO:5theory of Consumer behaviour and relates it to the practice of marketing.	*	*				*
			CO: 6 Demonstrate how knowledge of consumer behaviour can be applied to marketing.	*	*				*
	17260C012	Organisational Behaviour	CO:1 Contribute to the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes	*	*			*	
			CO:2Develop, implement, and evaluate employee orientation, training, and development programs.	*	*			*	
			CO:3Understanding of the basic concepts,functions and processes of HRM	*	*			*	
			CO:4 develop a selection and interviewing program	*	*			*	

Code	Course	Course Outcome	1	2	3	4	5	6
		CO:5 know formalize, Design and evaluate various Recruitment and Placement policies.	*	*			*	
		CO:6 Use methods of of collecting job analysis information.	*	*			*	
17260C013	Accounting for Managers	CO:1 Focuses on services, service design, and service innovation, with the aim of developing empathy for customers and understanding the customer experience	*	*			*	*
		CO:2 strategies that support broader marketing decisions.	*	*			*	
		CO:3 Develop an understanding of the role of relationship marketing and customer service	*	*			*	
		CO:4 Demonstrate a knowledge of the extended marketing mix for services.	*	*			*	*
		CO:5 Exhibit the capability to work effectively within a team environment.	*	*			*	
		CO:6Develop and Justify marketing planning and Control Systems.	*	*			*	
17260C014	Economics for Managers	CO:1 Study of decision making and performance evaluation techniques in management accounting	*	*				
		CO:2 Understand decision making and performance evaluation techniques in management accounting.	*	*	*	*		
		CO:3 In modern competitive business environment, suitable business decision making is very crucial	*	*	*			
		CO:4 Identify relevant information for decision making purposes in order to produce financial analyses for a range of decisions such as product-mix, pricing, outsourcing and special orders.	*	*	*	*		
		CO:5 Use standard costs to prepare budgets for planning and control purposes.	*	*	*	*		
		CO:6 Understand the principles of standard costing.	*	*	*	*		
17260C015	Legal Aspects of Business	CO:1xamine the differences and similarities between leadership, power, and management	*	*			*	
		CO:2 impact that a company's structure and design can have on its organizational behavior	*	*			*	
		CO:3 impact of culture on organizational behavior	*	*			*	
		CO:4 Analyze management issues as related to organizational behavior	*	*			*	

Sem	Course Code	Course	Course Outcome						
			CO:5 Examine challenges of effective organizational communication	*	*			*	
			CO:6 Evaluate ethical issues as related to organizational behavior	*	*			*	
	17260C016	Statistics for Managers	CO:1 Develop skills in data collection and complex analysis					*	
			CO:2 Clarify terminology and approaches to different facets of research-based teaching	*	*				
			CO:3 Explore good practices in institution-driven, strategic approaches on how to integrate research and education missions	*	*				
			CO:4 Generate ideas on how to build the capacity of faculty members to implement researchbased teaching	*	*				
			CO:5 create a research-based learning environment	*	*				
			CO:6 Analyse national frameworks, policies and funding	*	*				
	17260P017	Managerial Skill Development - Lab	CO:1 Employ basic statistical methods to decision making	*	*				
			CO:2 Understand how to apply basic models and theories in business	*	*		*		
			CO:3 Solve management problems effectively	*	*		*		
			CO:4 Use software tools to model decision problems.	*	*				
			CO:5 Clearly identify an otherwise unstructured business problem and its components	*	*		*		
			CO:6 Employ effective techniques for addressing the major challenges presented	*	*				
			CO:7 Provide a solution to the decision process	*	*		*		
II	17260C021	Financial Management	CO:1 Given a product or a service type, the student manager will be able to enumerate and justify the dimensions of product quality or service quality for the same	*	*			*	
			CO:2 Given the quality gurus (Deming/ Juran/ Taguchi/ Crosby), the student manager will be able to justify their philosophies/ contributions in Quality Management.	*	*			*	
			CO:3 Given a quality problem/ failure mode, the student manager will be able to identify causes and sub causes of the effect/ problem draw and justify Ishikawa Diagram.	*	*			*	

Code	Course	CO						
		CO:4 For a given type of organization, the student manager will be able to enlist and justify the four levels of benchmarking and/ or enlist and brief seven step benchmarking model	*	*			*	
17260C022	Human Resources Management	CO:1 Activity based approaches to management and cost analysis	*	*	*	*		
		CO:2 Analysis of common costs in manufacturing and service industry	*	*	*	*		
		CO:3 Techniques for profit improvement, cost reduction, and value analysis	*	*	*	*		
		CO:4 Throughput accounting	*	*	*			
		CO:5 Target costing; cost ascertainment and pricing of products and services	*	*	*	*		
		CO:6 Pricing Decisions	*	*	*	*		
		CO:7 Budgets and Budgetary Control	*	*	*	*		
		CO:8 Evolution of standards, continuous -improvement; keeping standards meaningful and relevant; variance analysis	*	*	*	*		
		CO:6 Distinguish Joint Venture and Partnership and to learn the methods of maintaining records under Joint Venture	*	*	*	*		
		CO:7 Understand the meaning and features of Non-Profit Organisations	*	*	*			
		CO:8 Learn to prepare Receipts & Payment Account, Income & Expenditure Account and Balance Sheet for Non-Profit Organizations	*	*	*	*		
17260C023	Marketing Management	CO:1 The role that retailing plays in the distribution component of the marketing mix	*	*			*	
		CO:2 Understanding of the concept of social responsibility and the role it plays in retailin	*	*			*	
		CO:3 Aware of the moral and ethical dilemmas that face the retailing industry in today's business environment	*	*			*	
		CO:4 Development and understanding of implementing a retail strategy.	*	*			*	
		CO: 5 Understanding of the increased use of technology in the field of retailing	*	*			*	
		CO:6 Identify key roles within retail businesses	*	*			*	

673

Code	Subject	Course Outcomes						
17260C024	Production & Operations Management	CO:1 Demonstrate knowledge of research processes (reading, evaluating, and developing)	*	*		*		
		CO:2 Perform literature reviews using print and online databases	*	*		*		
		CO:3 Identify, explain, compare, and prepare the key elements of a research proposal/report	*	*		*		
		CO:4 Select and define appropriate research problem and parameters	*	*		*		
		CO:5 Prepare a project proposal (to undertake a project)	*	*		*		
		CO:6 Understand some basic concepts of research and its methodologies	*	*		*		
171CBMRM25	Research Methodology	CO:1 Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.	*	*		*		
		CO:2 Have basic knowledge on qualitative research techniques	*	*		*		
		CO:3 Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis	*	*		*		
		CO:4 Have basic awareness of data analysis-and hypothesis testing procedures	*	*		*		
		CO:5 knowledge for enabling students to develop data analytics skills and meaningful interpretation to the data sets so as to solve the business/Research problem.	*	*		*		
		CO:6 Describe sampling methods, measurement scales and instruments, and appropriate uses of each	*	*		*		
17260C026	Strategic Management	CO:1 Understand the How Subcontract Administration and Control are practiced in the Industry.	*	*			*	
		CO:2 Understand the contract management, Project Procurement, Service level Agreements and productivity	*	*			*	
		CO:3 Apply the risk management plan and analyse the role of stakeholders.	*	*			*	
		CO:4 Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.	*	*		*		
		CO:5 Understand the conceptual clarity about project organization	*	*			*	

	Code	Course	CO						
			CO:6 Understand project characteristics and various stages of a project	*	*		*		
	17260P027	Data Analysis Lab	CO:1 Critically analyse both older and newer MA methods and their effects in organisations	*	*	*	*		
			CO:2 knowledge and understanding about MA issues, including its problems and difficulties	*	*	*	*		
			CO:3 Part in the design and use of the management accounting system in organisations	*	*	*	*		
			CO:4 Updated concerning the more recent development in MA and the emergence of new methods	*	*	*	*		
			CO:5 More advanced level compared to the basic knowledge acquired on the Bachelor level	*	*	*	*		
			CO:6 Exposure to the company final accounts	*	*	*	*		
	17161BRC27	Participation in Bounded Research	CO:1 Knowledge, understanding and skills in the area of international financial relations and tolls for its implementation	*	*	*			*
			CO:2 Knowledge and understanding of characteristics, activities, principles and specifics of international financial relations	*	*				*
			CO:3 Ability to summarize and critically evaluate results obtained by researchers in the field of international financial relations	*	*				*
			CO:4 Ability to analyse and use various sources of information and data in the field and make assessment	*	*				*
			CO:5 Use methods in the field of international finance in practice;	*	*				*
			CO:6 Economic essence and currency classifications: the concept of currency and its basic classification; characteristics of currencies.	*	*				*
III	17260C031	International Business Environment	CO:1 To introduces meaning and functions of Financial Intermediaries	*	*	*			
			CO:2 To understand the role of merchant bank qnd its services	*	*	*			
			CO:3 To provide information regarding management of mutual funds and Regulations	*	*	*			
			CO:4 To understand the role and functions of financial services Marketing	*	*	*			*

			CO:5 To know the structure and types of debt Instruments	*	*	*			
			CO:6 To realize Foreign Exchange Market	*	*	*			*
	17260C032	Operational Research	CO:1 to help students manage individual or team projects.	*	*			*	
			CO:2 Begin project-planning with a specific audience with a specific and pressing concern	*	*			*	
			CO:3 Let students design their own projects. Or require that projects iterate or counter existing cultural trends and patterns or that address compelling social concerns (e.g.technology addiction).	*	*			*	
			CO:4 Use concept-mapping before, during, and after the project is completed.	*	*			*	
			CO:5Give students the opportunities to use their specific gifts, skills, and backgrounds in completing the project.	*	*			*	
			CO:6 Help students brainstorm the opportunities for creative risk-taking at the beginning of a project.	*	*			*	
	17161SRC33	Participation in Scaffold Research	CO:1 File IT Return on individuals basis	*	*		*		
			CO:2 Compute the total Income and Define tax complicacies and structure.	*	*		*		
			CO:3 In order to familiarize the different know-how and heads of income with its components	*	*		*		
			CO:4 It helps to build an idea about income from house property as a concept	*	*		*		
			CO:5 It give more idea about the income from business or profession	*	*		*		
			CO:6 Make the students familiarizes with the concept of depreciation and its provisions	*	*		*		
IV	17260C041	Entrepreneurial Development	CO:1 Have developed an understanding of major issues related to international Business	*	*				*
			CO:2 Have developed skills in researching and analyzing trends in global markets and in modern marketing practice	*	*				*
			CO:3 An organization's ability to enter and compete in international markets.	*	*				*

676

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
			CO:4 Develop skills in researching and analyzing international Business opportunities	*	*				*
			CO:5 Develop a high level of analytical skills and critical thinking in an international Business contex	*	*				*
			CO:6 Explain the main institutions that shape the global marketplace;	*	*				*
	17261PRW44	Project Work	CO:1 Know about the company in the Abroad.	*	*				*
			CO:2 Understand the use of the memorandum of association and article of association in a company, they also learn from this course	*	*			*	
			CO:3 Develop Professionals in the filed of Project	*	*			*	
			SPECIALIZATIONS						
	MARKETING								
2017		MBA							

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
III	17260EA33	Consumer Behaviour	The basic objective of this course is to develop an understanding about the consumer decision making process and its applications in marketing function of firms.	*	*			*	
	17260EA34	Integrated Marketing Communication	Due to ever increasing business dealings the subject of International Marketing has gained utmost importance in recent times. The world these days, indeed has shrunk and foreign markets have particularly become important especially for a developing country like India. The major objective of this course is to provide an exposure to the area of Marketing in the International perspective.	*	*			*	
	17260EA35	Brand Management	The objective of this course is to introduce students to the basic scope, benefits and types of brands; and understand the steps involved in designing an appropriate brand for the organization.	*	*			*	
	17260EA36	Retail Management	The objective of this course is to introduce students to the basic scope, benefits and types of retailers; and understand the steps involved in designing an appropriate retail organization structure.	*	*		*		

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
	17260EA37	Sales Management	The purpose of this paper is to acquaint the student with the concepts which are helpful in developing a sound sales policy and in organizing and managing sales force and marketing channels and to impart the knowledge about sales management procedure, and activities.	*	*		*		
	17260EA38	Services Marketing	The objective of the course is to develop an understanding of services and service marketing with emphasis on various aspects of service marketing which make it different from goods marketing.	*	*		*		
	17260EA39	Industrial Marketing	A broad range of job profiles are available for individuals with a degree in industrial marketing courses, and many top companies provide various job offers for students engaged in this course degree. A Market Analyst helps companies and organizations in decision making of products and services.	*	*		*		
IV	17260EA42	Customer Relationship Management	The paper is designed to impart the skill based knowledge of Customer Relationship Management. The purpose of the syllabus is to not just make the students aware of the concepts and practices of CRM in modern businesses but also enable them to design suitable practices and programs for the company they would be working.	*	*		*		
	17260EA43	International Marketing	The course has been developed so as to acquaint the students with environment, procedural, institutional and decisional aspects of International Marketing.	*	*		*		
	17260EA44	Rural Marketing	The objective of this course is to explore the students to Rural Marketing environment so that they can understand consumer's and marketing characteristics of the same for understanding and contributing to the emerging challenges in the upcoming global economic scenario.	*	*				*
		Human Resourse							
2017		MBA							

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6

678

III	17260EB33	Knowledge Management	The goal of the course is to prepare studentso become familiar with the current theories, practices, tools and techniques in knowledge management (KM), and to assist students in pursuing a career in the information sector for profit and not for profit organizations. In addition, students will learn to determine the infrastructure requirements to manage the intellectual capital in organizations.	*	*			*	
	17260EB34	Organizational Development & Change management	The objective of this paper is to prepare students as organizational change facilitators using the knowledge and techniques of behavioral science.	*	*			*	
	17260EB35	Performance Management	The objective of this course is to help the students gain understanding of the functions of performance management system in the organization and provide them tools and techniques to be used in appraising the performance of the employees.	*	*			*	
	17260EB36	Labour Legislations	This course will help the student to get exposure on Industrial Law. Understand the relations ship between the employee, employer, union and government and to have awareness of various industrial laws relating to employees.	*	*		*		
	17260EB37	Compensation Reward Management	The course is designed to promote understanding of issues related to the compensation and rewarding human resources in the organizations and to impart skills in designing analyzing and restructuring reward management systems, policies and strategies.	*	*		*		
	17260EB38	Cross Culture Management	The objective of this course is to develop a diagnostic and conceptual understanding of the cultural and related behavioral variables in the management of global organizations.	*	*		*		
	17260EB39	Conflict and Negotiation Management	The course plan to develop an understanding of conflict dynamics and the art and science of negotiation. On the completion of syllabus, students will be in a position to answer the role that can be played by conflict resolution techniques such as mediation.	*	*		*		
IV	17260EB42	Industrial Relation	This course will help the student to get exposure on Industrial Relations. Understand the relations ship between the employee, employer, union and government	*	*		*		

679

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
	17260EB43	Training & Development	The objective of this course is to help the students gain understanding of the objectives of training in the organization and provide them tools and techniques to be used in training the employees. This paper will attempt to orient the students to tailor themselves to meet the specific needs of the organizations in training and development activities.	*	*		*		
	17260EB44	Talent Management	This course will help the student to get exposure on Talent management. Understand the how to acquire talent employees and how to retain such employees in the organization for effective performance and achievement of goals.	*	*				*
	FINANCE								
2017		MBA							

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
III	17260EC33	Security Analysis and Portfolio Management	The objective of this course is to impart knowledge to students regarding the theory and practice of Security Analysis and to give the students an in-depth knowledge of the theory and practice of Portfolio Management.	*	*			*	
	17260EC34	Derivatives Management	To give an in-depth knowledge of the functioning of derivative securities market.	*	*			*	
	17260EC35	Project Finance		*	*			*	
	17260EC36	Financial Services and Institutions	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.	*	*		*		
	17260EC37	International Finance	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.	*	*		*		
	17260EC38	Insurance and Risk Management	To give the students an overall view of the international financial system – instruments and markets.	*	*		*		

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
	17260EC39	Corporate Finance	To provide the basics of insurance contracts and to explain the various types of insurance policies.	*	*		*		
IV	17260EC42	Micro Finance	Student will acquire Nuances involved in short term corporate financing, Good ethical practices	*	*		*		
	17260EC43	Strategic Financial Management	To enable the students to understand the principles, practices and application in Micro Finance.	*	*		*		
	17260EC44	Merchant Banking and Financial Services	To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.	*	*				*
Production and Operations									
2017		MBA							

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
III	17260ED33	Project Management	This course focuses on project management methodology that will increase the ability of students to initiate and manage projects more efficiently and effectively. Also they will learn key project management phases through an innovative model.	*	*			*	
	17260ED34	Planning and control of operations	This course is designed to acquaint the student with the methods of planning and control	*	*			*	
	17260ED35	Technology Management	This course helps to understand the dynamics of technological innovation and be familiar with how to formulate technology strategies	*	*			*	
	17260ED36	Logistics Management	The objective of this course is to get the exposure of logistics management and to understand the relationship between the logistics and packaging.	*	*		*		
	17260ED37	Supply Chain Management	The objective of this course is to get the exposure of supply chain management and to understand the relationship between the procurement and supply chain management	*	*		*		
	17260ED38	Business Process Reengineering	The objectives of this course are to acquaint the student with understanding process orientation in business management and develop skills and abilities in re-engineering and business process for optimum performance.	*	*		*		

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
	17260ED39	Material Management	To understand the working of a materials management department, Aspects of Stores management, Warehousing management and material requirement planning.	*	*		*		
				*	*		*		
IV	17260ED42	Maintenance Management	To enable the students to understand the principles, practices and applications in Maintenance Management.	*	*		*		
	17260ED43	Service and Operation Management	To help understand how service performance can be improved by studying services operations management	*	*				*
	17260ED44	Product Design	To help Understand the application of structured methods to develop a product. Student gains knowledge on how a product is designed based on the needs of a customer	*	*				*

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

2017 — MBA

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
	17260EE33	Purchasing and Procurement Management	The objective of this course is to impart knowledge to students regarding the theory and practice of Security Analysis and to give the students an in-depth knowledge of the theory and practice of Portfolio Management.	*	*			*	
	17260EE34	Material Management	To give an in-depth knowledge of the functioning of derivative securities market.	*	*			*	
	17260EE35	Inventory Management		*	*			*	
III	17260EE36	Supply Chain Management	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.	*	*		*		
	17260EE37	Logistics Management	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.	*	*		*		
	17260EE38	Custom House Practice And Legalities	To give the students an overall view of the international financial system – instruments and markets.	*	*		*		

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
	17260EE39	Export Trade And Documentation	To provide the basics of insurance contracts and to explain the various types of insurance policies.	*	*		*		
IV	17260EE42	Quality Management	Student will acquire Nuances involved in short term corporate financing, Good ethical practices	*	*		*		
	17260EE43	Air Cargo Logistics Management	To enable the students to understand the principles, practices and application in Micro Finance.	*	*		*		
	17260EE44	Shipping And Ocean Freight Logistics Management	To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.	*	*				*

INTERNATIONAL BUSINESS

2017		MBA							

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
III	17260EF33	International Marketing	The objective of this course is to impart knowledge to students regarding the theory and practice of Security Analysis and to give the students an in-depth knowledge of the theory and practice of Portfolio Management.	*	*			*	
	17260EF34	International Human Resource Management	To give an in-depth knowledge of the functioning of derivative securities market.	*	*			*	
	17260EF35	Cross Cultural Management		*	*			*	
	17260EF36	Global Logistics and Supply Chain Management	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.	*	*		*		
	17260EF37	International Trade Procedures and	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.	*	*		*		
		Documentation	To give the students an overall view of the international financial system – instruments and markets.	*	*		*		
	17260EF38	International Strategic Management	To provide the basics of insurance contracts and to explain the various types of insurance policies.	*	*		*		

683

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
	17260EF39	Global Business Ethics and Corporate Governance	To give the students an overall view of the international financial system – instruments and markets.	*	*		*		
IV	17260EF42	Management Of International Developmental Organizations	To enable the students to understand the principles, practices and application in Micro Finance.	*	*		*		
			To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.	*	*				*
	17260EF43	Merger and Acquisitions	The course is to sensitize the students to issues pertaining to sustainable development and business ethics and enable development and business ethics and enable them to understand the implications of various statutory and policy guidelines concerning corporate governance for actual business decision making.	*	*		*		
	17260EF44	International Financial Management	The course is to sensitize the students to issues pertaining to sustainable development and business ethics and enable development and business ethics and enable them to understand the implications of various statutory and policy guidelines concerning corporate governance for actual business decision making.	*	*		*		

		SYSTEM							
2017		MBA							

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
	17260EG33	Software Engineering	This course aims to understand the software engineering and apply the knowledge of a disciplined approach to the development of software and to the management of the software product lifecycle.	*	*			*	
III	17260EG34	Software Project Management	To give an in-depth knowledge of the functioning of derivative securities market.	*	*			*	
	17260EG35	Relational Database Management		*	*			*	
	17260EG36	E- Business Technology Management	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.	*	*		*		

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
	17260EG37	Data Warehousing & Data Mining	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.	*	*		*		
	17260EG38	Knowledge Management	To give the students an overall view of the international financial system – instruments and markets.	*	*		*		
	17260EG39	Enterprise Resource Planning	To provide the basics of insurance contracts and to explain the various types of insurance policies.	*	*		*		
IV	17260EG42	Information Storage & Management	Student will acquire Nuances involved in short term corporate financing, Good ethical practices	*	*		*		
	17260EG43	Cloud Computing	To enable the students to understand the principles, practices and application in Micro Finance.	*	*		*		
	17260EG44	Decision Support System And Intelligent Systems	To understand the components of DSS and IS. To know the appropriate model to be used for a problem	*	*				*

HOSPITAL MANAGEMENT

2017		MBA							

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
III	17260EH33	Management Of Hospital Services	To enable the students gain insights into various aspects like importance, functions, policies and procedures, equipping, controlling, co-ordination, communication, staffing, reporting and documentation of both clinical and non clinical services in a hospital.	*	*			*	
	17260EH34	Operations Management In Health Care	To give an in-depth knowledge of the functioning of derivative securities market.	*	*			*	
	17260EH35	Marketing Management Of Hospital And Health Care Services		*	*			*	

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
		Community Health and Management of	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.	*	*		*		
	17260EH36	National Health Programmes	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.	*	*		*		
	17260EH37	Management of Clinical and Super Specialty Services in Hospitals	To give the students an overall view of the international financial system – instruments and markets.	*	*		*		
			To provide the basics of insurance contracts and to explain the various types of insurance policies.	*	*		*		
IV	17260EH38	Patient Care Management	Student will acquire Nuances involved in short term corporate financing, Good ethical practices	*	*		*		
	17260EH39	Health Related Laws and Ethics	To enable the students to understand the principles, practices and application in Micro Finance.	*	*		*		
	17260EH42	Medical Tourism	The Objective of the Course is to familiarize the learner with the importance, techniques and the procedures involved in the management of Hospital Waste.	*	*				*
		TOURISM							

2017		MBA							
Sem	**Course Code**	**Title of the Course**	**COs**	**POS**					
				PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
III	17260EI33	Tourism Principles, Policies and Practices	To realize the potential of tourism industry in India. To understand the various elements of Tourism Management and familiarize with the Tourism policies in the national and international context.	*	*			*	
	17260EI34	Tourism Products of India	To give an in-depth knowledge of the functioning of derivative securities market.	*	*			*	
	17260EI35	Destination Planning and development		*	*			*	

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
	17260EI36	Travel agency and Tour operations	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.	*	*		*		
	17260EI37	Hospitality Management	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.	*	*		*		
	17260EI38	Indian culture and Heritage	To give the students an overall view of the international financial system – instruments and markets.	*	*		*		
	17260EI39	Tourism Marketing	To provide the basics of insurance contracts and to explain the various types of insurance policies.	*	*		*		
IV	17260EI42	Ecotourism	Student will acquire Nuances involved in short term corporate financing, Good ethical practices	*	*		*		
	17260EI43	Event Management	To enable the students to understand the principles, practices and application in Micro Finance.	*	*		*		
	17260EI44	E- Tourism	To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.	*	*				*

AGRI BUSINESS MANAGEMENT

2017		MBA							
Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6
						POS			
III	17260EJ33	Agribusiness Environment and Policy	To realize the potential of tourism industry in India. To understand the various elements of Tourism Management and familiarize with the Tourism policies in the national and international context.	*	*			*	
	17260EJ34	Agricultural Marketing Management	To give an in-depth knowledge of the functioning of derivative securities market.	*	*			*	
	17260EJ35	Farm Business Management		*	*			*	

687

	17260EJ36	Management of Agribusiness Cooperatives	The objective of the course is to provide to the students a specialized knowledge of the techniques of evaluating proposed investments and to acquaint them with the problems encountered in the decisional process pertaining to capital investments of the project.	*	*		*		
	17260EJ37	Food Retail Management	This course provides an understanding of the following fund-based and fee-based financial services offered by financial intermediaries such as non-banking finance companies, banks and financial institutions. This course will also focus on issues concerning the financial management of financial intermediaries.	*	*		*		
	17260EJ38	Management of Agricultural Input Marketing	To give the students an overall view of the international financial system – instruments and markets.	*	*		*		
	17260EJ39	Agri Supply Chain Management	To provide the basics of insurance contracts and to explain the various types of insurance policies.	*	*		*		
	17260EJ42	Agriculture Economics	Student will acquire Nuances involved in short term corporate financing, Good ethical practices	*	*		*		
	17260EJ43	Agricultural and Micro-Finance	To enable the students to understand the principles, practices and application in Micro Finance.	*	*		*		
IV	17260EJ44	New Trends and Development in Agri-Sector	To equip the students with necessary strategic knowledge and skills received to evaluate discussions or capital restructuring, mergers and acquisitions.	*	*				*