



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY
[PRIST]

(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)
THANJAVUR – 613 403 - TAMIL NADU

School of Arts & Science



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY

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THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

MATHEMATICS

UG

B.SC

B.Sc. - Programme Educational Objectives (PEO)

- PEO1 - To provide students with knowledge, abilities and insight in mathematics and Related fields.
- PEO2. - To enables them to work as a mathematical professional, or qualify for training as scientific researcher.
- PEO3 - To develops the ability to utilize the mathematical problem solving methods such as analysis, modeling, programming and mathematical software applications in addressing the real world problems and heuristic issues.
- PEO4 -To enables students to recognize the need for and the ability to engage in life-long learning.

B.Sc.- Programme Specific Outcomes (PSO)

- PSO1 - To think in a critical manner.
- PSO2 - To know when there is a need for information, to be able to identify, locate, Evaluate, and effectively use that information for the issue or problem at hand.
- PSO3 - To formulate and develop mathematical arguments in a logical manner.
- PSO4 - To acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.
- PSO5. To understand, formulate and use quantitative models arising in social science, Business and other contexts.

B.Sc. Programme Outcomes (PO)

- PO1 - To understand and apply the knowledge of mathematical science to solve real life problems.
- PO2 - To design the methodology suitable to the problem on hand.

- PO3 - To analyze and interpret solution outputs and generate new ideas based on the Outputs.
- PO4 - To lead, work in team and give priority to the success of the aim of the team.
- PO5 - To recognize and learn the importance of life-long learning.

B.Sc. Course Outcomes - CO

CO1. 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.

CO2. Advanced English-I

- Develop vocabulary
- Learn to edit and do proof reading
- Read and comprehend literature

CO3. English-I

- Read and comprehend literature
- Appreciate poetry and prose
- Familiarize students with fiction.

CO4. Basic Mathematics -I (Differential Calculus and Vector Calculus)

- To manipulate, and solve problems using, successive differentiation & vector operators;
- To calculate Maxima & Minima for functions of two variables and Lagrange multiplier method
- To solve curvature, evolutes, asymptotes and envelopes in simple cases
- Define vector equation for lines and planes
- To calculate gradient, divergence and curl vectors in R^3 .
- Calculate work, circulation, flux and verify path independence
- Evaluate line integrals, surface area and surface integrals.

CO5. Basic Mathematics -II(Trigonometry, Analytical Geometry 3D and Calculus)

- To manipulate the expansions of basic trigonometric functions
- To calculate summation of trigonometric series and Gregory's series
- Understand the concept of analytical geometry and be able to use properties of spheres, cone and cylinder in real cases.
- To manipulate, and solve problems using, integral calculus

CO6. Allied- I- Paper -I Programming In C

- Understanding a functional hierarchical code organization.
- Ability to define and manage data structures based on problem subject domain.
- Ability to work with textual information, characters and strings.
- Understanding a concept of object thinking within the framework of functional model.
- Understanding a defensive programming concept. Ability to handle possible errors during program execution

- Understanding a concept of functional hierarchical code organization.

CO7. Allied- II- Paper -I Programming In C Lab

- Develop their programming skills.
- Declaration of variables and constants.
- Be familiar with programming environment with C Program structure.
- Ability to work with textual information, characters and strings.
- Understanding a defensive programming concept. Ability to handle possible errors during program execution

CO8. Package Lab-I

- Create documents

CO9. Soft Skill –I

- Make effective communication

CO10. Communicative English Lab-I

- Understand grammar.
- Develop listening skill
- Learn grammar.
- Enrich vocabulary

CO11. Indian Constitution

- Democratic values and citizenship Training are gained.
- Awareness on Fundamental Rights are established.
- Learn the functions of union and State Governments

CO12. Tamil II/

- Know what devotion really is.
- Know the fruitfulness obtained through devotion.
- Perceive the progress achieved in the society through devotion.

CO13. Advanced English-II

- Develop technological skill.
- Able to write in a variety of formats
- Read biographies and develop personality

CO14. English-II

- Appreciate different forms of literature
- Acquire language skills through literature
- Broadens the horizon of knowledge

CO15. Basic Mathematics -III (Integral calculus& Differential Equations)

- Evaluate the volumes of solids using cross-sections
- Calculate the length of an arc of a curve when whose equations are given in parametric and polar form.
- Evaluate the area of surfaces of revolution.
- Determine the area and volume by applying the techniques of double and triple integrals.
- Obtain equations for surfaces and curves in three dimension

- To understand the theory of, and be able to solve (in simple cases), ordinary differential equations and partial differential equations, and standard types of linear equations;
- To understand the theory of Fourier and Laplace transforms and apply it to the solution of ordinary and partial differential equations.

CO16. Basic Mathematics IV (Sequence and series)

- Detailed understanding of how Cauchy's criterion for the convergence of real and
- Complex sequences and series follows from the completeness axiom for \mathbb{R}
- Ability to explain the steps in standard mathematical notation;

Knowledge of some simple techniques for testing the convergence of sequences and series, and confidence in applying them;

- Familiarity with a variety of well-known sequences and series, with a developing intuition about the behaviour of new ones;
- An understanding of how the elementary functions can be defined by power series, with an ability to deduce some of their easier properties.

CO17. Web Programming

- Acquire knowledge about functionalities of World Wide Web and E-Mail.
- Apply a structured approach to identifying needs, interests, and functionality of a website.
- Write well-structured, easily maintained, standards-compliant, accessible HTML code, CSS code to present html pages in different ways.
- Explore Markup languages features and create interactive web pages using them
- Design dynamic websites that meet specified needs and interests.
- Learn and design Client side validation using scripting languages
- Acquire knowledge about Scripting libraries

CO18. Web Programming Lab

- Improved User Experience.
- An Increase in Mobile Traffic.
- Faster Website Development
- Create a web pages using HTML, DHTML and Cascading styles Sheets.
- Analyze a web page and identify its elements and attributes.

CO18. Research Led seminar

- Know the emerging areas in research

CO19. Packages Lab-II

- Prepare excel

CO20. Soft Skill -II

- Build self development

CO21. Communicative English Lab-II

- Learn grammar.
- Use a variety of reading strategies
- Enhance the skill of making grammatically correct sentences.

CO22. 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

CO23. Advanced English-III

- Understand phonetics.
- Develop writing skill
- Able to develop creative writing

CO24. 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.

CO25. Core – V Number Theory

- Solve problems in elementary number theory
- Apply elementary number theory to cryptography
- Develop a deeper conceptual understanding of the theoretical basis of number theory and cryptography
- Define and interpret the concepts of divisibility, congruence, greatest common divisor, prime, and prime-factorization.

CO26. Core – VI Numerical Analysis

- Solving problems in algebraic and transcended equations
- Understand about finite differences
- Students develop and analyze numerical techniques
- Applying Various numerical methods to solve the ordinary differential equations
- Students gets the Research inquiry and analytical thinking abilities.

CO27. Allied –II –Paper –I –Mathematical Statistics I

- Students learning statistical techniques and statistical data
- Understand the concept of random variables
- Understand the concept of central limit theorem for i.i.d random variables.

CO28. Allied –II –Paper –II –Mathematical Statistics Lab

- Students gets the methodology for the planning and execution for any scientific enquiry
- A knowledge of constructions and uses of fixed and chain based index numbers

CO29. Research Methodology

- To familiarize participants with basic of research and the research process.
- Have basic knowledge on qualitative research techniques
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
- Students gets the methodology for the planning and execution for any scientific enquiry

CO30. Packages Lab-III

- Create slides

CO31. Soft Skill-III

- Learn interpersonal relations and social responsibilities.

CO32. Communicative English Lab-III

- Learn grammar.
- Enhance their fluency in English
- Develop speaking and writing skills
- Develop individual perspectives that demonstrate critical thinking skills

CO33. Tamil IV

- Realize how the ancient people changed their life style 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

CO34. Advanced English-IV

- Develop communicative skill.
- Read and comprehend literature

CO35. English-IV

- Read and comprehend literature
- Know the genius of Shakespeare

CO36. Core –VIII Operations Research

- Students using OR techniques in business tools for decision making
- Students develop PERT and CPM networks and finding the shortest path
- Understand the concept of sequencing problems and game theory
- Students gets the knowledge about inventory theory.

CO37. Core – IX Astronomy

- Understand about celestial objects
- Knowledge about Eclipses
- Different zones of Earth
- Astronomical refraction
- Different phases of Moon

CO38. Allied –II – Paper –III – Mathematical Statistics II

- learned statistical techniques and statistical data
- A knowledge of test of significance based on parametric and non – parametric test
- Design/development of solutions

CO39. Allied –II – Paper –III – Mathematical Statistics II Lab

- Understood the concept of various distributions
- Understood the concept of sampling theory

CO40.Packages Lab-IV

- Create database

CO41. Soft Skill-IV

- Develop etiquette and interviewing skills.

CO42. Communicative English Lab-IV

- Understand grammar.
- Develop language and presentation skills

CO43. Environmental Studies

- Learn about environmental pollution.
- Familiarize with the social issues and the environment

CO44.Core-X- Modern Algebra

- Knowledge and understand about Algebraic structures like Groups, Rings, Vector spaces
- Understood about Morphisms
- Skillness in Linear dep. , in- dep. and bases problems

CO45.Core –XI- Real Analysis

- Knowledge about Connectedness, completeness and compactness
- Understanding the Riemann integrals, fundamental theorem of calculus
- Analyses the problem and finding the solution

CO46.Core – XII – Statics

- An ability to construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium.
- An understanding of the analysis of couples and friction.

CO47.Core-XIII- Programming in C++

- To know the proper lines of C++, Encapsulation, Inheritance and Polymorphism.
- To explain the various data types, operations and functions of C++.
- To know the concept of constructors and destructors.
- To explain the concept of inheritances, types of inheritance and polymorphism, virtual Functions.
- To explain the types of streams, format and format of input and output operations.
- To Known the procedural and object oriented paradigmwith concepts of streams, classes, functions, data and objects.

CO48.Elective Paper – I Fuzzy Analysis

- Be able to get the knowledge and understand Classical Sets vs Fuzzy Sets (FS) – Types of FS – Operations on FS
- Be able to get the knowledge and understand Zadeh's Extension Principle

- Be able to get the knowledge and understand Fuzzy Relations – Fuzzy Relational Equations – Possibility Theory :
- Be able to get the knowledge and understand Fuzzy Measures. Fuzzy relation equations based on sup-i compositions-fuzzy relation equations based on wi compositions.

CO49 .Elective Paper-I-Formal Languages and Automata Theory

- Design the pushdown automata.
- Comprehend the hierarchy of problems arising in the computer sciences.
- The Student will get an idea for designing Compiler Design.
- The students will get knowledge about regular expressions and computability theory
- Acquire a fundamental understanding of the core concepts in automata theory and formal languages.
- An ability to design grammars and automata (recognizers) for different language classes.
- An ability to identify formal language classes and prove language membership properties.
- An ability to prove and disprove theorems establishing key properties of formal languages and automata.

CO50 . Participation in Bounded Research

- Do the allotted work in research
- Learn to do review of literature

CO51 .Packages Lab-V

- Design various cards, Magazine and CD cover.

CO52.Soft Skill-V

- Develop leadership skills and body language

CO53.Communicative English Lab-V

- Develop corporate skills.
- Handle their day to day affairs well with their knowledge of language skills.

CO54.Core – XIV-Complex Analysis

- Represent complex numbers algebraically and geometrically,
- Define and analyze limits and continuity for complex functions as well as consequences of continuity,
- Apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra,
- Analyze sequences and series of analytic functions and types of convergence,
- Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula, and
- Represent functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem.

CO55.Core –XV Dynamics

- A knowledge of internal forces and moments in members.
- An ability to calculate centroids and moments of inertia.
- A knowledge of kinematic and kinetic analyses and energy and momentum methods for particles and systems of particles.
- A knowledge of kinematic and kinetic analyses and energy and momentum methods for rigid bodies.

CO56.Core-XVI Discrete Mathematics

- A knowledge of Relations and functions

- A knowledge of logical reasoning is used in mathematics to prove theorems, in computer science to verify the correctness of programs and to prove theorems in physical science to draw the conclusions..
- An ability to find the solutions of Recurrence relations.
- A knowledge of to study on ordering relations.

CO57. Elective Paper –II Graph Theory

- Knowledge in Graph Theory
- Understanding the properties of Graph Theory
- Understanding the concept of Kuratowski's graph
- Understanding Matrix representation of graphs

CO58. Elective Paper –II Mathematical Modelling

- The concept of mathematical modelling.
- The mathematical descriptions of some real systems.
- Correct methodology when developing mathematical models.
- Skill in applications
- Designing and developing the solutions

CO59. Open Elective – Tamil Elakiya Varalaru

- Know about three sangam periods of Tamil literature, epics, and myths
- Acquire knowledge of poetry, prose, drama and novel in modern literature.

CO60. Open Elective - Development of Mathematics Skills

- Understand the concepts from the five branches of mathematics
- Apply general rules correctly to solve problems including those in real-life contexts.
- Apply Fourier and Laplace transforms to analyse the behaviour and stability of complex systems

CO61. Open Elective- Instrumentation

- Important practical aspects of theoretical knowledge
- Acquire a sound understanding of the role of noise in measurement systems and know how to apply noise reduction techniques.

CO62. Open Elective- Food and Adulteration

- Knowledge about different processing and preservation methods and principles involved.

CO63. Open Elective -Wild life conservation

- Protection of natural habitat of organisms through controlled exploitation
- Educate the need to protect the environment

CO64. Open Elective -Web Technology

- Explore markup languages features and create interactive web pages using them.
- Learn and design Client side validation using scripting languages.

CO65. Open Elective -E-Commerce and its Application

- Secure exchange of documents, content and value in open trading protocols.
- Communication platforms for the e-Economy, including e-commerce, e-business and e-government

CO66.Open Elective - Indirect Taxes

- Gained knowledge of various provisions of central excise customs law, service tax, VAT and sales tax and their applications in different circumstance.

CO67.Open Elective - Journalism

- Become a journalist

CO68.Project Work

- Do research and prepare project

CO69.Packages Lab-VI

- Develop animation.Create documentation

CO70.Soft Skill -VI

- Develop life skills and other skills

CO71.Communicative English Lab-VI

- Apply study skills
- Widen creative thinking
- Be a good team worker
- Make them proficient in English



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DEPARTMENT:

MATHEMATICS

PG

M.SC

M.Sc.- Programme Educational Objectives (PEOs)

- PEO1.To equip students with knowledge, abilities and insight in mathematics and related fields.
- PEO2.To enable them to work as a mathematical and scientific researcher and to work as a team.
- PEO3.To equip students with the ability to translate and synthesize their understanding towards nature, human and development.
- PEO4.To develop the ability to utilize the mathematical problem solving methods such as analysis, modeling, programming and mathematical software applications in addressing the real world problems and heuristic issues.
- PEO5.To enable students to recognize the need for and the ability to engage in life-long learning.

M.Sc. Programme Specific Outcomes (PSO)

- PSO1.To develop problem-solving skills and apply them independently to problems in pure and applied mathematics.
- PSO2.To assimilate complex mathematical ideas and arguments.
- PSO3. To improve your own learning and performance
- PSO4.To develop abstract mathematical thinking.

M.Sc.Programme Outcomes (POs)

- PO1.To apply the knowledge of mathematical science to solve real life problems.
- PO2.To design the methodology suitable to the problem encountered.
- PO3.To analyse and interpret solutions and generate new ideas based on the outputs.
- PO4.To inculcate research ability in the mathematical science.
- PO5.To lead, work in team and give priority to the success of team.
- PO6.To recognize and learn the importance of life-long learning.
- PO7.To develop abstract mathematical thinking.

M.Sc. CourseOutcomes

CO1-Algebra

- Understand the concept of Group Theory, Ring Theory.
- Knowledge of Linear Transformations.
- An understanding of the analysis of Fields.
- Research inquiry and analytical thinking abilities.
- Simplify algebraic expressions to analyze functions and graphs.
- Create graphs using key features.
- Simplify algebraic expressions to analyze functions and graphs.

CO2-Real Analysis

- Know the motion of the Riemann-Stieltjesintegral; prove elementary properties of the Riemann integral and the Fundamental Theorem of Calculus.
- Describe the Infinite series and Infinite Produces, Sequences of Functions.
- An understanding of Multivariable Differential Calculus and Implicit Functions and Extremum problem.
- Describe fundamental properties of the real numbers that lead to the formal development of real analysis
- Comprehend rigorous arguments developing the theory underpinning real analysis
- Demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration
- Cconstruct rigorous mathematical proofs of basic results in real analysis;

CO3-Ordinary Differential Equations

- Upon completing this course students should be able to:

- Solve first order equations, systems of periodic coefficients and use these methods to solve applied problems.
- A knowledge of Sturm-Liouville Problem.
- Understanding about the stability of stationary solutions.
- Student will be able to solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases.
- Student will be able to find the complete solution of a nonhomogeneous differential equation as a linear combination of the complementary function and a particular solution.
- Student will be introduced to the complete solution of a nonhomogeneous differential equation with constant coefficients by the method of undetermined coefficients.
- Student will be able to find the complete solution of a differential equation with constant coefficients by variation of parameters.

CO4-Programming In C++

- To know the proper lines of C++, Encapsulation, Inheritance and Polymorphism.
- To explain the various data types, operations and functions of C++.
- To know the concept of constructors and destructors.
- : To explain the concept of inheritances, types of inheritance and polymorphism, virtual Functions.
- To explain the types of streams, format and format of input and output operations.
- To Known the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.

CO5 -Classical Dynamics

- Students who successfully complete the course will demonstrate the following
- outcomes by tests, homework, and written reports:
- A knowledge of mechanical systems , virtual work Energy and Momentum.
- Understanding the concept and Applications Lagrange's Equation.
- Have a deep understanding of the mathematical foundations of quantum mechanics
- Be able to solve the Schrödinger equation using various approximation methods
- Have a basic understanding of relativistic effects in quantum mechanics

CO6-Fluid Dynamics

- A knowledge of Two Dimensional and conformal mapping.
- A knowledge of solving problems in viscous flow-steady viscous flow
- Identify how properties of fluids change with temperature and their affect on pressure and fluid flow.
- Describe fluid pressure and its measurement.

- Define the relationship between pressure and elevation as it relates to manometers, barometers and other pressure measuring devices.
- Calculate forces on a plane submerged in a static fluid.
- Calculate buoyancy on a body submerged in a static fluid.
- Use the general energy equation to calculate changes in fluid flow for circular and non-circular pipes for in-compressible fluids.

CO7 -Research Led seminar

- Know the emerging areas in research

CO8- Complex Analysis

- On completion of this unit successful students will be able to:
- Understand the significance of harmonic functions, Reimann zeta function.
- A knowledge of periodic functions, the weierstrass
- Abilities in conformal mapping
- Students should be able to analyze functions of a complex variable using series expansions, using line integrals, using geometry, and using partial differential equations
- To explain the major theorems that distinguish complex analysis from real analysis
- Apply complex analysis to compute geometric mappings and real integrals.

CO9-Measure Theory and Integration

- To introduce the concepts of *measure* and *integral with respect to a measure*,
- To show their basic properties,
- To provide a basis for further studies in Analysis, Probability, and Dynamical Systems.
- Identify, describe, and apply emerging technologies in teaching and learning environments
- Demonstrate knowledge, attitudes, and skills of digital age work and learning
- Plan, design, and assess effective learning environments and experiences
- Implement curriculum methods and strategies that use technology to maximize student learning
- Develop technology-enabled assessment and evaluation strategies

➤ CO10-Mathematical Methods

- On completion of this unit successful students will be able to:
- Understand the significance of Calculus of Variations, Fourier Transforms and Henkel Transform.
- A knowledge of linear integral equations and Method of successive approximations.
- Stillness in transformation form one function into another function

- Students will be able to communicate both orally and verbally about music of all genres and styles in a clear and articulate manner (comprehension).
- Students will be able to analyze and interpret texts within a written context
- Students will be able to judge the reasonableness of obtained solutions
- Students will be able to evaluate theory and critique research within the discipline

CO11- Graph Theory

- Knowledge in Graph Theory
- Understanding the properties of Graph Theory
- Understanding the concept of Kuratowski's graph
- Understanding Matrix representation of graphs

CO11-Mathematical Probability

- Knowledge and understanding understand the place of probability theory knowledge in cognitive process, describe the basic probability theory and mathematical statistics concepts; Special abilities and skills.
- Calculate the probabilities of events with an appropriate choice of the method of calculation;
- Be familiar with the types of random variables, be able write them, calculate their numerical characteristics;
- Evaluate numerical characteristics of the sample and interpret the meanings of the parameters of population.
- Formulate and test hypotheses, draw the appropriate conclusions.
- Understand impotent distribution

CO12-Mathematical Modeling

- Having successfully completed this module, you will be able to demonstrate knowledge and understanding of:
- The concept of mathematical modeling.
- The mathematical descriptions of some real systems.
- Correct methodology when developing mathematical models.
- Skill in applications
- Designing and developing the solutions.

CO13. Research Methodology

- To familiarize participants with basic of research and the research process.
- Have basic knowledge on qualitative research techniques
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
- Students gets the methodology for the planning and execution for any scientific enquiry

CO14 - Participation in Bounded Research

- Do the allotted work in research
- Learn to do review of literature

CO15-Topology

- Upon successful completion of this course, the student will be able to: (Knowledge based) distinguish among open and closed sets on different topological spaces;
- know the two fundamental topologies: discrete and indiscrete topologies.

- Identify precisely when a collection of subsets of a given set equipped with a topology forms a topological space;
- Understand when two topological spaces are homeomorphic;
- Identify the concepts of distance between two sets; connectedness, denseness, compactness and separation axioms.
- explain the notion of metric space.
- use the open ball on metric spaces, construct the metric topology and define open-closed sets of the space.

CO16-Stochastic Processes

- On successful completion of the course, students should be able to:
- Explain fundamentals of probability theory, random variables and random processes.
- Understand the mathematical concepts related to probability theory and random processes
- Understand the characterization of random processes and their properties.
- Formulate and solve the engineering problems involving random processes.
- Analyze the given probabilistic model of the problem.
- Make precise statements about random processes.
- Use computational techniques to generate simulation results.

CO17-Advanced Numerical Analysis

- Solve an algebraic or transcendental equation using an appropriate numerical method.
- Solve a differential equation using an appropriate numerical method.
- Evaluate a derivative at a value using an appropriate numerical method.
- Solve a linear system of equations using an appropriate numerical method.
- Calculate a definite integral using an appropriate numerical method.
- Skill in finding the roots of the given equation

CO18-Cryptography

- Analyze key agreement algorithms to identify their weaknesses.
- Describe the ethical issues related to the misuse of computer security.
- Develop code to implement a cryptographic algorithm or write an analysis report on any existing security product.
- .Cryptographic Algorithms Symmetric Encryption and Message Confidentiality
Public-Key Cryptography and Message Authentication
- Network Security Internet Security Protocols and Standards Internet
Authentication Applications Wireless Network Security
- Software Security and Trusted Systems

CO19-Algebraic Coding Theory

- Upon completion of this course, students should be able to:
- Define channel capacities and properties using Shannon's Theorems.
- Construct efficient codes for data on imperfect communication channels.
- Generalize the discrete concepts to continuous signals on continuous channels.
- Define and illustrate main concepts and prove fundamental theorems concerning error-correcting codes given in the course;
- calculate the parameters of given codes and their dual codes using standard matrix and polynomial operations;
- encode and decode information by applying algorithms associated with well-known codes;

- compare the error-detecting/correcting facilities of given codes for a given binary symmetric channel;

CO20-Writing for the media

- Know the intricacies of Media

CO21-Applicable Mathematical Techniques

- Students using OR techniques in business tools for decision making
- Students develop Assignment problem and Replacement problems
- Understand the concept of decision analysis and game theory
- Students gets the knowledge about interpolation

CO22- Biomedical Instrumentation

- To familiarize students with various medical equipments and their technical aspects
- To introduce students to the measurements involved in some medical equipment.
- Ability to understand diagnosis and therapy related equipments
- Understanding the problem and ability to identify the necessity of an equipment to a specific problem

CO23- Green Chemistry

- To understand the environmental status and evolution.
- To know about the Pollution and its prevention measures.
- To familiarize the green chemistry.
- To learn about the bio-catalytic reactions.
- To understand about the vitamins and antibiotics

CO24-Internet and Web Design

- Acquire knowledge about functionalities of Internet
- 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.

CO25-Insurance Services

- Learnt the principles of Insurance and the functions of Life and general insurances and the IRDA

CO26-Counselling Psychology

- Learn counselling and its process

CO27-Herbal Medicine

- Develop individualised goal and plan for wellness
- Gather information about past and current health status
- Create comprehensive assessment of health inputs

CO28. Societal Project (Scaffold Research)

- Describe the inter-linkage of institutions and their effects on individuals.
- Explain how social change factors affect social structures and individuals.

- Describe how culture and social structure vary across time and place and with what effect.
- Identify examples of specific social policy implications using reasoning about social structural effects.

CO29-Functional Analysis

- Upon successful completion of this course, the student will be able to: (Knowledge based) distinguish among open and closed sets on different topological spaces;
- know the two fundamental topologies: discrete and indiscrete topologies.
- Identify precisely when a collection of subsets of a given set equipped with a topology forms a topological space;
- Understand when two topological spaces are homeomorphic;
- Identify the concepts of distance between two sets; connectedness, denseness, compactness and separation axioms.
- Research inquiry and analytical thinking abilities.

CO30-Visual Programming

- Students code visual programs by using Visual Basic work environment.
- Distinguish and compose events and methods.
- Distinguish and compose events and methods.
- Recognize and arrange control structures.
- Understand development of applications.
- Understand the use of various system libraries.

CO31-Number Theory

- Solve problems in elementary number theory
- Apply elementary number theory to cryptography
- Develop a deeper conceptual understanding of the theoretical basis of number theory and cryptography
- Research inquiry and analytical thinking abilities.
- find quotients and remainders from integer division
- apply Euclid's algorithm and backwards substitution
- understand the definitions of congruences, residue classes and least residues
- determine multiplicative inverses, modulo n and use to solve linear congruences.

CO32-Combinatorial. Mathematics

- Apply Diverse Counting Strategies To Solve Varied Problems Involving Strings, Combinations, Distributions, And Partitions,
- Write And Analyze Combinatorial, Algebraic, Inductive, And Formal Proofs Of Combinatoric Identities,
- Recognize Properties Of Graphs Such As Distinctive Circuits Or Trees.
- Will Become Familiar With Fundamental Combinatorial Structures That Naturally Appear In Various Other Fields Of Mathematics And Computer Science.
- They Will Learn How To Use These Structures To Represent Mathematical And Applied Questions, And They Will Become Comfortable With The Combinatorial Tools Commonly Used To Analyze Such Structures.
- apply mathematical concepts and principles to perform numerical and symbolic computations.
- use technology appropriately to investigate and solve mathematical and statistical problems.
- iii. write clear and precise proofs.
-

CO33-Design and Analysis of Algorithms

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis.

- Students will be able to design and conduct experiments to address questions germane to the discipline.
- Students will be able to design and administer surveys that address questions appropriate to the discipline.
- Students will be able to conduct interviews and focus groups that address questions relevant to the discipline.
- Students will be able to design and execute research plans using the major methodologies of the discipline (experiments, surveys, qualitative techniques, etc.) to answer disciplinary specific questions.
- one sentence in length that clearly states the behaviors that students should be able to demonstrate.

CO34-Project

- Do research and prepare project



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY [PRIST]

(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)

THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

PHYSICS

UG

B.SC

Program Educational Objectives

- PEO1:** Read, understand and interpret physical information – verbal, mathematical and graphical.
- PEO2:** Equip students in methodology related to Physics.
- PEO3:** Impart skills required to gather information from resources and use them.
- PEO4:** To give need based education in physics of the highest quality at the undergraduate level.
- PEO5:** Offer courses to the choice of the students with interdisciplinary approach.
- PEO6:** Perform experiments and interpret the results of observation, including making an assessment of experimental uncertainties.
- PEO7:** Provide an intellectually stimulating environment to develop skills and Enthusiasms of students to the best of their potential.
- PEO8:** Use Information Communication Technology to gather knowledge at will.

Program Outcomes

After the completion of the course, Students will be able to

- PO1:** To enhance the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens.
- PO2:** Develop interpersonal and communication skills including communicating in small groups, writing, working effectively with peers.
- PO3:** Express their knowledge and ideas through oral and written language.
- PO4:** To define the basic laws involved in Physics
- PO5:** To understand the concepts and significance of the various physical phenomena.
- PO6:** To carry out experiments to understand the laws and concepts of Physics.
- PO7:** To apply the theories learnt and the skills acquired to solve real time problems.
- PO8:** To acquire a wide range of problem solving skills, both analytical and computational and to apply them.

Program Specific Outcomes

After the completion of the course, Students will be able to

- PSO1:** Students are expected to acquire a core knowledge in physics, including the major premises of classical mechanics, quantum mechanics, electromagnetic theory, electronics, optics, special theory of relativity and modern physics.
- PSO2:** Students should learn how to design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes. Not only that they are expected to have an understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data.
- PSO3:** Students will learn the applications of numerical techniques for modeling physics systems for which analytical methods are inappropriate or of limited utility.
- PSO4:** Apply conceptual understanding of the physics to general real-world situations.

PSO5: Learn to minimize contributing variables and recognize the limitations of equipment.

PSO6: Develop the following experimental tools: Numerically model simple physical systems using Euler's method, curve fitting, and error analysis.

Course Outcomes

Tamil I

CO1: Learn the changes occurred in literature since classical period.

CO2: Make use of vocabulary systematically.

CO3: Understand how to lead one's life realizing the modernity and its environment/atmosphere.

Advanced English-I

CO1: Develop vocabulary

CO2: Read and comprehend literature

CO3: Learn to edit and do proof reading

English-I

CO1: Read and comprehend literature

CO2: Appreciate poetry and prose

CO3: Familiarize students with fiction.

Properties of Matter

CO1: This course would empower the student to acquire engineering skills and practical knowledge, which help the students in their everyday life.

CO2: The properties of solids especially knowledge of elasticity help the students to identify the materials suitable for the construction of buildings, houses etc.

CO3: Properties of fluids especially knowledge of viscosity and surface tension help the students in their daily life and agriculture.

CO4: This syllabus will cater the basic requirements for their higher studies. This course will provide a theoretical basis for doing experiments in related areas.

Properties of Matter Lab

CO1: Study the elastic behaviour and working of torsional pendulum

CO2: Study of bending behaviour beams and analyse the expression for young's modulus

CO3: Understand the surface tension and viscosity of fluid

CO4: Analyse waves and oscillations

Calculus and Fourier series

CO1: Define a vector differentiation

CO2: Evaluate Gauss divergence theorem, Stoke's theorem and Green's theorem

CO3: Find and interpret of vector differential operator, Gradient, Direction and magnitude of gradient.

CO4: Discuss the Application of Laplace transforms with Solution of ODE's.

CO5: Define Fourier series and Finding Fourier expansion of a periodic function with period 2π

Algebra and Trigonometry

CO1: Expansion of $\sin nq$, $\cos nq$, $\tan nq$ and powers of sines and cosines in terms of functions of multiples of q .

CO2: Define and illustrate the concept of hyperbolic functions and logarithms of complex numbers.

CO3: Understanding the concept of Inequalities.

CO4: Find relation between the roots and coefficients of equations and Symmetric function of the roots.

Package 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.

Soft Skill -I

CO1:Make effective communication

Communicative English Lab-I

CO1: Learn grammar..

CO2: Develop listening skill

CO3:Enrich vocabulary

CO4:Understand the process of communication

CO5:Develop listening skill

Indian Constitution

CO1:Democratic values and citizenship Training are gained.

CO2: Awareness on Fundamental Rights are established. .

CO3:Learn the functions of union and State Governments

CO4:Learn the power and functions of the Judiciary

CO5:Appreciate of Democratic Parliamentary Rule

Tamil II

CO1:Know what devotion really is.

CO2:Know the fruitfulness obtained through devotion.

CO3:Perceive the progress achieved in the society through devotion.

Advanced English-II

CO1:Develop technological skill.

CO2:Able to write in a variety of formats

CO3:Read biographies and develop personality

English-II

CO1:Appreciate different forms of literature

CO2:Acquire language skills through literature

CO3:Broadens the horizon of knowledge

Mechanics And Relativity

CO1: Understand the definition for centre of gravity in hemisphere, hollow hemisphere etc.,

CO2: Understand the dynamics and gravitation

CO3: Study the behaviour of rigid body dynamics

CO4: Analyse the performance of hydrostatic and hydrodynamics

CO5: Understand the negative result of michelsonmorleyexperiment ,galilean and lorentz transformation

Mechanics Lab

CO1: Understand the dynamics and gravitation

CO2: Understand the negative result of michelsonmorley experiment

CO3: Study the behaviour of rigid body dynamics

CO4: Analyse the performance of hydrostatic and hydrodynamics

ODE, PDE and Laplace Transforms

- CO1:** Discuss and demonstrate the Linear Equations with constant coefficients, Complementary function and Particular integrals.
- CO2:** Discuss and demonstrate the Linear equations with variable coefficients and Variation of parameters.
- CO3:** Define and illustrate Partial Differential Equations of the first order and Classification of integrals "
- CO4:** Define Linear equation and Bernoulli's equation .
- CO5:** Define Laplace transforms and discuss the Properties of Laplace transforms
- CO6:** Define Fourier series and Finding Fourier expansion of a periodic function with period 2π .

3D Vector Calculus

- CO1:** Define a vector differentiation
- CO2:** Find and interpret of vector differential operator, Gradient, Direction and magnitude of gradient.
- CO3:** Define and illustrate the vector integration, Line, Surface and Volume integral.
- CO4:** Evaluate Gauss divergence theorem, Stoke's theorem and Green's theorem.

Research Led seminar

- CO1:** Know the emerging areas in research
- CO2:** Exposure to various research domains
- CO3:** Acquaintance with languages of research
- CO4:** Development of research aptitude

Packages Lab-II

- CO1:** Identify the names and functions of the PowerPoint interface.
- CO2:** Create, edit, save, and print presentations.
- CO3:** Format presentations.
- CO4:** Add a graphic to a presentation.
- CO5:** Create and manipulate simple slide shows with outlines and notes.
- CO6:** Create slide presentations that include text, graphics, animation, and transitions.

Soft Skill -II

- CO1:** Build self development

Communicative English Lab-II

- CO1:** Learn grammar.
- CO2:** Use a variety of reading strategies
- CO3:** Enhance the skill of making grammatically correct sentences.

Tamil III

- CO1:** Achieve one's goal by following the ancestral path
- CO2:** Learn to lead life of perfection by realizing the uncertainty in the life
- CO3:** Attain happiness through honesty

Advanced English-III

- CO1:** Understand Phonetics.
- CO2:** Develop writing skill
- CO3:** Able to develop creative writing

English-III

- CO1:** Enable to appreciate different types of prose
- CO2:** Develop the conversational skills through one-act plays
- CO3:** Enhance the skill of making grammatically correct sentences.

Heat and Thermodynamics

CO1: Understand how statistics of the microscopic world can be used to explain the thermal features of the macroscopic world.

CO2: Be able to use thermal and statistical principles in a wide range of applications.

CO3: Learn a variety of mathematical and computer techniques.

Heat and Thermodynamics lab

CO1: Understand the nature of calorimetry by specific heat of solids and law of thermodynamics and entropy

CO2: Analyses thermal conductivity and black body radiation

CO3: Analyses of zeroth law of thermodynamics and entropy

CO4: Understanding the low temperature physics

Inorganic, organic and Physical chemistry - I

CO1: Apply the fundamental principles of measurement, matter, atomic theory

CO2: Chemical periodicity, chemical bonding,

CO3: General chemical reactivity and solution chemistry to subsequent courses in science.

Volumetric analysis Lab - I

CO1: Facilitate the learner to make solutions of various molar concentrations.

CO2: Defining concentration; Dilution of Solutions;

CO3: Making different molar concentrations.

CO4: Describe bonding models that can be applied to a consideration of the properties of transition metal compounds.

Research methodology

CO1: Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.

CO2: Understanding research questions and tools

CO3: Experience in scientific writings

CO4: Practice in various aspects of scientific publications

CO5: Inculcation of research ethics

Packages Lab-III

CO1: Indicate the names and functions of the Excel interface components.

CO2: Enter and edit data.

CO3: Format data and cells.

CO4: Construct formulas, including the use of built-in functions, and relative and absolute references.

CO5: Create and modify charts.

CO6: Preview and print worksheets.

Soft Skill-III

CO1: Learn interpersonal relations and social responsibilities.

Communicative English Lab-III

CO1: Learn grammar.

CO2: Develop speaking and writing skills

CO3: Enhance their fluency in English

CO4: Develop individual perspectives that demonstrate critical thinking skills

Tamil IV

CO1: Realize how the ancient people changed their life style according to the ages

CO2: Learn how to change one's lifestyle according to the needs of the future

CO3: Accept the modern trend and its uses

Advanced English-IV

CO1: Develop writing skill.

CO2: Comprehend and describe poems

CO3: Learn interviewing skills

English IV

CO1: Improve their ability to read and understand them

CO2: Know the genius of Shakespeare

CO3: Express in writing their views.

Optics

CO1: Understand the basic concepts of wave optics and an ability to compute basic quantities in optics.

CO2: Learn to use methods for solving differential equations.

CO3: Experience the diverse applications of the wave equation.

Optics Lab

CO1: Study the elastic behaviour of materials

CO2: Analyse the relationship between various types of experiments

CO3: Perform the procedure as per standard values

CO4: Understand the applications

Inorganic, organic and Physical chemistry – II

CO1: The fundamentals of the chemistry of the main group elements, and important real world applications of many of these species

CO2: The bonding models, structures, reactivity's, and applications of Hydrogen peroxide, ozone and hydrides.

CO3: Predicting geometries of simple molecules

CO4: Skills in handling and measurement of radioactive material.

Volumetric analysis Lab – II

CO1: Facilitate the learner to make solutions of various molar concentrations.

CO2: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration

CO3: Dilution of Solutions; Making different molar concentrations.

Packages Lab-IV

CO1: Examine database concepts and explore the Microsoft Office Access environment.

CO2: Design a simple database.

CO3: Build a new database with related tables.

CO4: Manage the data in a table.

CO5: Query a database using different methods.

CO6: Design a form.

CO7: Generate a report.

CO8: Import and export data.

Soft Skill-IV

CO1: Develop etiquette and interviewing skills.

Communicative English Lab-IV

CO1: Learn grammar.

CO2: Enable to express their views in conversation

CO3: Develop soft skills

CO4: Enhance presentation skills

Environmental Studies

CO1: Learn about environmental pollution.

CO2: Familiarize with the social issues and the environment

Electricity and Magnetism

CO1: Know the vocabulary and concepts of physics as it applies to: Principles of Electric Fields, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Current and Resistance, Direct Current Circuits, Magnetic Fields, Sources of Magnetic Fields, Faraday's Law, Inductance, Alternating Current Circuits, and Electromagnetic Waves.

CO2: Understand the relationship between electrical charge, electrical field, electrical potential, and magnetism.

CO3: Be able to use electromagnetic theory and principles in a wide range of applications.

CO4: Learn a variety of advanced mathematical methods and computer techniques.

CO5: Develop skill to solve numerical problems on it.

CO6: Solve mathematical problems involving electric and magnetic forces, fields, and various electro-magnetic devices and electric circuits.

Atomic Physics

CO1: Apply the mathematical tools developed to various quantum mechanics problems.

CO2: Develop problem solving methods that will include mathematical as well as numerical computations and solutions.

CO3: Build connections between mathematical development and conceptual understanding.

Basic Electronics

CO1: to impart knowledge of Basic Electronics in a broader context to the BSc students.

CO2: to clarify the concepts of Semiconductors, p-n junctions, Fermi Level.

CO3: to develop the understanding of rectifiers, Transistors and FET.

CO4: learn the basics of the transistor action along with their application as an amplifier.

CO5: gain basic knowledge of Digital electronics.

CO6: learn the logic of flip flops, counters, registers etc..

Digital Electronics Lab

CO1: Understand the fundamentals of codes and number system

CO2: Understand the binary arithmetic, logics and boolean functions

CO3: Understand the functions and working of flipflop circuits registers and counters

Energy Physics

CO1: Understand the basic significance of mechanics of a system of particles

CO2: Understand the old quantum theory

CO3: Perform the theories of quantum mechanics into Schrodinger wave equation

Laser Physics

CO1: Understand the basic principle of laser and characteristics

CO2: Understand the theory of types of lasers

CO3: Perform the procedures into applications oriented one

Participation in Bounded Research

CO1: Do the allotted work in research

CO2: Learn to do review of literature

CO3: Hands on exposure to problem solving tools in contemporary research

CO4: Evolution of research intuitiveness and orientation

CO5: Familiarity with cutting edge research trends

Packages Lab-V

CO1: work with the Photoshop workspace

CO2: navigate images

- CO3:** resize and crop images
- CO4:** make and work with selections
- CO5:** create new layers and perform other basic layer functions
- CO6:** transform images.

Soft Skill-V

- CO1:** Develop leadership skills and body language

Communicative English Lab-V

- CO1:** Develop corporate skills.
- CO2:** Handle their day to day affairs well with their knowledge of language skills.
- CO3:** Get a job

Electricity and Magnetism Lab

- CO1:** Analyse the chemical and heating effect of current
- CO2:** Analyse the value of maxwell equation- boundary conditions
- CO3:** Analyse the relations between b , h and m
- CO4:** Understand the faradays laws of electromagnetic induction by rayleigh's method

Digital Electronics & Microprocessor

- CO1:** This course is expected to provide necessary back ground for applications of electronics in mathematical computation.
- CO2:** Students will familiarise with logic circuits and their applications which enables them to design logic circuits of their own.

Wave Mechanics

- CO1:** Learn the mathematical tools needed to solve quantum mechanics problems. This will include complex functions and Hilbert spaces, and the theory of operator algebra. Solutions of ordinary and partial differential equations that arise in quantum mechanics will also be studied.
- CO2:** Develop problem solving methods that will include mathematical as well as numerical computations and solutions.
- CO3:** Build connections between mathematical development and conceptual understanding.

Digital Electronics Lab

- CO1:** Understand the fundamentals of codes and number system
- CO2:** Understand the binary arithmetic, logics and boolean functions
- CO3:** Understand the functions and working of flipflop circuits registers and counters

Elements and Theoretical Physics

- CO1:** They have understood the difference between covariance and invariance of various quantities and applied it.
- CO2:** One of the major advantages of this course is that it is very much related to the real life where the ionosphere is playing very important part.
- CO3:** Students now know the basics of scattering and absorption and relate them to real life phenomena.
- CO4:** They have learnt about wave guides and transmission lines and propagation of waves through them.

Material Physics

- CO1:** To develop an understanding of the unique properties and characteristics of polymer based materials.
- CO2:** To promote an understanding of the relationship between material structure, processing and properties.
- CO3:** To acquaint the student with common manufacturing processes and recent technological developments that are used in creating products from plastics and composites.

Communication physics

- CO1:** Explain the concept of amplitude and frequency modulation
- CO2:** Distinguish Digital modulation (pulse code and Pulse amplitude modulation) types
- CO3:** Know fundamental of AM radio receiver and superhetrodyne receiver.
- CO4:** Compare working principle of single mode and multimode optical fibres.
- CO5:** Understand the basic ideas about the project
- CO6:** Understand the working procedure of the project
- CO7:** Perform the procedure as the labarotary standards

Project Work

- CO1:** Understand the calues obtained and its applications

Packages Lab-VI

- CO1:** Learn to create animated graphics add sound and interactivity.
- CO2:**Can develop Website
- CO3:**CD based presentations

Soft Skill –VI

- CO1:** Develop life skills and other skills

Communicative English Lab-VI

- CO1:** Apply study skills
- CO2:** Widen creative thinking
- CO3:**Be a good team worker
- CO4:**Make them proficient in English



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DEPARTMENT:

PHYSICS

PG

M.SC

Program Educational Objectives

- PEO1:** Work alongside of engineers, healthy professionals, scientists and other professionals to help solve scientific problems.
- PEO2:** Work as techno manager, administrator, or an entrepreneur with further training and education.
- PEO3:** Pursue doctoral research degrees to work in colleges, universities as professors or as scientists in research establishments.
- PEO4:** To understand the underlying physics in respective specializations, and, be able to teach and guide successfully.
- PEO5:** To introduce advanced ideas and techniques that are applicable in respective fields.
- PEO6:** To develop human resource with a solid foundation in theoretical and experimental aspects of respective specializations as a preparation for career in academia and industry.

Program Outcomes

- PO1:** Explain the behavior of physical systems under various environmental and physical conditions
- PO2:** Interpret Laws of Physics and develop mathematical models of systems to predict behavior and estimate performance
- PO3:** Use modern tools and techniques for the solution of mathematical models and prediction of behavior of physical systems
- PO4:** Instrument and perform physical experiments for testing and evaluation of systems
- PO5:** Operate and monitor performance of machines and systems
- PO6:** Conduct research under supervision
- PO7:** Choose appropriate online programmes for further learning, participate in seminars and conferences
- PO8:** Lead a team to successfully complete a project and communicate across teams

Program Specific Outcomes

After the completion of the course, Students will be able to

- PSO1:** Students are also expected to develop a written and oral communication skills in communicating physics-related topics.
- PSO2:** Students will develop the proficiency in the acquisition of data using a variety of laboratory instruments and in the analysis and interpretation of such data.
- PSO3:** Students will realize and develop an understanding of the impact of physics and science on society.
- PSO4:** Describe the methodology of science and the relationship between observation and theory.
- PSO5:** Discover of physics concepts in other disciplines such as mathematics, computer science, engineering, and chemistry.
- PSO6:** Analyze physical problems and develop correct solutions using natural laws.

Course Outcomes

Advanced Mathematical Physics

- CO1:** know the method of contour integration to evaluate definite integrals of varying complexity.
- CO2:** have gained ability to apply group theory to physics problems, which is a prerequisite for deeper understanding of crystallography, particle physics, quantum mechanics and energy bands in solids.
- CO3:** be able to apply calculus of variations to diverse problems in physics including isoperimetric problems. Another interesting aspect is the use of Lagrange multipliers in solving physics problems.
- CO4:** to become familiar with the method of Green's function to solve linear differential equations with inhomogeneous term
CO5 : to find solutions to integral equations using different methods.

Classical and Statistical Mechanics

- CO1:** Understand the terminology used in Classical Mechanics.
- CO2:** Employ conceptual understanding to make predictions, and then approach the problem mathematically.
- CO3:** Understand the important connections between theory and experiment.
- CO4:** Connect concepts and mathematical rigor in order to enhance understanding

Electronics and Communication

- CO1:** Have basic knowledge of semiconductor diode, rectifier and filter circuits.
- CO2:** Understand transistor biasing and working principle of Amplifiers.
- CO3:** Explain feedback and oscillatory circuits.
- CO4:** An idea about Multivibrators and operational amplifiers.

General Electronics Lab

- CO1:** Analysis of Resistive Circuits and Solution of resistive circuits with independent sources
- CO2:** Two Terminal Element Relationships for inductors and capacitors and analysis of magnetic circuits
- CO3:** Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits

Instrumentation

- CO1:** Demonstrate basic knowledge of Laplace Transform.
- CO2:** Obtain the time response of systems using inverse Laplace transform
- CO3:** Find the Fourier series, Complex form of Fourier series, Fourier

Crystal Growth Processor

- CO1:** Introduction to crystal system and Symmetry
- CO2:** Description on crystal nucleation and growth
- CO3:** Discussion on various crystal growing techniques
- CO4:** Uses of Spray pyrolysis method

Microprocessor and Microcontroller

- CO1:** Study the Organization and internal architecture of the Intel 8085,
- CO2:** learn assembly language programming and arithmetic
- CO3:** Aware of Memory interfacing, and different Data transfer schemes,
- CO4:** Learn interfacing with peripheral I/O devices

Quantum Mechanics

- CO1:** Students will learn the role of uncertainty in quantum physics and use the commutation relations of operators.
- CO2:** Students will learn the method of separation variables to solve problems in 3D and spherical polar coordinates and will the occurrence of degeneracy in atomic structure.

CO3:Students will learn some matrix technique to solve physical problems.

Condensed Matter Physics

CO1: Explain the significance and value of condensed matter physics, both scientifically and in the wider community.

CO2: The subject treats functional materials from an experimental viewpoint, solid state theory and properties.

CO3: Critically analyse and evaluate experimental strategies, and decide which is most appropriate for answering specific questions.

CO4: Apply key analysis techniques to typical problems encountered in the field.

CO5: Gain and apply discipline-specific knowledge, including self-directed research into the scientific literature.

CO6: The subject will be useful to gain an understanding of the interplay between classical - and quantum mechanical phenomena, and how microscopic/atomic processes acting between many atoms/molecules produces the typical properties of different solid state matter.

Microprocessor Lab

CO1: To become familiar with the architecture and Instruction set of Intel 8085 microprocessor.

CO2: To improve programming logic and concepts of 8085 microprocessor.

CO3: To provide practical hands on experience with Assembly Language Programming.

CO3: To familiarize the students with interfacing of various peripheral devices with 8085 microprocessor.

Atomic and Nuclear Physics

CO1: Understand the properties of positive rays, experimental proof by frank and hertz method

CO2:Analyse the relationship between various types of couplings

CO3: Understand the properties of x-ray s verification

CO4:Analyse the ideas of basics of nucleus and their energy

CO5:Perform the procedures for nuclear fission and fusion

Radiation Physics

CO1: Explain the principles of radiation dosimetry;

CO2: Explain the principles of therapeutic radiation physics including X-rays, electron beam physics, radioactive sources, use of unsealed sources and Brachytherapy;

CO3: Describe how to use radiotherapy equipment both for tumourlocalisation, planning and treatment;

CO3: Define quality assurance and quality control, in the context of radiotherapy and the legal requirements

Research Methodology

CO1: Assess critically the following methods: literature study, case study, structured surveys, interviews, focus groups, participatory approaches, narrative analysis, cost-

CO2: Critically assess research methods pertinent to technology innovation research.

CO3: Understanding research questions and tools

CO4: Experience in scientific writings

CO5: Practice in various aspects of scientific publications

CO6: Inculcation of research ethics

Participation in bounded research

CO1: Hands on exposure to problem solving tools in contemporary research

CO2: Evolution of research intuitiveness and orientation

CO3: Familiarity with cutting edge research trends

Electro Magnetic Theory

CO1: Explains the fundamentals of electrostatics

CO2: Illustrates the application of electrostatics in macroscopic media

CO3: Briefs out the various concepts of magnetostatics

CO4: Describes the elementary ideas of electromagnetic theory

CO5: Elaborates the utilization of electromagnetic theory in optics

Nuclear and Particle Physics

CO1: Acquire knowledge in the content areas of nuclear and particle physics, focusing on concepts that are commonly used in this area.

CO2: Develop and communicate analytical skills in subatomic physics.

CO3: Develop familiarity with the vast areas of nuclear and particle physics as well as develop an interest in these subjects.

Advanced Electronics Lab

CO1: Understand the current voltage characteristics of semiconductor devices,

CO2: Evaluate frequency response to understand behavior of Electronics circuits

CO3: Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation,

CO4: Design and analyze of electronic circuits

Non-Conventional Energy Physics

CO1: Describe the environmental aspects of non conventional energy resources

CO2: In Comparison with various conventional energy system, their prospects and limitations

CO3: Know the need of renewable energy resources, historical and latest developments

Photonics devices and application

CO1: Learn Fundamentals of computerized modeling of diverse optical and photonics systems.

CO2: Gain working experience with standard computational tools used in industry.

CO3: Acquire essential laboratory skills in designing experiments.

CO4: Assembling standard optical tools for optical experimentation.

Societal research

CO1: Sensitization of social needs for innovation

CO2: Team work towards interdisciplinary synchronous research strategy

CO3: Development of critical thinking and synergistic research approach.

Laser Physics and Non Linear Optics

CO1: Apply the concepts and theories of a range of advanced topics in physics;

CO2: Demonstrate specialized analytical skills and techniques necessary to carry out advanced calculations in a range of advanced topics in physics;

CO4: Approach and solve new problems in a range of advanced topics in physics

Numerical Methods and Computational Physics

CO1: Describe and apply the Newton's forward, backward and divided difference formulas, Lagrange's polynomial and cubic spline to obtain the polynomial interpolation.

CO2: Develop algorithmic solutions to simple computational problems and write simple Python programs.

CO3: Explain the methods to solve algebraic and transcendental equations; solve the linear system of equations by direct or iterative methods and find the dominant Eigen value of a matrix.

Numerical methods lab with C++

- CO1:** Be aware of the use of numerical methods in modern scientific computing.
- CO2:** Be familiar with calculation and interpretation of errors in numerical methods.
- CO3:** Be familiar with numerical solutions of nonlinear equations in a single variable
- CO4:** Be familiar with finite precision Computing.
- CO5:** Be familiar with numerical interpolation and approximation of functions
- CO6:** Be familiar with numerical integration and differentiation
- CO7:** Be familiar with numerical solution of ordinary differential equations

Nano Science and Technology

- CO1:** Elucidate emerging needs in nanotechnology environment, health; and safety, and incorporate them into basic education that can be immediately employed in industry.
- CO2:** Promote interdisciplinary interactions among engineering, engineering technology, science, and industrial management/technology majors;

Non-linear Dynamics

- CO1:** The aim of the course is to present introduction to nonlinear dynamics of continuous and discrete models.
- CO2:** Students will be able to analyze models in using appropriate software.
- CO3:** Students should be able to illustrate mentioned nonlinear phenomena in models from various science fields.
- CO4:** Students will be able to explain one and multiparametric bifurcations and chaotic dynamics.

Project

- CO1:** Understand the basic ideas about the project
- CO2:** Understand the working procedure of the project
- CO3:** Perform the procedure as the laboratory standards
- CO4:** Understand the values obtained and its applications



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THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

CHEMISTRY

UG

B.SC

B.Sc Programme Educational Objectives – PEO

- PE01- Acquired the knowledge with facts and figures related to various subjects in pure sciences
- PE02- Understood the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
- PE03- Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments.
- PE04- The skills of observations and drawing logical inferences from the scientific experiments.
- PE05- Analyzed the given scientific data critically and systematically and the ability to draw the objective conclusions.
- PE06- Been able to think creatively (divergently and convergent) to propose novel ideas in explaining facts and figures or providing new solution to the problems.
- PE07- Realized how developments in any science subject helps in the development of other science subjects and vice-versa and how interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments.
- PE08- Developed scientific outlook not only with respect to science subjects but also in all aspects related to life.
- PE09- Realized that knowledge of subjects in other faculties such as humanities, performing arts, social sciences etc.
- PE10- Can have greatly and effectively influence which inspires in evolving new scientific theories and inventions.
- PE11- Imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.
- PE12- Developed various communication skills such as reading, listening, speaking, etc., which will help in expressing ideas and views clearly and effectively.
- PE13- Realized that pursuit of knowledge is a lifelong activity and in combination with untiring efforts and positive attitude and other necessary qualities leads towards a successful life.

B.Sc Programme Outcome – PO

- PO1- To understand basic facts and concepts in Chemistry while retaining the exciting aspects of Chemistry so as to develop interest in the study of chemistry as a discipline.
- PO2- To develop the ability to apply the principles of Chemistry.

- PO3- To appreciate the achievements in Chemistry and to know the role of Chemistry in nature and in society. To develop problem solving skills.
- PO4- To be familiarised with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies.
- PO5- To develop skills in the proper handling of apparatus and chemicals.
- PO6- To be exposed to the different processes used in industries and their applications.



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY [PRIST]
(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)
THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

CHEMISTRY

PG

M.SC

M.Sc. Programme Educational Objective – PEO

- PEO1-To demonstrate broad knowledge of descriptive Chemistry.
- PEO2-To impart the basic analytical and technical skills to work effectively in the various fields of chemistry.
- PEO3- To motivate critical thinking and analysis skills to solve complex chemical problems, e.g., analysis of data, synthetic logic, spectroscopy, structure and modeling, team-based problem solving, etc.
- PEO4-To demonstrate an ability to conduct experiments in the above sub-disciplines with mastery of appropriate techniques and proficiency using core chemical instrumentation and modeling methods.
- PEO5-To demonstrate the ability to perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on these results and draw reasonable, accurate conclusions.
- PEO6-To develop skills in quantitative modeling of static and dynamic chemical systems.
- PEO7-To develop laboratory competence in relating chemical structure to spectroscopic phenomena.
- PEO8-To demonstrate the ability to synthesize, separate and characterize compounds using published reactions, protocols, standard laboratory equipment, and modern instrumentation.

M.Sc Programme Outcome –PO

- PO1-Think critically and analyze chemical problems.
- PO2-Present scientific and technical information resulting from laboratory experimentation in both written and oral formats.
- PO3-Work effectively and safely in a laboratory environment.
- PO4-Use technologies/instrumentation to gather and analyze data.
- PO5-Work in teams as well as independently.
- PO6-Apply modern methods of analysis to chemical systems in a laboratory setting.



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THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

BIO CHEMSITRY

UG	B.SC
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Programme Educational Objective (PEO)

PEO 1: Grow professionally with their knowledge and proficient skills throughout their career.

PEO 2: Demonstrate high standard of ethical conduct, positive attitude and societal responsibilities.

PEO 3: Become successful Biochemist who are able to competent, innovative and productive in addressing the needs of the Industry, or pursue higher education and research.

PEO 4: Work as techno managers, administrator or entrepreneurs with further training and education.

PEO 5: Pursue doctoral research degrees to work in colleges, universities as professors or as scientists in research establishments

PROGRAMME SPECIFIC OUTCOME (PSOs)

- **PSO 1** – To demonstrate foundation knowledge in the areas of Biochemistry like cell biology, biomolecules, protein biochemistry, molecular biology, pharmaceutical chemistry, hormonal biochemistry.
- **PSO 2-** To prepare students for future careers in various fields of biochemistry by enhancing analytical and critical-thinking skills in which a core understanding of the chemistry of biological processes is important for the understanding of human health and disease.
- **PSO 3-** To equip highly skilled scientific workforce, particularly for the biomedical research sectors, in the academic, industry as well as for research laboratories across the country and the globe.
- **PSO 4-** To use standard laboratory protocols in biochemistry, modern instrumentations, proper laboratory safety protocols and classical techniques to carry out experiments and also use computers in data acquisition and processing and use available software as a tool in data analysis.
- **PSO 5-** The skills acquired in the programme will help the students in acquiring scientific, academic and industrial positions such as Analyst, Research Scientist at Pharma (R&D) Industries, Academician, Project Associates (JRF, SRF), Doctoral Research positions abroad at India and abroad. Clinical biochemist at renowned hospitals, medical coding, scientific writers.

Programme outcome (POs):

PO1- Creative and Critical Thinking: To assume, inquire and analyze, apply logical principles, validate assumptions, solve, integrate knowledge and widen perspective.

PO2- Effective communication: To understand that communication comprises attentiveness and listening, reading and comprehension, to communicate and gather information through oral and written formats.

PO3- Professional and Ethical Behavior: to learn to accomplish tasks at hand with proficient skills in teamwork, to master academic integrity and intellect independence.

PO4- Research inclination: Apply contemporary research methods, skills and techniques to conduct independent inquiry in a chosen scientific discipline.

PO5- Moral maturity and Social Interaction: Harness cognitive ability, elicit and appreciate views of others, mediate disagreements, promote interdependence and help reach conclusions in group settings.

PO6- Economic Independence & Employability Potential: Acquire the ability to be involved in economically sustainable employment opportunity and inculcate entrepreneurial abilities.

PO7- Environment and Sustainability: Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.

B. Sc., Curriculum Mapping Programme Course Outcome vs Programme Outcome

COURSE OUTCOME (CO)

CO1 – 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.

CO2 – Advanced English-I

- Develop vocabulary
- Learn to edit and do proof reading
- Read and comprehend literature

CO3- English-I

- Read and comprehend literature
- Appreciate poetry and prose
- Familiarize students with fiction.

CO4 – Biomolecules

- Recognize water as a universal solvent and elixir of life by knowing its importance
- Identify the properties and classification of carbohydrates
- Recall the role of various lipids in biomembrane including signal transduction
- Categories the amino acids and know their properties
- Differentiate the structure, properties and functions of DNA and RNA
- Differentiate the structure, properties and functions of DNA and RNA

- List the functions and deficiency disease of fat and water soluble vitamins

CO5 - Biomolecules Lab-I

- Gain knowledge on lab safety
- Trained on preparation of reagents and solution
- Able to analyze biomolecules and vitamins qualitatively and quantitatively
- Handle the instruments associated with the practical
- To identify the structure of biomolecules

CO6- Chemistry –I

- Apply quantitative reasoning skills to matter and energy, and physical or chemical changes that occur.
- Use accepted models to describe the reactions between acids and basis and basic equilibrium concepts. Demonstrate competence in collecting and interpreting data in the laboratory.

CO7 - Volumetric Analysis Lab

- To understand the apparatus used in volumetric analysis and correct volumetric analysis.
- To know Good laboratory practice.

CO8 -Communicative English Lab-I

- Learn grammar.
- Enrich vocabulary
- Understand the process of communication
- Develop listening skill

CO9 – Package Lab 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.

CO10- Indian Constitution

- Democratic values and citizenship Training are gained.
- Awareness on Fundamental Rights are established.
- Learn the functions of union and State Governments
- Learn the power and functions of the Judiciary
- Appreciate of Democratic Parliamentary Rule

CO11– Tamil II

- Develop listening skill
- Know the fruitfulness obtained through devotion.
- Perceive the progress achieved in the society through devotion.

CO12 - Advanced English-II

- Develop technological skill.
- Able to write in a variety of formats
- Read biographies and develop personality

CO13-Advanced English-II

- Develop technological skill.
- Able to write in a variety of formats
- Read biographies and develop personality

CO14-English-II

- Appreciate different forms of literature
- Acquire language skills through literature
- Broadens the horizon of knowledge

CO15 – Biochemical Techniques

- The units of this paper are crucial for implementation of research ideas at molecular level.
- It trains the students in adopting various techniques in biological research.
- This significantly enhances the employability of the candidates in Biotechnological, Pharmaceutical Industries and Analytical Laboratories and research institutes.
- This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.
- This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules
- To learn various techniques and acquire the skills to use appropriate methods
- To acquire the good laboratory practices

CO16 - Biochemical Techniques Lab-II

- Gain knowledge on lab safety
- Trained on preparation of reagents and solution
- Able to analyze biomolecules qualitatively and quantitatively
- Handle the instruments associated with the practical
- Students will understand the concept of spectrophotometer
- They will be able to assess the suitability of chromatographic techniques for solving specific bio- analytical problems and critically apply the knowledge for biomolecules separation

CO17 - Chemistry –II

- Apply quantitative reasoning skills to matter and energy, and physical or Chemical changes that occur.
- Use accepted models to describe the reactions between acids and basis and basic equilibrium concepts.
- Demonstrate competence in collecting and interpreting data in the laboratory.

CO18 - Organic Analysis Lab

- Apply significant figures rules in all calculations providing the correct number of significant figures and units
- convert between different units using conversion factors and dimensional analysis
- Name elements, provide their symbols and determine the number of protons, neutrons, electrons and nuclei in elements and compounds
- Calculate percent composition given a molecular formula and molecular formula given the percent composition

- Name salt, acids, bases and covalent compounds and provide formulas for these given a molecular formula.
- Explain the difference between solubility and dissociation in water and apply this knowledge to acids, bases and salts.
- Identify weak and strong acids and bases and insoluble compounds using dissociation and solubility rules.
- Construct molecular, total and net ionic equations for double displacement reactions

CO19 – Research Led Seminar

- Exposure to various research domains
- Acquaintance with languages of research
- Development of research aptitude

CO20- Package Lab I

- 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 simple slide shows with outlines and notes.
- Create slide presentations that include text, graphics, animation, and transitions.

CO21- Communicative English Lab-II

- Learn grammar.
- Use a variety of reading strategies
- Enhance the skill of making grammatically correct sentences.

CO22-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

CO23- Advanced English-III

- Understand phonetics.
- Develop writing skill
- Able to develop creative writing

CO24- 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.

CO25- Cell Biology and Genetics

- Differentiate the prokaryotic and eukaryotic cell
- Understand the principle behind studying the cell morphology using various microscope
- Identify the structure and functions of each organelle in cell
- Recognise the mechanism behind the protein sorting and transport to their destinations like lysosome, mitochondria and chloroplast
- Maintenance of cytoskeleton structure and function of micro, macro and intermediary filaments
- Identify the proteins involved in cell interaction

- Enumerate the phases of cell cycle, events in cell division and mechanism of cell death.

CO26 - Cell Biology and Genetics Lab

- By the end of the course, students can be able to demonstrate the importance of the chromatography and their wide applications
- Understand and apply the principles and techniques of separation of pigments, amino acid and protein which prepares students for further education and/or employment in teaching, basic research, or the health professions.
- would be able to separate the plant pigments, identify and distinguish different amino acid, protein, lipids
- would be able to identify and outline the structure of an cell membrane at different magnification
- It trains the students in adopting various techniques in biological research.

CO27- Programming in C

- Understanding a functional hierarchical code organization.
- Ability to define and manage data structures based on problem subject domain.
- Understanding a concept of object thinking within the framework of functional model.
- Understanding a concept of functional hierarchical code
- Understand operators, expressions and preprocessors
- To learn the concept of programming

CO28 - Programming in C lab

- To know the proper lines of C++, Encapsulation, Inheritance and Polymorphism Read, understand and trace the execution of programs written in C language.
- To explain the various data types, operations and functions of C++.
- To know the concept of constructors and destructors
- To explain the concept of inheritances, types of inheritance and polymorphism, virtual function
- To explain the types of streams, format and format of input and output operations
- To Known the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.

CO29 - Research Methodology

- Understanding research questions and tools
- Experience in scientific writings
- Practice in various aspects of scientific publications
- Inculcation of research ethics

CO30- Package lab 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.

CO31- Communicative English Lab-III

- Learn grammar.
- Enhance their fluency in English
- Develop speaking and writing skills
- Develop individual perspectives that demonstrate critical thinking skills

CO32- Tamil IV

- Realize how the ancient people changed their life style 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

CO33-Advanced English IV

- Develop writing skill.
- Comprehend and describe poems
- Learn interviewing skills

CO34-English IV

- Improve their ability to read and understand them
- Know the genius of Shakespeare
- Express in writing their views.

CO35- Human Physiology

- The purpose of this course is to promote knowledge in the integration of theories, methods and research in human physiology.
- It gives and exposure about human anatomy and physiology.
- Understand Anatomy & Physiology of various systems in Human which gives a clear picture about various systems and their respective disorders
- Acquire good knowledge on Nervous & Muscular systems
- A Fair knowledge on Human Reproductive Biology provides information with the system, hormones involved, disorders associated with them in, and treatments in both genders respectively.
- Understand "Anatomy & Physiology of various Systems such as Nervous system, Muscular system, Reproductive system, Liver.

CO36 - Biochemical Techniques Lab-II

- By the end of the course, students can be able to demonstrate the importance of the blood, buffer and their wide applications
- This skill based course will teach the students the various instrumentations that are used in the analytical laboratories
- This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules
- Perform skillful specimen collection, identification and processing
- Utilize communication skills necessary for working in the health care setting

- Exhibit professionalism, initiative, positive interpersonal skills, teamwork, respect and integrity.

CO37 - Fundamentals of Computing

- Bridge the fundamental concepts of computers with the present level of knowledge of the students
- Familiarize operating systems, programming languages, peripheral devices, networking, multimedia and internet
- Understand binary, hexadecimal and octal number systems and their arithmetic.
- Understand how logic circuits and Boolean algebra forms as the basics of digital computer
- Demonstrate the building up of Sequential and combinational logic from basic gates.

CO38 - Web Design Lab

- Acquire knowledge about functionalities of World Wide Web and E-Mail..
- Apply a structured approach to identifying needs, interests, and functionality of a website.
- Write well-structured, easily maintained, standards-compliant, accessible HTML Write CSS code to present html pages in different ways.
- Explore Markup languages features and create interactive web pages using them
- Design dynamic websites that meet specified needs and interests.
- Learn and design Client side validation using scripting languages
- Acquire knowledge about Scripting libraries

CO39 -Package lab 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.

CO40- Communicative English Lab-IV

- Learn grammar
- Enable to express their views in conversation
- Develop soft skills
- Enhance presentation skills

CO41- Environmental Studies

- To acquire awareness about immediate/wider surroundings through lived experiences on various themes related to daily life for example Family, Plants, Animals, Food, Water, Travel, and Shelter etc.
- To learn natural curiosity and creativity for the immediate surroundings.
- To develop various processes/skills e.g. observation, discussion, explanation, experimentation, logical reasoning, through interaction with immediate surroundings

- To develop sensitivity for the natural, physical and human resources in the immediate environment.
- To point out/ raise issues related to equality, justice and respect for human dignity and rights.
- To Learn about environmental pollution.
- Familiarize with the social issues and the environment

CO42 – Enzymes

- Understand the basic concepts on enzymes
- Relate the initial velocity and substrate concentration of enzymes and be able to understand the kinetics of inhibition reactions
- Able to understand the regulation pattern of various enzymes
- Relate the regulation pattern of enzymes for its application in health and diseases
- Understand the application of enzymes in industrial and therapeutic.
- Exposure to the nature of non-protein enzymes such

CO43 – Bioenergetics and Metabolism

- To shed knowledge on generation and transformation of energy in metabolic pathways.
- To know the various metabolic pathways associated with carbohydrate, lipid , protein and nucleic acid metabolism, their regulation and associated disorders.
- To understand the inter relationship of carbohydrate, lipid , protein and nucleic acid metabolism and understand the importance of TCA cycle.
- To aware about the Biological oxidation
- Understanding the importance of high energy compounds, electron transport chain, synthesis of ATP under aerobic and anaerobic conditions
- Understand the anabolic and catabolic processes associated with amino acids and nucleic acids and their regulation.

CO44 – Immunology

- The students may understand the immune system, its components and various techniques used in bio manipulation.
- Describe surface membrane barriers and their protective functions.
- Explain the importance of phagocytosis and natural killer cells in innate body defense.
- Describe the roles of different types of T cells, B cells and APCs.
- Compare and contrast the origin, maturation process, and general function of B and T lymphocytes.
- Along with this the students will become aware about concept, synthesis and action mechanism of vaccines.

CO45 - Food and enzyme Analysis Lab

- To illustrate various aspects of food engineering.
- To know the sources of enzymes and study the extraction and partial purification of enzyme.
- To standardize the optimum pH, optimum substrate concentration required for the maximum activity of enzyme.
- The students will be expertise in estimation of minerals in food.
- To understand the optimum activity of enzyme.
- Students will gain an understanding of buffers and their importance in the context of pH control.

CO46- Immunology Lab

- This course has been designed to provide hands-on experience on the tools and techniques used in immunology.
- The experiments have been designed in such a way that the student will have the opportunity to isolate a specific protein from a natural source, purify it and determine its activity
- Besides, students will get an opportunity to learn diffusion and electrophoresis.
- Basic understanding of Immunotechnology
- Study the principle and applications of various immuno techniques ranging from precipitation and agglutination reactions.
- To gain the experimental knowledge about ELISA, Radio immunoassay

CO47 – 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

CO48-Package lab 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

CO49- Communicative English Lab-V

- Develop corporate skills.
- Handle their day to day affairs well with their knowledge of language skills.
- Get a job

CO50 - Clinical Biochemistry

- At the end of the course, the student will be able to describe the diagnostic laboratory, according to the main stages pre-analytical, analytical and post-analytical.
- Describe the diagnostic significance of the main laboratory investigations know the problems related to the preparation of the patient, the collection and knowledge of the samples .
- Describe the various disorders
- Understand and explain the acid-base and water-electrolyte balance in the body.
- Understand the difference between plasma, serum, normal and abnormal constituents in various body fluids. Blood clotting mechanism and anticoagulants.
- Explain the nature and function of various enzymes ,normal levels and elevated levels in various diseases.
- Comprehend that blood is a universal fluid for carrying different minerals, nutrients, proteins etc to and from various tissues.
- Learn that many diseases result from imbalance in certain enzymes and helps in diagnosis of liver, cardiac, gastrointestinal, kidney diseases.

CO51 – Molecular Biology

- Discuss the most significant discoveries and theories through the historical progress of biological scientific discoveries, and their impacts on the development of molecular biology.
- Compare the structure of eukaryotic cells with the structure of simpler prokaryotic cells and with the structure of viruses
- To understand molecular concept of DNA, RNA
- They will be familiarized with mechanism of action and resistance to antibiotics at molecular level
- They will be able to describe the mechanisms of protein transport to various sub cellular sites and process of protein degradation
- Students will be able to describe how gene expression is regulated at the transcriptional and post-transcriptional level.
- They will be able to read and understand scientific articles related to subject and gain a critical understanding of their contents. They will be able to give a spoken and written presentation of scientific topics and research results.
- They will be familiarized with mechanism of action and resistance to antibiotics at molecular level

CO52 – Hematology and clinical biochemistry Lab

- Explain the origin of blood cells and articulate the process of erythropoiesis and leukopoiesis as it relates to health and disease.
- Discuss the coagulation process and its role in maintaining hemostasis.
- Demonstrate current hematological procedures used to diagnose, monitor and evaluate disorders.
- Demonstrate the basic principles of hematology and clinical biochemistry instrumentation
- Describe and Identify inborn defects in metabolism and correlate them with deficiency of key metabolic markers in the clinical laboratory, their common methods of analysis, and their clinical significance.
- Relate laboratory results to clinical diagnosis and relationship to heart, liver, kidney and pancreas function.

C053 - Molecular Biology Lab

- Exhibit a knowledge base in genetics, cell and molecular biology.
- Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.
- It can explain the principles of separation of DNA.
- To know the general safety routines for laboratory work in molecular biology.
- To gain the knowledge about isolation of Plasmid DNA from E.coli
- To understand purity determination by UV absorption

CO54 – Discipline Specific Elective – Pharmaceutical Biochemistry A

- Students are able to explain biopharmaceutical, physiological, biochemical and cell biology-related aspects on the transport and metabolism of drugs in the gastrointestinal tract and in the liver.
- Students be able to explain mechanisms behind the transport of drug and metabolism and how drugs can interact with other drugs and food and methods to study these - having developed its ability to plan, compile, analyze and report experiment that has importance for biopharmaceutical issues -

- Students be able to account for regulatory requirements within the biopharmaceutical area
- Students be able to describe the role of bio pharmaceuticals in drug development within the pharmaceutical industry
- To describe action of different drugs
- To analyze drugs to inhibit the particular enzymes and treatment of diseases

OR

CO54 – Basic Biotechnology B

- To understand principles of animal culture, media preparation.
- To explain basic principles of cloning
- To describe culture and clonal propagation of plants on a commercial scale.
- To get insight in applications or recombinant DNA technology in agriculture, production of therapeutic proteins.
- To describe commercial production of fuels, microbial enzymes.
- To explain the microbial degradation of pesticides, Bioremediation& Biofertilizers.

And

CO54 -Biochemistry of Plants and Microbes

- The students are able to perform plant phytochemical pigments
- to study about water microbiology.
- Prepare stained smears, culture micro-organisms, perform tests to identify bacteria and fungi, and to study food microbiology

And

CO54 - Hospital Managements

- Understand the theories of management.
- Understand the management process and integrated approach in management. Manage service organizations by accepting the inbuilt challenges.
- Manage service organizations by accepting the inbuilt challenges.
- Manage hospitals by understanding the complexity, levels and role of hospital administrator.
- Understand the current issues that have an implication in administration practice hospital administration

CO55 – Project work

- To results which are achieved immediately after implementing outcomes can be considered as mid-term results
- To outcome are the changes or result that the organization expects to be achieved the successful completion of the project
- The outcomes could be qualitative and qualitative or both

CO56-Package lab VI

- Learn to create animated graphics add sound and interactivity.
- Can develop Website
- CD based presentations

CO57- Communicative English Lab-VI

- Apply study skills
- Widen creative thinking
- Be a good team worker
- Make them proficient in English



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DEPARTMENT:

BIO CHEMISTRY

PG	M.SC
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PROGRAMME EDUCATIONAL OBJECTIVE (PEOs)

PEO 1: Graduates will be able to have increased understanding and awareness on the applications of scientific principles to the study of equine science and apply this in research activities.

PEO 2: Graduates will be able to critically evaluate research and a variety of clinical information and equipping themselves as researchers in multidisciplinary fields.

PEO 3: Graduates will be able to access and relate the biochemical issues to the environment and broader societal contexts.

PO 4: Graduates will be able to practice team work skills like work as a member in a multidisciplinary team, and understanding the qualities of team leadership and interpersonal dynamics through case studies and group projects.

PEO 5: Graduates will be able to gain awareness on Biochemical ethical issues and ethical responsibilities.

PROGRAMME SPECIFIC OUTCOME (PSOs)

PSO 1: Students can be able to understand and analyze the principles of Cell Biology, Enzyme & Enzyme technology, Intermediary metabolism & Clinical Biochemistry and relate the biochemical interactions within the living organism.

PSO 2: Students can be able to accumulate data and construct the experimental analysis on Enzyme – Clinical analysis, Colorimetric analysis in various biomolecules to determine the diseased state

PSO 3: Students can be able to understand the code of ethics in research through Basics of Patent and Bioethics & practice them Innovational

PSO 4: Students can be able to demonstrate effective scientific communication skills both written & oral. Also able to write the reports and present the results of their own work.

PSO 5: Clinical Biochemistry will enable the students to realize the clinical aspects and significance of various metabolic disorders

PROGRAMME OUTCOME(POs)

PG biochemistry graduate will be able to achieve

PO1- Critical Thinking and Effective Communication: The teaching is intended to kindle the critical thinking of the student to address problems (Problem based learning) and equip them to list out their understanding (Activity based learning). The syllabus also includes journal paper presentation and analysis on specific topics of all subjects which will be evaluated by faculty handling the subject.

PO2- Future Career: To prepare students for future careers in the various fields of biochemistry such as academic and research institution.

PO3- Societal Contribution and Social Interaction: The Biochemistry Programme will benefit the society on the whole by adding to the highly skilled scientific workforce, particularly for the biomedical research sectors, in the academic, industry as well as for research laboratories across the country and the globe. Inside the classrooms group discussion is encouraged on topics during the last five minutes of class to improve the understanding and to share the knowledge and view point. Outside the classroom, various outreach programme are conducted on various health initiatives.

PO4- Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

PO5- Ethics: Students learn about the significance of having right moral features to develop good interpersonal skills.

PO6. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

Mapping of PEOs and PO

M. Sc., Curriculum Mapping

Programme Educational Objectives vs Programme Outcome

M.Sc. Course Outcome(CO)

CO1- Biomolecules

- Recognize water as a universal solvent and elixir of life by knowing its importance
- Identify the properties and classification of carbohydrates
- Recall the role of various lipids in biomembrane including signal transduction
- Categories the amino acids and know their properties
- Differentiate the structure, properties and functions of DNA and RNA
- List the functions and deficiency disease of fat and water soluble vitamins

C02- Biochemical and Instrumental analysis

- This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.
- Understanding the principles of Electrophoresis, Spectrophotometry and ELISA and their applications in biological investigations/experiments
- **This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules**
- Develop competence in handling various chromatographic techniques and apply them in isolating and characterizing different biological molecules
- Purify proteins by affinity chromatography
- Understanding the principles of Electrophoresis, Spectrophotometry and ELISA and their applications in biological investigations/experiments

- To learn various techniques and acquire the skills to use appropriate methods
- To acquire the good laboratory practices

C03- Enzymology

- Upon successful completion of this course, the student will learn, the major classes of enzyme and their functions in the cell.
- The course also provides information pertaining to role of co-enzyme cofactor in enzyme catalyzed reaction, properties of enzymes and regulation of biochemical pathways.
- Exposure to the concept of activation energy and its importance in biological reactions.
- Understanding the role of enzymes in clinical diagnosis and industries
- To acquire fundamental knowledge on enzymes and their importance in biological reactions.
- Exposure to the nature of non-protein enzymes such as ribozymes
- Differentiate between equilibrium and steady state kinetics and analyzed simple kinetic data and estimate important parameter (K_m , V_{max} , K_{cat} etc)

C04- Biochemical Techniques Lab – I

- By the end of the course, students can be able to demonstrate the importance of the protein chemistry and their wide applications.
- This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.
- This course covers both fundamental and applications of the instruments that are

routinely used for the characterization of biomolecules

- Perform skillful specimen collection, identification and processing.
- Utilize communication skills necessary for working in the health care setting.
- Exhibit professionalism, initiative, positive interpersonal skills, teamwork, respect and integrity

C05 – Research Red Seminar

- Student develop their ability to write briefs, and coherent abstracts on a presentation they have attended; this helps note-taking and focusing during the presentation
- Student become more critical when evaluating and discussing published work;
- Students who present need to read in depth, and critically evaluate, a recent paper in their subject specialism. This prepares students towards writing for publication.

C06- Cellular Biochemistry

Upon successful completion of this course, participants will be able to:

- Describe the general principles of gene organization and expression in both prokaryotic and eukaryotic organisms.
- Describe the structure and function of biological membranes including the roles of gradients in energy transduction.
- Explain the basic pathways and mechanisms in biological energy transduction from oxidation of metabolites to synthesis of ATP.
- Explain various levels of gene regulation and protein function including signal transduction and cell cycle control.
- To become aware with the variations in the levels of triglycerides and lipoproteins and their relationship with various diseases
- Relate properties of cancerous cells to mutational changes in gene function.

C07- Metabolism and Regulation

- Gain knowledge on glucose anabolic and catabolic pathways that ultimately control the glucose homeostatis.
- Describe surface membrane barriers and their protective functions
- Able to explain the role of lipids, their metabolism and their stringent control by hormones and other factors.
- Understand the anabolic and catabolic processes associated with amino acids and nucleic acids and their regulation.
- To acquire knowledge related to the role of TCA cycle in central carbon metabolism, importance of anaplerotic reactions and redox balance.
- Understanding the importance of high energy compounds, electron transport chain, synthesis of ATP under aerobic and anaerobic conditions.
- Able to understand the energy homeostatis during starvation and energy excess.

C08- Neuro Biochemistry

- To understand various neurological system

- Recognize the need for, and engage in life-long learning
- Gain knowledge of contemporary issues
- To able to understand DNA microarrays, Methodology, types and applications
- Use the techniques, skills, and modern engineering tools necessary for engineering practice
- To acquire knowledge related to LEARNING AND MEMORY
- to understand biochemistry of vision and muscle contraction

C09- Enzymology Lab- II

- Students will gain an enhanced overall understanding of enzymology, enzyme assays, and in particular the influence of various physicochemical characteristics upon enzyme activity.
- Acquiring training to estimate activity of enzymes.
- To determine pH optimum, K_m and V_{max} of enzymes and to analyse enzyme kinetics
- To determine optimum temperature for the activity of an enzyme.
- Students will gain direct laboratory experience in spectrophotometry.
- Students will gain an understanding of buffers and their importance in the context of pH control.
- Students will gain an appreciation of working as part of an integrated research team.

C010- Research Methodology

- Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computational frameworks used in mathematical researches.

C011- Participation in Bounded Research

- Participatory action research (PAR) is an approach to research in communities that emphasizes participation and action. It seeks to understand the world by trying to change it, collaboratively and following reflection. PAR emphasizes collective inquiry and experimentation grounded in experience and social history.

C012- Molecular Biology

- At the end of the course, student will be able to
- Understand the structure of nucleic acids and the DNA replication process
 - Learn about the process of transcription
 - Understand the mechanism of translation
 - Learn about gene regulation in prokaryotes
 - Study the discovery of DNA as genetic material, transcription, DNA repair and translation.
 - Analyse coding and non-coding regions of eukaryotic genome and their importance.
 - Exposure with the importance of E. coli lac operon

C013- Clinical Biochemistry

- To learn about the normal constituents of urine, blood and their significance in maintaining good health

- Exposure to the mechanisms of causation of diseases of liver and kidney.
- Develop understanding of the current concepts related to mechanism of Cancer.
- To become aware with the variations in the levels of triglycerides and lipoproteins and their relationship with various diseases.
- able to describe the diagnostic laboratory, according to the main stages pre-analytical, analytical and post-analytical.
- describe the diagnostic significance of the main laboratory investigations know the problems related to the preparation of the patient, the collection and knowledge of the samples

CO14- Clinical Biochemistry Lab

- Identify the principal analytical procedures used to measure biochemical magnitudes.
- Interpret and integrate the analytical data from the principal biochemical and molecular genetics tests for the screening, diagnosis, prognosis and monitoring of pathologies.
- Interpret experimental results and identify consistent and inconsistent elements.
- To introduce them to metabolic pathways of the major biomolecules and relevance to clinical conditions. Make an oral, written and visual presentation of one's work to a professional or non-professional audience in English and understand the language and proposals of other specialists.
- **Manage information and the organization and planning of work. Read specialized texts both in English and one's own language.**
- To learn qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods.

CO15- Molecular Basis of diseases

After the completion of this course, the student will be able to

- Attain a thorough knowledge on the molecular mechanisms for Tuberculosis, Typhoid, Cholera
- Understand the pathological changes during infectious diseases.
- Provide an insight into the history of pathology covering all the basic definitions and common terms.
- Detail on the survival mechanism in diseases, an insight into microscopic and cellular pathology.
- Elaborate the overview of Dengue Hemorrhagic Fever, and Chlamydiae, opportunistic fungal pathogens
- review the causes and mechanisms of Emerging and re-emerging infectious diseases and pathogens

C016- Environmental Biochemistry

- Students will be able to explain fundamentals of earth atmosphere and its interconnectivity between various components.
- Students will be able to describe different elements of the environments and their impact on sustaining the environment.
- students will be able to interpret the fundamentals of ecology and its role in biological evolution
- Gain knowledge about pollution control
- understand the importance of Structure and functions of ecosystem
- exposure with the importance of Value of Biodiversity

C017- Molecular and Environmental biochemistry lab

- After the completion of this course, the student will be able to Learn how to isolate genomic DNA.
- Track various techniques adopted for separation of DNA.
- Demonstrate separation of protein by Western blotting and Animal Tissue culture.
- Separate chromosomal and plasmid DNA using enzyme.
- Gain the knowledege about COD and BOD
- demonstrate basis of Animal tissue culture

C018-- Participation in Scaffold Research (Design/Societal Project)

- Instructional scaffolding is a process through which a teacher adds support for students in order to enhance learning and aid in the mastery of tasks. I
- A temporary structure used to support a work crew and materials to aid in the construction, maintenance and repair of buildings, bridges and all other man made structures. A

C019- Project Work

- exposure for safe laboratory practices by handling high end equipments and chemical reagents.
- Biochemistry can be better understood with parallel practical components. In this regard the committee strongly felt that there shall be a guideline to maintain the students' teacher ratio for both theory and practical classes.
- analyze current literature research for research topic of his/her area of expertise

- rationalize the research gap for new innovation and design and execute independent experimental approach
- able analyze the data obtained from a particular experiment and make to plot graphs, power point presentations.
- comprehend expertise for writing the research reports.

CO20- Discipline Specific Elective I - Biostatistics I- A

- To use basic analytical techniques to generate results.
- interpret results of commonly used statistical analyses in written summaries.
- demonstrate statistical reasoning skills correctly and contextually
- They play an important role in interpretation of result of experiments and research work. This course will provide information how to utilize various tools of biostatistics in interpretation of biological data.
- The students will understand the principles of collection of data in biological experiments, proper statistical analysis of the data and its presentation
- Knowing statistical methods will help students in improving their analytical and interpretation skill..

OR

Immunology I- B

- The students may understand the immune system, its components and various techniques used in bio manipulation.
- The course will provide technical knowledge as to how different diseases are caused and various responses mediated by living cells to combat pathogen attack.
- Compare and contrast the origin, maturation process, and general function of B and T lymphocytes
- At The course will provide sound knowledge of how immune system deals with various pathogens, different processes and cell types involved in prevention of disease.
- To understand the principles of tolerance, autoimmunity and the role of immunity in protection against pathogens.
- Along with this the students will become aware about concept, synthesis and action mechanism of vaccines.

CO21- Discipline Specific Elective II- Endocrinology II- A

- Apply the knowledge from this course while working in medical laboratory to diagnose different hormone disorders

- Understand the scientific research that have been used to understand endocrine and hormone function
- Explain recent laboratory methods in diagnosis hormone disorders
- Knowledge and Understanding the synthesis of different endocrine gland hormones
- Ability to analyze and solve problems related to hormone tests
- To know the pathophysiology significance of the system with special reference to humans
-

OR

Clinical nutrition and dietetics II- B

- To learn glycemic index, balanced diet, micronutrient deficiencies and the remedies, nutraceuticals and their importance, junk foods and their hazards
- Understanding merits and demerits of vegetarian and non-vegetarian foods
- To understand the need for specialized food for people with special needs - diabetes, pregnancy, inherited genetic disorders.
- To know the use of alternate crops – cereals and pulses and their importance
- Patients receive medical or surgical help with their conditions, but some have conditions that can also benefit from special diets. Eating more of certain foods, and/or avoiding certain things can help to control a patient's symptoms.
- In some cases, by carefully monitoring what a sick patient eats and drinks, the dietitian can reduce the chance that patient will have problems in the long-term, and can establish and/or help maintain the patient's quality of life.

OR

Bioinformatics II- C

- The student will choose biological data, submission and retrieval from databases.
- The students will be able to experiment pair wise and multiple sequence alignment and will analyze the secondary and tertiary structures of protein sequences.
- The students will acquire training in different areas of bioinformatics related to various biological databases such as protein databases, nucleic acid databases, metabolic pathway databases, etc.
- to understand the Role of computers in Biology
- To know the Software in Bioinformatics - C, C++, bioperl, Biopython and oracle
- The student will understand the data structure (databases) used in bioinformatics and interpret the information (especially: find genes; determine their functions), understand and be aware of current research and problems relating to this area.

CO22- Discipline Specific Elective III- Genetics and Genetic Engineering III-

A

- Comprehensive, detailed understanding of the chemical basis of heredity
- Comprehensive and detailed understanding of genetic methodology and how quantification of heritable traits in families and populations provides insight into cellular and molecular mechanisms.
- Comprehensive detailed understanding of cellular mechanisms of

- developmental stages.
- Exposure to the concepts of genomics, proteomics, metabolomics and their importance in human health
- Acquaintance with the merits and demerits of transgenic crops.
- To produce insulin using recombinant DNA technology.

OR

Pharmaceutical Biotechnology III- B

- Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
- Genetic engineering applications in relation to production of pharmaceuticals
- This course gives information on drug designing, novel techniques in drug discovery and the role of biotechnology in pharmaceuticals.
- Importance of Monoclonal antibodies in Industries
- Appreciate the use of microorganisms in fermentation technology
- Exposure with the importance of expression vectors and their importance in Biotechnology.

AND

CO23- Discipline Specific Elective IV Medical Biotechnology IV A

- Explain insights about genetic diseases and also about the molecular aspects related to human disease
- Gain new insights into molecular mechanisms of nucleic acid and gene therapy
- Gain knowledge about therapeutic recombinant proteins and immunotherapy for the treatment of different diseases
- able to interpret the molecular basis of diseases
- exposure with Gene therapy
- understand then Nucleic acid based Therapy

OR

Applied Microbial Biochemistry IV B

- Will be acquainted with methods of measuring microbial growth, calculating growth kinetic parameters with understanding of steady state and continuous growth.
- Will have gained an in-depth knowledge of primary, secondary and group translocation transport systems existing in bacteria, simultaneously learning membrane transport proteins and kinetics of solute transport.
- Will have learnt central metabolic pathways for carbon metabolism in bacteria enlisting differences with eukaryotic systems and their regulation in diverse physiological conditions. This allows students to apply the acquired knowledge in engineering metabolic pathways for developing industrially useful strains.

- Will have gathered understanding of inorganic and organic nitrogen assimilation and its regulation. Also knows role of glutathione in cellular redox regulation and biochemistry of glutamate overproducing strains.
- will have learnt Microbial products in pharmaceutical and agriculture industry
- exposure with Medical microbiology and microbial metabolism

CO24- Applicable Mathematical Techniques

- Students using OR techniques in business tools for decision making
- Students develop Assignment problem and Replacement problems
- Understand the concept of decision analysis and game theory
- Students gets the knowledge about interpolation

CO25- Writing for the Media

- Understand the intricacies of mass media

CO26- Biomedical Instrumentation

- To familiarize students with various medical equipments and their technical aspects
- To introduce students to the measurements involved in some medical equipment.
- Ability to understand diagnosis and therapy related equipments
- Understanding the problem and ability to identify the necessity of an equipment to a specific problem

CO27- Green Chemistry

- To understand the environmental status and evolution.
- To know about the Pollution and its prevention measures.
- To familiarize the green chemistry.
- To learn about the bio-catalytic reactions.
- To understand about the vitamins and antibiotics.

CO28- Internet & Web Design

- Acquire knowledge about functionalities of Internet
- 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.



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY [PRIST]

(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)

THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

BIO TECHNOLOGY

UG

B.SC

B.Sc., Program Educational Objectives PEO

- **PEO 1** : To obtain detailed information about the fundamentals of Biotechnology, allied subjects and life skills.
- **PEO 2** : 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.
- **PEO 3** : 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.
- **PEO 4** : 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

B.Sc., Programme Specific Outcome (PSO)

- **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.

B.sc., Program Outcome PO

- **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 assess basic research tool

B.Sc., BIOTECHNOLOGY COURSE OUTCOME(CO)

CO1-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

CO2- Fundamentals of Biological System Lab

- The learners will acquire knowledge on the structure and functions relationship of biological system and as well their role 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

CO3-Biological Chemistry

- The learners will acquire knowledge on the structure and functions relationship of proteins nucleic acid carbohydrates and as well their role in various biological process.
- They study the influence and role of structure in reactivity of biomolecules
- Students will use current biochemical and molecular techniques to plan and carry out experiments

CO4- 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.

CO5-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

CO6- 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.

CO7- 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

CO8- Microbiology Lab

- Develop basic skill in aseptic techniques
- Understand various accessories for microbiology practicals
- Perform various staining techniques
- Cultivate bacteria with different cultivation technique

CO9- Research LED Seminar

- Know about the recent areas in research
- Explore good practices in institution-driven, strategic approaches on how to integrate research and education missions.

C10-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.

CO11-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

CO12- Immunology

- The students may understand the immune system, its components and various techniques used in biomanipulation.
- This course gives an overview on the immune system including organs, cells and receptors
- The students learn 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

CO13- 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

CO14- Research Methodology

- Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.

CO15- Animal Physiology

- Understand the physiological processes that regulate body functions and the regulation of an organ system from the molecular all the way to the whole animal level
- understanding the more complicated structures and processes in mammals and humans
- It's a paper which accomplishes the learning of techniques involved in understanding the immunological aspects of physiology and biological samples.
- To know the importance of phagocytosis and natural killer cells in innate body defense.

CO16- 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

CO17- 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.

CO18- 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

CO19- Development 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

CO20- 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.

CO21- 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.

CO22- Development 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.

CO23- 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

CO24-Participation in bounded research

- 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

CO25- 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

CO26- AppliedBiotechnology

- 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.

CO27- 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.

CO28- 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

CO29- Discipline Specific Elective V&VI (rDNA Technology& Molecular Biology - SEM –V)

- Utilize the knowledge on creation of a genomic library.
- explain the significance of model organisms in recombinant DNA technology
- 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.
- 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
- 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

Discipline Specific Elective (Environmental Biotechnology& Environmental Management- SEM VI)

- 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 underlying the activated sludge process, nitrification, denitrification, enhanced phosphorus removal, and anaerobic digestion

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

CO30-Project

- The outcomes are the changes or results that the organization expects to be achieved the successful completion of the project

CO31-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.

CO32-Tamil-II

- Know what devotion really is.
- Know the fruitfulness obtained through devotion.
- Perceive the progress achieved in the society through devotion.

CO33-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

CO34-Tamil-IV

- Realize how the ancient people changed their life style according to the ages
- Learn how to change one's lifestyle according to the needs of the future
- Accept the modern trend and its uses

CO35-English-I

- Read and comprehend literature
- Appreciate poetry and prose
- Familiarize students with fiction.

CO36-English-II

- Appreciate different forms of literature
- Acquire language skills through literature
- Broadens the horizon of knowledge

CO37-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.

CO38-English-IV

- Improve their ability to read and understand them
- Know the genius of Shakespeare
- Express in writing their views.

CO39- Communicative English Lab I

- Learn grammar.
- Enrich vocabulary
- Understand the process of communication
- Develop listening skill

CO40- Communicative English Lab II

- Learn grammar
- Use a variety of reading strategies
- Enhance the skill of making grammatically correct sentences.

CO41- Communicative English Lab III

- Learn grammar
- Enhance their fluency in English
- Develop speaking and writing skills
- Develop individual perspectives that demonstrate critical thinking skills

CO42- Communicative English Lab IV

- Learn grammar
- Enable to express their views in conversation
- Develop soft skills
- Enhance presentation skills

CO43- Communicative English Lab -V

- Develop corporate skills.
- Handle their day to day affairs well with their knowledge of language skills.
- Get a job

CO44- Communicative English Lab -VI

- Apply study skills

- Widen creative thinking
- Be a good team worker
- Make them proficient in English

CO45- Package lab- 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.

CO46-Package lab-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 simple slide shows with outlines and notes.
- Create slide presentations that include text, graphics, animation, and transitions.

CO47-Package lab-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.

CO48-Package lab-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.

CO49-Package lab-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

CO50-Package lab-VI

- Learn to create animated graphics add sound and interactivity.
- Can develop Website
- CD based presentations

CO51-Indian constitution

- Democratic values and citizenship Training are gained
- Awareness on Fundamental Rights are established.
- Learn the functions of union and State Governments
- Learn the power and functions of the Judiciary
- Appreciate of Democratic Parliamentary Rule

CO52-Environmental studies

- Learn about environmental pollution.
- Familiarize with the social issues and the environment

CO53-Tamil ilakiyavaralaru

- Know about three sangam periods of Tamil literature, epics, and myths
- Acquire knowledge of poetry, prose, drama and novel in modern literature.

CO54- Journalism

- Become a journalist

CO55- Development of Mathematical Skills

- Understand the concepts from the five branches of mathematics
- Apply general rules correctly to solve problems including those in real-life contexts.

CO56- Instrumentation

- Apply general rules correctly to solve problems including those in real-life contexts.
- Acquire a sound understanding of the role of noise in measurement systems and know how to apply noise reduction techniques.
- Apply Fourier and Laplace transforms to analyse the behaviour and stability of complex systems

CO57- Food and Adulteration

- Knowledge about different processing and preservation methods and principles involved.

CO58- Web Technology

- Explore markup languages features and create interactive web pages using them.
- Learn and design Client side validation using scripting languages.

CO59- E-Commerce and its application

- Secure exchange of documents, content and value in open trading protocols.
- Communication platforms for the e-Economy, including e-commerce, e-business and e-government

CO60- Indirect Taxes

- Gained knowledge of various provisions of central excise customs law, service tax, VAT and sales tax and their applications in different circumstance.

C061-Wild life conservation

- Protection of natural habitat of organisms through controlled exploitation
- Educate the need to protect the environment

CO62-Advanced English-I

- Develop vocabulary
- Learn to edit and do proof reading
- Read and comprehend literature

CO63-Advanced English-II

- Develop technological skill.
- Able to write in a variety of formats
- Read biographies and develop personality

CO64-Advanced English-III

- Understand Phonetics.
- Develop writing skill
- **Able to develop creative writing**

CO65-Advanced English-IV

- Develop writing skill.
- Comprehend and describe poems
- Learn interviewing skills

CO66-Soft skill-I

- Make effective communication

CO66-Soft skill-II

- Build self development

CO66-Soft skill-III

- Learn interpersonal relations and social responsibilities.

CO66-Soft skill-IV

- Develop etiquette and interviewing skills.

CO66-Soft skill-V

- Develop leadership skills and body language

CO66-Soft skill-VI

- Develop life skills and other skills



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY [PRIST]

(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)

THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

BIO TECHNOLOGY

PG	M.SC
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M.Sc., Programme Educational Objectives-PEO

- PEO1-To gain and apply knowledge of Biotechnology concept to solve the problems.
- PEO2- To identify, analyse and understand the problems related to biotechnology.
- PEO3- Ability to design and develop solution to biotechnology.
- PEO4-Ability to design, perform experiments, analyse and interpret data for investigating complex problems.
- PEO5 -To decide and apply appropriate tools and techniques in biotechnological manipulations

M.Sc., PROGRAMME SPECIFIC OUTCOME (PSO)

To enable the student to emerge as:

- **PSO1**-An expert to work on biotechnological concepts and allied fields (medical, microbial, agricultural, environmental, plant and animal) with modern tools and techniques towards product and process development for academic, industrial and research applications.
- **PSO2**-Proficiency to demonstrate entrepreneurial and leadership skills with life-long learning
- **PSO3**- Students can become Junior Production Officer and Technical Assistant in biotechnology, pharmaceutical Companies, bio fertilizer industry, aquaculture industries, environmental units, crop production units, food processing industries, national bio-resource development firms, banking and KPO.
- **PSO4**- Entrepreneurship ventures such as consultancy and training centers can be opened.
- **PSO5**- Beside industrial sector there are ample opportunities in academics as well
- **PSO6**-To equip the candidates to meet the demands of the society to get sustainable products and processes through biotechnology.

Programme Outcome-(PO)

- PO1**-Understand the basic knowledge and concepts of biotechnology and other related areas.
- PO2**- Learn about the usage of statistical tools in biological systems.
- PO3**- Analyses to learn the recent developments in the field of human genome

and gene concepts.

- PO4**-Enabling critical analysis of problems and situations to reach solutions.
- PO5**-.To be aware of the ethical issues, personal and environmental safety during biotechnology practices.
- PO6**- Learn the theoretical and practical exposure to the basic and the advanced fields of biotechnology.
- PO7**-Exhibit an ability to work independently and collaboratively.

M.Sc., BIOTECHNOLOGY COURSE OUTCOME(CO)

CO1- General Microbiology

- Students can gain the idea of how to identify the microorganisms based on the modern polyphasic approach.
- Students will gain awareness about the microbes present in the environment and their impact.
- Course will provide sound knowledge about different metabolic mechanism occurring inside microbes

CO2- Molecular Genetics

- students will get an overall view about genetic makeup of organisms and can take up a career in research.
- Course on molecular Biology & genetics will enhance the knowledge base about functional and structural organization of nucleic acid.
- Have a conceptual knowledge about DNA as a genetic material, enzymology, and replication strategies Understand the molecular mechanisms involved in transcription and translation

CO3- 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.
- Students will be imparted complete knowledge about structure and function of different biomolecules (proteins, lipids, nucleic acids, and carbohydrates) found in living cells.
- The course will provide the knowledge how biomolecules are synthesized and metabolized inside living cells.

CO4- Microbiology & Molecular Genetics - Lab

- Skills in handling microorganisms in the laboratory.
- An understanding of applications of microorganisms in the industry, health-care, environmental protection, food agriculture and research.
- The students will be able to analyze genetic problems and will be able to approach a research problem statistically

CO5- Research Led Seminar

- The students place on the link between research and teaching is that research ledteaching helps develop skills in data collection and complex analysis, this in turn being connected with technical, procedural and theoretical learningoutcomes

C06- 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 healthfields
- To understand the basic molecular tools and its application in basic research and applied research in various fields of life sciences.
- Understand and apply general concepts of cell and molecular biology to relevant, specific problems
- Describe and discuss the properties and biological significance of the major classes of molecules found in living organisms and the relationship between molecular structure and biological function

C07- Biophysics & Bioinformatics

- This paper has been designed to give the students comprehensive training in the emerging and exciting upcoming field of Systems Biology.
- Students will be able to analyze, interpret and study biological data (sequence, structure, etc) stored in various databases available on internet.
- Students will effectively communicate scientific data and ideas, using various formats appropriate for different target audiences.

C08- Industrial Biotechnology

- To understand techniques of sterilization and to study the various aspects of fermenter for an industrial fermentation process; To apply the knowledge of control system for control of industrial fermentation process.
- To learn the fundamental concepts of bioprocess engineering; To learn and understand fluid flow process, mixing process and mass transport; To apply the concepts of fluid flow, mixing and filtration to industrial operations
- The course aims to provide fundamental insights to exploit microbes for manufacturing of products which have huge industrial significance.
- Fermentative productions of representative biomolecules like Enzymes, antibiotics, vitamin, beverages
- The course blends science and engineering with various biochemical processes to obtain products such as food, chemicals, vaccines, medicine

C09- 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

- Fermentative productions of representative biomolecules like Enzymes, antibiotics, vitamin, beverages
- Summarize the processes of energy transduction in cells and explain their significance. and At the end of the course, the student will have a better appreciation for the role of biotechnology in industry using microbes

CO10- Research Methodology

- To culminate this final stage, students will learn to write a comprehensive research proposal that may be conducted in the future.

CO11-Participation in bounded research

- 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

CO12-Genomics

- Acquire the aspects of Gene Coding and Shotgun method.
- understand structure and organization of genomics
- Know the features of the Genome Mapping databases.

CO13-Proteomics

- Gain knowledge on phylogenetic profiles
- understand structure and organization of proteomics.
- Students will understand the practical and theoretical knowledge in proteomics. Knowledge about common workflows for the large-scale analysis of proteins

CO14-Genomics & Proteomics – lab

- This paper will help students interested in careers as laboratory, research or animal care technicians in the fields of veterinary and human health or biotechnology.
- The students will be made proficient in basic genomics and proteomics skills and laboratory techniques
- Perform a range of practical techniques including DNA extraction and sequencing, RT-PCR, reporter gene assay, metabolomics and genetic mapping. and Able to evaluate MS/MS data including de novo sequencing

CO15- Discipline specific elective-I

A) Immunology

- This course will provide the student insights into the various aspects of Immunology such as classical immunology, clinical immunology, Immunotherapy and diagnostic immunology.
- The course will provide technical knowledge as to how different diseases are caused and various responses mediated by living cells to combat pathogen attack.
- The course will provide sound knowledge of how immune system deals with various pathogens, different processes and cell types involved in prevention of disease.

(OR)

B) 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 mankind
- The aim of this course is to impart the knowledge of biodiversity and conservation

of environmental resources

- The students can demonstrate an understanding on the importance, management of safety aspects in work environment.

Discipline specific elective-II

A) Endocrinology

- To know the pathophysiological significance of the system with special referenceto humans.
- To study the endocrine system in terms of structure, function and its role in regulating metabolism, growth and reproduction in different animals, with reference to some disorders resulting from dysfunction
- The student will demonstrate an understanding of the basic properties of hormones.
- The student will demonstrate the role of hormones in maintaining body function..

(OR)

B) Bioethics &Intellectual propertyrights

- To get registration in our country and foreign countries of theirinvention.
- 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 TechnologyAct.

Discipline specific elective-III

A.) Nanobiotechnology

- Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment
- Apply their learned knowledge to develop Nanomaterial's
- Evaluate current constraints, such as regulatory, ethical, political, social and economical, encountered when solving problems in living systems

(OR)

A) Environmentalbiotechnology

- 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 theresearch
- 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

- Evaluate the potential for biodegradation of organic pollutants, taking microbial and physical/chemical environments, as well as the chemical structure of the compound itself, into consideration

Discipline specific elective-IV

A.) Gene therapy utilization & pharmacology

- Understand some of the types of disease that might be treatable by gene therapy
- Understand the basic principles of genetic manipulation
- Understand how genetics may be used in the design of drugs

(OR)

B.) Plant conservation & disaster management

- To make sustainable utilization of species and ecosystems.
- Familiarity with disaster management theory (cycle, phases) Knowledge about existing global frameworks and existing agreements

CO16-Writing for the media

- Know the intricacies of Media

CO17-Applicable Mathematics Techniques

- Students using OR techniques in business tools for decision making
- Students develop Assignment problem and Replacement problems
- Understand the concept of decision analysis and game theory
- Students gets the knowledge about interpolation

CO18-Bio-medical Instrumentation

- To familiarize students with various medical equipments and their technical aspects
- To introduce students to the measurements involved in some medical equipment.
- Ability to understand diagnosis and therapy related equipments
- Understanding the problem and ability to identify the necessity of an equipment to a specific problem

CO19-Green Chemistry

- To understand the environmental status and evolution.
- To know about the Pollution and its prevention measures.
- To familiarize the green chemistry.
- To learn about the bio-catalytic reactions.
- To understand about the vitamins and antibiotics.

CO20-Internet and Web Design

- Acquire knowledge about functionalities of Internet
- 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.

CO21- Insurance Services

- Learnt the principles of Insurance and the functions of Life and general insurances and the IRDA

CO22-Counselling Psychology

- Learn counselling and its process

CO23-Herbal Medicine

- Develop individualised goal and plan for wellness
- Gather information about past and current health status
- Create comprehensive assessment of health inputs

CO23-Participation in scaffold research(Design/Societal Project)

- The important for students' learning and well-being as well. One important factor in students' success is task effort. Numerous studies have demonstrated that students' task effort affects their achievement

CO24-Foodtechnology

- To understand the basic food safety issues in the food market
- To develop and evaluate quality of new food products using objective and subjective methodologies.
- To understand the basic concepts in food chemistry and food analysis

CO25-Bioinstrumentation

- Check for analytical functions and find the analytical function and study .
- Learn the measurement systems, errors of measurement,
- Demonstrate basic knowledge of Biotechniques

CO26-Food technology and bio instrumentation lab

- Ability to apply principles of food engineering in industry.
- Understand, identify and analyze a problem related to food industry and ability to find an appropriate solution for the same.
- The students shall be well acquainted about different food engineering processes and various principles working behind them. and Students will understand the application of electronics in diagnostics and therapeutic area

CO27-Project Work

- Every day, biotechnologist's findings are critical to research and application .
- Current research uses a suite of molecular biology tools and plant physiologystudies
- The main research project of our laboratory seeks to identify genetic factors.



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY
[PRIST]

(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)
THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

COMPUTER SCIENCE

UG

B.SC

B.Sc C.S. Programme Objectives-PEO

- POE1- To study about I/O management, storage management
- POE2- To know the methods of connecting them to the peripheral devices.
- POE3- To learn Software design and Implementation
- POE4- To learn the basic principles of database and database design
- POE5- To understand computational development of graphics with mathematics

B.Sc C.S. Programme Outcomes - PO

- PO1- Understand dynamic memory allocation and pointers.
- PO2- Trace the flow of information from one node to another node in the network.
- PO3- Understand the format and use of objects.
- PO4- Able to Measure the product and process performance using various metrics
- PO5- Design Secure applications.
- PO6- Apply the various optimization techniques.

B.Sc C.S. Programme Specific Outcomes - PSO

- PSO1- Understand the impact of the professional solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PSO2- Apply problem-solving skills and the knowledge of computer science to solve real world problems.
- PSO3- Use software development tools, software systems, and modern computing platforms
- PSO4- Communicate computer science concepts, designs, and solutions effectively and professionally

B.Sc C.S. Courses –C

CO1. 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.

CO2. Advanced English-I

- Develop vocabulary
- Read and comprehend literature
-

CO3. English-I

- Read and comprehend literature

CO4. Programming in C with C++

- Design C Programs for problems.
- Write and execute C programs for simple applications
- Able to understand and design the solution to a problem using object-oriented programming concepts.
- Able to demonstrate the use of virtual functions to implement polymorphism.
- Understand functions and parameter passing.
- Be able to do numeric (algebraic) and string-based computation.
- Understand object-oriented design and programming

CO5. Classical Algebra

- Apply mathematical methods involving arithmetic, algebra, geometry, and graphs to solve problems.
- Represent mathematical information and communicate mathematical reasoning symbolically and verbally.
- Interpret and analyze numerical data, mathematical concepts, and identify patterns to formulate and validate reasoning
- Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields
- Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences.
- Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.

CO6. Numerical And Statistical Methods

- Recognize the error in the number generated by the solution.
- Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Raphson method.
- Apply method of interpolation and extrapolation for prediction.
- Recognize elements and variable in statistics and summarize qualitative and quantitative data.
- Calculate mean, median and mode for individual series.
- Outline properties of correlation and compute Karl-Pearson's coefficient of correlation.

CO7. Packages lab –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.

CO8. Communicative English Lab-I

- Understand grammar.
- Develop listening skill

CO9. Indian Constitution

- Democratic values and citizenship Training are gained.
- Awareness on Fundamental Rights are established.
- The functions of union Government and State Governments are learnt.
- The power and functions of the Judiciary learnt thoroughly.
- Appreciation of Democratic parliamentary Rule is learnt.

CO10. Tamil – II

- Know what devotion really is.
- Know the fruitfulness obtained through devotion.
- Perceive the progress achieved in the society through devotion.

CO11. Advanced English-II

- Develop writing skill.
- Read and comprehend literature

CO12. English-II

- Read and comprehend literature

CO13. Internet and Java Programming

- Understand the format and use of objects.
- Understand basic input/output methods and their use.
- Understand object inheritance and its use.
- Understand development of JAVA applets vs. JAVA applications.
- Understand the use of various system libraries.

CO14. Discrete Mathematics

- Students completing this course will be able to express a logic sentence in terms of predicates, quantifiers, and logical connectives.
- Students completing this course will be able to apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction.
- Students completing this course will be able to use tree and graph algorithms to solve problems.
- Students completing this course will be able to evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
- Use the basic ideas of discrete probability

- Complete and use truth tables for expressions involving the following logical connectives: negation, conjunction, disjunction, conditional, and biconditional.

CO15. Operations Research

- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimisation problems.
- Use mathematical software to solve the proposed models.
- Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.
- Understand variety of problems such as assignment, transportation, travelling salesman etc.
- Solve the mathematical model manually as well as using software resources.

CO16. Packages lab –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 simple slide shows with outlines and notes.
- Create slide presentations that include text, graphics, animation, and transitions

CO17. Self Development

- Build self development
- Communicative English Lab –II
- Understand grammar
- Develop reading skills

CO18. Tamil – III

- Achieve one's goal by following the ancestral path
- Learn to lead life of perfection by realizing the uncertainty in the life
- Advanced English-III
- Understand Phonetics.
- Develop writing skill

CO19. English-III

- Read and comprehend literature

CO20. Visual Programming

- Design, create, build, and debug Visual Basic applications.
- Explore Visual Basic's Integrated Development Environment (IDE).
- Implement syntax rules in Visual Basic programs.

- Write Windows applications using forms, controls, and events
- Write and apply decision structures for determining different operations.
- Write and apply loop structures to perform repetitive tasks.

CO21. Applied physics –I

- Cognitive abilities and skills relating to solution of problems in Physics and Physics Related Disciplines
- Practical skills relating to the conduct of laboratory and industrial work in General skills relating to non-subject specific competencies, communication, ICT knowledge, interpersonal, organization skills and ethical standards.

CO22. Research Methodology

- Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computation frame works used in mathematical researches.

CO23. Packages lab – 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.

CO24. Interpersonal Relations and Social Responsibilities

- Learn interpersonal relations and social responsibilities.

CO25. Communicative English Lab-III

- Understand grammar.
- Develop speaking and writing skills

CO26. Tamil – IV

- Realize how the ancient people changed their life style according to the ages
- Learn how to change one's lifestyle according to the needs of the future
- Accept the modern trend and its uses

CO27. Advanced English-IV

- Develop communicative skill.
- Read and comprehend literature

CO28. English-IV

- Read and comprehend literature
- Know the genius of Shakespeare

CO29. Active Server Programming

- Explain concepts of Active Server Pages.
- Apply methods and properties of various objects and components of ASP
- Develop Dynamic real life website using the concept of ADO and ASP.

CO30. Applied physics –II

- The Applied Physics program will produce intellectually engaged graduates accomplished in application of fundamental physics principles, and prepared for direct entry into the workplace or continuing professional development. Demonstrate a working knowledge of the basic concepts and theories of physics.

CO31. Packages lab - 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.

CO32. Etiquette And Interviewing Skills

- Develop etiquette and interviewing skills.

CO33. Communicative English Lab -IV

- Understand grammar.
- Develop language and presentation skills

CO34. Environmental Studies

- Learn about environmental pollution.
- Familiarize with the social issues and the environment

CO35. Data Communication and Networking

- Identify the components required to build different types of networks.

- Identify solution for each functionality at each layer.
- Trace the flow of data from one node to another node.

CO36. Operating System

- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.

CO37. Microprocessor and its Applications

- Design and implement programs on 8086 microprocessor.
- Design I/O circuits.
- Design Memory Interfacing circuits.
- Design and implement 8051 microcontroller based systems

CO38. Cloud Computing

- Compare the strengths and limitations of cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Apply suitable virtualization concept.
- Choose the appropriate cloud player , Programming Models and approach.
- Address the core issues of cloud computing such as security, privacy and interoperability
- Design Cloud Services and Set a private cloud

CO39. Software Engineering

- Get an insight into the processes of software development
- Able to understand the problem domain for developing SRS and various models of software engineering
- Able to Model software projects into high level design using DFD,UML diagrams
- Able to Measure the product and process performance using various metrics
- Able to Evaluate the system with various testing techniques and strategies

CO40. Packages Lab –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

CO41. Leadership Skills and Body Language

- Develop leadership skills and body language

CO42. Communicative English Lab-V

- Develop communicative skills
- To get a job

CO43. .NET Programming

- Create web-based distributed applications using ASP.NET, SQL Server and ADO.NET
- Utilize DirectX libraries in the .NET environment to implement 2D and 3D animations and game-related graphic displays and audio.
- Utilize the .NET environment to create Web Service-based applications and components.

CO44. Relational Data Base Management System

- Design Databases for applications.
- Use the Relational model, ER diagrams.
- Apply concurrency control and recovery mechanisms for practical problems.
- Design the Query Processor and Transaction Processor.
- Apply security concepts to databases.

CO45. Data Mining

- Understanding of data mining software available on the market.
- Acquiring Knowledge about various algorithms.
- Acquiring Knowledge about cluster analysis techniques.

CO46. Artificial Intelligence and Expert Systems

- Identify problems that are amenable to solution by AI methods.
- Identify appropriate AI methods to solve a given problem.
- Formalize a given problem in the language/framework of different AI methods.
- Implement basic AI algorithms.

CO47. Journalism

- Become a journalist

CO48. Development Of Mathematical Skills

- know and demonstrate understanding of the concepts from the five branches of mathematics (Operations Research, Set Theory, statistics, Matrices and Business mathematics)
- use appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts

- Select and apply general rules correctly to solve problems including those in real-life contexts.

CO49. Instrumentation

- Appreciate important practical aspects of theoretical knowledge: how important components work, when to impedance match, non-ideal behaviour of op-amps etc.
- Acquire a sound understanding of the role of noise in measurement systems and know how to apply noise reduction techniques.
- Be able to apply Fourier and Laplace transforms to analyse the behaviour and stability of complex systems.

CO50. Food and Adulteration

- Knowledge about different processing and preservation methods and principles involved.

CO51. Indirect Taxes

- Gained knowledge of various provisions of central excise customs law, service tax, VAT and sales tax and their applications in different circumstance.

CO52. Packages Lab –VI

- Learn to create animated graphics add sound and interactivity.
- Can develop Website
- CD based presentations

CO53. Life Skills and Other Skills

- Develop life skills and other skills

CO54. Communicative English Lab –VI

- Develop communicative skills
- To be a good team worker

CO55. Project Work

- Do research and prepare project



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY [PRIST]

(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)

THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

COMPUER SCIENCE

PG

M.SC

Program Objectives (Po):

- **PO1:** To apply and continuously acquire knowledge, both theoretical and applied, related to core areas of computer science.
- **PO2 :**To demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment.
- **PO3 :**To work productively as computer professionals (in traditional careers, graduate school, or academia) by: demonstrating effective use of oral and written communication, working competently as a member of a team unit, adhering to ethical standards in the profession.

Program Outcomes (POs)

- **PO1:**To communicate computer science concepts, designs, and solutions effectively and professionally;
- **PO2:**To apply knowledge of computing to produce effective designs and solutions for specific problems;
- **PO3:** To identify, analyse, and synthesize scholarly literature relating to the field of computer science;
- **PO4:**To use software development tools, software systems, and modern computing platforms.
- **PO5:**To an understanding of professional, ethical, legal, security and social issues and responsibilities
- **PO6:**To do capable of evaluating personal and professional choices in terms of codes of ethics and ethical theories and understanding the impact of their decisions on themselves, their professions, and on society
- **PO7:** To apply design and development principles in the construction of software systems of varying complexity.

Program Specific Outcomes (PSO)

- **PSO1:** Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems.

- **PSO2:** Understanding the structure and development methodologies of software systems. Possess professional skills and knowledge of software design process. Familiarity and practical competence with a broad range of programming language and open source platforms.
- **PSO3:** Acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

Course Outcomes:

CO1 -J2EE programming:

- Understand the format and use of objects.
- Understand basic input/output methods and their use.
- Understand object inheritance and its use.
- Understand development of JAVA applets vs. JAVA applications.
- Understand the use of various system libraries.

CO2 -Relational Data Base Management System:

- Identify what students will know and be able to do if they master the material.
- Understand the basic concepts of the database and data models.
- Design a database using ER diagrams and map ER into Relations and normalize the relations.
- Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
- Develop a simple database applications using normalization.

CO3 -Discrete Mathematics:

- The common 2-year sequence works well for many disciplines.
- Topics can be introduced "just-in-time" for many disciplines.
- Since all students take the same sequence, advising is relatively easy
- Ability study of **mathematical structures** that are countable or otherwise distinct and separable.
- Examples of **structures** that are **discrete** are combinations, graphs, and logical statements. **Discrete structures** can be finite or infinite.

CO4 -J2EE programming Lab:

- The students able to Design and develop GUI applications using Abstract Windowing Toolkit (AWT)
- Swing and Event Handling
- Web applications and Designing
- Enterprise based applications for business logic
- In depth manual testing teaching with case studies.
- Programmer training by creating standardized, reusable modular components and by enabling the tier to handle many aspects of programming automatically.

CO5 :RDBMS Lab:

- The students able to Design and develop Normalize a database
- Can Declare and enforce integrity constraints on a database using a state-of-the-art.\

- Programming PL/SQL including stored Procedures.
- Can Design GUI applications
- Sharing of data and data integrity.
- Reducing Data Redundancy.

Discipline Specific Elective I:

CO6 : a) WAP & XML:

- To Identify advance concepts of **WAP browser** for mobile devices such as mobile phones that uses the mobile protocol.
- **XML/WML** is used to design wap pages for mobile devices.
- To develop a animated GIF, Java AWT, Frames, ActiveX Controls, Shockwave, movie clips, audio.
- To Designed for large bandwidth (compared to wireless access) and low delay

CO7: b) Computer Architecture:

- Analyze processor Performance improvement using instruction level parallelism.
- Learn the function of each element of a memory hierarchy.
- Study various data transfer techniques in digital computer.
- Articulate design issues in the development of processor or other components that satisfy design requirements and objectives.
- Learn microprocessor architecture and study assembly language programming

CO8: Research Led Seminar:

- It is clear that the lowest value the students place on the link between *research* and teaching is that research led teaching .
- Helps develop skills in data collection and complex analysis.
- This in turn being connected with technical, procedural and theoretical learning *outcomes* at the required level.
- Promoting the values of enquiry and deep approaches to learning.
- The motivation and development of students as a consequence of exposure to expert subject matter.

CO9 : Python Programming:

- Presence of Third Party Modules.
- Extensive Support Libraries.
- Open Source and Community Development
- Able to determine the methods to create and manipulate **Python** programs.
- Can Identify the commonly used operations involving file systems and regular expressions

CO10: Cryptography & Network Security:

- Develop basic skills of secure **network** architecture and explain the theory behind the **security** of different **cryptographic** algorithms.
- Describe common **network** vulnerabilities and attacks, defence mechanisms against **network** attacks, and **cryptographic** protection mechanisms.
- Compare various Cryptographic Techniques
- Design Secure applications
- Inject secure coding in the developed applications

CO11 :Software Engineering:

- Graduates of the *program* are expected to demonstrate the problem
- An ability to identify, formulate, and solve complex *engineering* problems by applying principles of *engineering*, science, and mathematics.
- To Explain methods of capturing, specifying, visualizing and analyzing software requirements.
- To understand concepts and principles of software design and user-centric approach and principles of effective user interfaces.
- To Understand the nature of software life cycle.

CO12 Python Programming Lab:

- Able to determine the methods to create and manipulate Python programs.
- By utilizing the data structures like lists, dictionaries, tuples and sets.
- Identify the commonly used operations involving file systems and regular expressions
- Duck typing and huge standard library
- Presence of third-party modules.
- Extensive support libraries(NumPy for numerical calculations, Pandas for data analytics etc).

CO13 UNIX Lab:

- To introduce Basic Unix general purpose Commands
- To learn network Unix commands.
- To learn C programming in Unix editor environment.
- To learn shell script and sed concepts.
- To learn file management and permission advance commands.
- To learn awk, grep, perl scripts.

Discipline Specific Elective II:

CO14 a)Operating System:

- To understand the main components of an OS & their functions.
- To study the process management and scheduling.
- To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.

- To Understand the concepts and implementation Memory management policies and virtual memory.
- To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS.

CO15 b)Artificial Intelligence:

- To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing
- To introduce advanced topics of AI such as planning, Bayes networks,
- Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
- Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
- Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
- Formulate and solve problems with uncertain information using Bayesian approaches.

CO16: Research Methodology:

- These students able to demonstrate knowledge of **research** processes (reading, evaluating, and developing)
- Can identify, explain, compare, and prepare the key elements of a **research** proposal/report.
- To compare and contrast quantitative and qualitative **research** paradigms
- Ability to develop research questions and the various research strategies
- Compile research results in terms of journal manual scripts

CO17 Participation in Bounded Research:

- To understand the general definition of research design.
- To be able to identify the overall process of designing a research study from its inspection to its report.
- Familiar with how to write a good introduction to an education, research study and the components that comprise such an introduction.
- To know the type of descriptive statistics typically reported in educational research studies.
- Able to identify a research problem stated in a study.

CO18 Open Source programming:

- Develop **open source programming** products which are normally free to download, although it does incur running costs such as storage and computing power.
- Even those rare paid-for **open source** products still tend to be far cheaper than closed **source** alternatives
- Understand process of executing a PHP-based script on a webserver.

- Be able to develop a form containing several fields and be able to process the data provided on the form by a user in a PHP-based script.
- Understand basic PHP syntax for variable use, and standard language constructs, such as conditionals and loops

CO19 .Net Programming:

- To Demonstrate advanced knowledge of networking understands the key protocols which support the Internet.
- Be familiar with several common **programming** interfaces for **network** communication.
- Create web-based distributed applications using ASP.NET, SQL Server and ADO.NET
- Utilize DirectX libraries in the .NET environment to implement 2D and 3D animations and game-related graphic displays and audio.
- Utilize the .NET environment to create Web Service-based applications and components.

CO20 .Net Programming Lab:

- The students are able to develop *programs* using *C#* based on object oriented concepts
- Write the ROBUST, EXTENSIBLE and EFFICIENT *programs* by using *c#* code and ASP.Net
- Create dynamic web pages for further development.
- It provides re-usability.
- Less Coding and Increased Reuse of Code:

CO21 Open Source programming Lab:

- These students able to develop efficient open source programmes for rapidly developing network world
- Reliability and auditability.
- Integrated management.
- Simple license management

Discipline Specific Elective III

CO22 Wireless communication Network:

- These students able to understand and develop wireless communication and its infrastructure.
- Understand design considerations for wireless communication networks
- Understand the fundamentals of wireless networks.
- Learn and analyze the different wireless technologies.
- Evaluate Ad-hoc networks and wireless sensor networks.
- Understand and evaluate emerging wireless technologies and standards

CO23 Real time Operating System:

- Ability to estimate if a system takes distributed system characteristic into account in a reasonable way.

- Knowing the basic structures (e.g. client-server) and knowing the existing middleware frameworks.
- Ability to estimate framework suitability for different applications.
- Ability to implement a simple distributed software laboratory work with socket and RMI interfaces.
- Understanding the mathematical principles behind validity of algorithms solving the problems of distribution.
- Understanding the problems that will arise if atomicity and timing issues are not handled in a distributed application.

CO24 Societal project (Mini Project):

- These students will learn to real world project developing skill.
- Group discussion.
- Cost effective development
- Breaking problem
- Reassembling problem

CO25 Internship:

- Develop communication, interpersonal and other critical skills in the job interview process.
- Explore career alternatives prior to graduation.
- Integrate theory and practice.
- Assess interests and abilities in their field of study.
- Learn to appreciate work and its function in the economy.
- Develop work habits and attitudes necessary for job success.

CO26 Software Testing:

- Apply modern **software testing** processes in relation to **software** development and project management.
- Create **test** strategies and plans, design **test** cases, prioritize and execute them.
- To develop, implement black box and white box testing cases.
- To understand use of Flow graphs and computing cyclomatic complexity using various methods.
- To understand and implement Automated software testing techniques for Web testing, Performance testing, and GUI testing.
- To develop, implement, and demonstrate the learning through a project that meet stated specifications.

CO27 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 Websites.

Discipline Specific Elective IV:

CO28 a) Multimedia And Its Application:

- To customize the specific parts of the Multimedia Applications (Power Point) software.
- To prepare visuals by making arrangements on the slide master, and placeholders, etc.
- An understanding of multimedia development in the business world, and how successful development is contingent on detailed client specifications, user and audience research, and design decisions taken during the planning phase.
- An understanding of the content of learning materials available from e-skills UK and how these can be used with learners to develop multimedia products
- To work with learners to plan and create a multimedia product that includes animation, audio and video

CO29 b) Middleware technology:

- In business, it helps streamline processes and improves efficiency in terms of organization.
- It facilitates communication between systems,
- It is able to maintain the integrity of information across a multitude of systems within a network.
- Understand Middleware Interoperability.

CO30 Project work:

- Can be able to develop plans with relevant people to achieve the **project's** goals.
- Break **work** down into tasks and determine handover procedures.
- Identify links and dependencies, and schedule to achieve deliverablehandoverE
- Estimate and cost the human and physical resources required, and make plans to obtain the necessary resources.
- It supports students to show their talent.

CO31 Program Exit Examination:

- The exam is supposed to measure the learning outputs of the program as a whole not a individual course.
- The primary purpose of the exit exams is to assess students' educational achievement in the courses in their major area of program study.
- The exam is supposed to measures the learning outputs of the program as a whole not the individual courses.



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY [PRIST]

(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)

THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

COMPUTER SCIENCE

UG	BCA
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PROGRAMME OBJECTIVES:

- Be exposed to the syntax of C.
- Be Familiar with the Basics of C Programming Language.
- To study about Graphics programming using java Language
- Design and implement reliable and maintainable object-oriented applications of moderate complexity composed of several classes
- To learn the basic principles of database and database design
- To understand computational development of graphics with mathematics

PROGRAMME OUTCOMES (O_I):

- Able to understand and design the solution to a problem using object-oriented programming concepts
- Trace the flow of information from one node to another node in the network
- Design Databases for applications.
- Able to Measure the product and process performance using various metrics
- Gain the knowledge of different media streams in multimedia transmission
- Apply the various optimization techniques.

COURSES (C_I):

- Programming in C with C++
- Data Structure and Algorithms
- Internet and Java Programming

- Visual Programming
- Relational Database Management Systems
- .NET Programming
- Designing and supporting Computer Networks
- Advanced Web Technology
- Operating System



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DEPARTMENT:

COMPUTER SCIENCE

PG

MCA

MCA :- Programme Objectives (POs)

- The broad **objective** of the **MCA programme** is to prepare post graduates for productive careers in software industry.
- And also to get careers in Corporate sector, Govt. organizations and academia by providing skill based environment for teaching and research in the core and emerging areas of the discipline.

MCA :- Programme Outcomes (POs)

- PO1- Apply the different data structures for implementing solutions to practical problems
- PO2- Trace the flow of information from one node to another node in the network
- PO3- Understand the format and use of objects
- PO4- Able to Measure the product and process performance using various metrics
- PO5- Design Secure applications
- PO6- Apply the various optimization techniques

MCA :- Programme Specific Outcomes (PSO)

PSO 1. Ability to pursue careers in IT industry/ consultancy/ research and development, teaching and allied areas related to computer science.

PSO 2. Comprehend, explore and build up computer programs in the areas allied to Algorithms, System Software, Multimedia, Web Design and Big Data Analytics for efficient design of computer-based systems of varying complexity.

PSO 3. Understand, analyze and develop computer programs in the areas related to algorithms, Process and solutions for specific application development using appropriate data modeling concepts.

PSO 4. Apply standard Software Engineering practices and strategies in software project development using open-source programming environment to deliver a quality product for business success.

PSO 5. Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

MCA :- Program Educational Objectives (PEOs)

- PEO1-To understand the different methods of organizing large amounts of data.
- PEO2-To introduce GUI programming using Microsoft Foundation Classes
- PEO3-To learn the fundamental concept of Web Design.
- PEO4-To develop network programs in java.
- PEO5-Provides idea on VLAN, VTP, STP and Inter-VLAN Routing.
- PEO6-To know the network security tools and system level security used
- PEO7-To get an idea about Sharing Files.

MCA :- Course Outcomes (CO)

CO 1 : C Programming and Data structure

- Design C Programs for problems.
- Write and execute C programs for simple applications.
- Apply the different data structures for implementing solutions to practical problems.
- Develop searching and sorting programs.
- Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.

CO 2 : Data communication network

- Identify the components required to build different types of networks.
- Choose the required functionality at each layer for given.
- Identify solution for each functionality at each layer.
- Trace the flow of information from one node to another node in the network.
- Use data communication vocabulary appropriately when discussing issues with other networking professionals.

CO 3: Computer Architecture

- Design arithmetic and logic unit.
- Design and analyze pipelined control Units.
- Evaluate performance of memory systems.
- Understand parallel processing architectures.
- They should be able to read outline descriptions of real processors and understand in which way their designs fit into the frameworks described in the course.

CO 4: Programming in VB

- Design, create, build, and debug Visual Basic applications.
- Explore Visual Basic's Integrated Development Environment (IDE).
- Create one and two dimensional arrays for sorting, calculating, and displaying of data.
- Write Visual Basic programs using object-oriented programming techniques including
- Classes, objects, methods, instance variables, composition, and inheritance, and polymorphism.
- Write Windows applications using forms, controls, and events

CO 5: Numerical and Statistical Methods

- Recognize the error in the number generated by the solution.
- Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Raphson method.
- Apply method of interpolation and extrapolation for prediction.
- Recognize elements and variable in statistics and summarize qualitative and quantitative data.
- Calculate mean, median and mode for individual series.
- Outline properties of correlation and compute Karl-Pearson's coefficient of correlation.

CO 6 : C programming and Data structure Lab

- The course is designed to develop skills to design and analyze simple linear and non linear data structures.
- It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem.
- It enables them to gain knowledge in practical applications of data structures .
- To understand how to design, implement, test.
- Prove that any bilinear transformation can be expressed as a product of translation.

CO 7: Programming in VB LAB

- The structure of the Basic programming language is very simple, particularly as to the executable code.
- Structural exception handling, enhanced security, versioning, automatic memory management.

- Continue to develop and improve skills in object-oriented analysis, design, programming, and testing.
- Learn to use the VB IDE.
- Ability to implement a simple distributed software laboratory work with socket and RMI interfaces.

CO 8 : OOPs with C++

- Able to understand and design the solution to a problem using object-oriented programming concepts.
- Able to use proper class protection mechanism to provide security.
- Able to demonstrate the use of virtual functions to implement polymorphism.
- Able to reuse.
- They can make their own Applications/Projects using C++.

CO 9 : Operating system

- Able to understand the operating system components and its services
- Implement the algorithms in process management and solving the issues of IPC
- Able to demonstrate the mapping between the physical memory and virtual memory
- Able to understand file handling concepts in OS perspective
- Able to understand the operating system components and services with the recent OS

CO 10 : 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.

CO 11 : Database Management system

- Understand the basic concepts of the database and data models.
- Design a database using ER diagrams and map ER into Relations and normalize the relations
- Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
- Develop a simple database applications using normalization.
- Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.

CO 12: Optimization Technique

- These methods are typically inspired by some phenomena from nature and have the advantage of being extremely robust.

- Having an increased chance of finding a global or near global optimum, being easy to implement and being well suited for discrete optimization problems.
- Understanding the Concept of optimization.
- The Proximal Optimization Technique Improves Clinical Outcomes When Treated without Kissing Ballooning in Patients with a Bifurcation Lesion.
- Multi-objective optimization is an area of multiple criteria decision making that is concerned.

CO 13 : OOPs with C++ Lab

- It provides a clear modular structure for programs which makes it good for defining abstract data types in which implementation details are hidden.
- More effort is put into the object-oriented analysis and design, which lowers the overall cost of development.
- Demonstrate the use of various OOPs concepts with the help of programs.
- Identify and use various networking components.
- The objectives of the course are to have students identify and practice the object-oriented.

CO 14 : Web Designing Lab

- Improved User Experience.
- An Increase in Mobile Traffic.
- Faster Website Development.
- Demonstrate knowledge and skills utilizing various HTML tags for designing a static web page.
- Design screen-based user interfaces, with graphics, textual components, and navigation systems to achieve a unified, functional environment that results in static web pages.

CO 15: J2EE Programming

- Understand the format and use of objects.
- Understand basic input/output methods and their use.
- Understand object inheritance and its use.
- Understand development of JAVA applets vs. JAVA applications.
- Understand the use of various system libraries.

CO 16: Relational Data Base Management System

- Understand the basic concepts of the database and data models.
- Design a database using ER diagrams and map ER into Relations and normalize the relations.

- Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
- Develop a simple database applications using normalization.
- Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.

CO 17 : Routing and Switching in LAN

- Systematic approach to hierarchical network that support voice, video, and data.
- Idea on VLAN, VTP, STP and Inter-VLAN Routing.
- Components of a wireless LAN and its operations.
- You will also learn how to configure the router and the switch for remote access.
- small business router in order to provide network connectivity in a small LAN environment.

CO 18: Discrete Mathematics

- Students completing this course will be able to express a logic sentence in terms of predicates, quantifiers, and logical connectives.
- Students completing this course will be able to apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction.
- Students completing this course will be able to use tree and graph algorithms to solve problems.
- Students completing this course will be able to evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
- Use the basic ideas of discrete probability
- Complete and use truth tables for expressions involving the following logical connectives: negation, conjunction, disjunction, conditional, and biconditional.e.

CO 19 : J2EE Programming Lab

- In depth manual testing teaching with case studies.
- Programmer training by creating standardized, reusable modular components and by enabling the tier to handle many aspects of programming automatically.
- Identify advance concepts of java programming with database connectivity.
- Design and develop platform independent applications using a variety of component based frameworks.
- Able to implement the concepts of Hibernate, XML& EJB for building enterprise applications.

CO 20 : Relational Data Base Management System Lab

- Sharing of data and data integrity.

- Reducing Data Redundancy.
- The file based data management systems contained multiple files that were stored in many different locations in a system or even across multiple systems.
- Be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
- Foundation knowledge in database concepts

CO 21 : Mobile Computing

- Enhanced Productivity.
- Location Flexibility.
- Streamlining of Business Processes.
- Understand fundamentals of wireless communications.
- Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.

CO 22: Knowledge based decision support system

- 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

CO 23 : Research Led Seminar

- Learn about contemporary research topics in the domain of security and privacy of machine learning.
- Learn the methodology for scientific paper reading, analyzing and synthesizing information, and reporting the findings.
- Identifying strengths and weaknesses of contributions and expanding a discussion beyond the paper content.
- This course provides an experience in leading and participating in a discussion about a scientific paper.
- It also gives an overview and insights on good methodology for carrying research and writing research papers, which is useful for Master's thesis writing.

CO 24 : Python Programming

- Presence of Third Party Modules.
- Extensive Support Libraries.

- Open Source and Community Development.
- Express proficiency in the handling of strings and functions.
- Identify the commonly used operations involving file systems and regular expressions

CO 25 : Cryptography & Network security

- Compare various Cryptographic Techniques
- Design Secure applications
- Inject secure coding in the developed applications.
- Its help to develop the technical skills necessary to manage wireless computer networks.
- Understanding the most common type of cryptography algorithms.

CO 26 : Open Source programming

- Understand process of executing a PHP-based script on a web server.
- Be able to develop a form containing several fields and be able to process the data provided on the form by a user in a PHP-based script.
- Understand basic PHP syntax for variable use, and standard language constructs, such as conditionals and loops.
- Understand the paradigm for dealing with form-based data, both from the syntax of HTML forms, and how they are accessed inside a PHP-based script.
- To understand the role and future of open source software in the industry along with the impact of legal, economic and social issues for such software.

CO 27 : Web Service

- Get an idea on Processing XML.
- Understand the concepts of SOAP, UDDI.
- Understand the concepts of Web security.
- Efficiently use market leading environment tools to create and consume web services.
- Identify and select the appropriate framework components in creation of web service solution.

CO 28 : Python Programming Lab

- Duck typing and huge standard library
- Presence of third-party modules.
- Extensive support libraries(NumPy for numerical calculations, Pandas for data analytics etc).
- Express proficiency in the handling of strings and functions.
- To write programs for a wide variety problem in mathematics, science, and games.
- Open source and community development.

CO 29 : Open Source programming Lab

- Reliability and auditability.
- Integrated management.
- Simple license management.
- To understand the role and future of open source software in the industry along with the impact of legal, economic and social issues for such software.
- Knowledge about the latest research results in for the development and management

CO 30 : Game Programming

- Illustrate an understanding of the concepts behind game programming techniques.
- Implement game programming techniques to solve game development tasks.
- Construct a basic game engine using open-source programming libraries.
- Develop and maintain software documentation and communicate technical ideas using verbal, written, and digital communication skills.
- Test, debug, and optimize a game or game component to meet production requirements.

CO 31 : Multimedia and Graphics

- Gain proficiency in 3D computer graphics API programming
- Enhance the perspective of modern computer system with modeling, analysis and interpretation of, 2D and 3D visual information.
- 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

CO 32 : Middleware Technology

- In business, it helps streamline processes and improves efficiency in terms of organization.
- It facilitates communication between systems,
- It is able to maintain the integrity of information across a multitude of systems within a network.
- Understand Middleware Interoperability.
- Understand Middleware Interoperability.

CO 33 : Research Methodology

- Formulate research hypotheses.
- Review, compare and contrast research outcomes.
- Discriminate between different degrees of quality traits of a research article.
- Examine statistical methods to conduct data analysis and inference.

- Select computational techniques from information sciences for data analysis and inference.
- Associate different types of research to computational problems in various domains.
- Recommend research management techniques.

CO 34 : Data mining and warehousing

- Apply data mining techniques and methods to large data sets.
- Use data mining tools
- Compare and contrast the various classifiers.
- Compare different approaches of data ware housing and data mining with various technologies.
- The candidate will get knowledge of Data preprocessing and data quality.

CO 35 Grid and Cloud Computing

- Use the grid and cloud tool kits.
- Design and implement applications on the Grid.
- Compare the strengths and limitations of cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Design Cloud Services and Set a private cloud

CO 36 : .NET Programming

- Create web-based distributed applications using ASP.NET, SQL Server and ADO.NET
- Utilize DirectX libraries in the .NET environment to implement 2D and 3D animations and game-related graphic displays and audio.
- Utilize the .NET environment to create Web Service-based applications and components.
- Develop menu based program for text manipulation.
- Understand ADO .NET and develop database.

CO 37: Object Oriented System Design

- Understand the basic concepts to identify state & behavior of real world objects
- Able to learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies
- Understand the concept of analysis, design & testing to develop a document for the project
- Able to implement analysis, design & testing phases in developing a software project
- Able to understand the testing strategies and know about automated testing tools

CO 38 : .NET Programming Lab

- It provides re-usability.

- Create web-based distributed applications using ASP.NET, SQL Server and ADO.NET.
- Develop menu based program for text manipulation.
- Utilize the .NET environment to create Web Service-based applications and components.
- Less Coding and Increased Reuse of Code: This framework works on object-oriented programming which eliminates unnecessary codes and involves less coding for the developers.

CO 39 : Information Security

- Securing confidential information.
- Protection from malicious attacks on your network.
- Develop an understanding of security policies.
- Deletion and/or guaranteeing malicious elements within a preexisting network.
- Prevents users from unauthorized access to the network.

CO 40 : Internet of Things

- Upon completion of the course, the student should be able to
- Analyze various protocols for IoT
- Develop web services to access/control IoT devices.
- Design a portable IoT using Raspberry Pi
- Deploy an IoT application and connect to the cloud.
- Analyze applications of IoT in real time scenario

CO 41: M-Marketing

- Upon Completion of the course, the students should be able to
- Analyze various mobile marketing strategies.
- Market Mobile based Applications.
- To introduce marketing as a business function and a philosophy.
- Apply various tools in mobile marketing.

CO 42 : Societal project (Mini Project)

- It supports students to show their talent.
- Improve your chances of achieving the desired result.
- To strengthen the understanding of student fundamentals through effective application of the theoretical concepts.
- They also support students to show their talent and they might not have a direct effect on employment.
- Gain a fresh perspective on your project, and how it fits with your business strategy.

CO 43 : Human Computer Interaction

- Design effective dialog for HCI.
- Design effective HCI for individuals and persons with disabilities.
- Assess the importance of user feedback.
- Apply theories and concepts associated with effective work design to real-world application.
- Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Websites.

CO 44 : Software Project Management

- Better Communication with Clients.
- Easier collaboration and better scheduling.
- Easier Collaboration.
- The outputs from any process. This is what counts. Processes are how you get there. That makes processes relevant and important.
- Better Scheduling.

CO 45 : Big Data

- Work with big data platform and Understand the fundamentals of various big data analysis techniques.
- Analyze the big data analytic techniques for useful business applications.
- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics.
- Explore the applications of Big Data

CO 46 : Project work

- Each student will develop and implement individually developed application software based on any of the latest technologies.
- It supports students to show their talent.
- To strengthen the understanding of student fundamentals through effective application of the theoretical concepts.
- Improve your chances of achieving the desired result.
- They also support students to show their talent and they might not have a direct effect on employment.
- Improve your chances of achieving the desired result.

CO 47: Program Exit Examination

- The exam is supposed to measure the learning outputs of the program as a whole not a individual course.

- The primary purpose of the exit exams is to assess students' educational achievement in the courses in their major area of program study.
- It help the student on latest programming languages and tools to develop better and faster applications.
- The exam is supposed to measures the knowledge of mathematics and computing fundamentals to various real life applications for any given requirement.
- The exam is supposed to measures the learning outputs of the program as a whole not the individual courses.



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DEPARTMENT:

ENGLISH

UG

BA

PEOs, POs, PSOs & Cos

B.A Programme Educational Objectives

- PEO1-To understand British Literature, American Literature, Indian Writing in English, Commonwealth Literature and their landscape, tradition, milieu, spirit, socio-cultural ethos, national identity etc.
- PEO2-To know the social and the literary background of the English society
- PEO3-To impart the figures of speech and literary forms
- PEO4-To introduce Linguistic aspects through Phonetics.
- PEO5-To understand the art of criticism
- PEO6-To appreciate the works of Oliver Goldsmith and Tagore
- PEO7-To develop the skill of English Language teaching
- PEO8-To enthuse the art of translation
- PEO9-To know the different classifications of Novel and Poetry
- PEO10-To understand the steps in research process and the suitable methods
- PEO11-To learn the concomitant grammatical terms and enhance communication skill
- PEO12-To develop computer knowledge

B.A Programme Outcome=PO

- PO1-Understand literature as a body of knowledge open to multiple interpretations
- PO2-Know the different genres of British Literature, American Literature, Indian Writing in English, commonwealth literature
- PO3-Recognise, interpret and explain the connections between their own experiences and the world using the texts
- PO4-Personal and intellectual autonomy
- PO5-Ethical, social and professional understanding
- PO6-Ability to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.
- PO7-Communicate effectively
- PO8-Improve computer knowledge

B.A Courses-C1

- C1-Literature in 1400-1600 Period

- C2-Literature in Elizabethan Period
- C3-Social History of England-I & II
- C4-History of English Literature-I & II
- C5-Literature in Augustan Period
- C6-Literature in Romantic Period
- C7-Literary Forms and Prosody
- C8-Shakespeare
- C9-Language and Linguistics
- C10-Literature in Victorian Period
- C11-Literary Criticism
- C12-Indian and European Classics in Translation
- C13-Literature in Modern Period-I & II
- C14-American Literature
- C15-Indian Writing in English
- C16-Translation
- C17-Single Author Study- Tagore
- C18-Single Author Study-Oliver Goldsmith
- C19-English Language Teaching
- C20-Commonwealth Literature
- C21-Study of a Genre-Poetry
- C22-Study of a Genre-Novel
- C23-Research Led Seminar
- C24-Research Methodology
- C25-Participation in Bounded Research
- C26-Communicative English Lab-I to VI
- C27-Packages Lab –I to VI
- C28-Project Work



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DEPARTMENT:

ENGLISH

PG

MA

M.A Programme Educational Objective-PEO

- PEO1-To acquaint with the historical evolution and development of English Language and structure.
- PEO2-To understand the genius and the craftsmanship of Shakespeare.
- PEO3-To learn different genres of British Literature
- PEO4-To have a deeper insight into the genesis of Indian English literature and its output in different forms.
- PEO5-To appreciate the works of writers influenced by the Romantic Movement
- PEO6-To learn the features of the various literary movements
- PEO7-To know the components of research methodology
- PEO8-To enhance students to have a good stead for the career of English teacher
- PEO9-To know the background and features of the post colonial literature
- PEO10-To understand comparative literature and world classics in translation
- PEO11-To understand American Literature, Canadian literature, Australian literature, African Literature and their landscape, tradition, milieu, spirit, socio-cultural ethos, national identity etc.
- PEO12-To explore the literary corpus produced by the writers from the diasporic locations.
- PEO13-To analyse a text using various approaches
- PEO14-To develop the translation skill
- PEO15-To interpret a text using various theories of literary criticism
- PEO16-To know the writings intended for the mass and those that find favour with large audience.
- PEO17-To keep abreast with feminine writings
- PEO18-To take up a competitive examination.
- PEO19-To understand the fiction in other languages in India
- PEO20-To develop suitable methods of data collection and interpretation
- PEO21-To carry out basic literature survey using the common data-bases

M.A Programme Outcome-PO

- PO1-Understand literature as a body of knowledge open to multiple interpretations
- PO2-Know the different genres of British Literature, American Literature, Indian Writing in English, Canadian literature, Australian literature, African Literature

- PO3-Understand, analyse and evaluate any text using various approaches and theories
- PO4-Recognise, interpret and explain the connections between their own experiences and the world using the texts
- PO5-Personal and intellectual autonomy
- PO6-Ethical, social and professional understanding
- PO7-Research and inquiry
- PO8-Take up a competitive examination.
- PO9-Ability to develop research hypothesis and carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.

M.A Course –C

- C1-History of English Language and Structure
- C2-Shakespeare
- C3-British Literature
- C4-Indian Writing in English
- C5-Romantic Movement
- C6-Literary Movement
- C7-Research Led Seminar
- C8-Women's Writings in English
- C9-Post-Colonial literature
- C10-Comparative Literature & World Classics in Translation
- C11-Diaspora literature
- C12-Canadian Literature
- C13-Research Methodology
- C14-Participation in Bounded Research
- C15-Critical Approaches to English Literature
- C16-American Literature
- C17-Literary Criticism
- C18-African Literature
- C19-Popular Literature
- C20-Participation in Scaffold research
- C21-Translation
- C22-English Language Teaching
- C23-English Literature for Competitive Examination
- C24-Australian Literature
- C25-Indian Fiction in Translation
- C26-Project Work

School of Engineering and Technology

PROGRAMME EDUCATIONAL OBJECTIVES:

- PEO1:** To enable graduates to pursue research or have a successful career in academia or industries associated with Electronics and Communication Engineering or as entrepreneurs.
- PEO2:** To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity.
- PEO3:** To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

- 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.

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

- PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions:** Design solutions for complex engineering problems and 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 and research 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, and modern 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 to assess 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 engineering solutions 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 and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

Department: ECE

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

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering 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 to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Educational Objectives (PEOs) and the Programme Outcomes (POs) is given in the following table:

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
PEO1	3	3	2	3	2	1	1	1	1	1	1	2
PEO2	3	3	3	3	3	2	2	3	1	3	3	3
PEO3	3	3	3	3	3	3	3	2	1	1	1	3

Contribution 1: Reasonable 2: Significant 3: Strong

MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Specific Objectives (PSOs) and the Programme Outcomes (POs) is given in the following table:

PROGRAMME SPECIFIC OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
PSO1	3	3	2	3	2	1	1	1	1	1	1	2
PSO2	3	3	3	3	3	2	2	3	1	3	3	3
PSO3	3	3	3	3	3	3	3	2	1	1	1	3

Contribution 1: Reasonable 2: Significant 3: Strong

COURSE OBJECTIVES AND OUTCOMES

**B.TECH (FULL TIME) ELECTRONICS AND COMMUNICATION ENGINEERING
REGULATION 2019**

SEMESTER – I

NAME OF THE COURSE: COMMUNICATIVE ENGLISH COURSE CODE: 19147S11

COURSE OBJECTIVES:

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills

COURSE OUTCOMES:

At the end of the course, learners will be able to:

- 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.

NAME OF THE COURSE: ENGINEERING MATHEMATICS COURSE CODE: 19148S12

COURSE OBJECTIVES:

- The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

COURSE OUTCOMES:

After completing this course, students should demonstrate competency in the following skills:

- 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.

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NAME OF THE COURSE: ENGINEERING PHYSICS

COURSE CODE: 19149S13

COURSE OBJECTIVES:

- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

COURSE OUTCOMES:

Upon completion of this course,

- 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.

NAME OF THE COURSE: ENGINEERING CHEMISTRY

COURSE CODE: 19149S14

COURSE OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

COURSE OUTCOMES:

- 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.

NAME OF THE COURSE: ENGINEERING GRAPHICS

COURSE CODE: 19154S15

COURSE OBJECTIVES:

- To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.
- To expose them to existing national standards related to technical drawings.

COURSE OUTCOMES:

On successful completion of this course, the student will be able to:

- 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.

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NAME OF THE COURSE: PROBLEM SOLVING AND PYTHON PROGRAMMING

COURSE CODE: 19150S16

COURSE OBJECTIVES:

- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures — lists, tuples, dictionaries.
- To do input/output with files in Python.

COURSE OUTCOMES:

Upon completion of the course, students will be able to

- 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.

NAME OF THE COURSE: PROBLEM SOLVING AND PYTHON PROGRAMMING LAB

COURSE CODE: 19150L17

COURSE OBJECTIVES

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python.

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- 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.

NAME OF THE COURSE: PHYSICS AND CHEMISTRY LAB

COURSE CODE: 19149L18

PHYSICS LAB

COURSE OBJECTIVES:

To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications.

Department: ECE
CHEMISTRY LAB

COURSE OBJECTIVES:

- 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 viscometry.

COURSE OUTCOMES:

The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

NAME OF THE COURSE: VALUE EDUCATION COURSE CODE: 191VEA19

COURSE OBJECTIVES

- To teach the philosophy of Life, personal value, social value, mind cultural value and personal health
- To teach and inculcate the importance of value based living.
- To teach professional ethical values, codes of ethics, responsibilities, safety, rights and related global issues.
- To give students a deeper understanding about the purpose of life.
- To teach the significance of being responsible citizens of the society.

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- 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.

SEMESTER - II

NAME OF THE COURSE: TECHNICAL ENGLISH COURSE CODE: 19147S21

COURSE OBJECTIVES:

The Course prepares second semester engineering and Technology students to:

- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write convincing job applications and effective reports.
- Develop their speaking skills to make technical presentations, participate in group discussions.
- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialization.

COURSE OUTCOMES:

At the end of the course learners will be able to:

- 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.

Department: ECE

NAME OF THE COURSE: ENGINEERING MATHEMATICS– II

COURSE CODE: 19148S22

COURSE OBJECTIVES :

This course is designed to cover topics such as Matrix Algebra, Vector Calculus, Complex Analysis and Laplace Transform. Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering. Vector calculus can be widely used for modelling the various laws of physics. The various methods of complex analysis and Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

COURSE OUTCOMES:

After successfully completing the course, the student will have a good understanding of the following topics and their applications:

- 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.

NAME OF THE COURSE: PHYSICS FOR ELECTRONICS ENGINEERING

COURSE CODE: 19149S23B

COURSE OBJECTIVES:

To understand the essential principles of Physics of semiconductor device and Electron transport properties. Become proficient in magnetic, dielectric and optical properties of materials and nano devices.

COURSE OUTCOMES:

At the end of the course, the students will able to

- 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 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.

NAME OF THE COURSE: CIRCUIT ANALYSIS

COURSE CODE: 19152S24B

COURSE OBJECTIVES:

- To introduce the basic concepts of DC and AC circuits behavior
- To study the transient and steady state response of the circuits subjected to step and sinusoidal excitations.
- To introduce different methods of circuit analysis using Network theorems, duality and topology.

Department: ECE

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time
- Design and understand and evaluate the AC and DC circuits.

NAME OF THE COURSE: BASIC ELECTRICAL AND INSTRUMENTATION ENGINEERING

COURSE CODE: 19153S25B

COURSE OBJECTIVES:

To impart knowledge on

- Operation of Three phase electrical circuits and power measurement
- Working principles of Electrical Machines
- Working principle of Various measuring instruments

COURSE OUTCOMES:

At the end of the course the students will be able to

- 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

NAME OF THE COURSE: ELECTRONIC DEVICES COURSE CODE: 19152S26B

COURSE OBJECTIVES:

To acquaint the students with the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices

COURSE OUTCOMES:

At the end of the course the students will be able to:

- 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

NAME OF THE COURSE: ENGINEERING PRACTICES LAB

COURSE CODE: 19154L27

COURSE OBJECTIVES:

To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

COURSE OUTCOMES:

On successful completion of this course, the student will be able to

- 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

Department: ECE

- Elaborate on the components, gates, soldering practices.

NAME OF THE COURSE: CIRCUITS AND DEVICES LAB COURSE CODE: 19152L28B

COURSE OBJECTIVES:

- To learn the characteristics of basic electronic devices such as Diode, BJT, FET, SCR
- To understand the working of RL, RC and RLC circuits
- To gain hand on experience in Thevenin & Norton theorem, KVL & KCL, and Super Position Theorems

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Analyze the characteristics of basic electronic devices
- Design RL and RC circuits
- Verify Thevenin & Norton theorem KVL & KCL, and Super Position Theorems

NAME OF THE COURSE: FUNDAMENTALS OF INDIAN CONSTITUTION AND ECONOMY

COURSE CODE: 191ICA29

COURSE OBJECTIVES:

- To Enable the student to understand the importance of constitution
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court, controller and auditor general of India and election commission of India.
- To understand the central and state relation.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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.

SEMESTER – III

NAME OF THE COURSE: LINEAR ALGEBRA AND PARTIAL DIFFERENTIAL EQUATIONS

COURSE CODE: 19148S31B

COURSE OBJECTIVES:

To introduce the basic notions of groups, rings, fields which will then be used to solve related problems.

- To understand the concepts of vector space, linear transformations and diagonalization.
- To apply the concept of inner product spaces in orthogonalization.
- To understand the procedure to solve partial differential equations.
- To give an integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

Department: ECE

COURSE OUTCOMES:

Upon successful completion of the course, students should be able to:

- 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.

NAME OF THE COURSE: CONTROL SYSTEMS ENGINEERING

COURSE CODE: 19152S32

COURSE OBJECTIVES:

- To introduce the components and their representation of control systems
- To learn various methods for analyzing the time response, frequency response and stability of the systems.
- To learn the various approach for the state variable analysis.

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- 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.
- Design various transfer functions of digital control system using state variable models.

NAME OF THE COURSE: FUNDAMENTALS OF DATA STRUCTURES IN C

COURSE CODE: 19152S33

COURSE OBJECTIVES:

- To learn the features of C
- To learn the linear and non-linear data structures
- To explore the applications of linear and non-linear data structures
- To learn to represent data using graph data structure
- To learn the basic sorting and searching algorithms

COURSE OUTCOMES:

Upon completion of the course, students will be able to:

- 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

NAME OF THE COURSE: DIGITAL ELECTRONICS COURSE CODE: 19152C34

COURSE OBJECTIVES:

- To present the Digital fundamentals, Boolean algebra and its applications in digital systems
- To familiarize with the design of various combinational digital circuits using logic gates

Department: ECE

- To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits
- To explain the various semiconductor memories and related technology
- To introduce the electronic circuits involved in the making of logic gates

COURSE OUTCOMES:

At the end of the course:

- 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

NAME OF THE COURSE: SIGNALS AND SYSTEMS COURSE CODE: 19152C35

COURSE OBJECTIVES:

- To understand the basic properties of signal & systems
- To know the methods of characterization of LTI systems in time domain
- To analyze continuous time signals and system in the Fourier and Laplace domain
- To analyze discrete time signals and system in the Fourier and Z transform domain

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: ELECTRONIC CIRCUITS I COURSE CODE: 19152C36

COURSE OBJECTIVES:

- To understand the methods of biasing transistors
- To design and analyze single stage and multistage amplifier circuits
- To analyze the frequency response of small signal amplifiers
- To design and analyze the regulated DC power supplies.
- To troubleshoot and fault analysis of power supplies.

COURSE OUTCOMES:

After studying this course, the student should be able to:

- 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

Department: ECE

NAME OF THE COURSE: FUNDAMENTALS OF DATA STRUCTURES IN C LAB

COURSE CODE: 19152L37

COURSE OBJECTIVES:

- 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

COURSE OBJECTIVES:

- 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

NAME OF THE COURSE: ANALOG AND DIGITAL CIRCUITS LAB

COURSE CODE: 19152L38

COURSE OBJECTIVES:

The student should be made to:

- Study the Frequency response of CE, CB and CC Amplifier
- Learn the frequency response of CS Amplifiers
- Study the Transfer characteristics of differential amplifier
- Perform experiment to obtain the bandwidth of single stage and multistage amplifiers
- Perform SPICE simulation of Electronic Circuits
- Design and implement the Combinational and sequential logic circuits

COURSE OUTCOMES:

On completion of this laboratory course, the student should be able to:

- 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.

NAME OF THE COURSE: INTERPERSONAL SKILLS / LISTENING & SPEAKING

COURSE CODE: 19152L39

COURSE OBJECTIVES:

The Course will enable learners to:

- 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.

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COURSE OBJECTIVES:

The Course will enable learners to:

- 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.

SEMESTER – IV

NAME OF THE COURSE: PROBABILITY AND RANDOM PROCESSES

COURSE CODE: 19148S41B

COURSE OBJECTIVES :

- To provide necessary basic concepts in probability and random processes for applications such as random signals, linear systems in communication engineering.
- To understand the basic concepts of probability, one and two dimensional random variables and to introduce some standard distributions applicable to engineering which can describe real life phenomenon.
- To understand the basic concepts of random processes which are widely used in IT fields.
- To understand the concept of correlation and spectral densities.
- To understand the significance of linear systems with random inputs.

COURSE OUTCOMES:

Upon successful completion of the course, students should be able to:

- 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 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.

NAME OF THE COURSE: ELECTRONIC CIRCUITS II

COURSE CODE: 19152C42

COURSE OBJECTIVES:

- To give a comprehensive exposure to all types of amplifiers and oscillators constructed with discrete components. This helps to develop a strong basis for building linear and digital integrated circuits
- To study about feedback amplifiers and oscillators principles
- To design oscillators.
- To study about turned amplifier.
- To understand the analysis and design of LC and RC oscillators, amplifiers, multi vibrators, power amplifiers and DC convertors.

Department: ECE

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- 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.

NAME OF THE COURSE: COMMUNICATION THEORY COURSE CODE: 19152C43

COURSE OBJECTIVES:

- To introduce the concepts of various analog modulations and their spectral characteristics
- To understand the properties of random process
- To know the effect of noise on communication systems
- To study the limits set by Information Theory

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: ELECTROMAGNETIC FIELDS COURSE CODE: 19152C44

COURSE OBJECTIVES:

- To gain conceptual and basic mathematical understanding of electric and magnetic fields in free space and in materials
- To understand the coupling between electric and magnetic fields through Faraday's law, displacement current and Maxwell's equations
- To understand wave propagation in lossless and in lossy media
- To be able to solve problems based on the above concepts

COURSE OUTCOMES:

By the end of this course, the student should be able to:

- 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

NAME OF THE COURSE: LINEAR INTEGRATED CIRCUITS COURSE CODE: 19152C45

COURSE OBJECTIVES:

- To introduce the basic building blocks of linear integrated circuits
- To learn the linear and non-linear applications of operational amplifiers

Department: ECE

- To introduce the theory and applications of analog multipliers and PLL
- To learn the theory of ADC and DAC
- To introduce the concepts of waveform generation and introduce some special function ICs

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- 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

NAME OF THE COURSE: ENVIRONMENTAL SCIENCE AND ENGINEERING
COURSE CODE: 19149S46

COURSE OBJECTIVES:

- To study the nature and facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

COURSE OUTCOMES:

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

NAME OF THE COURSE: CIRCUITS DESIGN AND SIMULATION LAB
COURSE CODE: 19152L47

COURSE OBJECTIVES:

- To gain hands on experience in designing electronic circuits
- To learn simulation software used in circuit design
- To learn the fundamental principles of amplifier circuits
- To differentiate feedback amplifiers and oscillators.
- To differentiate the operation of various multivibrators

COURSE OUTCOMES:

On completion of this laboratory course, the student should be able to:

- 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.

Department: ECE

NAME OF THE COURSE: LINEAR INTEGRATED CIRCUITS LAB

COURSE CODE: 19152L48

COURSE OBJECTIVES:

- To understand the basics of linear integrated circuits and available ICs
- To understand the characteristics of the operational amplifier.
- To apply operational amplifiers in linear and nonlinear applications.
- To acquire the basic knowledge of special function IC.
- To use SPICE software for circuit design

COURSE OUTCOMES:

On completion of this laboratory course, the student should be able to:

- 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.
- Design DC power supply using ICs.
- Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE.

NAME OF THE COURSE: RESEARCH LED SEMINAR

COURSE CODE: 19152CRS

COURSE OBJECTIVES:

- To be exposed to various research domains
- To have an acquaintance with languages of research
- To inculcate a development of research aptitude

COURSE OUTCOMES:

The student should have an:

- Exposure to various research domains
- Acquaintance with languages of research
- Development for research aptitude

SEMESTER – V

NAME OF THE COURSE: DIGITAL COMMUNICATION

COURSE CODE: 19152C51

COURSE OBJECTIVES:

- To know the principles of sampling & quantization
- To study the various waveform coding schemes
- To learn the various baseband transmission schemes
- To understand the various band pass signaling schemes
- To know the fundamentals of channel coding

COURSE OUTCOMES:

Upon completion of the course, the student should be able to

- 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

Department: ECE

NAME OF THE COURSE: DISCRETE-TIME SIGNAL PROCESSING
COURSE CODE: 19152C52

COURSE OBJECTIVES:

- To learn discrete fourier transform, properties of DFT and its application to linear filtering
- To understand the characteristics of digital filters, design digital IIR and FIR filters and apply these filters to filter undesirable signals in various frequency bands
- To understand the effects of finite precision representation on digital filters
- To understand the fundamental concepts of multi rate signal processing and its applications
- To introduce the concepts of adaptive filters and its application to communication engineering

COURSE OUTCOMES:

At the end of the course, the student should be able to

- 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

NAME OF THE COURSE: COMPUTER ARCHITECTURE AND ORGANIZATION
COURSE CODE: 19152C53

COURSE OBJECTIVES:

- To make students understand the basic structure and operation of digital computer
- To familiarize with implementation of fixed point and floating-point arithmetic operations
- To study the design of data path unit and control unit for processor
- To understand the concept of various memories and interfacing
- To introduce the parallel processing technique

COURSE OUTCOMES:

At the end of the course, the student should be able to

- 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

NAME OF THE COURSE: COMMUNICATION NETWORKS **COURSE CODE: 19152C55**

COURSE OBJECTIVES:

The student should be made to:

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Identify the components required to build different types of networks
- Choose the required functionality at each layer for given application

Department: ECE

- Identify solution for each functionality at each layer
- Trace the flow of information from one node to another node in the network

NAME OF THE COURSE: DISCRETE TIME SIGNAL PROCESSING LAB

COURSE CODE: 19152L57

COURSE OBJECTIVES:

The student should be made:

- To perform basic signal processing operations such as Linear Convolution, Circular Convolution, Auto Correlation, Cross Correlation and Frequency analysis in MATLAB
- To implement FIR and IIR filters in MATLAB and DSP Processor
- To study the architecture of DSP processor
- To design a DSP system to demonstrate the Multi-rate and Adaptive signal processing concepts.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: COMMUNICATION SYSTEMS LAB

COURSE CODE: 19152L58

COURSE OBJECTIVES:

The student should be made:

- To visualize the effects of sampling and TDM
- To Implement AM & FM modulation and demodulation
- To implement PCM & DM
- To simulate Digital Modulation schemes
- To simulate Error control coding schemes

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: COMMUNICATION NETWORKS LAB

COURSE CODE: 19152L59

COURSE OBJECTIVES:

The student should be made to:

- Learn to communicate between two desktop computers
- Learn to implement the different protocols
- Be familiar with IP Configuration

Department: ECE

- Be familiar with the various routing algorithms
- Be familiar with simulation tools

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Communicate between two desktop computers
- Implement the different protocols
- Program using sockets.
- Implement and compare the various routing algorithms
- Use the simulation tool.

NAME OF THE COURSE: RESEARCH METHODOLOGY
COURSE CODE: 19152CRM

COURSE OBJECTIVES:

- To understand the approaches towards and constraints in good research.
- To identify various statistical tools used in research methodology
- To appreciate and compose the manuscript for publication
- To train in basic computational and excel- skills for research in engineering.

COURSE OUTCOMES:

- 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

SEMESTER – VI

NAME OF THE COURSE: MICROPROCESSORS AND MICROCONTROLLERS
COURSE CODE: 19152C61

COURSE OBJECTIVES:

- To understand the Architecture of 8086 microprocessor.
- To learn the design aspects of I/O and Memory Interfacing circuits.
- To interface microprocessors with supporting chips.
- To study the Architecture of 8051 microcontroller.
- To design a microcontroller based system

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- 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.

NAME OF THE COURSE: VLSI DESIGN **COURSE CODE: 19152C62**

COURSE OBJECTIVES:

- Study the fundamentals of CMOS circuits and its characteristics.
- Learn the design and realization of combinational & sequential digital circuits.

Department: ECE

- Architectural choices and performance tradeoffs involved in designing and realizing the circuits in CMOS technology are discussed
- Learn the different FPGA architectures and testability of VLSI circuits.

COURSE OUTCOMES:

Upon Completion of the Course, Students should be able to:

- 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.

NAME OF THE COURSE: WIRELESS COMMUNICATION COURSE CODE: 19152C63

COURSE OBJECTIVES:

- To study the characteristic of wireless channel
- To understand the design of a cellular system
- To study the various digital signaling techniques and multipath mitigation techniques
- To understand the concepts of multiple antenna techniques

COURSE OUTCOMES:

The student should be able to:

- 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.

NAME OF THE COURSE: PRINCIPLES OF MANAGEMENT COURSE CODE: 19152S64

COURSE OBJECTIVES:

- To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

COURSE OUTCOMES:

- 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

NAME OF THE COURSE: TRANSMISSION LINES AND RF SYSTEMS

COURSE CODE: 19152C65

COURSE OBJECTIVES:

- To introduce the various types of transmission lines and its characteristics
- To give thorough understanding about high frequency line, power and impedance measurements
- To impart technical knowledge in impedance matching using smith chart
- To introduce passive filters and basic knowledge of active RF components
- To get acquaintance with RF system transceiver design

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- Explain the characteristics of transmission lines and its losses

Department: ECE

- 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

**NAME OF THE COURSE: MICROPROCESSORS AND MICROCONTROLLERS
LAB**

COURSE CODE: 19152L61

COURSE OBJECTIVES:

- To Introduce ALP concepts, features and Coding methods
- Write ALP for arithmetic and logical operations in 8086 and 8051
- Differentiate Serial and Parallel Interface
- Interface different I/Os with Microprocessors
- Be familiar with MASM

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: VLSI DESIGN LAB

COURSE CODE: 19152L62

COURSE OBJECTIVES:

The student should be made:

- To learn Hardware Descriptive Language (Verilog/VHDL)
- To learn the fundamental principles of VLSI circuit design in digital and analog domain
- To familiarize fusing of logical modules on FPGAs
- To provide hands on design experience with professional design (EDA) platforms

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: PROFESSIONAL COMMUNICATION

COURSE CODE: 19152L63

COURSE OBJECTIVES:

The course aims to:

- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

Department: ECE

COURSE OUTCOMES:

At the end of the course Learners will be able to:

- Make effective presentations
- Participate confidently in Group Discussions.
- Attend job interviews and be successful in them.
- Develop adequate Soft Skills required for the workplace

NAME OF THE COURSE: TECHNICAL SEMINAR

COURSE CODE: 19152L64

COURSE OBJECTIVES:

The course aims to:

- Study research papers, summarise and review them
- Identify promising new directions of various cutting edge technologies
- Impart skills in preparing detailed report describing the project and results

COURSE OUTCOMES:

At the end of the course, Learners will be able:

- 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

NAME OF THE COURSE: PARTICIPATION IN BOUNDED RESEARCH

COURSE CODE: 19152CBR

COURSE OBJECTIVES:

The course aims to:

- Develop hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

COURSE OUTCOMES:

At the end of the course, Learners will be able to have a:

- Hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

SEMESTER VII

NAME OF THE COURSE: ANTENNAS AND MICROWAVE ENGINEERING

COURSE CODE: 19152C71

COURSE OBJECTIVES:

- To enable the student to understand the basic principles in antenna and microwave system design
- To enhance the student knowledge in the area of various antenna designs.
- To enhance the student knowledge in the area of microwave components and antenna for practical applications.

Department: ECE

COURSE OUTCOMES:

The student should be able to:

- 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

NAME OF THE COURSE: OPTICAL COMMUNICATION COURSE CODE: 19152C72

COURSE OBJECTIVES:

- To study about the various optical fiber modes, configuration and transmission characteristics of optical fibers
- To learn about the various optical sources, detectors and transmission techniques
- To explore various idea about optical fiber measurements and various coupling techniques
- To enrich the knowledge about optical communication systems and networks

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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.

NAME OF THE COURSE: EMBEDDED AND REAL TIME SYSTEMS

COURSE CODE: 19152C73

COURSE OBJECTIVES:

The student should be made to:

- Understand the concepts of embedded system design and analysis
- Learn the architecture and programming of ARM processor
- Be exposed to the basic concepts of embedded programming
- Learn the real time operating systems

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: AD HOC AND WIRELESS SENSOR NETWORKS

COURSE CODE: 19152C75

COURSE OBJECTIVES:

- Learn Ad hoc network and Sensor Network fundamentals
- Understand the different routing protocols
- Have an in-depth knowledge on sensor network architecture and design issues
- Understand the transport layer and security issues possible in Ad hoc and Sensor networks
- Have an exposure to mote programming platforms and tools

Department: ECE

COURSE OUTCOMES:

At the end of the course, the student would be able to:

- 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

NAME OF THE COURSE: EMBEDDED LAB

COURSE CODE: 19152L77

COURSE OBJECTIVES:

The student should be made to:

- Learn the working of ARM processor
- Understand the Building Blocks of Embedded Systems
- Learn the concept of memory map and memory interface
- Write programs to interface memory, I/Os with processor
- Study the interrupt performance

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: ADVANCED COMMUNICATION LAB

COURSE CODE: 19152L78

COURSE OBJECTIVES:

The student should be made to:

- Understand the working principle of optical sources, detector, fibers
- Develop understanding of simple optical communication link
- Understand the measurement of BER, Pulse broadening
- Understand and capture an experimental approach to digital wireless communication
- Understand actual communication waveforms that will be sent and received across wireless channel

COURSE OUTCOMES:

On completion of this lab course, the student would be able to

- 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

Department: ECE

NAME OF THE COURSE: DESIGN/SOCIO TECHNICAL PROJECT

COURSE CODE: 19152CSR

COURSE OBJECTIVES:

The student should have:

- Sensitization of social needs for innovation
- Team work towards interdisciplinary synchronous research strategy
- Development of critical thinking and synergistic research approach.

COURSE OUTCOMES:

On completion of this course, the student would be able to be

- Sensitive to social needs for innovation
- Develop teams and work towards interdisciplinary synchronous research strategy
- Develop critical thinking and synergistic research approach.

SEMESTER VIII

NAME OF THE COURSE: PROJECT WORK

COURSE CODE: 19152P83

COURSE OBJECTIVES:

- To enable the student to understand the basic principles in antenna and microwave system design
- To enhance the student knowledge in the area of various antenna designs.
- To enhance the student knowledge in the area of microwave components and antenna for practical applications.

COURSE OUTCOMES:

The student should be able to:

- 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.

NAME OF THE COURSE: PROGRAMME EXIT EXAMINATION

COURSE CODE: 19152PEE

COURSE OBJECTIVES:

- To assess the comprehensive knowledge gained in basic courses relevant to the branch of study
- To comprehend the questions asked and answer them with confidence

COURSE OUTCOMES:

- The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them

ELECTIVE – I (SEMESTER – V)

NAME OF THE COURSE: MEDICAL ELECTRONICS COURSE CODE: 19152E56B

COURSE OBJECTIVES:

The student should be made:

- To gain knowledge about the various physiological parameters both electrical and non electrical and the methods of recording and also the method of transmitting these parameters
- To study about the various assist devices used in the hospitals
- To gain knowledge about equipment used for physical medicine and the various recently developed diagnostic and therapeutic techniques.

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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

NAME OF THE COURSE: NANOTECHNOLOGY AND APPLICATIONS

COURSE CODE: 19152E56E

COURSE OBJECTIVES:

The student should be made:

- To provide a broad view of the nascent field of nanoscience and nanotechnology to undergraduates
- To explore the basics of nanomaterial synthesis and characterization.
- To introduce the applications of nanotechnology

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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.

NAME OF THE COURSE: TOTAL QUALITY MANAGEMENT

COURSE CODE: 19152E56G

COURSE OBJECTIVES:

- To facilitate the understanding of Quality Management principles and process.

Department: ECE

COURSE OUTCOMES:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

NAME OF THE COURSE: DIGITAL AUDIO ENGINEERING COURSE CODE: 19152E56H

COURSE OBJECTIVES:

- To understand the concept of fundamentals of digital audio.
- To understand the concept of audio in digital TV broadcasting.
- To understand the various codes of digital coding.
- To understand the concept of digital audio tape recorder.
- To analyze the concept internet audio in digital audio engineering.

COURSE OUTCOMES:

At the end of the course, students would be able to

- Analyze the type of dither.
- Analyze the recording and transmission principles in digital audio.
- Analyze the various compression techniques.
- Design and analyze the digital audio editing.
- Analyze the various application of digital audio.

NAME OF THE COURSE: LOGIC AND DISTRIBUTED CONTROL SYSTEMS

COURSE CODE: 19152E56I

COURSE OBJECTIVES:

- To give an overview of the automation technologies such as PLCs, SCADA and DCS used in industries.
- To provide a fundamental understanding of the different languages used for PLC Programming
- To provide insight into some of the advanced principles those are evolving for present and future automation.

COURSE OUTCOMES:

- Ability to understand and analyze Instrumentation systems and their applications to various industries.
- Ability to understand and analyse, linear and digital electronic circuits.

ELECTIVE – II (SEMESTER – VI)

NAME OF THE COURSE: CRYPTOGRAPHY AND NETWORK SECURITY

COURSE CODE: 19152E66A

COURSE OBJECTIVES:

- To understand Cryptography Theories, Algorithms and Systems.
- To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
- Apply the different cryptographic operations of symmetric cryptographic algorithms

Department: ECE

- 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

NAME OF THE COURSE: ADVANCED DIGITAL SIGNAL PROCESSING

COURSE CODE: 19152E66B

COURSE OBJECTIVES:

- To learn and understand the concepts of stationary and non-stationary random signals and analysis & characterization of discrete-time random processes
- To enunciate the significance of estimation of power spectral density of random processes
- To introduce the principles of optimum filters such as Wiener and Kalman filters
- To introduce the principles of adaptive filters and their applications to communication engineering
- To introduce the concepts of multi-resolution analysis

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: WIRELESS NETWORKS COURSE CODE: 19152E66F

COURSE OBJECTIVES:

The student should be made:

- To understand the concept about Wireless networks, protocol stack and standards
- To understand and analyse the network layer solutions for Wireless networks
- To study about fundamentals of 3G Services, its protocols and applications
- To have in depth knowledge on internetworking of WLAN and WWAN
- To learn about evolution of 4G Networks, its architecture and applications

COURSE OUTCOMES:

Upon completion of the course, the student would be able to:

- 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

NAME OF THE COURSE: SCADA SYSTEM AND APPLICATIONS MANAGEMENT

COURSE CODE: 19152E66H

COURSE OBJECTIVES:

- To understand about the SCADA system components and SCADA communication protocols
- To provide knowledge about SCADA applications in power system

Department: ECE

COURSE OUTCOMES:

This course gives knowledge about various system components and communication protocols of SCADA system and its applications.

NAME OF THE COURSE: SOFTWARE ENGINEERING

COURSE CODE: 19152E66I

COURSE OBJECTIVES:

- To understand the phases in a software project
- To understand fundamental concepts of requirements engineering and Analysis Modeling.
- To understand the various software design methodologies
- To learn various testing and maintenance measures

COURSE OUTCOMES:

On Completion of the course, the students should be able to:

- 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.

ELECTIVE – III (SEMESTER – VII)

NAME OF THE COURSE: ADVANCED WIRELESS COMMUNICATION

COURSE CODE: 19152E76A

COURSE OBJECTIVES:

- To expose the students to the importance of improving capacity of wireless channel using MIMO
- To enable understanding of channel impairment mitigation using space-time block and Trellis codes
- To teach advanced MIMO system like layered space time codes, MU-MIMO System and MIMO-OFDM systems

COURSE OUTCOMES:

The student should be able to:

- 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

NAME OF THE COURSE: COGNITIVE RADIO

COURSE CODE: 19152E76B

COURSE OBJECTIVES:

The student should be made:

- To understand the evolving software defined radio and cognitive radio techniques and their essential functionalities
- To study the basic architecture and standard for cognitive radio
- To understand the physical, MAC and Network layer design of cognitive radio
- To expose the student to evolving applications and advanced features of cognitive radio

Department: ECE

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: MIXED SIGNAL IC DESIGN

COURSE CODE: 19152E76F

COURSE OBJECTIVES:

The student should be made to:

- Study the mixed signal of submicron CMOS circuits
- Understand the various integrated based filters and topologies
- Learn the data converters architecture, modeling and signal to noise ratio
- Study the integrated circuit of oscillators and PLLs

COURSE OUTCOMES:

Upon completion of the course, student should be able to

- 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.

NAME OF THE COURSE: SPACE TIME WIRELESS COMMUNICATION

COURSE CODE: 19152E76H

COURSE OBJECTIVES:

The student should be made to:

- understand the concept of multiple antenna propagation.
- understand the concept of capacity of frequency flat deterministic MIMO channel.
- understand the concept of transmitter and receiver diversity technique.
- design the coding for frequency flat channel.
- analyze the concept of micro multi user detection.

COURSE OUTCOMES:

At the end of the course, students would be able to

- Design and analyze the channel characterization.
- Analyze the capacity of random MIMO channel.
- Design and analyze the order diversity and channel variability.
- Analyze the multiple antenna coding and receivers.
- Analyze the MIMO multi user detection

NAME OF THE COURSE: TELECOMMUNICATION NETWORK MANAGEMENT

COURSE CODE: 19152E76I

COURSE OBJECTIVES:

- To understand the concept of network management standards.
- To design the common management information service element model.
- To understand the various concept of information modelling.
- To analyze the concept of SNMPv1 and SNMPv2 protocol.

Department: ECE

- To analyze the concept of examples of network management.

COURSE OUTCOMES:

At the end of the course, students would be able to

- Design and analyze of fault management.
- Analyze the common management information protocol specifications.
- Design and analyze of management information model.
- Design the simple network management protocol.
- Design the various types of network management tools.

ELECTIVE – IV (SEMESTER – VIII)

NAME OF THE COURSE: ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY

COURSE CODE: 19152E81A

COURSE OBJECTIVES:

- To introduce the basic concepts of Electromagnetic Interference
- To teach the importance of Electromagnetic Compatible designs
- To explain the existing standards for Electromagnetic Compatibility

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: DIGITAL IMAGE PROCESSING COURSE CODE: 19152E81E

COURSE OBJECTIVES:

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- 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.

NAME OF THE COURSE: PROFESSIONAL ETHICS IN ENGINEERING

COURSE CODE: 19152E81F

COURSE OBJECTIVES:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

Department: ECE

COURSE OUTCOMES:

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.

NAME OF THE COURSE: TELECOMMUNICATION SYSTEM MODELING AND SIMULATION

COURSE CODE: 19152E81G

COURSE OBJECTIVES:

- To gain knowledge in modeling of different communication systems.
- To know the techniques involved in performance estimation of telecommunication systems.
- To learn the use of random process concepts in telecommunication system simulation.
- To study the modeling methodologies of a telecommunication system.
- To study about the QAM digital radio link environment.

COURSE OUTCOMES:

At the end of the course, students would be able to

- Apply the constituents of a telecommunication systems.
- Analyze various modeling methodologies and simulation techniques.
- Estimate the performance measures of telecommunication systems.
- Apply system modeling in telecommunication.
- Demonstrate light wave communication and satellite communication systems.

NAME OF THE COURSE: TRANSDUCER ENGINEERING COURSE CODE: 19152E81H

COURSE OBJECTIVES:

- To understand how physical quantities are measured and how they are converted to electrical or other forms.
- To have an adequate knowledge in resistance, transducers.
- To develop the knowledge of inductance and capacitance transducers.
- To study the characteristics of Transducers.
- To impart knowledge on various types of transducers

COURSE OUTCOMES:

Upon completion of the course, the student should be able

- to model and analyze transducers.

ELECTIVE – V (SEMESTER – VIII)

**NAME OF THE COURSE: DSP PROCESSOR ARCHITECTURE AND PROGRAMMING
COURSE CODE: 19152E82B**

COURSE OBJECTIVES:

The objective of this course is to provide knowledge on:

- Basics on Digital Signal Processors
- Programmable DSP's Architecture, On-chip Peripherals and Instruction set
- Programming for signal processing applications
- Advanced Programmable DSP Processors

Department: ECE

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: SATELLITE COMMUNICATION COURSE CODE: 19152E82C

COURSE OBJECTIVES:

The student should be made to:

- Understand the basics of satellite orbits
- Understand the satellite segment and earth segment
- Analyze the various methods of satellite access
- Understand the applications of satellites
- Understand the basics of satellite Networks

COURSE OUTCOMES:

At the end of the course, the student would be able to:

- Analyze the satellite orbits
- Analyze the earth segment and space segment
- Analyze the satellite Link design
- Design various satellite applications

NAME OF THE COURSE: FUNDAMENTALS OF NANO SCIENCE

COURSE CODE: 19152E82F

COURSE OBJECTIVES:

- To learn about basis of nanomaterial science, preparation method, types and application

COURSE OUTCOMES:

- Will familiarize about the science of nanomaterials
- Will demonstrate the preparation of nanomaterials
- Will develop knowledge in characteristic nanomaterial

NAME OF THE COURSE: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

COURSE CODE: 19152E82G

COURSE OBJECTIVES:

- To impart knowledge on Environmental management and Environmental Impact Assessment.

COURSE OUTCOMES:

The students completing the course will have ability to

- 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

Department: ECE

NAME OF THE COURSE: TELEHEALTH TECHNOLOGY COURSE CODE: 19152E82H

COURSE OBJECTIVES:

The student should be made to:

- Learn the key principles for telemedicine and health.
- Understand telemedical technology.
- Know telemedical standards, mobile telemedicine and its applications

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Apply multimedia technologies in telemedicine.
- Explain Protocols behind encryption techniques for secure transmission of data.
- Apply telehealth in healthcare.

OPEN ELECTIVE – I (SEMESTER – V)

NAME OF THE COURSE: DATABASE MANAGEMENT SYSTEMS

COURSE CODE: 19150FE54A

COURSE OBJECTIVES:

The student should be made:

- To learn the fundamentals of data models
- To learn conceptual modeling using ER diagrams.
- To study SQL queries and database programming
- To learn proper designing of relational database.
- To understand database security concepts
- To understand Information retrieval techniques

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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

NAME OF THE COURSE: CLOUD COMPUTING COURSE CODE: 19150FE54B

COURSE OBJECTIVES:

The student should be made:

- To learn about the concept of cloud and utility computing.
- To have knowledge on the various issues in cloud computing.
- To be familiar with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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.

Department: ECE

- 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.

NAME OF THE COURSE: INDUSTRIAL NANO TECHNOLOGY

COURSE CODE: 19153FE54A

COURSE OBJECTIVES:

The student should be made:

- 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 OUTCOMES:

On successful completion of this course, the student should be able to:

- 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

NAME OF THE COURSE: ENERGY CONSERVATION AND MANAGEMENT

COURSE CODE: 19153FE54B

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- Understand and analyse the energy data of industries
- Carryout energy accounting and balancing
- Conduct energy audit and suggest methodologies for energy savings and
- Utilise the available resources in optimal ways

COURSE OUTCOMES:

Upon completion of this course, the students can able to analyse the energy data of industries

- Can carry out energy accounting and balancing
- Can suggest methodologies for energy savings

NAME OF THE COURSE: RENEWABLE ENERGY SOURCES

COURSE CODE: 19154FE54A

COURSE OBJECTIVES:

The student should be made:

- To get exposure on solar radiation and its environmental impact to power.
- To know about the various collectors used for storing solar energy.
- To know about the various applications in solar energy.
- To learn about the wind energy and biomass and its economic aspects.
- To know about geothermal energy with other energy sources.

Department: ECE

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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.

NAME OF THE COURSE: AUTOMOTIVE SYSTEMS COURSE CODE: 19154FE54B

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- To understand the construction and working principle of various parts of an automobile.
- To have the practice for assembling and dismantling of engine parts and transmission System.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to

- Identify the different components in automobile engineering.
- Have clear understanding on different auxiliary and transmission systems usual.

**NAME OF THE COURSE: AIR POLLUTION AND CONTROL ENGINEERING
COURSE CODE: 19155FE54A**

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- To impart knowledge on the principle and design of control of Indoor/ particulate/ gaseous air pollutant and its emerging trends.

COURSE OUTCOMES:

The students completing the course will have

- 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.

**NAME OF THE COURSE: GEOGRAPHIC INFORMATION SYSTEM
COURSE CODE: 19155FE54B**

COURSE OBJECTIVES:

The student should be made:

- To introduce the fundamentals and components of Geographic Information System
- To provide details of spatial data structures and input, management and output processes.

Department: ECE

COURSE OUTCOMES:

This course equips the student to

- 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

OPEN ELECTIVE – II (SEMESTER – VII)

NAME OF THE COURSE: INTRODUCTION TO C PROGRAMMING

COURSE CODE: 19150FE74A

COURSE OBJECTIVES:

The student should be made:

- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions and structures

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- Develop simple applications using basic constructs
- Develop applications using arrays and strings
- Develop applications using functions and structures

NAME OF THE COURSE: DATA STRUCTURES AND ALGORITHMS

COURSE CODE: 19150FE74B

COURSE OBJECTIVES:

The student should be made:

- To understand the various algorithm design and analysis techniques
- To learn linear data structures – lists, stacks, and queues
- To learn different sorting and searching algorithms
- To understand Tree and Graph data structures

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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.

NAME OF THE COURSE: BASIC CIRCUIT THEORY COURSE CODE: 19153FE74A

COURSE OBJECTIVES:

The student should be made:

- To introduce electric circuits and its analysis
- To impart knowledge on solving circuit equations using network theorems
- To introduce the phenomenon of resonance in coupled circuits.
- To introduce Phasor diagrams and analysis of three phase circuits

Department: ECE

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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

NAME OF THE COURSE: INTRODUCTION TO RENEWABLE ENERGY SYSTEMS
COURSE CODE: 19153FE74B

COURSE OBJECTIVES:

To provide knowledge

- About the stand alone and grid connected renewable energy systems.
- Design of power converters for renewable energy applications.
- Wind electrical generators and solar energy systems.
- Power converters used for renewable energy systems.

COURSE OUTCOMES:

Upon completion of this course, the students can able to

- 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.

NAME OF THE COURSE: INDUSTRIAL SAFETY COURSE CODE: 19154FE74A

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- To impart knowledge on safety engineering fundamentals and safety management practices.

COURSE OUTCOMES:

Upon completion of this course, the students must be able to

- identify and prevent chemical, environmental mechanical, fire hazard through analysis and apply proper safety techniques on safety engineering and management.

NAME OF THE COURSE: TESTING OF MATERIALS COURSE CODE: 19154FE74B

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- understand the various destructive and non destructive testing methods of materials and its industrial applications.

COURSE OUTCOMES:

Upon completion of this course, the students can able to

- Identify suitable testing technique to inspect industrial component
- Ability to use the different technique and know its applications and limitations

Department: ECE

NAME OF THE COURSE: GREEN BUILDING DESIGN

COURSE CODE: 19155FE74A

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- attain further knowledge of green building techniques, materials and practices.
- Utilize costs/benefits analysis, life cycle costs, embodied energy evaluation, and overall sustainability of various materials and methods

COURSE OUTCOMES:

Upon completion of this course, the students can able to analyse the energy data of industries

- 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

NAME OF THE COURSE: WASTE WATER TREATMENT

COURSE CODE: 19155FE74B

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- To make the student conversant with the water treatment methods including adsorption and oxidation process.
- To provide basic understandings about the requirements of water, its preliminary treatment.

COURSE OUTCOMES:

Upon completion of this course, the students

- 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.

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
M.TECH COMMUNICATIONS SYSTEMS – FULL TIME – R2019**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

- PEO1:** To provide students with strong fundamental concepts and also advanced techniques and tools to build various communication systems.
- PEO2:** To enable graduates to attain successful professional careers by applying their engineering skills in communication system design to meet out the challenges in industries and academia.
- PEO3:** To engage graduates in lifelong learning, adapt emerging technology and pursue research for the development of innovative products.

PROGRAMME SPECIFIC OBJECTIVES (PSOs):

- PSO1:** To inculcate the ability in graduates to design and analyze the subsystems such as RF, Signal processing, Modern communication systems and networks.
- PSO2:** To enhance problem solving skills in communication systems design using latest hardware and software tools.
- PSO3:** To apply communication engineering principles and practices for developing products for scientific and business applications.

PROGRAM OUTCOMES (POS):

M.Tech students will be able to:

- PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions:** Design solutions for complex engineering problems and 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 and research 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, and modern 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 to assess 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 engineering solutions 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 and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

COURSE OBJECTIVES AND OUTCOMES

M.TECH (FULL TIME) COMMUNICATION SYSTEMS

REGULATION 2019

SEMESTER – I

NAME OF THE COURSE: APPLIED MATHEMATICS FOR ELECTRONICS ENGINEERS
COURSE CODE:19248S11B

COURSE OBJECTIVES:

- The primary objective of this course is to demonstrate various analytical skills in applied mathematics and extensive experience with the tactics of problem solving and logical thinking applicable in communication engineering.
- This course also will help the students to identify, formulate, abstract, and solve problems using mathematical tools from a variety of mathematical areas, including fuzzy logic, matrix linear programming, probability, numerical solution of ordinary differential equations and queuing models.

COURSE OUTCOMES:

After completing this course, students should demonstrate competency in the following skills:

- Concepts on fuzzy logic, fuzzy proposition and fuzzy quantifiers.
- Apply various methods in matrix algebra to solve system of linear equations.
- Computation of probability, random variables and their associated distributions, correlations and regression.
- Exposing the basic characteristic features of a queuing system and acquire skills in analyzing queuing models.
- Using discrete time Markov chains to model computer systems.

NAME OF THE COURSE: STATISTICAL SIGNAL PROCESSING
COURSE CODE:19271H12

COURSE OBJECTIVES:

- The student comprehends mathematical description and modelling of discrete time random signals.
- The student is conversant with important theorems and algorithms.
- The student learns relevant figures of merit such as power, energy, bias and consistency.
- The student is familiar with estimation, prediction and filtering concepts and techniques.

COURSE OUTCOMES:

- Formulate time domain and frequency domain description of Wide Sense Stationary process in terms of matrix algebra and relate to linear algebra concepts.
- State Parseval's theorem, W-K theorem, principle of orthogonality, spectral factorization theorem, Widrow-Hoff LMS algorithm and Shannon's sampling theorem, and define linear prediction, linear estimation, sample auto-correlation, periodogram, bias and consistency.
- Explain various noise types, Yule-Walker algorithm, parametric and non-parametric methods, Wiener and Kalman filtering, LMS and RMS algorithms, Levinson Durbin algorithm, adaptive noise cancellation and adaptive echo cancellation, speed versus convergence issues, channel

Department: ECE

equalization, sampling rate change, subband coding and wavelet transform.

- Calculate mean, variance, auto-correlation and PSD for WSS stochastic processes, and derive prediction error criterion, Wiener-Hoff equations, Parseval's theorem, W-K theorem and normal equations.
- Design AR, MA, ARMA models, Wiener filter, anti aliasing and anti imaging filters, and develop FIR adaptive filter and polyphase filter structures.
- Simulate spectral estimation algorithms and basic models on computing platform.

NAME OF THE COURSE: MODERN DIGITAL COMMUNICATION SYSTEMS
COURSE CODE: 19271H13

COURSE OBJECTIVES:

- To understand the basics of signal-space analysis and digital transmission.
- To understand the coherent and noncoherent receivers and its impact on different channel characteristics.
- To understand the different Equalizers
- To understand the different block coded and convolutional coded digital communication systems.
- To understand the basics of Multicarrier and Multiuser Communications.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to:

- Develop the ability to understand the concepts of signal space analysis for coherent and non-coherent receivers.
- Conceptually appreciate different Equalization techniques
- Possess knowledge on different block codes and convolutional codes.
- Comprehend the generation of OFDM signals and the techniques of multiuser detection.

NAME OF THE COURSE: COMMUNICATION PROTOCOL ENGINEERING
COURSE CODE: 19271H14

COURSE OBJECTIVES:

- To expose the students to the layered architecture for communication networks and the specific functionality of the network layer.
- To enable the student to understand the basic principles of routing and the manner this is implemented in conventional networks and the evolving routing algorithms based on Internetworking requirements, optical backbone and the wireless access part of the network.
- To enable the student to understand the different routing algorithms existing and their performance characteristics.

COURSE OUTCOMES:

- Given the network and user requirements and the type of channel over which the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance.
- The student would also be able to design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.

Department: ECE

NAME OF THE COURSE: ADVANCED RADIATION SYSTEMS
COURSE CODE:19271H15

COURSE OBJECTIVES:

- To understand antenna radiation and its parameters.
- To enhance the student knowledge in the area of various antenna design.
- To design mono pole, dipole and patch antenna and to impart the knowledge about modern antennas.

COURSE OUTCOMES:

- Ability to understand antenna concepts
- Ability to design antenna for various applications
- Knowledge of modern antenna design

NAME OF THE COURSE: COMMUNICATION SYSTEM LABORATORY - I
COURSE CODE:19271L17

COURSE OBJECTIVES:

- To acquire knowledge on Transmission line and S- parameter estimation of microwave devices.
- To study & measure the performance of digital communication systems.
- To provide a comprehensive knowledge of Wireless Communication.
- To learn about the design of digital filter and its adaptive filtering algorithms.

COURSE OUTCOMES:

Upon the completion of course, students are able to

- Measure and analyze various transmission line parameters.
- Implement the adaptive filtering algorithms
- To generate and detect digital communication signals of various modulation techniques using MATLAB.
-

NAME OF THE COURSE: RESEARCH LED SEMINAR
COURSE CODE:19271CRS

COURSE OBJECTIVES:

COURSE OUTCOMES:

Upon the completion of course, students are able to

- Exposure to various research domains
- Acquaintance with languages of research
- Development of research aptitude

ELECTIVE – I (SEMESTER – I)

NAME OF THE COURSE: INTERNETWORKING AND MULTIMEDIA
COURSE CODE:19271E16A

Department:ECE

COURSE OBJECTIVES:

- Recent advances in multimedia and networking technologies have made possible the evolution of the Internet from a text-based environment to a multimedia global communication network.
- The objective of this module is to address the technical issues and the solutions for the implementation of multimedia services on the Internet.
- After studying this module, students are expected to be able to appreciate the state-of-the-art in Internet technologies for multimedia services.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

- Understand the state-of-art developments in Internet technologies and applications
- Understand the development of next generation Internet
- Appreciate the principles used in designing Internet protocols for multimedia applications, and so understand why standard protocols are designed the way that they are
- Be able to solve problems for the design of multimedia applications on Internet.

NAME OF THE COURSE: DIGITAL IMAGE PROCESSING

COURSE CODE:19271E16B

COURSE OBJECTIVES:

- To understand the image fundamentals.
- To understand the various image segmentation techniques.
- To extract features for image analysis.
- To introduce the concepts of image registration and image fusion.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

- Explain the fundamentals digital image processing.
- Describe image various segmentation and feature extraction techniques for image analysis.
- Discuss the concepts of image registration and fusion.

NAME OF THE COURSE: LASER COMMUNICATION

COURSE CODE:19271E16C

COURSE OBJECTIVES:

- To gain knowledge about light and its propagation.
- To study the non-linear optic devices.
- To learn about holography.
- To study the different types of laser and its effects.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

- Understand the fundamentals of light and its propagation.
- Design non-linear optic devices.
- Gain knowledge about holography and laser and its effects.

NAME OF THE COURSE: MEMS and NEMS

COURSE CODE:19271E16D

Department:ECE

COURSE OBJECTIVES:

- To introduce the concepts of micro and nano electromechanical devices
- To know the fabrication process of Microsystems
- To know the design concepts of micro sensors and micro actuators
- To introduce the concepts of quantum mechanics and nano systems

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

**NAME OF THE COURSE: **ADVANCED SATELLITE COMMUNICATION
AND NAVIGATION SYSTEMS****

COURSE CODE:19271E16E

COURSE OBJECTIVES:

The students should be made to be

- Learn M2M developments and satellite applications
- Understand Satellite Communication In Ipv6 Environment

COURSE OUTCOMES:

At the end of this course, the student should be able to:

- Discuss satellite navigation and global positioning system
- Outline deep space networks and inter planetary missions

SEMESTER – II

NAME OF THE COURSE: **MOBILE COMMUNICATION NETWORKS**

COURSE CODE:19271H21

COURSE OBJECTIVES:

- To understand the basic cellular system concepts.
- To have an insight into the various propagation models and the speech coders used in mobile communication.
- To understand the multiple access techniques and interference reduction techniques in mobile communication

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

Department:ECE

- Discuss cellular radio concepts.
- Identify various propagation effects.
- To have knowledge of the mobile system specifications.
- Classify multiple access techniques in mobile communication.
- Outline cellular mobile communication standards.
- Analyze various methodologies to improve the cellular capacity

NAME OF THE COURSE: ADVANCED MICROWAVE SYSTEMS
COURSE CODE:19271H22

COURSE OBJECTIVES:

- To understand the fundamentals of Microwave integratedcircuits.
- To understand the various components for WirelessCommunications.
- To know the basic techniques needed for analysis of Microwavesystems.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

- Capability to design Microwavecircuits.
- To be able to analyze microwave integratedcircuits.

NAME OF THE COURSE: FIBER OPTIC NETWORKING
COURSE CODE:19271H23

COURSE OBJECTIVES:

The students should be made to understand:

- Optical system components like optical amplifiers, wavelengthconverters.
- Up-to-date survey of development in Optical NetworkArchitectures.
- Packetswitching.
- Network design perspectives.
- Different Optical Network management techniques andfunctions.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Design and Analyze NetworkComponents
- Assess and Evaluate opticalnetworks

NAME OF THE COURSE: COMMUNICATION SYSTEM LABORATORY - II
COURSE CODE:19271L26

COURSE OBJECTIVES:

- To enable the students to verify the basic principles and design aspects involved in high frequency communication systemscomponents
- To expose the student to different high frequency components and conduct the experiments to analyze and interpret data to produce meaningful conclusion and match with theoreticalconcepts.
- To design and develop RF components using microstriptechnology

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to:

- Apply knowledge to identify a suitable architecture and systematically design an RF

Department: ECE

- system.
- Comprehensively record and report the measured data, and would be capable of analyzing, interpreting the experimentally measured data and produce the meaningful conclusions.
 - Design and develop microstrip filters.

ELECTIVE – II (SEMESTER – II)

NAME OF THE COURSE: HIGH SPEED SWITCHING ARCHITECTURE
COURSE CODE:19271E24A

COURSE OBJECTIVES:

The students should be made to understand:

- To enable the student to understand the basics of switching technologies and their implementation LANs, ATM networks and IP networks.
- To enable the student to understand the different switching architectures and queuing strategies and their impact on the blocking performances.
- To expose the student to the advances in packet switching architectures and IP addressing and switching solutions and approaches to exploit and integrate the best features of different architectures for high speed switching.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- The student would be able to identify suitable switch architectures for a specified networking scenario and demonstrate its blocking performance.
- The student would be in a position to apply his knowledge of switching technologies, architectures and buffering strategies for designing high speed communication networks and analyse their performance

NAME OF THE COURSE: DSP PROCESSOR ARCHITECTURE AND PROGRAMMING
COURSE CODE:19271E24B

COURSE OBJECTIVES:

The objective of this course is to provide in-depth knowledge on

- Digital Signal Processor basics
- Third generation DSP Architecture and programming skills
- Advanced DSP architectures and some applications.

COURSE OUTCOMES:

Students should be able to:

- Become Digital Signal Processor specialized engineer
- DSP based System Developer

NAME OF THE COURSE: DIGITAL SPEECH PROCESSING
COURSE CODE:19271E24C

COURSE OBJECTIVES:

The objective of this course is to provide in-depth knowledge on

- To introduce speech production and related parameters of speech.

Department: ECE

- To illustrate the concepts of speech signal representations and coding.
- To understand different speech modeling procedures such as Markov and their implementation issues.
- To gain knowledge about text analysis and speech synthesis.

COURSE OUTCOMES:

Students will be able to:

- Model speech production system and describe the fundamentals of speech.
- Extract and compare different speech parameters.
- Choose an appropriate statistical speech model for a given application.
- Design a speech recognition system.
- Use different text analysis and speech synthesis techniques.

NAME OF THE COURSE: ASIC AND FPGA DESIGN

COURSE CODE: 19271E24D

COURSE OBJECTIVES:

The objective of this course is to provide in-depth knowledge on

- To study the design flow of different types of ASIC.
- To familiarize the different types of programming technologies and logic devices.
- To learn the architecture of different types of FPGA.
- To gain knowledge about partitioning, floor planning, placement and routing including circuit extraction of ASIC.

COURSE OUTCOMES:

Students will be able to:

- To analyze the synthesis, simulation and testing of systems.
- To apply different high performance algorithms in ASICs.
- To discuss the design issues of SOC.

NAME OF THE COURSE: VLSI FOR WIRELESS COMMUNICATION

COURSE CODE: 19271E24E

COURSE OBJECTIVES:

- To understand the concepts of basic wireless communication concepts.
- To study the parameters in receiver and low noise amplifier design.
- To study the various types of mixers designed for wireless communication.
- To study and design PLL and VCO.
- To understand the concepts of transmitters and power amplifiers in wireless communication.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

- Design LNA and mixers
- Evaluate frequency synthesizers
- Design and analyze power amplifiers

ELECTIVE – III (SEMESTER – II)

NAME OF THE COURSE: DIGITAL COMMUNICATION RECEIVERS

COURSE CODE:19271E25A

COURSE OBJECTIVES:

- To understand the basic principles of digital communication techniques.
- To gain knowledge about receivers for AWGN channel and Fading channels.
- To understand the concepts of synchronization and adaptive equalization techniques.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

- Apply basic principles of digital communication techniques.
- Discuss on receivers for AWGN & Fading channel
- Describe various synchronization techniques.
- Design adaptive equalization algorithms to satisfy the evolving demands in digital communication.

NAME OF THE COURSE: SOFT COMPUTING

COURSE CODE:19271E25B

COURSE OBJECTIVES:

- To know the basics of artificial neural networks
- To provide adequate knowledge about feed forward /feedback neural networks
- To apply the concept of fuzzy logic in various systems.
- To have the idea about genetic algorithm.
- To provide adequate knowledge about the applications of Soft Computing.

COURSE OUTCOMES:

- Knowledge on concepts of soft computational techniques.
- Able to apply soft computational techniques to solve various problems.
- Motivate to solve research oriented problems.

NAME OF THE COURSE: COMMUNICATION NETWORK SECURITY

COURSE CODE:19271E25C

COURSE OBJECTIVES:

The students should be made to:

- Understand the need and concept of security
- Learn cryptosystems

COURSE OUTCOMES:

At the end of this course, the students should be able to:

- Explain digital signature standards
- Discuss authentication
- Explain security at different layers

NAME OF THE COURSE: RADAR SIGNAL PROCESSING

COURSE CODE:19271E25D

Department: ECE

COURSE OBJECTIVES:

The students should be made to:

- To understand the basic concepts of Radar systems and Signal models.
- To illustrate the concepts of Sampling and Quantization of pulsed radar signals.
- To provide in-depth knowledge in Radar waveforms and Doppler processing.

COURSE OUTCOMES:

At the end of this course, the students should be able to:

- Explain the principles of elements and functions involved in radar signal processing.
- Describe different types of radar waveforms.
- Discuss on Doppler processing and its issues

NAME OF THE COURSE: ADVANCED ANTENNA DESIGN

COURSE CODE:19271E25E

COURSE OBJECTIVES:

The students should be made to:

- To understand the antenna radiation characteristics and arrays.
- To enhance the student knowledge in the area of various antenna design.
- To enhance the student knowledge in the area of antenna for practical applications.

OUTCOMES:

- The student would be able to understand recent design techniques in antenna.
- Ability to design and assess the performance of various antenna
- The student would be able to design the antenna for various industrial, medical and sensor applications.

NAME OF THE COURSE: RESEARCH METHODOLOGY

COURSE CODE:19271CRM

COURSE OBJECTIVES:

The students should be made to:

- To understand the approaches towards and constraints in good research.
- To identify various statistical tools used in research methodology
- To appreciate and compose the manuscript for publication
- To train in basic computational and excel- skills for research in engineering.

SEMESTER – III

NAME OF THE COURSE: WIRELESS SENSOR NETWORKS

COURSE CODE:19271H31

COURSE OBJECTIVES:

- To study about advanced wireless network, LTE, 4G and Evolutions from LTE to LTE.
- To study about wireless IP architecture, Packet Data Protocol and LTE network architecture

Department: ECE

- To study about adaptive link layer, hybrid ARQ and graphs routing protocol.
- To study about mobility management, cellular network, and micro cellular networks

COURSE OUTCOMES:

- Familiar with the latest 4G networks and LTE
- Understand about the wireless IP architecture and LTE network architecture.
- Familiar with the adaptive link layer and network layer graphs and protocol.
- Understand about the mobility management and cellular network.
- Understand about the wireless sensor network architecture and its concept.

ELECTIVE – IV (SEMESTER – III)

NAME OF THE COURSE: SOFTWARE DEFINED RADIO
COURSE CODE:19271E32A

COURSE OBJECTIVES:

The students should be made to be

- Understand the concepts of software defined radio
- Learn spectrum sensing and dynamic spectrum access

COURSE OUTCOMES:

At the end of this course, the student should be able to

- Compare MAC and network layer design for software defined radio
- Discuss cognitive radio for Internet of Things and M2M technologies

NAME OF THE COURSE: SATELLITE COMMUNICATION
COURSE CODE:19271E32B

COURSE OBJECTIVES:

The students should be made to be

- Learn M2M developments and satellite applications
- Understand Satellite Communication In IPv6 Environment

COURSE OUTCOMES:

At the end of this course, the student should be able to:

- Discuss satellite navigation and global positioning system
- Outline deep space networks and inter planetary missions

NAME OF THE COURSE: CDMA SYSTEMS
COURSE CODE:19271E32C

COURSE OBJECTIVES:

The students should be made to be

- understand cellular concept, widely popular 2G digital, TDMA based mobile system GSM and modern mobile wireless system CDMA.

COURSE OUTCOMES:

At the end of this course, the student should be able to:

- Define the basics of cellular communications.

Department: ECE

- Explain the Architecture OF GSM & its Radio Channels.
- Distinguish between GSM & CDMA Technology
- Interpret the practical applicability of above concepts.

NAME OF THE COURSE: SPEECH PROCESSING AND SYNTHESIS
COURSE CODE:19271E32D

COURSE OBJECTIVES:

The students should be made to be

- To introduce speech production and related parameters of speech.
- To illustrate the concepts of speech signal representations and coding.
- To understand different speech modeling procedures such Markov and their implementation issues.
- To gain knowledge about text analysis and speech synthesis.

COURSE OUTCOMES:

At the end of this course, the student should be able to:

- Model speech production system and describe the fundamentals of speech.
- Extract and compare different speech parameters.
- Choose an appropriate statistical speech model for a given application.
- Design a speech recognition system.
- Use different text analysis and speech synthesis techniques.

NAME OF THE COURSE: PATTERN RECOGNITION AND MACHINE LEARNING
COURSE CODE:19271E32E

COURSE OBJECTIVES:

The students should be made to be

- Study the fundamental of pattern classifier.
- To know about various clustering concepts.
- To originate the various structural pattern recognition and feature extraction.
- To understand the basic of concept learning and decision trees
- To explore recent advances in pattern recognition.

OUTCOMES:

Upon Completion of the course, the students will be able to

- Classify the data and identify the patterns.
- Utilize the given data set to extract and select features for Pattern recognition.
- Describe the decision tree and concept learning.
- Discuss on recent advances in pattern recognition.

ELECTIVE – V (SEMESTER – III)

Department:ECE

NAME OF THE COURSE: WAVELETS AND MULTIREOLUTION PROCESSING
COURSE CODE:19271E33A

COURSE OBJECTIVES:

- To introduce the fundamentals concepts of wavelet transforms.
- To study system design using Wavelets
- To learn the different wavelet families & their applications.

COURSE OUTCOMES:

- The students will be able to apprehend the detailed knowledge about the Wavelet transforms & its applications.

NAME OF THE COURSE: HIGH PERFORMANCE COMMUNICATION NETWORKS
COURSE CODE:19271E33B

COURSE OBJECTIVES:

- To appreciate the need for interoperable network management as a typical distributed application
- To familiarize concepts and terminology associated with ATM, Frame Relay, MPLS, Bluetooth technology
- To be aware of current trends in network technologies

COURSE OUTCOMES:

After the completion of this course, students will be able to

- Diagnose problems and make minor repairs to computer networks using appropriate diagnostics software
- Demonstrate how to correctly maintain LAN computer systems
- Maintain the network by performing routine maintenance tasks
- Apply network management tools

NAME OF THE COURSE: ADVANCED MICROPROCESSORS AND MICRO CONTROLLERS

COURSE CODE:19271E33C

COURSE OBJECTIVES:

- To enable the students to understand various microcontroller architectures.
- To introduce the advanced features in microprocessors and microcontrollers.
- To expose the students to the fundamentals of microprocessor architecture.

COURSE OUTCOMES:

- The student will be able to work with suitable microprocessor / microcontroller for a specific real world application.

Department:ECE

NAME OF THE COURSE: RECONFIGURABLE COMPUTING
COURSE CODE:19271E33D

COURSE OBJECTIVES:

- Students will gain fundamental knowledge and understanding of the principles and practice in reconfigurable architecture and computing
- To learn designing using HDLs in FPGA platforms

COURSE OUTCOMES:

- Understand the Concept of Reconfigurable Computing and FPGA Architectures.
- Understand and explore the various FPGA computing platforms in terms of design tools.
- Explore and apply the basic building blocks of FPGA designing in terms of Programming (HDLs).
- Analyze the Coarse-grained and Fine Grain configurability for performance enhancement using multi-FPGA systems.
- Design, Analyze and apply reconfigurable computing in various applications for optimization.
- To be able to create new designs and analyze advanced techniques such as Fault tolerance and Partial Reconfiguration.

NAME OF THE COURSE: INTERNET OF THINGS
COURSE CODE:19271E33E

COURSE OBJECTIVES:

- To understand the fundamentals of Internet of Things
- To learn about the basics of IOT protocols
- To build a small low cost embedded system using Raspberry Pi.
To apply the concept of Internet of Things in the real world scenario.

OUTCOMES:

Upon completion of the course, the student should be able to:

- Analyze various protocols for IoT
- Develop web services to access/control IoT devices.
- Design a portable IoT using Raspberry Pi
- Deploy an IoT application and connect to the cloud.
- Analyze applications of IoT in real time scenario

ELECTIVE – VI (SEMESTER – III)

NAME OF THE COURSE: SIMULATION OF COMMUNICATION NETWORKS
COURSE CODE:19271E34A

COURSE OBJECTIVES:

The students should be made to be

- Learn modeling and simulation

Department: ECE

- Understand Monte Carlo simulation
- Study channel modeling and mobility modeling

COURSE OUTCOMES:

At the end of this course, the student should be able to

- Apply Monte Carlo simulation
- Discuss Lower Layer and Link Layer Wireless Modeling
- Compare channel modeling and mobility modeling

NAME OF THE COURSE: MEDICAL IMAGING

COURSE CODE: 19271E34B

COURSE OBJECTIVES:

The students should be made to be

- To study the production of x-rays and its application to different medical Imaging techniques.
To study the different types of Radio diagnostic techniques.
- To study the special imaging techniques used for visualizing the cross sections of the body.
- To study the imaging of soft tissues using ultrasound technique

COURSE OUTCOMES:

At the end of this course, the students should be able to:

- Explain computer aided tomography
- Discuss ultrasonic systems
- Outline magnetic resonance imaging

NAME OF THE COURSE: MOBILE ADHOC NETWORKS

COURSE CODE: 19271E34C

COURSE OBJECTIVES:

- To understand the basics of Ad-hoc & Sensor Networks.
- To learn various fundamental and emerging protocols of all layers.
- To study about the issues pertaining to major obstacles in establishment and efficient management of Ad-hoc and sensor networks.
- To understand the nature and applications of Ad-hoc and sensor networks.
- To understand various security practices and protocols of Ad-hoc and Sensor Networks.

COURSE OUTCOMES:

Upon Completion of the course, the students should be able to

- Identify different issues in wireless ad hoc and sensor networks.
- To analyze protocols developed for ad hoc and sensor networks.
- To identify and address the security threats in ad hoc and sensor networks.
- Establish a Sensor network environment for different type of applications.

NAME OF THE COURSE: ULTRA WIDE BAND COMMUNICATION

COURSE CODE: 19271E34D

COURSE OBJECTIVES:

- To give fundamental concepts related to Ultra wide band
- To understand the channel model and signal processing for UWB.

Department: ECE

- To acquire knowledge about UWB antennas and regulations.

COURSE OUTCOMES:

Upon Completion of the course, the students should be able to

- understand UWB technologies.
- Ability to assess the performance of UWB channels.
- design UWB antenna for various applications.

NAME OF THE COURSE: NETWORK PROCESSORS
COURSE CODE:19271E34E

COURSE OBJECTIVES:

The students should be made to:

- Learn networkprocessors
- Study commercial network processors
- Understand network processorarchitecture

OUTCOMES:

At the end of this course, the students should be able to:

- Discuss network processorarchitecture
- Compare differentprogramming
- Explain IOStechologies



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THANJAVUR – 613 403 - TAMILNADU

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

B.Tech – Full Time 2019R

IDENTIFICATION OF PO's, PSO's AND COs FOR ALL UG & PG PROGRAMMES OFFERED BY THE DEPARTMENT & ITS MAPPING

Program Educational Objectives (PEOs) :

PEO1 : To produce graduates who have developed the skills required to design Civil Engineering systems and facilities, including the graduate's abilities to formulate problems, to think creatively, to synthesize information, and to work collaboratively in teams.

PEO2 : To produce graduates who are trained thoroughly in methods of analysis, including the mathematical and computational skills appropriate for Civil Engineers to use when problem solving.

PEO3 : To produce graduates who are prepared for life-long learning and successful careers as Civil Engineers & also taught to use current, experimental and data analysis techniques for Civil Engineering applications.

Program Specific Objectives (PSOs):

PSO1: Capably design and build civil engineering-based systems in the context of environmental, economical, and societal requirements and serve the community as ethical and responsible professionals.

PSO2: Explain basic professional practice concepts & the importance of professional licensure.

PSO3: Inculcate the knowledge of Engineering and Management principles among the team members to manage projects effectively.

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and 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.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **The engineer and society:** An ability to develop the professional status using the broad education to understand the potential impact of Engineering solutions in various geographical settings including societal and environmental contexts.
6. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
7. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
8. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
9. **Communication:** Communicate effectively on complex engineering activities with the engineering 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.
10. **Project management and finance:** Demonstrate knowledge and understanding of the engineering 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.
11. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Educational Objectives (PEOs) and the Programme Outcomes (POs) is given in the following table:

Programme Educational Objectives	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PEO 1	3	3	2	3	2	1	1	2	1	1	3
PEO 2	3	3	3	3	3	1	1	1	1	1	1
PEO 3	3	3	3	3	3	2	2	3	1	2	2

Contribution 1: Reasonable 2: Significant 3: Strong

MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Specific Objectives (PSOs) and the Programme Outcomes(POs) is given in the following table:

Programme Educational Objectives	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PSO 1	3	3	2	3	2	1	1	2	1	1	3
PSO 2	3	3	3	3	3	1	1	1	1	1	1
PSO 3	3	3	3	3	3	2	2	3	1	2	2

Contribution 1: Reasonable 2: Significant 3: Strong

B.Tech –CIVIL ENGINEERING (FT)

COURSE OUTCOMES:

19147S11 COMMUNICATIVE ENGLISH

OBJECTIVES:

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills

OUTCOMES: At the end of the course, learners will be able to:

- 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

19148S12 ENGINEERING MATHEMATICS-I

OBJECTIVES :

- The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

OUTCOMES :

After completing this course, students should demonstrate competency in the following skills:

- 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.

19149S13 ENGINEERING PHYSICS

OBJECTIVES:

- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

OUTCOMES:

Upon completion of this course,

- 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.

19149S14 ENGINEERING CHEMISTRY

OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

OUTCOMES:

- 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.

19154S15

ENGINEERING GRAPHICS

OBJECTIVES:

- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing national standards related to technical drawings.

OUTCOMES:

On successful completion of this course, the student will be able to

- 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.

19150S16 PROBLEM SOLVING AND PYTHON PROGRAMMING

OBJECTIVES:

- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures — lists, tuples, dictionaries.
- To do input/output with files in Python.

OUTCOMES:

Upon completion of the course, students will be able to

- 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.

19150L17 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

OBJECTIVES:

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data **from/to files in Python.**

OUTCOMES:

Upon completion of the course, students will be able to

- 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.

19149L18 PHYSICS AND CHEMISTRY LABORATORY

OBJECTIVES:

- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

OUTCOMES:

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

19147S21 TECHNICAL ENGLISH

OBJECTIVES:

The Course prepares second semester engineering and Technology students to:

- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write convincing job applications and effective reports.
- Develop their speaking skills to make technical presentations , participate in group discussions.
- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialisation.

OUTCOMES:

At the end of the course learners will be able to:

- 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.

19148S22A ENGINEERING MATHEMATICS-II

OBJECTIVES :

This course is designed to cover topics such as Matrix Algebra, Vector Calculus, Complex Analysis and Laplace Transform. Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering. Vector calculus can be widely used for modelling the various laws of physics. The various methods of complex analysis and Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines

OUTCOMES:

After successfully completing the course, the student will have a good understanding of the following topics and their applications:

- 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.

19149S23D PHYSICS FOR CIVIL ENGINEERING

OBJECTIVE:

- To introduce the principles of thermal, acoustics, optics and new materials for civil engineering applications.

OUTCOMES:

Upon completion of this course,

- 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.

19149S24A ENVIRONMENTAL SCIENCE AND ENGINEERING

OBJECTIVES:

- To study the nature and facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

OUTCOMES:

- 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

19153S25E BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

OBJECTIVES:

- To explain the basic theorems used in Electrical circuits and the different components and function of electrical machines.
- To explain the fundamentals of semiconductor and applications.
- To explain the principles of digital electronics
- To impart knowledge of communication.

OUTCOMES:

- Ability to identify the electrical components and explain the characteristics of electrical machines.
- ability to identify electronics components and understand the characteristics

19154S26D ENGINEERING MECHANICS

OBJECTIVES:

- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering.

OUTCOMES:

On successful completion of this course, the student will be able to

- 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

19154L27 ENGINEERING PRACTICES LABORATORY

OBJECTIVES:

- To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

OUTCOMES:

On successful completion of this course, the student will be able to

- 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.

19155L28E COMPUTER AIDED BUILDING DRAWING

OBJECTIVES:

- To introduce the students to draft the plan, elevation and sectional views of buildings in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

OUTCOMES:

- 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.

19148S31C TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

OBJECTIVES :

- To introduce the basic concepts of PDE for solving standard partial differential equations.
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.
- To acquaint the student with Fourier series techniques in solving heat flow problems used in various situations.
- To acquaint the student with Fourier transform techniques used in wide variety of situations.
- To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

OUTCOMES:

Upon successful completion of the course, students should be able to:

- 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

19155C32 STRENGTH OF MATERIALS I

OBJECTIVES:

- To learn the fundamental concepts of Stress, Strain and deformation of solids.
- To know the mechanism of load transfer in beams, the induced stress resultants and deformations.
- To understand the effect of torsion on shafts and springs.
- To analyze plane and space trusses

OUTCOMES:

Students will be able to

- 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

19155C33 FLUID MECHANICS

OBJECTIVE:

- To understand the basic properties of the fluid, fluid kinematics, fluid dynamics and to analyze and appreciate the complexities involved in solving the fluid flow problems.

OUTCOMES:

At the end of the course students will be able to

- 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.

19155C34 SURVEYING

OBJECTIVES :

- To introduce the rudiments of plane surveying and geodetic principles to Civil Engineers.
- To learn the various methods of plane and geodetic surveying to solve the real world Civil Engineering problems.
- To introduce the concepts of Control Surveying
- To introduce the basics of Astronomical Surveying

OUTCOMES:

At the end of the course the student will be able to understand

- 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.

19155C35 CONSTRUCTION MATERIALS

OBJECTIVE:

- To introduce students to various materials commonly used in civil engineering construction and their properties.

OUTCOMES:

On completion of this course the students will be able to

- 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.

19155C36 ENGINEERING GEOLOGY

OBJECTIVE:

- At the end of this course the students will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and to apply this knowledge in projects such as dams, tunnels, bridges, roads, airport and harbor.

OUTCOMES:

The students completing this course

- 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

19155L37 CONSTRUCTION MATERIALS LABORATORY

OBJECTIVE:

- To facilitate the understanding of the behavior of construction materials.

OUTCOME:

- the students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.

19155 L 38 SURVEYING LABORATORY

OBJECTIVE :

At the end of the course the student will possess knowledge about Survey field techniques

OUTCOME:

- 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.

19147L39 INTERPERSONAL SKILLS/LISTENING AND SPEAKING

OBJECTIVES:

The Course will enable learners to:

- 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.

OUTCOMES:

At the end of the course Learners will be able to:

- Listen and respond appropriately.
- Participate in group discussions
- Make effective presentations
- Participate confidently and appropriately in conversations both formal and informal

**19148S41C NUMERICAL METHODS
OBJECTIVES :**

- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals in real life situations.
- To acquaint the student with understanding of numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.
- To understand the knowledge of various techniques and methods of solving various types of partial differential equations.

OUTCOMES:

Upon successful completion of the course, students should be able to:

- 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.

19155C42 CONSTRUCTION TECHNIQUES AND PRACTICES

OBJECTIVE:

- The main objective of this course is to make the student aware of the various construction techniques, practices and the equipment needed for different types of construction activities. At the end of this course the student shall have a reasonable knowledge about the various construction procedures for sub to super structure and also the equipment needed for construction of various types of structures from foundation to super structure.

OUTCOMES:

On successful completion of this course, students will be able to:

- 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.

19155C43 STRENGTH OF MATERIALS II

OBJECTIVES:

- To know the method of finding slope and deflection of beams and trusses using energy theorems and to know the concept of analysing indeterminate beam
- To estimate the load carrying capacity of columns, stresses due to unsymmetrical bending and various theories for failure of material.

OUTCOMES:

Students will be able to

- Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
- 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.

19155C44 APPLIED HYDRAULIC ENGINEERING

OBJECTIVE:

- To introduce the students to various hydraulic engineering problems like open channel flows and hydraulic machines. At the completion of the course, the student should be able to relate the theory and practice of problems in hydraulic engineering.

OUTCOMES:

On completion of this course the students will be able to

- Apply their knowledge of fluid mechanics in addressing problems in open channels.
- 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.
-

19155C45 CONCRETE TECHNOLOGY

OBJECTIVE:

- To impart knowledge to the students on the properties of materials for concrete by suitable tests, mix design for concrete and special concretes.

OUTCOMES:

Students will be able to understand

- 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.

19155L46 SOIL MECHANICS

OBJECTIVE:

- To impart knowledge to classify the soil based on index properties and to assess their engineering properties based on the classification. To familiarize the students about the fundamental concepts of compaction, flow through soil, stress transformation, stress distribution, consolidation and shear strength of soils. To impart knowledge of design of both finite and infinite slopes.

OUTCOMES:

Students will be able to

- 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.

19155L47 STRENGTH OF MATERIALS LABORATORY

OBJECTIVE:

- To expose the students to the testing of different materials under the action of various forces and determination of their characteristics experimentally.

OUTCOME:

- The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.

19155 L 48 HYDRAULIC ENGINEERING LABORATORY

OBJECTIVE:

- Students should be able to verify the principles studied in theory by performing the experiments in lab.

OUTCOMES:

- 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.

19147L49 ADVANCED READING AND WRITING

OBJECTIVES:

- Strengthen the reading skills of students of engineering.
- Enhance their writing skills with specific reference to technical writing.
- Develop students' critical thinking skills.
- Provide more opportunities to develop their project and proposal writing skills.

OUTCOMES:

At the end of the course Learners will be able to:

- Write different types of essays.
- Write winning job applications.
- Read and evaluate texts critically.

19155CRS RESEARCH LED SEMINAR

COURSE OBJECTIVES:

- To be exposed to various research domains
- To have an acquaintance with languages of research
- To inculcate a development of research aptitude

COURSE OUTCOMES:

The student should have an:

- Exposure to various research domains
- Acquaintance with languages of research
- Development for research aptitude

19155C51 DESIGN OF REINFORCED CEMENT CONCRETE ELEMENTS

OBJECTIVES:

- To introduce the different types of philosophies related to design of basic structural elements such as slab, beam, column and footing which form part of any structural system with reference to Indian standard code of practice.

OUTCOMES:

Students will be able to

- 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.

19155C52 STRUCTURAL ANALYSIS I

OBJECTIVE:

- To introduce the students to basic theory and concepts of classical methods of structural analysis

OUTCOMES:

Students will be able to

- 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 deflection 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.

19155C53 WATER SUPPLY ENGINEERING

OBJECTIVE:

- To equip the students with the principles and design of water treatment units and distribution system.

OUTCOMES:

The students completing the course will have

- 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.

19155C56 FOUNDATION ENGINEERING

OBJECTIVE:

- To impart knowledge to plan and execute a detail site investigation programme, to select geotechnical design parameters and type of foundations. Also to familiarize the students for the geotechnical design of different type of foundations and retaining walls.

OUTCOMES:

Students will be able to

- 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.

19155L57 SOIL MECHANICS LABORATORY

OBJECTIVE:

- To develop skills to test the soils for their index and engineering properties and to characterise the soil based on their properties.

OUTCOME:

- 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.

19155L58 WATER AND WASTE WATER ANALYSIS LABORATORY

COURSE OBJECTIVES:

- To analyse the physical, chemical and biological characteristics of water and wastewater
- To quantify the dosage requirement for coagulation process
- To study the growth of micro-organism and its quantification
- To quantify the sludge

COURSE OUTCOME:

On the completion of the course, the students will be able to:

- 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

19155L59

SURVEY CAMP

The objective of the survey camp is to enable the students to get practical training in the field work. Groups of not more than six members in a group will carry out each exercise in survey camp. The camp must involve work on a large area of not less than 40 acres outside the campus (Survey camp should not be conducted inside the campus). At the end of the camp, each student shall have mapped and contoured the area. The camp record shall include all original field observations, calculations and plots.

19155CRM RESEARCH METHODOLOGY

OBJECTIVES:

- To understand the approaches towards and constraints in good research.
- To identify various statistical tools used in research methodology
- To appreciate and compose the manuscript for publication
- To train in basic computational and excel- skills for research in engineering.

OUTCOMES:

- 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

19155C61 DESIGN OF STEEL STRUCTURAL ELEMENTS

OBJECTIVE:

- To introduce the students to limit state design of structural steel members subjected to compressive, tensile and bending loads, including connections. Design of structural systems such as roof trusses, gantry girders as per provisions of current code (IS 800 - 2007) of practice for working stress and Limit state Method.

OUTCOMES:

Students will be able to

- 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.

19155C62 STRUCTURAL ANALYSIS II

OBJECTIVES :

- To learn the method of drawing influence lines and its uses in various applications like beams and plane trusses.
- To analyse the arches, suspension bridges and space trusses.

OUTCOMES:

Students will be able to

- 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.

19155C63 IRRIGATION ENGINEERING

OBJECTIVE:

- The student is exposed to different phases in irrigation practices and Planning and management of irrigation. Further they will be imparted required knowledge on Irrigation storage and distribution canal system and Irrigation management.

OUTCOMES:

Students will be able to

- 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.

19155C64 HIGHWAY ENGINEERING

OBJECTIVE:

- To give an overview about the highway engineering with respect to, planning, design, construction and maintenance of highways as per IRC standards, specifications and methods.

OUTCOMES:

Students will be able to

- 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.

19155C65 WASTEWATER ENGINEERING

OBJECTIVE:

- The objectives of this course is to help students develop the ability to apply basic understanding of physical, chemical, and biological phenomena for successful design, operation and maintenance of sewage treatment plants.

OUTCOMES:

The students completing the course will have

- 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.

19155 L 67 HIGHWAY ENGINEERING LABORATORY

OBJECTIVE :

- To learn the principles and procedures of testing of highway materials

OUTCOME:

- Student knows the techniques to characterize various pavement materials through relevant tests.

19155L68 IRRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING

OBJECTIVE:

- At the end of the semester, the student shall conceive, design and draw the irrigation and environmental engineering structures in detail showing the plan, elevation and Sections.

OUTCOME:

- The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.

19155CBR PARTICIPATION IN BOUNDED RESEARCH

COURSE OBJECTIVES:

The course aims to:

- Develop hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

COURSE OUTCOMES:

At the end of the course, Learners will be able to have a:

- Hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

19155C71 ESTIMATION, COSTING AND VALUATION ENGINEERING

OBJECTIVE:

- The students will acquire knowledge in estimation, tender practices, contract procedures, and valuation and will be able to prepare estimates, call for tenders and execute works.

OUTCOMES:

The student will be able to

- 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.

19155C72 RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING

OBJECTIVE:

- To introduce the students about Railways planning, design, construction and maintenance and planning design principles of airport and harbour

OUTCOMES:

Students who successfully complete this course will be able to:

- 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.

19155C73 STRUCTURAL DESIGN AND DRAWING

OBJECTIVE:

- This course aims at providing students with a solid background on the principles of structural engineering design. Students will be acquire the knowledge of liquid retaining structures, bridges components, retaining wall and industrial structures.

OUTCOMES:

At the end of the course the student will be able to

- 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

19155L76 CREATIVE AND INNOVATIVE PROJECT (Activity Based - Subject Related)

OBJECTIVE:

- To use the knowledge acquired in Civil Engineering to do a mini project, which allows the students to come up with designs, fabrication or algorithms and programs expressing their ideas in a novel way.

19155L77 INDUSTRIAL TRAINING

OUTCOMES:

At the end of the course the student will be able to understand

- The intricacies of implementation textbook knowledge into practice
- The concepts of developments and implementation of new techniques
-

19155CSR

DESIGN/SOCIO- TECHNICAL PROJECT

COURSE OBJECTIVES:

The student should have:

- Sensitization of social needs for innovation
- Team work towards interdisciplinary synchronous research strategy
- Development of critical thinking and synergistic research approach.

COURSE OUTCOMES:

On completion of this course, the student would be able to be

- Sensitive to social needs for innovation
- Develop teams and work towards interdisciplinary synchronous research strategy
- Develop critical thinking and synergistic research approach.

19155PW83 PROJECT WORK

OUTCOME:

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

19155COMS COMPS

COURSE OBJECTIVES:

- To assess the comprehensive knowledge gained in basic courses relevant to the branch of study
- To comprehend the questions asked and answer them with confidence

COURSE OUTCOMES:

- The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them

ELECTIVE – I (SEMESTER – V)

19155E55A DIGITAL CADASTRE

Objective:

- To introduce the students to the cadastral survey Methods and its applications in generation of Land information system.

OUTCOMES:

On completion of this course students will be able to

- Gain knowledge about cadastre survey.
- Understand the methods of cadastral survey.
- Get the knowledge about photogrammetric methods.
- Understand Land Record System and computational procedure for modernization of the same.
- The students will be in position to understand the Government procedure in Land Record Management.

19155E55B

ADVANCED SURVEYING

OBJECTIVE :

- To understand the use of Astronomy, Photogrammetry, Total Station and GPS

OUTCOMES:

On completion of this course, the student shall be able to

- know the astronomical surveying
- do the photogrammetric surveying and interpretation
- solve the field problems with Total station
- know the GPS surveying and the data processing
- understand the route surveys and tunnel alignments

19155E55C

GEOGRAPHIC INFORMATION SYSTEM

OBJECTIVE :

To Introduce the fundamentals and components of Geographic Information System.

To provide details spatial data structures and input ,management and output process

OUTCOMES:

This course equips the student to

- 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

19155E55D

GEOINFORMATICS APPLICATIONS FOR CIVIL ENGINEERS

L T P C

3 0 0 3

OBJECTIVE:

- To solve the Civil Engineering problems with the help of Geoinformatics technique.

OUTCOMES:

On completion of this course students will be able to

- Get knowledge about the land resource management.
- Study structural deformation and movement.
- Model soil characteristics, soil degradation assessment and management.
- Monitor urban growth and management of transport infrastructure.
- Model catchments and management of water resources.
-

19155E55E

TOTAL STATION AND GPS SURVEYING

L T P C

3 0 0 3

OBJECTIVE :

- To understand the working of Total Station equipment and solve the surveying problems.

OUTCOMES:

At the end of the course the student will be able to understand

- Working principles of total station and GPS instruments
- Propagation of EMR through atmosphere and corrections for its effects
- The functioning various types total station and GPS equipments and their applications
- Various techniques available for surveying and mapping with total station and GPS.

19155E55F

DISASTER MANAGEMENT

L T P C

3 0 0 3

OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

OUTCOMES:

The students will be able to

- 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.

1. .

19155E55G

HUMAN RIGHTS

3

OBJECTIVE:

- To sensitize the Engineering students to various aspects of Human Rights.

19155E66A

GROUND IMPROVEMENT TECHNIQUES

L T P C

3 0 0 3

OBJECTIVE:

- Students will be exposed to various problems associated with soil deposits and methods to evaluate them. The different techniques will be taught to them to improve the characteristics of difficult soils as well as design techniques required to implement various ground improvement methods.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the student will be able to

- 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 reinforcement and design of reinforced earth.
- Get to know types of grouts and grouting technique.

19155E66B INTRODUCTION TO SOIL DYNAMICS AND MACHINE FOUNDATIONS

L T P C

3 0 0 3

OBJECTIVE:

- To understand the basics of soil dynamics – dynamic behaviour of soils – effects of dynamic loads and the various design methods.

OUTCOMES:

At the end of the course the student will be able to

- 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.

1. Swamisaran, “Soil Dynamics and Machine Foundations”, Galgotia Publications Pvt.Ltd. New Delhi-110002, 3rd Edition 2016.
2. Kameswara Rao., “Dynamics Soil Tests and Applications”, Wheeler Publishing, New Delhi, 2003.
3. P. Srinivasulu, and C.V. Vaidyanathan, “Handbook of Machine Foundations”, Tata McGraw-Hill, 2007

19155E66C

ROCK ENGINEERING

L T P C

3 0 0 3

OBJECTIVE:

- To impart knowledge on fundamentals of rock mechanics and its application in solving simple problems associated with rock slopes and underground openings. Student gains the knowledge on the mechanics of rock and its applications in underground structures and rock slope stability analysis.

OUTCOMES:

At the end of the course the student will be able to

- Classify the rocks, study the index properties of rock systems.
- Understand the modes of rock failure, stress-strain characteristics, failure criteria.
- Estimate the stresses in rocks.
- Apply rock mechanics in engineering.
- Get knowledge on rock stabilization.

19155E66D

URBAN PLANNING AND DEVELOPMENT

L T P C

3 0 0 3

OBJECTIVE:

- To enable students to have the knowledge on planning process and to introduce to the students about the regulations and laws related to Urban Planning.

OUTCOMES:

The students completing the course will have the ability to

- 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.

19155E66E

AIR POLLUTION AND CONTROL ENGINEERING

L T P C
3 0 0 3

OBJECTIVE:

- To impart knowledge on the principle and design of control of Indoor/ particulate/ gaseous air pollutant and its emerging trends.

OUTCOMES:

The students completing the course will have

- 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.

19155E66F

INTELLECTUAL PROPERTY RIGHTS

OBJECTIVE:

- To give an idea about IPR, registration and its enforcement.

OUTCOME:

- Ability to manage Intellectual Property portfolio to enhance the value of the firm.

19155E75A

PAVEMENT ENGINEERING

OBJECTIVE:

- Student gains knowledge on various IRC guidelines for designing rigid and flexible pavements. Further, the student will be in a position to assess quality and serviceability conditions of roads.

OUTCOMES:

The students completing the course will

- 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.

19155E75B TRAFFIC ENGINEERING AND MANAGEMENT**L T P C
4 0 0 4****OBJECTIVE:**

- To give an overview of Traffic engineering, traffic regulation, management and traffic safety with integrated approach in traffic planning as well.

OUTCOMES:

On completing this course, the Students will be able to

- Analyse traffic problems and plan for traffic systems various uses
- Design Channels, Intersections, signals and parking arrangements
- Develop Traffic management Systems.

19155E75C TRANSPORT AND ENVIRONMENT**L T P C
4 0 0 4****OBJECTIVE:**

- The objective of this course is to create an awareness / overview of the impact of Transportation Projects on the environment and society..

OUTCOMES:

Students will be able to

- 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.

19155E75D INDUSTRIAL STRUCTURES**L T P C
4 0 0 4****OBJECTIVE:**

- To learn the planning, layout, functional aspects of industries and design of major steel and R.C structures needed for industries.

OUTCOMES:

Upon completion of this course, students will be able to

- 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

19155E75E

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

**L T P C
4 0 0 4**

OBJECTIVE:

- To impart the knowledge and skills to identify, assess and mitigate the environmental and social impacts of developmental projects

OUTCOMES:

The students completing the course will have ability to

- 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

19155E75F**DESIGN OF PRESTRESSED CONCRETE STRUCTURES****L T P C
4 0 0 4****OBJECTIVES:**

- To introduce the need for prestressing in a structure
- To explain the methods, types and advantages of prestressing to the students.
- To make the students to design a prestressed concrete structural elements and systems
- To introduce the students the effect of prestressing in the flexural and shear behaviour of structural elements.

OUTCOMES:

On successful completion of this course, students will be able to:

- 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.

19155E75G**CONSTRUCTION PLANNING AND SCHEDULING****L T P C
4 0 0 4****OBJECTIVE:**

- To make the students to learn about planning of construction projects, scheduling procedures and techniques, cost and quality control projects and use of project information as decision making tool.

OUTCOMES:

The students completing the course will have ability to

- 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.

19155E75H**MUNICIPAL SOLID WASTE MANAGEMENT****L T P C
4 0 0 4****OBJECTIVE:**

- To make the students conversant with the types, sources, generation, storage, collection, transport, processing and disposal of municipal solid waste.

OUTCOMES:

The students completing the course will demonstrate

- 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.

19160E75I

TOTAL QUALITY MANAGEMENT

L T P C

4 0 0 4

OBJECTIVE:

- To facilitate the understanding of Quality Management principles and process.

OUTCOME:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

19155E81A

COASTAL ENGINEERING

L T P C

3 0 0 3

OBJECTIVES:

- The main purpose of coastal engineering is to protect harbors and improve navigation.
- The students to the diverse topics as wave mechanics, wave climate, shoreline protection methods and laboratory investigations using model studies.

OUTCOMES:

The students will be able to

- 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.

19155E81B

PARTICIPATORY WATER RESOURCES MANAGEMENT

**L T P C
3 0 0 3**

OBJECTIVE:

- To gain an insight on local and global perceptions and approaches on participatory water resource management

OUTCOMES:

The students will be able to

- Gain knowledge on various processes involved in participatory water resource management.
- Understand farmers 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.

19155E81C

INTEGRATED WATER RESOURCES MANAGEMENT

**L T P C
3 0 0 3**

OBJECTIVES:

- To introduce the students to the interdisciplinary analysis of water and conceptual design of intervention strategies.
- To develop a knowledge-base on capacity building on IWRM.

OUTCOMES:

The students will be able to

- 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.

19155E81D

GROUNDWATER ENGINEERING

**L T P C
3 0 0 3**

OBJECTIVES:

- To introduce the student to the principles of Groundwater governing Equations and Characteristics of different aquifers,
- To understand the techniques of development and management of groundwater.

OUTCOMES:

The students will be able to

- 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.

19155E81E

WATER RESOURCES SYSTEMS ENGINEERING

**L T P C
3 0 0 3**

OBJECTIVES:

- To introduce the student to the concept of Mathematical approaches for managing the water resources system.
- To make the students apply an appropriate system approach to optimally operate a water resource system.

OUTCOMES:

The students will be

- Eexposed 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.
- Ddeveloping skills in solving problems in operations research through LP, DP and Simulation techniques.

19155E81F

GEO-ENVIRONMENTAL ENGINEERING

**L T P C
3 0 0 3**

OBJECTIVE:

- The student acquires the knowledge on the Geotechnical engineering problems associated with soil contamination, safe disposal of waste and remediate the contaminated soils by different techniques thereby protecting environment.

OUTCOMES:

The students will be able to

- 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.

19155E81G

HYDROLOGY AND WATER RESOURCES ENGINEERING

**L T P C
3 0 0 3**

OBJECTIVE:

- To introduce the student to the concept of hydrological aspects of water availability and requirements and should be able to quantify, control and regulate the water resources.

OUTCOMES:

The students completing the course will have

- 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.

19155E81H

PROFESSIONAL ETHICS IN ENGINEERING

**LT P C
3 0 0 3**

OBJECTIVE:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

OUTCOME:

- 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.

19155E82A

COMPUTER AIDED DESIGN OF STRUCTURES

**L T P C
3 0 0 3**

OBJECTIVES:

- To introduce the students about computer graphics, structural analysis, design and optimization and expert systems, applications in analysis.

OUTCOMES:

On successful completion of this course, students will be able to:

- 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.

19155E82B

MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES

OBJECTIVE:

- To acquire the knowledge on Quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repairing of structures and demolition procedures.

OUTCOMES:

Students will be able to understand

- 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 and protection methods
- repair, rehabilitation and retrofitting of structures and demolition methods.

19155E82C

STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING

OBJECTIVE:

- To understand the behaviour of dynamic loading. Study the effect of earthquake loading on the behaviour of structures. Understand the codal provisions to design the structures as earthquake resistant.

OUTCOMES:

- 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.

19155E82D**PREFABRICATED STRUCTURES****OBJECTIVE:**

- To impart knowledge to students on modular construction, industrialised construction and design of prefabricated elements and construction methods.

OUTCOMES:

- 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.

19155E82E**BRIDGE ENGINEERING****OBJECTIVE:**

- To make the student to know about various bridge structures, selection of appropriate bridge structures and its design for given site conditions.

OUTCOMES:

On successful completion of this course, students will be able to:

- 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.

19155E82F FUNDAMENTALS OF NANO SCIENCE

OBJECTIVE:

- To learn about basis of nanomaterial science, preparation method, types and application

OUTCOMES:

- Will familiarize about the science of nanomaterials
- Will demonstrate the preparation of nanomaterials
- Will develop knowledge in characteristic nanomaterial



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SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

M.Tech – Structural Engineering –Full Time (2019R)

IDENTIFICATION OF PO's, PSO's AND COs FOR ALL UG & PG PROGRAMMES OFFERED BY THE DEPARTMENT & ITS MAPPING

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

- PEO1:** To provide students with strong fundamental concepts and also advanced techniques and Design cum Analysis to build various Structural Elements.
- PEO2:** To enable graduates to attain successful professional careers by applying their engineering skills in Structural design to meet out the challenges in industries and academia.
- PEO3:** To engage graduates in lifelong learning, adapt emerging technology and pursue research for the development of innovative projects.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

- PSO1 :** Understand and calculate the stability, strength and rigidity of built structures for buildings and non building structures.
- PSO2:** To enhance problem solving skills in Structural design using latest hardware and software tools.
- PSO3:** To apply Structural engineering principles and practices for developing products for scientific and business applications.

PROGRAMME OUTCOMES (POs):

M.Tech students will be able to:

- PO1:Engineering knowledge:** Apply principles of engineering mechanics and use appropriate tools to solve problems in structural engineering.
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions:** Design solutions for complex engineering problems and 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 and research 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, and modern 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 to assess 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 engineering solutions 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 and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering 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 the engineering 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 to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) WITH PROGRAMME OUTCOMES (POs):

The mapping between the Programme Educational Objectives (PEOs) and the Programme Outcomes (POs) is given in the following table:

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
PEO1	3	2	1	1	2	1	-	-	2	-	-	2
PEO2	3	3	2	3	3	2	1	1	2	2	1	1
PEO3	3	3	3	3	3	1	1	1	2	2	1	3

Contribution 1: Reasonable 2: Significant 3: Strong

MAPPING OF PROGRAM SPECIFIC OBJECTIVES (PSOs) WITH PROGRAMME OUTCOMES (POs):

A broad relation between the Programme Specific Objectives (PSOs) and the Programme Outcomes (POs) is given in the following table:

PROGRAMME SPECIFIC OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
PSO1	3	2	1	1	1	1	1	-	1	-	-	1
PSO2	3	3	1	3	3	1	1	-	1	-	-	1
PSO3	3	3	2	3	2	3	2	2	2	2	2	2

Contribution 1: Reasonable 2: Significant 3: Strong

M.Tech- STRUCTURAL ENGINEERING (FT)

COURSE OUTCOMES

SEMESTER-I

19248S11E ADVANCED ENGINEERING MATHEMATICS

AIM & OBJECTIVES:

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.

OUTCOMES:

- Introduce students to ordinary differential equations and the methods for solving these equations
- Use differential equations as models for real world phenomena
- Integrate the knowledge accumulated in the calculus sequence to solve applied problems
- Introduce the fundamentals of Linear Algebra and Complex Analysis
- Provide a rigorous introduction to upper level mathematics which is necessary for students of engineering, physical sciences and mathematics

19255H12 QUALITY CONTROL AND ASSURANCE IN CONSTRUCTION

OBJECTIVE:

- 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

OUTCOMES:

- Understand the fundamentals of quality management for a project-based industry.
- Demonstrate knowledge of the theories, principles and processes in quality management.
- Recognise the differences between quality control and quality management.
- Apply quality management best practice in construction in terms of both processes and attitudes.

19255 H 13 THEORIES OF PLASTICITY AND ELASTICITY

AIM and OBJECTIVES:

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.

OUTCOMES:

- The students shall be able to demonstrate the application of plane stress and plane strain in a given situation. The student will demonstrate the ability to analyze the structure using plasticity.
- To impart the knowledge of stress-strain relations for linearly elastic solids, and Torsion.

19255H14 STRUCTURAL DYNAMICS**AIM and OBJECTIVES:**

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.

OUTCOMES:

- Compute analytical and numerical solutions for general cases of equations of motions.
- Deduce the natural frequencies and mode shapes for multi degree of freedom systems.
- Analyze the response of a structure by time domain methods and frequency domain methods.

19255H15 MAINTENANCE & REHABILITATION OF STRUCTURES**AIM and OBJECTIVES:**

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.

OUTCOMES:

- Suggest maintenance and repair strategies (k2).
- examine the durability due to various climate conditions(k4)
- suggest the suitable materials and techniques for repair(k2)
- choose various rehabilitation and retrofitting techniques.(k3)
- select suitable demolition techniques for structures(k3)

19255L17 COMPUTER PROGRAMMING LAB- AUTO CAD**OBJECTIVES:**

- To learn the basic concepts of computing.
- To know the methodology of problem solving.
- To develop civil engineering drawing using Auto CAD.

OUTCOMES:

- 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.

19255CRS RESEARCH LED SEMINAR

- To understand the approaches towards and constraints in good research.
- To identify various statistical tools used in research methodology
- To appreciate and compose the manuscript for publication
- To train in basic computational and excel- skills for research in engineering.

SEMESTER-II

19255H21 MANAGEMENT INFORMATION SYSTEM

OBJECTIVES:

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

OUTCOMES:

- Recognize contemporary MIS theory and how information systems support business strategy, business processes, and practical applications in an organization. 2. Interrelate how various support systems can be used for business decisions and to sustain competitive advantage

19255 H 22 FINITE ELEMENT ANALYSES

AIM and OBJECTIVES:

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.

OUTCOMES:

- Understand the numerical methods involved in Finite Element Theory 2. Understand the role and significance of shape functions in finite element formulations and use linear, quadratic, and cubic shape functions for interpolation

19255H23 ADVANCED CONCRETE STRUCTURAL DESIGN

AIM and OBJECTIVES:

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.

OUTCOMES:

- Use the knowledge of the structural properties of materials i.e. steel and concrete in assessing the strength.

19255 L 26 SOFTWARE LABS

OBJECTIVES:

- To learn the basic concepts of computing.
- To know the methodology of problem solving.
- To develop Civil Engineering drawing using FEA – ANSYS

OUTCOMES:

- An ability to apply knowledge of mathematics, science, and engineering to problem solving.

192TECWR TECHNICAL SEMINAR

COURSE OBJECTIVES:

The course aims to:

- Study research papers, summarise and review them
- Identify promising new directions of various cutting edge technologies
- Impart skills in preparing detailed report describing the project and results

COURSE OUTCOMES:

At the end of the course, Learners will be able:

- 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

19255CRM RESEARCH METHODOLOGY

OBJECTIVE:

To give an exposure to development of research questions and the various statistical methods suitable to address them through available literature, with basic computational operators.

OUTCOMES:

- prepare a project proposal (to undertake a project) • organize and conduct research (advanced project) in a more appropriate manner.

19255CBR PARTICIPATION IN BOUNDED RESEARCH

COURSE OBJECTIVES:

The course aims to:

- Develop hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

COURSE OUTCOMES:

At the end of the course, Learners will be able to have a:

- Hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

SEMESTER-III
ADVANCED STEEL STRUCTURES

19255H31

OBJECTIVES:

Introduction to steel structure, tensioned member, compressed member, beam, design of beam and column, bolt jointing, welding jointing and other joint design.

OUTCOMES:

- Students who successfully complete this course will be able to: 1. Identify and compute the design loads on a typical steel building.

19255P35

PROJECT WORK PHASE-I

OUTCOME:

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

19255CSR

DESIGN/SOCIO- TECHNICAL PROJECT

OBJECTIVES:

- Sensitization of social needs for innovation
- Team work towards interdisciplinary synchronous research strategy
- Development of critical thinking and synergistic research approach.

OUTCOMES:

On completion of this course, the student would be able to be

- Sensitive to social needs for innovation
- Develop teams and work towards interdisciplinary synchronous research strategy
- Develop critical thinking and synergistic research approach.

19255P41

PROJECT WORK PHASE-II

OUTCOME:

On Completion of the project work students will be in a position to take up any challenging innovative projects & practical problems and find solution by formulating proper methodology

LIST OF ELECTIVES

SEMESTER I

HARD CORE ELECTIVE- I

19255E16A PRESTRESSED CONCRETE DESIGN

AIM and OBJECTIVES:

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.

OUTCOMES:

- To design prestressed concrete beam CO2 To design prestressed composite beams

19255E16B HIGH RISE STRUCTURES

AIM and OBJECTIVES:

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.

19255E16C COMPUTER AIDED STRUCTURAL DESIGN

AIM:

To learn design and preparation of structural drawing of concrete and steel structures (STADD-PRO).

OBJECTIVES:

At the end of the course the students acquires hands on experiences in design and

Preparation of structural drawing for concrete and steel structures normally encountered in Civil Engineering practice.

SEMESTER II

HARD CORE ELECTIVES-II

19255E24A FAILURE ANALYSIS OF STRUCTURES

AIM and OBJECTIVES:

This course introduces about the failure of structures, buckling failure of columns, deterioration of wood and miscellaneous failures.

19255E24B ADVANCED CONCRETE TECHNOLOGY

AIM and OBJECTIVES:

To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.

OUTCOMES:

- Discuss the concrete ingredients and its influence at gaining strength.
- Design of concrete mix and grade as per IS codes.
- Summarise the concepts of conventional concrete and its differences with other concretes like no fines, light weight etc.
- Describe the application and use of fiber reinforced concrete.
- Design and develop the self compacting and high performance concrete.

19255E24C STEEL, CONCRETE COMPOSITE STRUCTURES

AIM and OBJECTIVES:

This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.

HARD CORE ELECTIVE III

19255E25A OPTIMIZATION IN STRUCTURAL DESIGN

AIM and OBJECTIVES:

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.

19255E25B DESIGN OF INDUSTRIAL STRUCTURES

AIM and OBJECTIVES:

This course deals about the requirements, planning and construction techniques of an industry. And also deals with modes of communication and transport to be used in an industrial structures.

19255E25C ELEMENTS OF EARTHQUAKE ENGINEERING

AIM and OBJECTIVES:

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.

19255E25C ELEMENTS OF EARTHQUAKE ENGINEERING

OUTCOMES:

- Understand and apply the basics of structural dynamics in analysis of structures subjected to earthquakes.
- Understand plate tectonics.
- Understand ground motion magnitude, intensity, and frequency.
- Understand and compute ground motion intensity measures and attenuation relationships.
- Understand and compute earthquake hazard and design response spectra.

SEMESTER III

HARD CORE ELECTIVE IV

19255E32A EXPERIMENTAL STRESS ANALYSIS

AIM and OBJECTIVES:

At the end of the semester students can learn about the strain gauges, strain rosetters, model analysis, calibration of photo elastic materials.

OUTCOMES:

- Explain the measurement of strain under static and dynamic loads.
- Describe the Mechanical, optical, pneumatic and electrical strain gauges for strain measurement.
- 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.
- Describe the measurements by using transducers and exciters

19255E32B SOIL STRUCTURE INTERACTION

AIM & OBJECTIVES:

This course deals with the soil- foundation interaction, analysis of beams and finite plates, elastic analysis of pile, load deflection for laterally loaded pile.

19255E32C ASEISMIC DESIGN OF STRUCTURES

AIMS & OBJECTIVES:

This course deals about seismology, seismic design concepts, codal provisions and detailing of frames.

HARD CORE ELECTIVE V

19255E33A PREFABRICATED STRUCTURES

AIMS & OBJECTIVES:

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.

OUTCOMES:

- Upon Completion of the course, the students will be able to: Appreciate modular construction of prefabricated elements
- Classify the components of prefabricated
- Design of disuniting structures
- Analyze the joints in structural detailing of prefabricated
- Refer the codal provisions for abnormal load of prefabricated structure

19255E33B DISASTER RESISTANT STRUCTURES

AIMS & OBJECTIVES:

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.

19255E33C NONLINEAR ANALYSIS OF STRUCTURES

AIMS & OBJECTIVES:

This course deals about the non –linearities, non-linear equations and non linear static analysis of plates, columns, trusses and frames.

HARD CORE ELECTIVE VI

19255E34A OFFSHORE STRUCTURES

AIMS & OBJECTIVES:

This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures .

OUTCOMES:

- At the end of the course, students will be able to understand the basic theoretical concepts in offshore engineering and apply them to actual problems.
- They will be able to calculate wave forces on fixed and floating structures and calculate the dynamic response.
- They will be able to use design codes to check the capacity of structural members.
- They will be proficient in the use of finite element software to perform computer simulations, thus being prepared for the practical needs of the industry.

7255E34B STABILITY OF STRUCTURES

AIMS & OBJECTIVES:

This course deals with the concept and characteristics of stability problems and behavior of torsional buckling and lateral buckling in beams and columns.

19255E34C MECHANICS OF COMPOSITE MATERIALS

AIMS & OBJECTIVES:

This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.

PROGRAMME EDUCATIONAL OBJECTIVES:

- PEO1:** To enable graduates to pursue research or have a successful career in academia or industries associated with Electronics and Communication Engineering or as entrepreneurs.
- PEO2:** To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity.
- PEO3:** To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

- 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.

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

- PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions:** Design solutions for complex engineering problems and 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 and research 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, and modern 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 to assess 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 engineering solutions 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 and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

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

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering 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 to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Educational Objectives (PEOs) and the Programme Outcomes (POs) is given in the following table:

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
PEO1	3	3	2	3	2	1	1	1	1	1	1	2
PEO2	3	3	3	3	3	2	2	3	1	3	3	3
PEO3	3	3	3	3	3	3	3	2	1	1	1	3

Contribution 1: Reasonable 2: Significant 3: Strong

MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Specific Objectives (PSOs) and the Programme Outcomes(POs) is given in the following table:

PROGRAMME SPECIFIC OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
PSO1	3	3	2	3	2	1	1	1	1	1	1	2
PSO2	3	3	3	3	3	2	2	3	1	3	3	3
PSO3	3	3	3	3	3	3	3	2	1	1	1	3

Contribution 1: Reasonable 2: Significant 3: Strong

COURSE OBJECTIVES AND OUTCOMES

B.TECH (FULL TIME) MECHANICAL ENGINEERING

REGULATION 2019

SEMESTER – I

NAME OF THE COURSE: COMMUNICATIVE ENGLISH COURSE CODE: 19147S11

COURSE OBJECTIVES:

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills

COURSE OUTCOMES:

At the end of the course, learners will be able to:

- 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.

NAME OF THE COURSE: ENGINEERING MATHEMATICS - I

COURSE CODE: 19148S12

COURSE OBJECTIVES:

- The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

COURSE OUTCOMES:

After completing this course, students should demonstrate competency in the following skills:

- 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.

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NAME OF THE COURSE: ENGINEERING PHYSICS COURSE CODE: 19149S13

COURSE OBJECTIVES:

- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

COURSE OUTCOMES:

Upon completion of this course,

- 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.

NAME OF THE COURSE: ENGINEERING CHEMISTRY COURSE CODE: 19149S14

COURSE OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

COURSE OUTCOMES:

- 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.

**NAME OF THE COURSE: PROBLEM SOLVING AND PYTHON PROGRAMMING
COURSE CODE: 19150S16**

COURSE OBJECTIVES:

- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures — lists, tuples, dictionaries.
- To do input/output with files in Python.

COURSE OUTCOMES:

Upon completion of the course, students will be able to

- Develop algorithmic solutions to simple computational problems
- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.

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- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs.

NAME OF THE COURSE: ENGINEERING GRAPHICS

COURSE CODE: 19154S15

COURSE OBJECTIVES:

- To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.
- To expose them to existing national standards related to technical drawings.

COURSE OUTCOMES:

On successful completion of this course, the student will be able to:

- 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.

NAME OF THE COURSE: PROBLEM SOLVING ANDPYTHON PROGRAMMING LAB

COURSE CODE: 19150L17

COURSE OBJECTIVES

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python.

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- 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.

NAME OF THE COURSE: PHYSICS AND CHEMISTRY LAB

COURSE CODE: 19149L18

PHYSICS LAB

COURSE OBJECTIVES:

To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications.

Department:MECH
CHEMISTRY LAB

COURSE OBJECTIVES:

- 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 viscometry.

COURSE OUTCOMES:

The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

NAME OF THE COURSE: VALUE EDUCATION COURSE CODE: 191VEA19
COURSE OBJECTIVES

- To teach the philosophy of Life, personal value, social value, mind cultural value and personal health
- To teach and inculcate the importance of value based living.
- To teach professional ethical values, codes of ethics, responsibilities, safety, rights and related global issues.
- To give students a deeper understanding about the purpose of life.
- To teach the significance of being responsible citizens of the society.

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- 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.

SEMESTER - II

NAME OF THE COURSE: TECHNICAL ENGLISH COURSE CODE: 19147S21

COURSE OBJECTIVES:

The Course prepares second semester engineering and Technology students to:

- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write convincing job applications and effective reports.
- Develop their speaking skills to make technical presentations, participate in group discussions.
- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialization.

COURSE OUTCOMES:

At the end of the course learners will be able to:

- 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.

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NAME OF THE COURSE: ENGINEERING MATHEMATICS– II

COURSE CODE: 19148S22A

COURSE OBJECTIVES :

This course is designed to cover topics such as Matrix Algebra, Vector Calculus, Complex Analysis and Laplace Transform. Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering. Vector calculus can be widely used for modelling the various laws of physics. The various methods of complex analysis and Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

COURSE OUTCOMES:

After successfully completing the course, the student will have a good understanding of the following topics and their applications:

- 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.

NAME OF THE COURSE: MATERIALS SCIENCE

COURSE CODE: 19149S23C

COURSE OBJECTIVES:

To introduce the essential principles of materials science for mechanical and related engineering applications.

COURSE OUTCOMES:

At the end of the course, the students will able to

- the students will have knowledge on the various phase diagrams and their applications
- the students will acquire knowledge on Fe-Fe₃C 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.

NAME OF THE COURSE: ENVIRONMENTAL SCIENCE AND ENGINEERING

COURSE CODE: 19149S24A

COURSE OBJECTIVES:

- To study the nature and facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the

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- human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE:BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION

COURSE CODE: 19153S25D

COURSE OBJECTIVES:

To impart knowledge on

- Electric circuit laws, single and three phase circuits and wiring
- Working principles of Electrical Machines
- Working principle of Various electronic devices and measuring instruments

COURSE OUTCOMES:

At the end of the course the students will be able to

- 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

NAME OF THE COURSE: ENGINEERING MECHANICS

COURSE CODE:

19154S26D

COURSE OBJECTIVES:

To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering

COURSE OUTCOMES:

At the end of the course the students will be able to:

- 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

NAME OF THE COURSE: ENGINEERING PRACTICES LAB

COURSE CODE: 19154L27

COURSE OBJECTIVES:

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To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

COURSE OUTCOMES:

On successful completion of this course, the student will be able to

- 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.

NAME OF THE COURSE: BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION

ENGINEERING LABORATORY

COURSE CODE: 19153L28D

COURSE OBJECTIVES:

- To train the students in performing various tests on electrical drives, sensors and circuits.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Ability to determine the speed characteristic of different electrical machines
- Ability to design simple circuits involving diodes and transistors
- Ability to use operational amplifiers

NAME OF THE COURSE: FUNDAMENTALS OF INDIAN CONSTITUTION AND ECONOMY

COURSE CODE: 191ICA29

COURSE OBJECTIVES:

- To Enable the student to understand the importance of constitution
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court, controller and auditor general of India and election commission of India.
- To understand the central and state relation.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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.

SEMESTER – III

NAME OF THE COURSE: TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

Department:MECH

COURSE CODE: 19148S31C

COURSE OBJECTIVES:

To introduce the basic notions of groups, rings, fields which will then be used to solve related problems.

- To introduce the basic concepts of PDE for solving standard partial differential equations.
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.
- To acquaint the student with Fourier series techniques in solving heat flow problems used in various situations.
- To acquaint the student with Fourier transform techniques used in wide variety of situations.
- To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

COURSE OUTCOMES:

Upon successful completion of the course, students should be able to:

- 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.

NAME OF THE COURSE: ENGINEERING THERMODYNAMICS

COURSE CODE: 19154C32

COURSE OBJECTIVES:

- To familiarize the students to understand the fundamentals of thermodynamics and to perform thermal analysis on their behavior and performance.

(Use of Standard and approved Steam Table, Mollier Chart, Compressibility Chart and Psychrometric Chart permitted)

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- 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
- Derive simple thermodynamic relations of ideal and real gases

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Calculate the properties of gas mixtures and moist air and its use in psychometric processes

NAME OF THE COURSE: FLUID MECHANICS AND MACHINERY

COURSE CODE: 19152C33

COURSE OBJECTIVES:

- 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.

COURSE OUTCOMES:

Upon completion of the course, students will be able to:

- 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.

NAME OF THE COURSE: PRODUCTION TECHNOLOGY – I

COURSE CODE:

19152C34

COURSE OBJECTIVES:

To introduce the concepts of basic manufacturing processes and fabrication techniques, such as metal casting, metal joining, metal forming and manufacture of plastic components

COURSE OUTCOMES:

At the end of the course:

- Explain different metal casting processes, associated defects, merits and demerits
- Compare different metal joining processes.
- Summarize various hot working and cold working methods of metals.
- Explain various sheet metal making processes.
- Distinguish various methods of manufacturing plastic components.

NAME OF THE COURSE: ELECTRICAL DRIVES AND CONTROLS COURSE CODE:

19152C35

COURSE OBJECTIVES:

- To understand the basic concepts of different types of electrical machines and their performance.
- To study the different methods of starting D.C motors and induction motors.
- To study the conventional and solid-state drives

COURSE OUTCOMES:

At the end of the course, the student should be able to:

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- Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance

NAME OF THE COURSE: PRODUCTION TECHNOLOGY LABORATORY – I

COURSE CODE: 19154L36

COURSE OBJECTIVES:

To Study and practice the various operations that can be performed in lathe, shaper, drilling, milling machines etc. and to equip with the practical knowledge required in the core industries

COURSE OUTCOMES:

After studying this course, the student should be able to:

- Demonstrate the safety precautions exercised in the mechanical workshop.
- Make the workpiece as per given shape and size using Lathe.
- Join two metals using arc welding.
- Use sheet metal fabrication tools and make simple tray and funnel.
- Use different moulding tools, patterns and prepare sand moulds.

NAME OF THE COURSE: COMPUTER AIDED MACHINE DRAWING

COURSE CODE: 19154L37

COURSE OBJECTIVES:

- To make the students understand and interpret drawings of machine components
- To prepare assembly drawings both manually and using standard CAD packages
- To familiarize the students with Indian Standards on drawing practices and standard components
- To gain practical experience in handling 2D drafting and 3D modeling software systems

COURSE OBJECTIVES:

- CO1 Follow the drawing standards, Fits and Tolerances
- CO2 Re-create part drawings, sectional views and assembly drawings as per standards

NAME OF THE COURSE: ELECTRICAL ENGINEERING LABORATORY

COURSE CODE: 19154L38

COURSE OBJECTIVES:

- To validate the principles studied in theory by performing experiments in the laboratory

COURSE OUTCOMES:

On completion of this laboratory course, the student should be able to:

- Ability to perform speed characteristic of different electrical machine

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NAME OF THE COURSE: INTERPERSONAL SKILLS / LISTENING & SPEAKING

COURSE CODE: 19152L39

COURSE OBJECTIVES:

The Course will enable learners to:

- 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.

COURSE OBJECTIVES:

The Course will enable learners to:

- 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.

SEMESTER – IV

NAME OF THE COURSE: STATISTICS AND NUMERICAL METHODS

COURSE CODE: 19148C41D

COURSE OBJECTIVES :

- This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems?
- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines?
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

COURSE OUTCOMES:

Upon successful completion of the course, students should be able to:

- Apply the concept of testing of hypothesis for small and large samples in real life problems.
- 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.

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- Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

NAME OF THE COURSE: THEORY OF MACHINES-I COURSE CODE: 19152C42

COURSE OBJECTIVES:

- To understand the basic components and layout of linkages in the assembly of a system machine.
- To understand the principles in analyzing the assembly with respect to the displacement, velocity, and acceleration at any point in a link of a mechanism.
- To understand the motion resulting from a specified set of linkages, design few linkage mechanisms and cam mechanisms for specified output motions.

To understand the basic concepts of toothed gearing and kinematics of gear trains and the effects of friction in motion transmission and in machine components

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- 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

NAME OF THE COURSE: PRODUCTION TECHNOLOGY – II

COURSE CODE: 19154C43

COURSE OBJECTIVES:

- To understand the concept and basic mechanics of metal cutting, working of standard machine tools such as lathe, shaping and allied machines, milling, drilling and allied machines, grinding and allied machines and broaching.
- To understand the basic concepts of Computer Numerical Control (CNC) of machine tools and CNC Programming

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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.

NAME OF THE COURSE: ENGINEERING METALLURGY

COURSE CODE: 19152C44

COURSE OBJECTIVES:

Department:MECH

To impart knowledge on the structure, properties, treatment, testing and applications of metals and non-metallic materials so as to identify and select suitable materials for various engineering applications

COURSE OUTCOMES:

By the end of this course, the student should be able to:

- 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. .

NAME OF THE COURSE:

**STRENGTH OF MATERIALS FOR
MECHANICAL ENGINEERS**

COURSE CODE: 19152C45

COURSE OBJECTIVES:

- To understand the concepts of stress, strain, principal stresses and principal planes.
- To study the concept of shearing force and bending moment due to external loads in determinate beams and their effect on stresses.
- To determine stresses and deformation in circular shafts and helical spring due to torsion.
- To compute slopes and deflections in determinate beams by various methods.
- To study the stresses and deformations induced in thin and thick shells.

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- 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.

NAME OF THE COURSE: THERMAL ENGINEERING - I

COURSE CODE: 19149S46

COURSE OBJECTIVES:

- To integrate the concepts, laws and methodologies from the first course in thermodynamics into analysis of cyclic processes
- To apply the thermodynamic concepts into various thermal application like IC engines, Steam.
- Turbines, Compressors and Refrigeration and Air conditioning systems
(Use of standard refrigerant property data book, Steam Tables, Mollier diagram and Psychrometric chart)
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

Department:MECH

COURSE OUTCOMES:

- 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.

NAME OF THE COURSE: PRODUCTION TECHNOLOGY LABORATORY – II
COURSE CODE: 19152L47

COURSE OBJECTIVES:

- To Study and acquire knowledge on various basic machining operations in special purpose machines and its applications in real life manufacture of components in the industry

COURSE OUTCOMES:

On completion of this laboratory course, the student should be able to:

- use different machine tools to manufacturing gears
- Ability to use different machine tools to manufacturing gears.
- Ability to use different machine tools for finishing operations
- Ability to manufacture tools using cutter grinder
- Develop CNC part programming

NAME OF THE COURSE: STRENGTH OF MATERIALS AND FLUID MECHANICS
AND MACHINERY LABORATORY COURSE CODE: 19152L48

COURSE OBJECTIVES:

- To study the mechanical properties of materials when subjected to different types of loading.
- To verify the principles studied in Fluid Mechanics theory by performing experiments in lab.

COURSE OUTCOMES:

On completion of this laboratory course, the student should be able to:

- Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials. Perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.
- Use the measurement equipments for flow measurement.
- Perform test on different fluid machinery

NAME OF THE COURSE: ADVANCED READING AND WRITING **COURSE**
CODE: 19154L 49

COURSE OBJECTIVES:

- Strengthen the reading skills of students of engineering.
- Enhance their writing skills with specific reference to technical writing.
- Develop students' critical thinking skills.

Provide more opportunities to develop their project and proposal writing skills

COURSE OUTCOMES:

The student should have an:

- Write different types of essays.

Department:MECH

- Write winning job applications.
- Read and evaluate texts critically.

Display critical thinking in various professional contexts

SEMESTER – V

NAME OF THE COURSE: THERMAL ENGINEERING – II COURSE CODE: 19152C51

COURSE OBJECTIVES:

- To apply the thermodynamic concepts for Nozzles, Boilers, Turbines, and Refrigeration & Air Conditioning Systems.

To understand the concept of utilising residual heat in thermal systems

COURSE OUTCOMES:

Upon completion of the course, the student should be able to

Solve problems in Steam Nozzle

Explain the functioning and features of different types of Boilers and auxiliaries and 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 Heat Exchangers

Solve problems using refrigerant table / charts and psychrometric charts

NAME OF THE COURSE: DESIGN OF MACHINE ELEMENTS

COURSE CODE: 19152C52

COURSE OBJECTIVES:

- To familiarize the various steps involved in the Design Process
- To understand the principles involved in evaluating the shape and dimensions of a component to satisfy functional and strength requirements.
- To learn to use standard practices and standard data
- To learn to use catalogues and standard machine components
- (Use of P S G Design Data Book is permitted)

COURSE OUTCOMES:

At the end of the course, the student should be able to

Explain the influence of steady and variable stresses in machine component design.

Apply the concepts of design to shafts, keys and couplings.

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 bearings.

NAME OF THE COURSE: METROLOGY AND MEASUREMENTS

COURSE CODE: 19152C53

COURSE OBJECTIVES:

- To provide knowledge on various Metrological equipments available to measure the dimension of the components.

To provide knowledge on the correct procedure to be adopted to measure the dimension of the components

COURSE OUTCOMES:

Department:MECH

At the end of the course, the student should be able to

- Describe the concepts of measurements to apply in various metrological instruments
- Outline the principles of linear and angular measurement tools used for industrial Applications
- Explain the procedure for conducting computer aided inspection
- Demonstrate the techniques of form measurement used for industrial components
- Discuss various measuring techniques of mechanical properties in industrial applications

NAME OF THE COURSE: THEORY OF MACHINES-II COURSE CODE: 19154C54

COURSE OBJECTIVES:

The student should be made to:

- To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms.
- To understand the undesirable effects of unbalances resulting from prescribed motions in mechanism.
- To understand the effect of Dynamics of undesirable vibrations.
- To understand the principles in mechanisms used for speed control and stability control.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Calculate static and dynamic forces of mechanisms.
- Calculate the balancing masses and their locations of reciprocating and rotating masses.
- Compute the frequency of free vibration.
- Compute the frequency of forced vibration and damping coefficient.
- Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.

NAME OF THE COURSE: THEORY OF MACHINES LABORATORY

COURSE CODE: 19154L56

COURSE OBJECTIVES:

The student should be made:

- To supplement the principles learnt in kinematics and Dynamics of Machinery.
- To understand how certain measuring devices are used for dynamic testing.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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 of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.

NAME OF THE COURSE:

THERMAL ENGINEERING LABORATORY

COURSE CODE: 19152L57

COURSE OBJECTIVES:

Department:MECH

The student should be made:

- To study the value timing-V diagram and performance of IC Engines
- To Study the characteristics of fuels/Lubricates used in IC Engines
- To study the Performance of steam generator/ turbine
- To study the heat transfer phenomena predict the relevant coefficient using implementation

To study the performance of refrigeration cycle / components

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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 on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.
- 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.

NAME OF THE COURSE: METROLOGY AND MEASUREMENTS LABORATORY

COURSE CODE: 19152L58

COURSE OBJECTIVES:

The student should be made to:

- To familiar with different measurement equipments and use of this industry for quality inspection.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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.

NAME OF THE COURSE: RESEARCH METHODOLOGY

COURSE CODE: 19152CRM

COURSE OBJECTIVES:

- To understand the approaches towards and constraints in good research.
- To identify various statistical tools used in research methodology
- To appreciate and compose the manuscript for publication
- To train in basic computational and excel- skills for research in engineering.

COURSE OUTCOMES:

- 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

SEMESTER – VI

Department:MECH

NAME OF THE COURSE: DESIGN OF TRANSMISSION SYSTEMS

COURSE CODE: 19152C61

COURSE OBJECTIVES:

- To gain knowledge on the principles and procedure for the design of Mechanical power Transmission components.
- To understand the standard procedure available for Design of Transmission of Mechanical elements
- To learn to use standard data and catalogues (Use of P S G Design Data Book permitted)

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- 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

NAME OF THE COURSE: COMPUTER AIDED DESIGN AND MANUFACTURING

COURSE CODE: 19152C62

COURSE OBJECTIVES:

- To provide an overview of how computers are being used in mechanical component design
- To understand the application of computers in various aspects of Manufacturing viz., Design, Proper planning, Manufacturing cost, Layout & Material Handling system.

COURSE OUTCOMES:

Upon Completion of the Course, Students should be able to:

- Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics
- Explain the fundamentals of parametric curves, surfaces and Solids
- Summarize the different types of Standard systems used in CAD
- Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines
- Summarize the different types of techniques used in Cellular Manufacturing and FMS
- .

NAME OF THE COURSE: HEAT AND MASS TRANSFER COURSE CODE: 19152C63

COURSE OBJECTIVES:

- To understand the mechanisms of heat transfer under steady and transient conditions.
- To understand the concepts of heat transfer through extended surfaces.
- To learn the thermal analysis and sizing of heat exchangers and to understand the basic concepts of mass transfer.
(Use of standard HMT data book permitted)

COURSE OUTCOMES:

The student should be able to:

Department:MECH

Apply heat conduction equations to different 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 between different types of surfaces to solve problems
Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications

NAME OF THE COURSE: FINITE ELEMENT ANALYSIS COURSE CODE: 19152S64

COURSE OBJECTIVES:

- To introduce the concepts of Mathematical Modeling of Engineering Problems.
- To appreciate the use of FEM to a range of Engineering Problems.

COURSE OUTCOMES:

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.

NAME OF THE COURSE: HYDRAULICS AND PNEUMATICS

COURSE CODE: 19152C65

COURSE OBJECTIVES:

- To provide student with knowledge on the application of fluid power in process, construction and manufacturing Industries.
- To provide students with an understanding of the fluids and components utilized in modern industrial fluid power system.

To develop a measurable degree of competence in the design, construction and operation of fluid power circuits

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

Explain the Fluid power and operation of different types of pumps.
Summarize the features and functions of Hydraulic motors, actuators and Flow control Valves
Explain the different types of Hydraulic circuits and systems
Explain the working of different pneumatic circuits and systems
Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.

NAME OF THE COURSE: CAD / CAM LABORATORY COURSE CODE: 19152L67

COURSE OBJECTIVES:

- To gain practical experience in handling 2D drafting and 3D modelling software systems.

Department:MECH

- To study the features of CNC Machine Tool.
- To expose students to modern control systems (Fanuc, Siemens etc..)

To know the application of various CNC machines like CNC lathe, CNC Vertical Machining centre, CNC EDM and CNC wire-cut and studying of Rapid prototyping

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Draw 3D and Assembly drawing using CAD software
- Demonstrate manual part programming with G and M codes using CAM

NAME OF THE COURSE: DESIGN AND FABRICATION PROJECT COURSE
CODE: 19154L68

COURSE OBJECTIVES:

The student should be made:

- The main objective is to give an opportunity to the student to get hands on training in the fabrication of one or more components of a complete working model, which is designed by them.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- design and Fabricate the machine element or the mechanical product.
- demonstrate the working model of the machine element or the mechanical product.

NAME OF THE COURSE: PROFESSIONAL COMMUNICATION
COURSE CODE: 19154L69

COURSE OBJECTIVES:

The course aims to:

- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

COURSE OUTCOMES:

At the end of the course Learners will be able to:

- Make effective presentations
- Participate confidently in Group Discussions.
- Attend job interviews and be successful in them.
- Develop adequate Soft Skills required for the workplace

NAME OF THE COURSE: PARTICIPATION IN BOUNDED RESEARCH
COURSE CODE: 19152CBR

COURSE OBJECTIVES:

The course aims to:

- Develop hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

COURSE OUTCOMES:

Department:MECH

At the end of the course, Learners will be able to have a:

- Hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

SEMESTER VII

NAME OF THE COURSE: POWER PLANT ENGINEERING
COURSE CODE: 19152C71

COURSE OBJECTIVES:

- Providing an overview of Power Plants and detailing the role of Mechanical Engineers in their operation and maintenance.

COURSE OUTCOMES:

The student should be able to:

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.

NAME OF THE COURSE: PROCESS PLANNING AND COST ESTIMATION
COURSE CODE: 19152C72

COURSE OBJECTIVES:

- To introduce the process planning concepts to make cost estimation for various products after process planning

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COURSE OUTCOMES:

At the end of the course, the student should be able to:

select the process, equipment and tools for various industrial products.

prepare process planning activity chart.

explain the concept of cost estimation.

compute the job order cost for different type of shop floor.

calculate the machining time for various machining operations.

NAME OF THE COURSE: MECHATRONICS
COURSE CODE: 19152C73

COURSE OBJECTIVES:

The student should be made to:

To impart knowledge about the elements and techniques involved in Mechatronics systems which are very much essential to understand the emerging field of automation

Department:MECH

COURSE OUTCOMES:

At the end of the course, the student should be able to:

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.

Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies

NAME OF THE COURSE: SIMULATION AND ANALYSIS LABORATORY

COURSE CODE: 19154L77

COURSE OBJECTIVES:

- To give exposure to software tools needed to analyze engineering problems.
- To expose the students to different applications of simulation and analysis tools.

COURSE OUTCOMES:

At the end of the course, the student would be able to:

simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.

analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.

calculate the natural frequency and mode shape analysis of 2D components and beams.

NAME OF THE COURSE: MECHATRONICS LABORATORY

COURSE CODE: 19152L78

COURSE OBJECTIVES:

The student should be made to:

- To know the method of programming the microprocessor and also the design, modeling & analysis of basic electrical, hydraulic & pneumatic Systems which enable the students to understand the concept of mechatronics

COURSE OUTCOMES:

At the end of the course, the student should be able to:

Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.

Demonstrate the functioning of control systems with the help of PLC and microcontrollers.

NAME OF THE COURSE: DESIGN/SOCIO TECHNICAL PROJECT

COURSE CODE: 19152CSR

COURSE OBJECTIVES:

The student should have:

- Sensitization of social needs for innovation

Department:MECH

- Team work towards interdisciplinary synchronous research strategy
- Development of critical thinking and synergistic research approach.

COURSE OUTCOMES:

On completion of this course, the student would be able to be

- Sensitive to social needs for innovation
- Develop teams and work towards interdisciplinary synchronous research strategy
- Develop critical thinking and synergistic research approach.

SEMESTER VIII

NAME OF THE COURSE: PROJECT WORK

COURSE CODE: 19152P83

COURSE OBJECTIVES:

- To enable the student to understand the basic principles in antenna and microwave system design
- To enhance the student knowledge in the area of various antenna designs.
- To enhance the student knowledge in the area of microwave components and antenna for practical applications.

COURSE OUTCOMES:

The student should be able to:

- 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.

NAME OF THE COURSE: COMPS

COURSE CODE: 19152COMS

COURSE OBJECTIVES:

- To assess the comprehensive knowledge gained in basic courses relevant to the branch of study
- To comprehend the questions asked and answer them with confidence

COURSE OUTCOMES:

- The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them

ELECTIVE – I (SEMESTER – V)

NAME OF THE COURSE: AUTOMOBILE ENGINEERING
COURSE CODE: 19152E56A

COURSE OBJECTIVES:

The student should be made:

- To understand the construction and working principle of various parts of an automobile.
- To have the practice for assembling and dismantling of engine parts and transmission system

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- recognize the various parts of the automobile and their functions and materials.
- 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.

NAME OF THE COURSE: WELDING TECHNOLOGY COURSE CODE: 19154E66B

COURSE OBJECTIVES:

The student should be made:

- To understand the basics of welding and to know about the various types of welding processes

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- Understand the construction and working principles of gas and arc welding process.
- Understand the construction and working principles of resistance welding process.
- Understand the construction and working principles of various solid state welding process.
- Understand the construction and working principles of various special welding processes.
- Understand the concepts on weld joint design, weldability and testing of weldments.

NAME OF THE COURSE: GAS DYNAMICS AND JET PROPULSION COURSE CODE: 19154E66C

COURSE OBJECTIVES:

The student should be made:

- To understand the basic difference between incompressible and compressible flow.
- To understand the phenomenon of shock waves and its effect on flow. To gain some basic knowledge about jet propulsion and Rocket Propulsion. (Use of Standard Gas Tables permitted)

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- Apply the concept of compressible flows in variable area ducts.

Department: ECE

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.

NAME OF THE COURSE: INTELLECTUAL PROPERTY RIGHTS
COURSE CODE: 19154E66D

COURSE OBJECTIVES:

The student should be made:

- To give an idea about IPR, registration and its enforcement.

COURSE OUTCOMES:

The student should be able to:

- Ability to manage Intellectual Property portfolio to enhance the value of the firm.

NAME OF THE COURSE: FUNDAMENTALS OF NANOSCIENCE
COURSE CODE: 19154E66E

COURSE OBJECTIVES:

The student should be made:

To learn about basis of nanomaterial science, preparation method, types and application

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Will familiarize about the science of nanomaterials
- Will demonstrate the preparation of nanomaterials
- Will develop knowledge in characteristic nanomaterial

NAME OF THE COURSE: REFRIGERATION AND AIR CONDITIONING
COURSE CODE: 19154E74A

COURSE OBJECTIVES:

- To understand the underlying principles of operations in different Refrigeration & Air conditioning systems and components.
- To provide knowledge on design aspects of Refrigeration & Air conditioning systems

COURSE OUTCOMES:

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

NAME OF THE COURSE: RENEWABLE SOURCES OF ENERGY
COURSE CODE: 19154E74B

COURSE OBJECTIVES:

- At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources.

Department: ECE

COURSE OUTCOMES:

- Discuss the importance and Economics of renewable 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.

ELECTIVE – II (SEMESTER – VI)

NAME OF THE COURSE: QUALITY CONTROL AND RELIABILITY ENGINEERING
COURSE CODE: 19154E74C

COURSE OBJECTIVES:

- To introduce the concept of SQC
- To understand process control and acceptance sampling procedure and their application.
- To learn the concept of reliability.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE:
UNCONVENTIONAL MACHINING PROCESSES

COURSE CODE: 19154E74D

COURSE OBJECTIVES:

- To learn about various unconventional machining processes, the various process parameters and their influence on performance and their applications

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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.

NAME OF THE COURSE:
OPERATIONS RESEARCH

COURSE CODE: 19154E74E

COURSE OBJECTIVES:

To provide knowledge and training in using optimization techniques under limited resources for the engineering and business problems

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems

NAME OF THE COURSE: ADDITIVE MANUFACTURING

COURSE CODE: 19154E74F

COURSE OBJECTIVES:

The student should be made:

- To know the principle, methods, possibilities and limitations as well as environmental effects of Additive Manufacturing technologies.
To be familiar with the characteristics of the different materials those are used in

Additive Manufacturing technologies

COURSE OUTCOMES:

At the end of the course, the student should be able to:

On completion of this course, students will learn about a working principle and construction of Additive Manufacturing technologies, their potential to support design and manufacturing, modern development in additive manufacturing process and case studies relevant to mass customized manufacturing

NAME OF THE COURSE: TOTAL QUALITY MANAGEMENT

COURSE CODE: 19154E74G

COURSE OBJECTIVES:

The student should be made:

To facilitate the understanding of Quality Management principles and process

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

NAME OF THE COURSE: ROBOTICS COURSE CODE: 19154E76A

COURSE OBJECTIVES:

The student should be made:

- To understand the functions of the basic components of a Robot.
- To study the use of various types of End of Effectors and Sensors
- To impart knowledge in Robot Kinematics and Programming
- To learn Robot safety issues and economics.

COURSE OUTCOMES:

Upon completion of the course, the student would be able to:

Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors.
Illustrate the different types of robot drive systems as well as robot end effectors.

Department: ECE

Apply the different sensors and image processing techniques in robotics to improve the ability of robots.

Develop robotic programs for different tasks and familiarize with the kinematics motions of robot.

Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots.

NAME OF THE COURSE:

DESIGN OF JIGS, FIXTURES AND PRESS TOOLS

COURSE CODE: 19154E76B

COURSE OBJECTIVES:

- To understand the functions and design principles of Jigs, fixtures and press tools
- To gain proficiency in the development of required views of the final design.

COURSE OUTCOMES:

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

ELECTIVE – III (SEMESTER – VII)

NAME OF THE COURSE: COMPUTATIONAL FLUID DYNAMICS

COURSE CODE: 19154E76C

COURSE OBJECTIVES:

- To introduce Governing Equations of viscous fluid flows
- To introduce numerical modeling and its role in the field of fluid flow and heat transfer
- To enable the students to understand the various discretization methods, solution procedures and turbulence modeling.
- To create confidence to solve complex problems in the field of fluid flow and heat transfer by using high speed computers.

COURSE OUTCOMES:

The student should be able to:

- CO1 Derive the governing equations and boundary conditions for Fluid dynamics
- CO2 Analyze Finite difference and Finite volume methods for Diffusion
- CO3 Analyze Finite volume method for Convective diffusion
- CO4 Analyze Flow field problems
- CO5 Explain and solve the Turbulence models and Mesh generation techniques

NAME OF THE COURSE: NON DESTRUCTIVE TESTING AND EVALUATION

COURSE CODE: 19154E76D

Department: ECE

COURSE OBJECTIVES:

The student should be made:

- To study and understand the various Non Destructive Evaluation and Testing methods, theory and their industrial applications.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Explain the fundamental concepts of NDT
- Discuss the different methods of NDE
- Explain the concept of Thermography and Eddy current testing
- Explain the concept of Ultrasonic Testing and Acoustic Emission
- Explain the concept of Radiography

NAME OF THE COURSE: COMPOSITE MATERIALS AND MECHANICS COURSE

CODE: 19154E76E

COURSE OBJECTIVES:

- To understand the fundamentals of composite material strength and its mechanical behavior
- Understanding the analysis of fiber reinforced Laminate design for different combinations of plies with different orientations of the fiber.
- Thermo-mechanical behavior and study of residual stresses in Laminates during processing.
- Implementation of Classical Laminate Theory (CLT) to study and analysis for residual stresses in an isotropic layered structure such as electronic chips.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Summarize the various types of Fibers, Equations and manufacturing methods for Composite materials
- Derive Flat plate Laminate equations
- Analyze Lamina strength
- Analyze the thermal behavior of Composite laminates
- Analyze Laminate flat plates

NAME OF THE COURSE: HUMAN RIGHTS

COURSE CODE: 19154E76F

COURSE OBJECTIVES:

- To sensitize the Engineering students to various aspects of Human Rights.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

Engineering students will acquire the basic knowledge of human rights

NAME OF THE COURSE: DISASTER MANAGEMENT

COURSE CODE: 19154E76G

COURSE OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and

Department: ECE

- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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.

NAME OF THE COURSE: PRODUCTION PLANNING AND CONTROL COURSE CODE: 19154E82A

COURSE OBJECTIVES:

The student should be made to:

- To understand the various components and functions of production planning and control such as work study, product planning, process planning, production scheduling, Inventory Control.
- To know the recent trends like manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).

COURSE OUTCOMES:

Upon completion of the course, student should be able to

- 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.
- They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).

NAME OF THE COURSE: ENTREPRENEURSHIP DEVELOPMENT COURSE CODE: 19154E82B

COURSE OBJECTIVES:

The student should be made to:

- To develop and strengthen entrepreneurial quality and motivation in students and to impart basic entrepreneurial skills and understanding to run a business efficiently and effectively.

COURSE OUTCOMES:

The students will be able to

- 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.

ELECTIVE – IV (SEMESTER – VIII)

Department: ECE

NAME OF THE COURSE: COMPUTER INTEGRATED MANUFACTURING SYSTEMS

COURSE CODE: 19154E82C

COURSE OBJECTIVES:

- To understand the application of computers in various aspects of Manufacturing viz., Design, Proper planning, Manufacturing cost, Layout & Material Handling system.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE:

VIBRATION AND NOISE CONTROL

COURSE CODE: 19154E82D

COURSE OBJECTIVES:

The student should be made to:

- The student will be able to understand the sources of vibration and noise in automobiles and make design modifications to reduce the vibration and noise and improve the life of the components

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- 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

NAME OF THE COURSE: MICRO ELECTRO MECHANICAL SYSTEMS COURSE CODE: 19154E82E

COURSE OBJECTIVES:

- To provide knowledge of semiconductors and solid mechanics to fabricate MEMS devices.
- To educate on the rudiments of Micro fabrication techniques.
- To introduce various sensors and actuators
- To introduce different materials used for MEMS

To educate on the applications of MEMS to disciplines beyond Electrical and Mechanical engineering

COURSE OUTCOMES:

At the end of the course, the student should be able to:

Department: ECE

- Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.

Ability to understand and analyse, linear and digital electronic circuits

NAME OF THE COURSE: PROFESSIONAL ETHICS IN ENGINEERING COURSE CODE: 19154E82F

COURSE OBJECTIVES:

- To enable the students to create an awareness on Engineering Ethics and Human Values to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

COURSE OUTCOMES:

At the end of the course, the student should be able to:

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

OPEN ELECTIVE – I (SEMESTER – V)

**NAME OF THE COURSE: DATABASE MANAGEMENT SYSTEMS
COURSE CODE: 19150FE54A**

COURSE OBJECTIVES:

The student should be made:

- To learn the fundamentals of data models
- To learn conceptual modeling using ER diagrams.
- To study SQL queries and database programming
- To learn proper designing of relational database.
- To understand database security concepts
- To understand Information retrieval techniques

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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

NAME OF THE COURSE: CLOUD COMPUTING COURSE CODE: 19150FE54B

COURSE OBJECTIVES:

The student should be made:

- To learn about the concept of cloud and utility computing.
- To have knowledge on the various issues in cloud computing.
- To be familiar with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.

Department: ECE

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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.

NAME OF THE COURSE: INDUSTRIAL NANO TECHNOLOGY

COURSE CODE: 19153FE54A

COURSE OBJECTIVES:

The student should be made:

- 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 OUTCOMES:

On successful completion of this course, the student should be able to:

- 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

NAME OF THE COURSE: ENERGY CONSERVATION AND MANAGEMENT

COURSE CODE: 19153FE54B

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- Understand and analyse the energy data of industries
- Carryout energy accounting and balancing
- Conduct energy audit and suggest methodologies for energy savings and
- Utilise the available resources in optimal ways

COURSE OUTCOMES:

Upon completion of this course, the students can able to analyse the energy data of industries

- Can carry out energy accounting and balancing
- Can suggest methodologies for energy savings

NAME OF THE COURSE: RENEWABLE ENERGY SOURCES

COURSE CODE: 19154FE54A

COURSE OBJECTIVES:

The student should be made:

- To get exposure on solar radiation and its environmental impact to power.

Department: ECE

- To know about the various collectors used for storing solar energy.
- To know about the various applications in solar energy.
- To learn about the wind energy and biomass and its economic aspects.
- To know about geothermal energy with other energy sources.

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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.

NAME OF THE COURSE: AUTOMOTIVE SYSTEMS COURSE CODE: 19154FE54B

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- To understand the construction and working principle of various parts of an automobile.
- To have the practice for assembling and dismantling of engine parts and transmission System.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to

- Identify the different components in automobile engineering.
- Have clear understanding on different auxiliary and transmission systems usual.

**NAME OF THE COURSE: AIR POLLUTION AND CONTROL ENGINEERING
COURSE CODE: 19155FE54A**

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- To impart knowledge on the principle and design of control of Indoor/ particulate/ gaseous air pollutant and its emerging trends.

COURSE OUTCOMES:

The students completing the course will have

- 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.

**NAME OF THE COURSE: GEOGRAPHIC INFORMATION SYSTEM
COURSE CODE: 19155FE54B**

COURSE OBJECTIVES:

The student should be made:

- To introduce the fundamentals and components of Geographic Information System

Department: ECE

- To provide details of spatial data structures and input, management and output processes.

COURSE OUTCOMES:

This course equips the student to

- 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

OPEN ELECTIVE – II (SEMESTER – VII)

NAME OF THE COURSE: INTRODUCTION TO C PROGRAMMING

COURSE CODE: 19150FE74A

COURSE OBJECTIVES:

The student should be made:

- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions and structures

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- Develop simple applications using basic constructs
- Develop applications using arrays and strings
- Develop applications using functions and structures

NAME OF THE COURSE: DATA STRUCTURES AND ALGORITHMS

COURSE CODE: 19150FE74B

COURSE OBJECTIVES:

The student should be made:

- To understand the various algorithm design and analysis techniques
- To learn linear data structures – lists, stacks, and queues
- To learn different sorting and searching algorithms
- To understand Tree and Graph data structures

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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.

NAME OF THE COURSE: BASIC CIRCUIT THEORY COURSE CODE: 19153FE74A

COURSE OBJECTIVES:

The student should be made:

- To introduce electric circuits and its analysis
- To impart knowledge on solving circuit equations using network theorems

Department: ECE

- To introduce the phenomenon of resonance in coupled circuits.
- To introduce Phasor diagrams and analysis of three phase circuits

COURSE OUTCOMES:

On successful completion of this course, the student should be able to:

- 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

NAME OF THE COURSE: INTRODUCTION TO RENEWABLE ENERGY SYSTEMS

COURSE CODE: 19153FE74B

COURSE OBJECTIVES:

To provide knowledge

- About the stand alone and grid connected renewable energy systems.
- Design of power converters for renewable energy applications.
- Wind electrical generators and solar energy systems.
- Power converters used for renewable energy systems.

COURSE OUTCOMES:

Upon completion of this course, the students can able to

- 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.

NAME OF THE COURSE: INDUSTRIAL SAFETY COURSE CODE: 19154FE74A

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- To impart knowledge on safety engineering fundamentals and safety management practices.

COURSE OUTCOMES:

Upon completion of this course, the students must be able to

- identify and prevent chemical, environmental mechanical, fire hazard through analysis and apply proper safety techniques on safety engineering and management.

NAME OF THE COURSE: TESTING OF MATERIALS COURSE CODE: 19154FE74B

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- understand the various destructive and non destructive testing methods of materials and its industrial applications.

COURSE OUTCOMES:

Upon completion of this course, the students can able to

- Identify suitable testing technique to inspect industrial component

Department: ECE

- Ability to use the different technique and know its applications and limitations

NAME OF THE COURSE: GREEN BUILDING DESIGN

COURSE CODE: 19155FE74A

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- attain further knowledge of green building techniques, materials and practices.
- Utilize costs/benefits analysis, life cycle costs, embodied energy evaluation, and overall sustainability of various materials and methods

COURSE OUTCOMES:

Upon completion of this course, the students can able to analyse the energy data of industries

- 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

NAME OF THE COURSE: WASTE WATER TREATMENT

COURSE CODE: 19155FE74B

COURSE OBJECTIVES:

At the end of the course, the student is expected to

- To make the student conversant with the water treatment methods including adsorption and oxidation process.
- To provide basic under standings about the requirements of water, its preliminary treatment.

COURSE OUTCOMES:

Upon completion of this course, the students

- 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.

DEPARTMENT OF MECHANICAL ENGINEERING
M.TECH (MANUFACTURING TECHNOLOGY) – FULL TIME – R2019

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

- PEO1:** The graduates acquire ability to create model, design, synthesize and analyze essential production operational skills, mechanism and automation system.
- PEO2:** The graduates use their talent, self-confidence, knowledge and engineering practice which facilitate them to presume position of scientific and/or managerial leadership in their career paths.
- PEO3:** The graduates apply their consciousness of moral, professional responsibilities and motivation to practice life-long learning in a team work environment.

PROGRAM SPECIFIC OBJECTIVES (PSOs):

- PSO1:** Advanced knowledge in manufacturing tools, solutions to industrial applications; Identify, formulate and solve mechanical engineering problems related to advanced manufacturing environment.
- PSO2:** To spreading the recent developments in manufacturing engineering field through educating the students using new technologies, software's usages and recent trends in manufacturing technology.
- PSO3:** To design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life.

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

- PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions:** Design solutions for complex engineering problems and 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 and research 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, and modern 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 to assess 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 engineering solutions 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 and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering 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 the engineering 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 to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Educational Objectives (PEOs) and the Programme Outcomes (POs) is given in the following table:

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
PEO1	3	3	2	3	2	1	1	1	1	2	1	2
PEO2	3	3	3	3	3	3	2	3	3	3	3	3
PEO3	3	3	3	3	3	3	3	2	2	1	2	3

Contribution 1: Reasonable 2: Significant 3: Strong

MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Specific Objectives (PSOs) and the Programme Outcomes(POs) is given in the following table:

PROGRAMME SPECIFIC OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
PSO1	3	3	2	3	2	1	1	1	1	2	1	2
PSO2	3	3	3	3	3	3	2	3	3	3	3	3
PSO3	3	3	3	3	3	3	3	2	2	1	2	3

Contribution 1: Reasonable 2: Significant 3: Strong

COURSE OBJECTIVES AND OUTCOMES

M.TECH (FULL TIME) MANUFACTURING TECHNOLOGY

REGULATION 2019

SEMESTER – I

NAME OF THE COURSE: **Advanced Engineering Mathematics**

COURSE CODE: **19248S11E**

COURSE OBJECTIVES:

- To make strong foundation of the Laplace transforms and its application for mass spring calculations.
- To make students familiar with Fourier transforms and its inverse in practical applications of one dimensional heat equations.
- To understand probability theory and random process that serve as an essential tool for applications of engineering sciences and introduce probability theory and statistics from a computational perspective.
- To enable the students to use the concepts of Testing of hypothesis, regression, correlation & Design of experiment and to understand the role and importance of non parametric test in manufacturing
- To acquaint the student with the techniques in the theory of analytic functions and complex integration and introduce the basic concepts of one dimensional and two dimensional Random Variables.

COURSE OUTCOMES:

At the end of the course, Students are able to:

- 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.

NAME OF THE COURSE:

Theory of Metal Cutting

COURSE CODE: **19254H12**

COURSE OBJECTIVES:

- To know about the mechanics of chip formation, to analyze the tool failure, and thermodynamics involved in metal cutting and evaluation of tool materials.
- To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.
- To impart knowledge about wear-mechanisms of cutting tools and wear-chatter in machining.

COURSE OUTCOMES:

At the end of the course, Students are able to:

- 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.

NAME OF THE COURSE: **Advanced Manufacturing Processes** **COURSE CODE:** 19254H13

COURSE OBJECTIVES:

- To make the students knowledge about the various alternative manufacturing processes available.
- To develop an altitude to look for the unconventional manufacturing process to machine
- To make them to understand and appreciate the latest manufacturing process for micro fabrication and devices.
- Learning about different types of micro fabrication methods.

COURSE OUTCOMES:

Upon completion of this courses the students can able to;

- 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, micro systems and their applications.
- Ability to design the micro devices, micro systems using the micro fabrication process.

NAME OF THE COURSE: **Mechanical Metallurgy** **COURSE CODE:** 19254H14

COURSE OBJECTIVES:

- To study about the behavior of Metals during the loading conditions related to distribution of Stress and Strain.
- To know about the fracture of metals and various test procedures.
- To impart a sound understanding of the tensile, hardness and toughness behavior of materials.
- To understand the factors affecting the fatigue and fracture behavior of materials.
- To study the time dependant mechanical behavior of materials.

COURSE OUTCOMES:

Upon completion of this courses the students can able to;

- 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.

NAME OF THE COURSE: **Automated Computer Integrated Manufacturing Systems** **COURSE CODE:**19254H15

COURSE OBJECTIVES:

- To teach the role of computers in processing the information knowing across the various Stages and various departments in a manufacturing concern.
- To introduce the fundamentals of robotics and its applications in manufacturing industries.
- To introduce the concept of FMS and the materials handling and storage system used
- To familiarize the group technology concept and the clustering algorithms associated with it.
- To introduce the concepts of CAPP and CAQC

COURSE OUTCOMES:

Upon completing this course, students should be able to:

- 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.

NAME OF THE COURSE:**Research Led Seminar****COURSE CODE: 19254CRS****COURSE OBJECTIVES:**

- To work on a technical topic related to Manufacturing Engineering and acquire the ability of written and oral presentation.
- To acquire the ability of writing technical papers for Conferences and Journals
- To explore good practices in institution-driven, strategic approaches on how to integrate research and education missions.

COURSE OUTCOMES:

- 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.

NAME OF THE COURSE:**CIM LABORATORY****COURSE CODE: 19254L19****COURSE OBJECTIVES:**

- To make the students to get knowledge about the drafting and modeling of 3D components and analyzing the same using modeling software's.
- To introduce CNC part programming for simulation of various machining operations by using computer aided manufacturing software's.
- To demonstrate the concepts discussed in Computer Integrated Manufacturing course.

COURSE OUTCOMES:

The expected outcome of Computer Integrated Manufacturing laboratory is that the students will be able;

- Use parametric 3D CAD software tools in the correct manner for making geometric part models, assemblies and 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, and operate CNC milling and turning equipment.

- Create and validate NC part program data using manual data input (MDI) and automatically using standard commercial CAM package for manufacturing of required component using CNC milling or turning applications
- Produce an industrial component by interpreting 3D part model/ part drawings using Computer Aided Manufacturing technology through programming, setup, and ensuring safe operation of Computer Numerical Control (CNC) machine tools.
- Create and demonstrate the technical documentation for design/ selection of suitable drive technologies, precision components and an overall CNC machine tool system for automation of machining operations using appropriate multi-axis CNC technology.

SEMESTER – II

NAME OF THE COURSE:

Production Management

COURSE CODE: 19254H21

COURSE OBJECTIVES:

To train the students for working as production managers by providing them knowledge about ,

- effective and efficient purchase,
- different inventory policies and models,
- effective and efficient stores management,
- Modern techniques like JIT and MRP.

COURSE OUTCOMES:

- 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.

NAME OF THE COURSE:

MEMS and Nano Technology

COURSE CODE: 19254H22

COURSE OBJECTIVES:

- To expose the students to the evolution of micro electromechanical systems, to the various fabrication techniques and
- To make students to be aware of micro sensors and micro actuators.
- To impart knowledge to the students about Nano materials and various Nano measurements techniques.
- To understand the concepts and context of MEMS and nanotechnology
- Separate a Microsystems into simple parts (“lumped elements”) modeled in different physical domains
- Calculate the static and dynamic behavior of simple mechanical Microsystems, e.g. cantilevers and membranes
- Evaluate and choose transduction principles (e.g., electrostatic or magnetic) for actuation in a Microsystems and perform analytical calculations for a simple actuator based on them
- Evaluate and choose transduction principles (e.g., capacitive or piezoresistive) for sensors in a Microsystems and perform analytical calculations for a simple sensor based on them

COURSE OUTCOMES:

- 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

NAME OF THE COURSE: Manufacturing Metrology and Quality Control COURSE CODE: 19254H23

COURSE OBJECTIVES:

Students are expected to ,

- Select suitable instrument / gauge / method of inspection for determining geometrical and dimensional measurements.
- Calibrate measuring instruments and also design inspection gauges.
- Understand the advances in Metrology such as use of CMM, Laser, Machine Vision System for Metrology etc.
- Select and apply appropriate Quality Control Technique for given application.
- Select and Apply appropriate Quality Management Tool and suggest appropriate Quality Management System (QMS).

COURSE OUTCOMES:

Upon completing this course, students should be able to:

- 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

NAME OF THE COURSE: Automation Laboratory COURSE CODE: 19254L26

COURSE OBJECTIVES:

The purpose of this laboratory is

- To make the students to learn the basic concepts of hydraulics and pneumatics and its applications in the area of manufacturing process.
- To simulate the various hydraulics and pneumatics circuits.
- The facilities in the laboratory enable students to build a firm background in PLC hardware as well as software.

COURSE OUTCOMES:

Upon completing this course, students should be able to:

- 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

NAME OF THE COURSE:

Research Methodology

COURSE CODE: 19254CRM

COURSE OBJECTIVES:

- To understand the approaches towards and constraints in good research.
- To identify various statistical tools used in research methodology
- To appreciate and compose the manuscript for publication
- To train in basic computational and excel- skills for research in engineering.

COURSE OUTCOMES:

At the end of course, the student will be able to:

- 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.

NAME OF THE COURSE:

Participation in Bounded Research

COURSE CODE: 19254CBR

COURSE OBJECTIVES:

The course aims to:

- Develop hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

COURSE OUTCOMES:

At the end of the course, Learners will be able to have a:

- Hands on exposure to problem solving tools in contemporary research
- Evolve research intuitiveness and orientation
- Familiarize with cutting edge research trends

NAME OF THE COURSE:

Technical Writing/Seminar

COURSE CODE: 192TECWR

COURSE OBJECTIVES:

Technical Writing prepares students,

To design effective technical documents for both written and digital media, with particular emphasis upon technical memos, problem-solving and decision-making reports, and organizational, product-support, and technical-information webs.

COURSE OUTCOMES:

- 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.
- Develop professional work habits, including those necessary for effective collaboration and cooperation with other students, instructors, and Service.

SEMESTER –III

NAME OF THE COURSE:

Metal Forming Process

COURSE CODE: 19254H31

COURSE OBJECTIVES:

- To develop fundamental understanding in principles of various metalworking processes and to familiarize response of materials under plastic deformation.
- To develop an understanding of how metal forming processes are carried out in industry.
- To provide a fundamental and quantitative understanding of the principles and practice of metals processing and to Determine the working load for various forming process.
- To introduce Recent developments in high speed forming process.
- Knowledge about shape-forming, machining, surface treatment and joining operations in metallic systems ranging from high purity elemental constituents to complex, multi-component alloys is gain.

COURSE OUTCOMES:

- 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.

NAME OF THE COURSE:

Design Project /SOCIO Technical Project

COURSE CODE: 19254HSR

COURSE OBJECTIVES:

- To introduce concepts and methods of engineering system at a level that can be understood and applied by postgraduate's students in real -world projects.
- To enable students to gain conceptual understanding of the complex interplay among technical, social political and cultural aspect of socio-technical systems.
- To motivate and energize students Via Mini Project Works with student and faculty mentors on complex global issues.
- To develop students problem solving and critical thinking abilities in deciding how to model and analyze a complex socio-technical system as part of their project work.

- To enable students to draw directly on their math, science and social study background in conceptual understanding and practical application of engineering system concepts and methods.
- To introduce and provide practice in use of mathematical methods and computer simulation tools used in modeling, analyzing, optimization and design of engineering systems.
- To develop students abilities in team work, oral communication and written communication as part of completion of their projects.

COURSE OUTCOMES:

On completion of this course, the students are able to;

- 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.
- An understanding of professional and ethical responsibility and communicate effectively.
- 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.

NAME OF THE COURSE:

Project Work Phase I

COURSE CODE: 19254P35

COURSE OBJECTIVES:

- To identify a specific problem for the current need of the society and collecting information related to the same through detailed review of literature.
- To develop the methodology to solve the identified problem.
- To train the students in preparing project reports and to face reviews and viva-voce examination.

COURSE OUTCOMES:

Upon completion of project work phase-I, the students will be able to:

- Demonstrate a depth of knowledge of manufacturing Engineering.
- Demonstrate a thorough 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.

SEMESTER –IV

NAME OF THE COURSE:

Project Work Phase - II

COURSE CODE: 19254P41

COURSE OBJECTIVES:

- To solve the identified problem based on the formulated methodology.
- To develop skills to analyze and discuss the test results, and make conclusions.
- To develop critical thinking for analyzing the manufacturing fields.

COURSE OUTCOMES:

After successful completion of Project Work – Phase II, the student will be able to,

- 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 chosen field of research.

ELECTIVE –I (SEMESTER-I)

NAME OF THE COURSE: **Materials Management and Logistics** **COURSE CODE: 19254E16A**

COURSE OBJECTIVES:

- To understand how the knowledge of materials management can be an advantage to logistics and supply chain operations.
- To sensitize the students on the materials management functions – Planning, Purchase, Controlling, Storing, Handling, Packaging, Shipping and Distributing, and Standardizing.
- To realize the importance of materials both in product and service.
- Use of MRP, ERP and PLM in managing materials
- To understand how Logistics, Supply Chain, Operations, Channels of Distribution fit in to various types of Business viz., Manufacturing, Service and Project.
- To understand how Warehouse Management and, other functions in Logistics fits into Logistics & Supply Chain Management.
- To understand how Managers, take decisions – strategic, tactical and operations - and how they are taken in Warehouse Management functional area.

COURSE OUTCOMES:

On completion of this course, the students will be able to meet:

- 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.

NAME OF THE COURSE: **Financial Management** **COURSE CODE: 19254E16B**

COURSE OBJECTIVES:

- To train students in various functions of finance such as working capital management, current assets management so that students will be able to make high investment decisions when they take up senior managerial positions.
- Provide the learner with an in-depth understanding of the link between company decision-making and the operation of capital markets.
- Ensure the learner understands and appreciates the strong linkages between finance and globalization.
- Demonstrate the importance of working capital management and the tools to manage it.

- Help the learner to explore the financial environment in which firms and managers must operate.

COURSE OUTCOMES:

Upon successful completion of Financial Management, the student will be able to:

- 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.

NAME OF THE COURSE: Manufacturing Information Systems COURSE CODE: 19254E16C

COURSE OBJECTIVES:

- On completion of this course, the students are expected to be conversant with order policies, data base terminologies, designing, manufacturing considerations and information system for manufacturing.
- To provide knowledge on different types of Information systems and their applications in industry.

COURSE OUTCOMES:

At the end of course, the student will be able to:

- 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.

ELECTIVE –II (SEMESTER-II)

NAME OF THE COURSE: Finite Element Application in Manufacturing COURSE CODE: 19254E24A

COURSE OBJECTIVES:

- To learn basic principles of finite element analysis procedure.
- To learn the theory and characteristics of finite elements that represent engineering structures.
- To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses.

COURSE OUTCOMES:

At the end of the course, a student will be able to,

- 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.,

NAME OF THE COURSE:

Lean Manufacturing

COURSE CODE: 19254E24B

COURSE OBJECTIVES:

- To study the various tools for lean manufacturing (LM).
- To apply the above tools to implement LM system in an organization.

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

- 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.

NAME OF THE COURSE:

Design and Analysis of Experiments

COURSE CODE: 19254E24C

COURSE OBJECTIVES:

- To study the fundamentals experimental design and various kinds of experiments.
- To design and carry out experiments and to analyze the output data using the statistical tools like Taguchi method.

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

- 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

ELECTIVE –III (SEMESTER-II)

NAME OF THE COURSE:

Advanced Metrology and Computer Aided Inspection

COURSE CODE: 19254E25A

COURSE OBJECTIVES:

The objective of this course is

- To learn various concepts of instrumentation, metrology & computer assisted inspection.
- To have practical view of various measuring, gauging instruments.

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

- 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.

NAME OF THE COURSE:

Maintenance Management

COURSE CODE: 19254E25B

COURSE OBJECTIVES:

- To ensure the maximum efficiency and availability of production equipment, utilities and related facilities at optimal cost and under satisfactory conditions of quality, safety and protection for the environment.

COURSE OUTCOMES:

At the end of the course, the students shall have the abilities to:

- 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 different levels of use of these techniques
- Cost and resources management for maintenance

NAME OF THE COURSE:

Optimization Techniques

COURSE CODE: 19254E25C

COURSE OBJECTIVES:

- To Learn classical optimization techniques and numerical methods of optimization.
- To Know the basics of different evolutionary algorithms.
- Explain Integer programming techniques and apply different optimization techniques to solve various models arising from engineering areas.

COURSE OUTCOMES:

At the end of the course, the students shall be able to:

- 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.

ELECTIVE –IV (SEMESTER-III)

NAME OF THE COURSE:

Manufacturing Systems and Simulation

COURSE CODE: 19254E32A

COURSE OBJECTIVES:

- Introduce computer simulation technologies and techniques
- Introduce concepts of modeling layers of society's critical infrastructure networks
- Build tools to view and control simulations and their results.

COURSE OUTCOMES:

At the end of this course the students are expected to

- Develop Manufacturing Models of Discrete event systems.
- Generation of Uncertainty using Random numbers and Random Variants.
- Input, Output Analysis: Verification & Validation 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.

NAME OF THE COURSE: Instrumentation and Control Engineering COURSE CODE: 19254E32B

COURSE OBJECTIVES:

- To provide essential elements of electrical circuit analysis with a definite focus on Mechanical Engineering application.
- To provide an introduction to instrumentation and devices used for measurements in electromechanical systems and introduction to automatic control systems.

COURSE OUTCOMES:

At the end of this course the students are expected to

- 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.

NAME OF THE COURSE: Artificial Intelligence and Neural Networks COURSE CODE: 19254E32C

COURSE OBJECTIVES:

- To Gain a historical perspective of AI and its foundations and familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
- To Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- To Introduce students to artificial neural networks and fuzzy theory from an engineering perspective
- Experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.
- Experiment with a machine learning model for simulation and analysis. 6. Explore the current scope, potential, limitations, and implications of intelligent systems.

COURSE OUTCOMES:

Upon successful completion of this course, the student shall be able to:

- 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 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.

ELECTIVE –V (SEMESTER-III)

NAME OF THE COURSE: **Product Design and Development** **COURSE CODE: 19254E33A**

COURSE OBJECTIVES:

- To understand the relationship between customer desires, functional requirements, and product design.
- To identify and analyze the product design and development processes in manufacturing industry.
- To define the components and their functions of product design and development processes and their relationships from concept to customer over whole product lifecycle.

COURSE OUTCOMES:

At the end of the course, students are able to:

- 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.

NAME OF THE COURSE: **Fluid Power Automation** **COURSE CODE: 19254E33B**

COURSE OBJECTIVES:

- To make the students to learn the basic concepts of hydraulics and pneumatics and their controlling elements in the area of manufacturing process.
- To train the students in designing the hydraulic and pneumatic circuits using ladder diagram.
- To train the students to get knowledge about PLC.

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- 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.

ELECTIVE –VI (SEMESTER-III)

NAME OF THE COURSE:

Advanced Material Technology

COURSE CODE: 19254E34A

OBJECTIVE:

- To enlighten the PG students on elastic, plastic and fractured behavior of engineering Materials.
- To train the PG students in selection of metallic and non-metallic materials for the various engineering applications.
- To understanding the relationship between the material structure and mechanical behavior of materials.
- To Acquiring specific and technical knowledge about ceramic materials, polymers and polymeric matrix composites, to allow optimized selection of these materials.

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- 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.

NAME OF THE COURSE

Industrial Ergonomics

COURSE CODE: 19254E34B

COURSE OBJECTIVES:

- To learn about the different types of work, from a musculoskeletal point of view, that can be found in industrial workplaces and how that can influence the type of injuries that occur.
- Learn how to use advanced hazard identification tools to identify variables that affect the safety of employees' jobs.
- Learn about and gain practice using a participatory approach to identify root causes of hazards that place employees at risk of injury and solutions to eliminate the root causes.
- Identify areas within your workplace where there is room for organizational improvement and what changes need to take place for improvement to occur.

COURSE OUTCOMES:

After completing this chapter students should be able to,

- 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.



PRIST
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THANJAVUR – 613 403 - TAMILNADU

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech – Full Time 2019R

**IDENTIFICATION OF PO's, PSO's AND COs FOR ALL UG & PG PROGRAMMES OFFERED
BY THE DEPARTMENT & ITS MAPPING**

Program Educational Objectives (PEOs)

(The graduate will)

PEO1	Graduates will pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs.
PEO2	Graduates will have the ability and attitude to adapt to emerging technological changes

Program Specific Objectives (PSOs):

PSO1	To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering.
PSO2	To apply software engineering principles and practices for developing quality software for scientific and business applications.
PSO3	To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems.

PROGRAM OUTCOMES POs:

(Engineering Graduates will be able to)

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

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and 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 and research 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, and modern 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 to assess 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 engineering solutions 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 and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or

	leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering 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 the engineering 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.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Educational Objectives (PEOs) and the Programme Outcomes (POs) is given in the following table:

Programme Educational Objectives	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PEO 1	3	3	2	3	2	1	1	2	1	1	3
PEO 2	3	3	3	3	3	1	1	1	1	1	1

Contribution 1: Reasonable 2: Significant 3: Strong

MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Specific Objectives (PSOs) and the Programme Outcomes (POs) is given in the following table:

Programme Specific Outcomes	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PSO 1	3	3	2	3	2	1	1	2	1	1	3
PSO 2	3	3	3	3	3	1	1	1	1	1	1
PSO 3	3	3	3	3	3	2	2	3	1	2	2

Contribution 1: Reasonable 2: Significant 3: Strong

B.Tech – Full Time 2019R

COURSE OUTCOME

19147S11

Communicative English

OBJECTIVES

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of general kind by developing their reading skills

OUTCOMES:

- Read articles of a general kind in magazines and newspapers.
- Participate effectively in informal conversations; introduce themselves to 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

19148S12

Engineering Mathematics I

OBJECTIVES

The goal of this course is to achieve conceptual understanding and to retain the best tradition of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multi variable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

OUTCOMES:

- 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, integral 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

To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.

- To expose them to existing national standards related to technical drawings.

OUTCOMES:

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

19150S16 Problem Solving and Python Programming

OBJECTIVES

To know the basics of algorithmic problem solving

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures — lists, tuples, dictionaries.
- To do input/output with files in Python.

OUTCOMES

Upon completion of the course, students will be able to

- 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.

19150L19 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

OBJECTIVES:

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data **from/to files in Python.**

OUTCOMES:

Upon completion of the course, students will be able to

- 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.

19149L18 PHYSICS AND CHEMISTRY LABORATORY

OBJECTIVES:

- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

OUTCOMES:

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

19147S21 Technical English

OBJECTIVES

The Course prepares second semester engineering and Technology students to:

- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write convincing job applications and effective reports.
- Develop their speaking skills to make technical presentations, participate in group discussions.
- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialization

OUTCOMES:

Learners should be able to:

- 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

19148S22 Engineering Mathematics –II

OBJECTIVES

This course is designed to cover topics such as Matrix Algebra, Vector Calculus, Complex Analysis and Laplace Transform. Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering. Vector calculus can be widely used for modelling the various laws of physics. The various methods of complex analysis and Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines

OUTCOMES

After successfully completing the course, the student will have a good understanding of the following topics and their applications:

- 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

19149S23A Physics for Information Science

OBJECTIVES

To understand the essential principles of Physics of semiconductor device and Electron transport properties. Become proficient in magnetic and optical properties of materials and Nano-electronic devices.

Gain knowledge on classical and quantum electron theories, and energy band structures

OUTCOMES

- 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..

19149S24A ENVIRONMENTAL SCIENCE AND ENGINEERING

OBJECTIVES:

- To study the nature and facts about environment.
- To find and implement scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organisms and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

OUTCOMES:

- 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

19153S25A Basic Electrical, Electronics And measurement Engineering**OBJECTIVES**

To understand the fundamentals of electronic circuit constructions.

- To learn the fundamental laws, theorems of electrical circuits and also to analyze them
- To study the basic principles of electrical machines and their performance
- To study the different energy sources, protective devices and their field applications
- To understand the principles and operation of measuring instruments and transducers

OUTCOMES

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.

19150S26A Programming in C**OBJECTIVES**

- To develop C programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions, pointers and structures
- To do input/output and file handling in C

OUTCOMES

- 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.

19154L27 ENGINEERING PRACTICES LABORATORY**OBJECTIVES:**

- To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

OUTCOMES:

On successful completion of this course, the student will be able to

- 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.

19150L28A C PROGRAMMING LABORATORY

OBJECTIVES

To develop programs in C using basic constructs.

- To develop applications in C using strings, pointers, functions, structures.
- To develop applications in C using file processing.

OUTCOMES:

Upon completion of the course, the students will be able to:

- 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.

19148C31A DISCRETE MATHEMATICS

OBJECTIVES

To extend student's logical and mathematical maturity and ability to deal with abstraction.

- To introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
- To understand the basic concepts of combinatorics and graph theory
- To familiarize the applications of algebraic structures.
- To understand the concepts and significance of lattices and boolean algebra which are widely used in computer science and engineering

OUTCOMES

- 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 relate 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

19150C32 DIGITAL PRINCIPLES AND SYSTEM DESIGN

OBJECTIVES

To design digital circuits using simplified Boolean functions

- To analyze and design combinational circuits
- To analyze and design synchronous and asynchronous sequential circuits
- To understand Programmable Logic Devices
- To write HDL code for combinational and sequential circuits

OUTCOMES

- 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

19150C33 DATA STRUCTURES

OBJECTIVES

- To understand the concepts of ADTs
- To learn linear data structures – lists, stacks, and queues
- To understand sorting, searching and hashing algorithms
- To apply Tree and Graph structures

OUTCOMES

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.

19150C34 OBJECT ORIENTED PROGRAMMING

OBJECTIVES

- To understand Object Oriented Programming concepts and basic characteristics of Java
- To know the principles of packages, inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a Java application with threads and generic classes
- To design and build simple Graphical User Interfaces

OUTCOMES

- Develop Java programs using OOP principles
- Develop Java programs with the concepts of inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Develop Java applications with threads and generic classes
- Develop interactive Java programs using swings

19150S35 COMMUNICATION ENGINEERING

OBJECTIVES

- To introduce the relevance of this course to the existing technology through demonstrations, case studies, simulations, contributions of scientist,

national/international policies with a futuristic vision along with socio-economic impact and issues

- To study the various analog and digital modulation techniques
- To study the principles behind information theory and coding
- To study the various digital communication techniques

OUTCOMES

- 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.

19150L36 DATA STRUCTURES LABORATORY

OBJECTIVES

- To implement linear and non-linear data structures
- To understand the different operations of search trees
- To implement graph traversal algorithms
- To get familiarized to sorting and searching algorithms

OUTCOMES

- Write functions to implement linear and non-linear data structure operations
- Suggest appropriate linear/nonlinear data structure for given problem

19150L37 OBJECT ORIENTED PROGRAMMING LABORATORY

OBJECTIVES

- To build software development skills using Java programming for real-world applications.
- To understand and apply the concepts of classes, packages, interfaces, arraylist, exception handling and file processing.
- To develop applications using generic programming and event handling

OUTCOMES

- 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.

19150L38 DIGITAL SYSTEMS LABORATORY

OBJECTIVES

- To understand the various basic logic gates
- To design and implement the various combinational circuits
- To design and implement combinational circuits using MSI devices.
- To design and implement sequential circuits
- To understand and code with HDL programming

OUTCOMES

- Implementsimplified combinationalcircuitsusingbasiclogic gates
- Implementcombinationalcircuitsusing MSIdevices
- Implementsequentialcircuitslikeregisters and counters
- Simulate combinationaland sequentialcircuitsusing HDL

19150L39 INTERPERSONALSKILLS/LISTENING&SPEAKING

OBJECTIVES

- Equip studentswith theEnglish language skillsrequired forthe successfulundertakingof academic studieswith primary emphasison academicspeaking and listening skills.
- Provide guidanceand practicein basic generaland classroomconversation and to engagein specific academic speaking activities.
- improvegeneraland academiclistening skills

OUTCOMES

- Make effectivepresentations
 - Listenand respond appropriately.
 - Participatein group discussions
 - Make effectivepresentations
 - Participate confidently and appropriatelyin conversationsboth formaland informal

19148C41A PROBABILITYAND QUEUINGTHEORY

OBJECTIVES

- To providenecessarybasic conceptsin probability and randomprocessesforapplications such as randomsignals, linearsystems in communication engineering.
- To understand thebasic conceptsofprobability, one and two dimensional randomvariables and to introduce some standard distributions applicableto engineeringwhich can describereal life phenomenon.
- To understand thebasic conceptsof randomprocesses which arewidelyused in IT fields.
- To understand the conceptofqueueingmodels and applyin engineering.
- To understand the significanceofadvanced queueingmodels.
- To providetherequired mathematical support inreal lifeproblems and develop probabilistic modelswhich can beused in severalareasofscience and engineering

OUTCOMES

- Understand thefundamentalknowledgeof the conceptsofprobability and haveknowledge ofstandard distributionswhich can describereal lifephenomenon.
- Understand thebasic conceptsofone and two dimensional randomvariablesandapplyin 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

19150C42 COMPUTER ARCHITECTURE

OBJECTIVES:

- To have a thorough understanding of operation of a digital computer.
- To list the operation of the arithmetic unit .
- To study in detail the different types of control and the concept of pipelining.
- To understand the hierarchy of memories.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

COURSE OUTCOME

- To have a thorough understanding of operation of a digital computer.
- To list the operation of the arithmetic unit .
- To study in detail the different types of control and the concept of pipelining.
- To understand the hierarchy of memories.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

19150C43 DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:

- To learn the fundamentals of data models .
- To understand the internal storage structures using different file and indexing techniques.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To understand the basic concepts of the emerging trends in the area of distributed DB- and OODB.

COURSE OUTCOME

- To learn the fundamentals of data models .
- To understand the internal storage structures using different file and indexing techniques.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To understand the basic concepts of the emerging trends in the area of distributed DB- and OODB.

19150C44 - DESIGN and ANALYSIS OF ALGORITHMS

OBJECTIVES:

- To prove the correctness and analyze the running time of the basic algorithms
- To apply the algorithms and design techniques to solve problems.
- To analyze the complexities of various problems in different domains.

COURSE OUTCOME

- To prove the correctness and analyze the running time of the basic algorithms
- To apply the algorithms and design techniques to solve problems.
- To analyze the complexities of various problems in different domains.

19150C46 - SOFTWARE ENGINEERING

OBJECTIVES:

- To know the generic models to structure the software development process.
- To understand different notion of complexity at both the module and system level.
- To be aware of some widely known design methods.
- To understand the role and contents of testing activities in different life cycle phases.
- **COURSE OUTCOME**
 - To know the generic models to structure the software development process.
 - To understand different notion of complexity at both the module and system level.
 - To be aware of some widely known design methods.
 - To understand the role and contents of testing activities in different life cycle phases.

19150C45- OPERATING SYSTEM

OBJECTIVES:

- To have an overview of different types of operating systems.
- To know the components of an operating system.
- To have a knowledge of process management and storage management.
- To know the concepts of I/O and file systems.
- To know the concepts of Distributed Operating System
- **Course outcomes:**
 - Analyze the structure of OS and basic architectural components involved in OS design
 - Analyze and design the applications to run in parallel either using process or thread models of different OS
 - Analyze the various device and resource management techniques for timesharing and distributed systems

19150L47Database Management Systems Laboratory

OBJECTIVES

- The aim of this laboratory is to inculcate the abilities of applying the principles of

the database management systems. This course aims to prepare the students for projects where a proper implementation of databases will be required

- To understand data definitions and data manipulation commands
- To learn the use of nested and join queries
- To understand functions, procedures and procedural extensions of databases
- To be familiar with the use of a front-end tool
- To understand design and implementation of typical database applications

OUTCOMES

- 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

19150L48 OPERATING SYSTEMS LABORATORY

OBJECTIVES

- To learn Unix commands and shell programming
- To implement various CPU Scheduling Algorithms
- To implement Process Creation and InterProcess Communication.
- To implement Deadlock Avoidance and Deadlock Detection Algorithms
- To implement Page Replacement Algorithms
- To implement File Organization and File Allocation Strategies.

OUTCOMES

- 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

19150L49 ADVANCED READING AND WRITING

OBJECTIVES

- Strengthen the reading skills of students of engineering.
- Enhance their writing skills with specific reference to technical writing.
- Develop students' critical thinking skills.
- Provide more opportunities to develop their project and proposal writing skills

OUTCOMES

- Write different types of essays.
- Write winning job applications.
- Read and evaluate texts critically.
- Display critical thinking in various professional contexts.

19148S51A ALGEBRA AND NUMBER THEORY

OBJECTIVES

- To introduce the basic notions of groups, rings, fields which will then be used to solve related problems.
- To introduce and apply the concepts of rings, finite fields and polynomials.
- To understand the basic concepts in number theory
- To examine the key questions in the Theory of Numbers.
- To give an integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

OUTCOMES

- 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 an integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

19150C52 COMPUTER NETWORKS

OBJECTIVES:

- To learn the fundamentals of data models .
- To understand the internal storage structures using different file and indexing techniques.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To understand the basic concepts of the emerging trends in the area of distributed DB- and OODB.

COURSE OUTCOME

- To learn the fundamentals of data models .
- To understand the internal storage structures using different file and indexing techniques.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To understand the basic concepts of the emerging trends in the area of distributed DB- and OODB.

19150C53 MICROPROCESSORS AND MICROCONTROLLERS

OBJECTIVES

- To understand the Architecture of 8086 microprocessor.

- To learn the design aspects of I/O and Memory Interfacing circuits.
- To interface microprocessors with supporting chips.
- To study the Architecture of 8051 microcontroller.
- To design a microcontroller based system

OUTCOMES

- 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.

19150C55 THEORY OF COMPUTATION

OBJECTIVES:

- To focus on the study of abstract models of computation.
- To assess via formal reasoning what could be achieved through computing when they are using it to solve problems in science and engineering.
- To introduce fundamental questions about problems, such as whether they can or not be computed, and if they can, how efficiently.
- **COURSE OUTCOME**
- discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving.
- explain the models of computation, including formal languages, grammars and automata, and their connections.
- state and explain the Church-Turing thesis and its significance.
- analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
- solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation.

19150C56 OBJECT ORIENTED ANALYSIS AND DESIGN

OBJECTIVES:

- To study the concepts of modeling in object oriented context.
- To learn about the Object Constraint Language.
- To study the Use cases, Interaction Diagrams, Class Diagrams and System Sequence Diagrams.
- To study implementation related issues.
- To study and learn how to apply advanced techniques including Architectural Analysis and Design Patterns.

- **COURSE OUTCOME**

- Analyse, design, document the requirements through use case driven approach.
- .Identify, analyse, and model structural and behavioural concepts of the system.
- Develop,explore the conceptual model into various scenarios and applications.
- Apply the concepts of architectural design for deploying the code for software.

19150L57MICROPROCESSORS ANDMICROCONTROLLERS LABORATORY

OBJECTIVES

- To IntroduceALPconcepts, features and Codingmethods
- WriteALP forarithmeticand logicaloperationsin 8086 and8051
- DifferentiateSerialand ParallelInterface
- InterfacedifferentI/Oswith Microprocessors
- Befamiliarwith MASM
- To IntroduceALPconcepts, features and Codingmethods

OUTCOMES

- WriteALP forarithmeticand logicaloperationsin 8086 and8051
- DifferentiateSerialand ParallelInterface
- InterfacedifferentI/Oswith Microprocessors
- Befamiliarwith MASM

19150L58 OBJECTORIENTED ANALYSISANDDESIGN LABORATORY

OBJECTIVES

- To capturetherequirements specification foran intended software system
- To drawtheUMLdiagramsfor the givenspecification
- To map the design properlyto code
- To test the softwaresystem thoroughlyforallscenarios
- To improvethedesign by applying appropriatedesign patterns.

OUTCOMES

- Upon completion of this course, the studentswillbe ableto:
- Perform OOanalysis and design fora given problemspecification.
- Identify and map basic softwarerequirementsin UMLmapping.
- Improvethe softwarequalityusingdesign patterns andto explain therationalebehind applying specificdesign patterns
- Test the complianceof the softwarewith theSRS

19150L59 NETWORKSLABORATORY

OBJECTIVES

- To learn and usenetwork commands.
- To learn socketprogramming.
- To implementand analyzevariousnetwork protocols.
- To learn and use simulationtools.

- To use simulation tools to analyze the performance of various network protocols

OUTCOMES

- 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.

19150CRM RESEARCH METHODOLOGY

OBJECTIVES

To create a basic appreciation towards research process and awareness of various research publications

- To understand the steps in research process and the suitable methods.
- To identify various research communications and their salient features
- To carry out basic literature survey using the common data-bases
- To give exposure to standard laboratory precautions and best practices for experimental work
- To provide orientation for basic mathematical computation useful in basic research

OUTCOMES

Ability to carry out independent literature survey corresponding to the specific publication type and assess basic experimental as well as conceptual set up.

19150C61 INTERNET PROGRAMMING

OBJECTIVES

- To understand different Internet Technologies.
- To learn java-specific web services architecture To design a context free grammar for any given language

OUTCOMES

- Build dynamic web page with validation using JavaScript 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 Derive whether a problem is decidable or not.

19150C62 ARTIFICIAL INTELLIGENCE

OBJECTIVES:

- To study various complex problem solving AI tools like Search and optimization
- To facilitate of logic, Probabilistic methods for uncertain reasoning, Classifiers and statistical learning methods, Neural networks, Control theory & Languages.
- To develop programming skills for AI applications.

- To provide exposure to logic programming with practical topics.
- **COURSE OUTCOME**
- Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents
- Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.

19150C63 MOBILE COMPUTING

OBJECTIVES

- To understand the basic concepts of mobile computing.
- To learn the basics of mobile telecommunication system.
- To be familiar with the network layer protocols and Ad-Hoc networks.
- To know the basis of transport and application layer protocols.
- To gain knowledge about different mobile platforms and application development.

OUTCOMES

- 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

19150C64 COMPILER DESIGN

OBJECTIVES

- To learn the various phases of compiler.
- To learn the various parsing techniques.
- To understand intermediate code generation and run-time environment.
- To learn to implement front-end of the compiler.
- To learn to implement code generator.

OUTCOMES

- 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.

19150C65 DISTRIBUTED SYSTEMS

OBJECTIVES

- To understand the foundations of distributed systems.
- To learn issues related to clock Synchronization and the need for global state in distributed systems.
- To learn distributed mutual exclusion and deadlock detection algorithms.
- To understand the significance of agreement, fault tolerance and recovery protocols in

- Distributed Systems.
- To learn the characteristics of peer-to-peer and distributed shared memory systems.

OUTCOMES

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 system.

19150L67 INTERNET PROGRAMMING LABORATORY

OBJECTIVES

- To be familiar with Web page design using HTML/XML and style sheets
- To be exposed to creation of user interfaces using Java frames and applets.
- To learn to create dynamic web pages using server-side scripting.
- To learn to write Client Server applications.
- To be familiar with the PHP programming.
- To be exposed to creating applications with AJAX

OUTCOMES

- Construct Web pages using HTML/XML and style sheets.
- Build dynamic web pages with validation using JavaScript 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.

19150L68 MOBILE APPLICATION DEVELOPMENT LABORATORY

OBJECTIVES

- To understand the components and structure of mobile application development frameworks for Android and Windows OS based mobiles.
- To understand how to work with various mobile application development frameworks.
- To learn the basic and important design concepts and issues of development of mobile applications.
- To understand the capabilities and limitations of mobile devices.

OUTCOMES

- 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.

19150C71 PRINCIPLES OF MANAGEMENT

OBJECTIVES

- To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization

OUTCOMES

Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have some basic knowledge on international aspect of management

19150C72 CRYPTOGRAPHY AND NETWORK SECURITY

OBJECTIVES

- To understand Cryptography Theories, Algorithms and Systems.
- To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks..

OUTCOMES

- Understand the fundamentals of network 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

19150C73 CLOUD COMPUTING

OBJECTIVES

- To understand the concept of cloud computing.
- To appreciate the evolution of cloud from the existing technologies.
- To have knowledge on the various issues in cloud computing.
- To be familiar with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.

OUTCOMES

- 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.

19150L77 CLOUD COMPUTING LABORATORY

OBJECTIVES

- To develop web applications in cloud
- To learn the design and development process involved in creating a cloud based application
- To learn to implement and use parallel programming using Hadoop

OUTCOMES

- 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 news schedulers.
- Install and use a generic cloud environment that can be used as a private cloud.
- Manipulate large data sets in a parallel environment.

19150L78 SECURITY LABORATORY

OBJECTIVES

- To learn different cipher techniques
- To implement the algorithms DES, RSA, MD5, SHA-1
- To use network security tools and vulnerability assessment tools

OUTCOMES

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

19150E66A DATA WAREHOUSING AND DATA MINING

OBJECTIVES

- To understand data warehouse concepts, architecture, business analysis and tools
- To understand data pre-processing and data visualization techniques
- To study algorithms for finding hidden and interesting patterns in data
- To understand and apply various classification and clustering techniques using tools.

OUTCOMES

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

19150E66B SOFTWARE TESTING

OBJECTIVES:

- To determine software testing objectives and criteria.
- To develop and validate a test plan.
- To select and prepare test cases.
- To identify the need for testing.
- To prepare testing policies and standards.
- To use testing aids and tools.
- To test before buying a software package and Test after maintenance and enhancement changes.
- To measure the success of testing efforts.
- **COURSE OUTCOME**
- Various test processes and continuous quality improvement
- Types of errors and fault models
- Methods of test generation from requirements
- Behavior modeling using UML: Finite state machines (FSM)
- Test generation from FSM models
- Input space modeling using combinatorial designs
- Combinatorial test generation
- Test adequacy assessment using: control flow, data flow, and program mutations
- The use of various test tools
- Application of software testing techniques in commercial environments

19150E66C EMBEDDED SYSTEMS

OBJECTIVES

- To learn the architecture and programming of ARM processor.
- To become familiar with the embedded computing platform design and analysis.
- To get thorough knowledge in interfacing concepts
- To design an embedded system and to develop programs.

OUTCOMES

- 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

19150E66D AGILE METHODOLOGIES

OBJECTIVES

- To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
 - To provide a good understanding of software design and a set of software technologies and APIs

- . To do a detailed examination and demonstration of Agile development and testing techniques.
- To understand the benefits and pitfalls of working in an Agile team.
- To understand Agile development and testing.

OUTCOMES

- Perform iterative software development processes: how to plan them, how to execute them.
- Point out the impact of social aspects on software development success.
- 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.

19150E66E GRAPH THEORY AND APPLICATIONS

OBJECTIVES

- To understand fundamentals of graph theory.
- To study proof techniques related to various concepts in graphs.
- To explore modern applications of graph theory.

OUTCOMES

- 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.

19150E66F DIGITAL SIGNAL PROCESSING

OBJECTIVES

- To understand the basics of discrete time signals, systems and their classifications.
- To analyze the discrete time signals in both time and frequency domain.
- To design low pass digital IIR filters according to predefined specifications based on analog filter theory and analog-to-digital filter transformation.
- To design Linear phase digital FIR filters using Fourier method, window technique
- To realize the concept and usage of DSP in various engineering fields

OUTCOMES

- 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

19150E75A BIG DATA ANALYTICS

OBJECTIVES

- To know the fundamental concepts of big data and analytics.
- To explore tools and practices for working with big data
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data

OUTCOMES

- Learn and apply different mining algorithms and recommendation systems for large data
- Perform analytics on data streams
- Learn NoSQL databases and management..

19150E75B MACHINE LEARNING TECHNIQUES

OBJECTIVES

- To understand the need for machine learning for various problems solving
- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To understand the latest trends in machine learning
- To design appropriate machine learning algorithms for problems solving

OUTCOMES

- Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
- Discuss the decision tree algorithm and identify and overcome the problem of overfitting
- Discuss and apply the backpropagation 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

19150E75C COMPUTER GRAPHICS AND MULTIMEDIA

OBJECTIVES

- To develop an understanding and awareness of issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wider range of audiences and end users.

- To become familiar with various software programs used in the creation and implementation of multi-media
- To appreciate the importance of technical ability and creativity within design practice.
- To gain knowledge about graphics hardware devices and software used.
- To understand the two-dimensional graphics and their transformations.
- To understand the three-dimensional graphics and their transformations.
- To appreciate illumination and color models
- To become familiar with understand clipping techniques
- To become familiar with Blender Graphics

OUTCOMES

- 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

19150E75D SOFTWARE PROJECT MANAGEMENT

OBJECTIVES:

- Understand Project planning and management
- Identify Client management and project definition
- Understand testing based approach to development
- Team management and ongoing schedule tracking
-
- **COURSE OUTCOME**
 - Estimate project cost and perform cost-benefit evaluation among projects
 - Perform project scheduling, activity network analysis and risk management
 - Apply schedule and cost control techniques for project monitoring including contract management

19150E75E INTERNET OF THINGS

OBJECTIVES

- To understand Smart Objects and IoT Architectures
- To learn about various IOT-related protocols
- To build simple IoT Systems using Arduino and Raspberry Pi.
- To understand data analytics and cloud in the context of IoT
- To develop IoT infrastructure for popular applications

OUTCOMES

- Explain the concept of IoT.
- Analyze various protocols for IoT.
- Design a PoC of an IoT system using Raspberry Pi/Arduino
- Apply data analytics and use cloud offerings related to IoT.

- Analyze applications of IoT in real time scenario

19150E75F SERVICE ORIENTED ARCHITECTURE

OBJECTIVES

To learn fundamentals of XML

- To provide an overview of Service Oriented Architecture and Webservices and their importance
- To learn web services standards and technologies
- To learn service oriented analysis and design for developing SOA based applications

OUTCOMES

Understand XML technologies

- Understand service orientation, benefits of SOA
- Understand webservices and WS standards
- Use webservices extensions to develop solutions

19150E75G TOTAL QUALITY MANAGEMENT

OBJECTIVE:

- Develop the ability to adopt new techniques and synthesize new knowledge.
- Analyze basic operational and research data using TQM techniques in a systematic way.
- Cooperate efficiently and effectively in a team to apply TQM techniques and tools for accomplishing pre-determined goals.
- **COURSE OUTCOME**

Evaluate the principles of quality management and to explain how these principles can be applied within quality management systems.

2. Identify the key aspects of the quality improvement cycle and to select and use appropriate tools and techniques for controlling, improving and measuring quality.

3. Critically appraise the organisational, communication and teamwork requirements for effective quality management

4. Critically analyse the strategic issues in quality management, including current issues and developments, and to devise and evaluate quality implementation plans

19150E76A MULTI-CORE ARCHITECTURES AND PROGRAMMING

OBJECTIVES

- To understand the need for multi-core processors, and their architecture.
- To understand the challenges in parallel and multi-threaded programming.
- To learn about the various parallel programming paradigms,
- To develop multi-core programs and design parallel solutions

OUTCOMES

- 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 parallel processors.

19150E76B HUMAN COMPUTER INTERACTION

OBJECTIVES

- To learn the foundations of Human Computer Interaction.
- To become familiar with the design technologies for individuals and persons with disabilities.
- To be aware of mobile HCI.
- To learn the guidelines for user interface.

OUTCOMES

Explain the HCI implications for designing multimedia/e-commerce/e-learning Websites.

- Develop meaningful user interface.

19150E76C C# AND .NET PROGRAMMING

OBJECTIVES

- To learn basic programming in C# and the object-oriented programming concepts.
- To update and enhance skills in writing Windows applications, ADO.NET and ASP.NET.
- To study the advanced concepts in data connectivity, WPF, WCF and WPF with C# and .NET 4.5.
- To implement mobile applications using .NET compact framework
- To understand the working of base class libraries, their operations and manipulation of data using XML.

OUTCOMES

Write various applications using C# Language in the .NET Framework.

- Develop distributed applications using .NET Framework.
- Create mobile applications using .NET compact Framework.

19150E76D WIRELESS ADHOC AND SENSOR NETWORKS

OBJECTIVES

- To learn about the issues and challenges in the design of wireless ad hoc networks.
- To understand the working of MAC and Routing Protocols for ad hoc and sensor networks
- To learn about the Transport Layer protocols and their QoS for ad hoc and sensor networks.

- To understand various security issues in ad hoc and sensor networks and the corresponding solution

OUTCOMES

Identify and understand security issues in ad hoc and sensor networks

19150E76G HUMAN RIGHTS

OBJECTIVES

To sensitize the Engineering students to various aspects of Human Rights.

OUTCOMES

Engineering students will acquire the basic knowledge of human rights.

19150E81A DIGITAL IMAGE PROCESSING

OBJECTIVES

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

OUTCOMES

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.

19150E81B SOCIAL NETWORK ANALYSIS

OBJECTIVES

To understand the concept of semantic web and related applications.

- To learn knowledge representation using ontology.
- To understand human behaviour in social web and related communities.
- To learn visualization of social networks.

OUTCOMES

Develop semantic web related applications.

- Represent knowledge using ontology.
- Predict human behaviour in social web and related communities.

- Visualize social networks

19150E81C INFORMATION SECURITY

OBJECTIVES

- To understand the basics of Information Security
- To know the legal, ethical and professional issues in Information Security
- To know the aspects of risk management
- To become aware of various standards in this area
- To know the technological aspects of Information Security

OUTCOMES

- 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

19150E81D SOFTWARE DEFINED NETWORKS

OBJECTIVES

- To learn the fundamentals of software defined networks.
- To understand the separation of the data plane and the control plane.
- To study about the SDN Programming.
- To study about the various applications of SDN

OUTCOMES

- 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

19150E81E CYBER FORENSICS

OBJECTIVES

- To learn computer forensics
- To become familiar with forensic tools
 - To learn to analyze and validate forensic data

OUTCOMES

- Understand the basics of computer forensics
- Apply a number of different computer forensic tools to a given scenario
- Analyze and validate forensic data
- Identify the vulnerabilities in a given network infrastructure
- Implement real-world hacking techniques to test system security.

19150E81F SOFT COMPUTING

OBJECTIVES

- To learn the basic concepts of Soft Computing
- To become familiar with various techniques like neural networks, genetic algorithms and fuzzy systems.
- To apply soft computing techniques to solve problems.

OUTCOMES

- Apply suitable soft computing techniques for various applications.
- Integrate various soft computing techniques for complex problems

19150E81G PROFESSIONAL ETHICS IN ENGINEERING

OBJECTIVES

To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

OUTCOMES

To apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

19150E82A INFORMATION RETRIEVAL TECHNIQUES

OBJECTIVES

- To understand the basics of Information Retrieval.
- To understand machine learning techniques for text classification and clustering.
- To understand various search engine system operations.
- To learn different techniques of recommender system

OUTCOMES

- 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.

19150E82B GREEN COMPUTING

OBJECTIVES

- To learn the fundamentals of Green Computing.
- To analyze the Green computing Grid Framework.
- To understand the issues related with Green compliance.
- To study and develop various case studies.

OUTCOMES

- 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 carbon footprint by the stakeholders.
- Understand the ways to minimize equipment disposal requirements.

19150E82C

GPU ARCHITECTURE AND PROGRAMMING

OBJECTIVES

- To understand the basics of GPU architectures
- To write programs for massively parallel processors
- To understand the issues in mapping algorithms for GPUs
- To introduce different GPU programming models

OUTCOMES

- 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

19150E82D NATURAL LANGUAGE PROCESSING

OBJECTIVES

- To learn the fundamentals of natural language processing
- To understand the use of CFG and PCFG in NLP
- To understand the role of semantics of sentences and pragmatics
- To apply the NLP techniques to IR applications

OUTCOMES

- To implement a rule-based system to tackle morphology/syntax of a language
- To design a tagset 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

19150E82E PARALLEL ALGORITHMS

OBJECTIVES

- To understand different parallel architectures and models of computation.
- To introduce the various classes of parallel algorithms.
- To study parallel algorithms for basic problems

OUTCOMES

- Develop parallel algorithms for standard problems and applications.
- Analyse efficiency of different parallel algorithms.

19150E82F SPEECH PROCESSING

OBJECTIVES

- To understand the fundamentals of the speech processing
- Explore the various speech models
- Gather knowledge about the phonetics and pronunciation processing
- Perform wavelet analysis of speech
- To understand the concepts of speech recognition

OUTCOMES

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

19150E82G FUNDAMENTALS OF NANO SCIENCE

OBJECTIVES

To learn about basis of nanomaterials science, preparation method, types and application

OUTCOMES

Familiarize about the science of nanomaterials

- Demonstrate the preparation of nanomaterials
- Develop knowledge in characteristic nanomaterial



**SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

M.Tech – Full Time 2019R

**IDENTIFICATION OF PO's, PSO's AND COs FOR ALL UG & PG PROGRAMMES
OFFERED BY THE DEPARTMENT & ITS MAPPING**

Program Educational Objectives (PEOs)

(The graduate will)

PEO1	Graduates will pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs.
PEO2	Graduates will have the ability and attitude to adapt to emerging technological changes

Program Specific Objectives (PSOs):

PSO1	To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering.
PSO2	To apply software engineering principles and practices for developing quality software for scientific and business applications.
PSO3	To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems.

PROGRAM OUTCOMES POs:

(Engineering Graduates will be able to)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and 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 and research 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, and modern 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 to assess 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 engineering solutions 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 and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering 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.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Educational Objectives (PEOs) and the Programme Outcomes (POs) is given in the following table:

Programme Educational Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	PEO 1	3	3	2	3	2	1	1	2	1
PEO 2	3	3	3	3	3	1	1	1	1	1
PEO 3	3	3	3	3	3	2	2	3	1	2

Contribution 1: Reasonable 2: Significant 3: Strong

MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Specific Objectives (PSOs) and the Programme Outcomes(POs) is given in the following table:

Programme Specific Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	PSO 1	3	3	2	3	2	1	1	2	1
PSO 2	3	3	3	3	3	1	1	1	1	1
PSO 3	3	3	3	3	3	2	2	3	1	2

Contribution 1: Reasonable 2: Significant 3: Strong

M.Tech – Full Time 2019R

COURSE OUTCOME

19248S11AHIGHER MATHEMATICS

Objectives:

- 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.

Course outcomes:

- to know how root finding techniques can be used to solve practical engineering problems.
- to apply the concept of numerical analysis to find the relative strengths and weaknesses of each computation method and know which are most applicable for given problem.
- to apply the analytical technique to express periodic function as a Fourier sine and cosine series

19250C12MODERN OPERATING SYSTEM

Objectives:

- 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.

Course outcomes:

- Analyze the structure of OS and basic architectural components involved in OS design
- Analyze and design the applications to run in parallel either using process or thread models of different OS
- Analyze the various device and resource management techniques for time sharing and distributed systems

19250C13PARALLEL AND HIGH PERFORMANCE COMPUTING

Objectives:

- To understand the models and parameters used.

- To understand the Matrix Algorithms and DesignIssues.

Course outcomes:

- Describe the High performance computing environments like Parallel, Distributed, Clusters, etc.
- Compare the Static as well as Dynamic Interconnection networks for Parallel Computing.
- Create new algorithms for real-life problems for any given High Performance architecture.

19250C14 ADHOC AND SENSOR NETWORK

Objectives:

- 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.

Course outcomes:

- Students will be able to describe an ad hoc network and analyze various technologies associated with it.
- Students will be able to analyze various transport layer and analyze various protocols associated with it.
- Students will apply this knowledge to analyze ad hoc & sensor based networks and compute various parameters associated with it.

19250C15 ADVANCED DATA STRUCTURES AND ALGORITHMS

Objectives:

- The Different Heap Structures, Search Structures and Multimedia Structures.
- The various coding scheduling and algorithms.
- The various multimedia structures.

Course outcomes:

- Design and analyze programming problem statements.
- Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.
- Understand the necessary mathematical abstraction to solve problems.

19250E16A MULTIMEDIA SYSTEMS

OBJECTIVES:

- To study the graphics techniques and algorithms.
- To study the multimedia concepts and various I/O technologies.

Course outcomes:

- Developed understanding of technical aspect of Multimedia Systems.
- Understand various file formats for audio, video and text media.
- Develop various Multimedia Systems applicable in real time.
- Design interactive multimedia software.
- Apply various networking protocols for multimedia applications.
- To evaluate multimedia application for its optimum performance.

19250E16B GENETIC ALGORITHMS:

OBJECTIVES:

OBJECTIVES:

- 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.
- to find exact or approximate solutions to optimization and search problems.

Course outcomes:

- Explain the of the principles underlying Evolutionary Computation in general and Genetic Algorithms in particular.
- Apply Evolutionary Computation Methods to find solutions to complex problems
- Analyze and experiment with parameter choices in the use of Evolutionary Computation
- Summarize current research in Genetic Algorithms and Evolutionary Computing

19250E16C SOFTWARE METRICS**Objectives:**

- Approach to software development incorporating quality management methodologies.
- To study about the quality improvements in software
- To understand the Software Quality software standards

Course outcomes:

- Able to understand the importance of the software development process
- Analyze the importance of modeling and modeling languages
- Design and develop correct and robust software products, going beyond freshman and sophomore levels of programming;

19250C21 MIDDLEWARE TECHNOLOGIES**Objectives:**

- 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.

Course outcomes:

- 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.

19250C22 OBJECT ORIENTED SOFTWARE ENGINEERING**Objectives:**

- To learn about software prototyping, analysis and design.
- To learn UML and its usage.
- Case studies to apply the principles.

Course outcomes:

- Develop teamwork and management skills to divide tasks and effectively develop projects in large software teams.
- Produce industry standard documentation from requirements, analysis, and design through testing and verification.

19250C23 DIGITAL IMAGE PROCESSING**Objectives:**

- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.

Course outcomes:

- Review the fundamental concepts of a digital image processing system.
- Analyze images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.

19250E24A - Advanced Distributed Computing

OBJECTIVES:

Understanding the concepts of

- processing . distributed systems, operating system issues.
- learn about distributed transaction
- study about the distributed databases.

Course outcomes:

- Understand the concepts and issues related to distributed systems.
- Design and develop the programs for distributed environment.
- Manage performance, reliability and other issues while designing in distributed environment

19250E24B DATA WAREHOUSING & DATA MINING

OBJECTIVES:

- 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.

Course outcomes:

- Understand the functionality of the various data mining and data warehousing component
- Appreciate the strengths and limitations of various data mining and data warehousing models
- Explain the analyzing techniques of various data

19250E24C- Artificial Neural Networks

OBJECTIVES:

- 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

Course outcomes:

- Know the main provisions neuromathematics;
- Know the main types of neural networks;
- Know and apply the methods of training neural networks;
- Know the application of artificial neural networks;

- To be able to formalize the problem, to solve it by using a neural network.

19250E25A SERVICE ORIENTED ARCHITECTURE

Objectives:

- Understand SOA, service orientation and webservices
- Analyzing and designing business based on SOA principles.
- Learning the concepts of XML.

Course outcomes:

- Gained knowledge on creation of SOA compliant web service using various technologies and acquire hands-on experience on the same through the practical course
- Gained knowledge on various service oriented analysis techniques
- Also understand the technology underlying the service design

19250E25B - High Speed Networks

OBJECTIVES:

- 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

Course outcomes:

- Develop specialised knowledge related to the building blocks and operation of high speed networking technology to research and analyse a network in terms of quality and liability of the individual components;
- Determine related hardware and software components to meet the designed network; and Analyse critically and reflect on the relations and interrelations of the designed network

17250E25C- Embedded Systems

OBJECTIVES:

- 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 – IRTOS.

Course outcomes:

- Understand hardware and software design requirements of embedded systems.
- Analyze the embedded systems' specification and develop software programs.
- Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.

19250C31 SOFTWARE PROJECT MANAGEMENT

Objectives:

- Understand Project planning and management.
- Identify Client management and project definition.
- Understand testing based approach to development.
- Team management and ongoing schedule tracking.

Course outcomes:

- Estimate project cost and perform cost-benefit evaluation among projects
- Perform project scheduling, activity network analysis and risk management
- Apply schedule and cost control techniques for project monitoring including contract management.

19250E32A CLOUD COMPUTING

Objectives:

- Identify cloud computing models, characteristics, and technologies.
- Get knowledge about the different architectures in cloud.
- Identify the information about service management and cloud securities.

Course outcomes:

- Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.
- Design different workflows according to requirements and apply a predictive programming model.
- Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms

17250E32B - Information Security

OBJECTIVES

- 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.

Course outcomes:

- Examine and apply the fundamental techniques of computer security.
- Identify and explain potential security issues.
- Demonstrate responsible computer use as it deals with social, political, legal and ethical issues in today's electronic society.
- Demonstrate foundation knowledge of information security/assurance within the organization.

19250E33A ADVANCED DATABASE TECHNOLOGY

Objectives:

- Know the operations of parallel and distributed databases.
- Understand the structures and standards of object relational databases.
- Get familiar with the concepts of XML, Mobile and Multimedia Databases.

Course outcomes:

- Apply normalization techniques.
- Understand how transactions are processed in a database.
- Discuss/explain the concepts of Distributed Databases and Data Warehousing.

19250E32C - Soft Computing

OBJECTIVES:

- To introduce the ideas of Neural networks, fuzzy logic and use of heuristics based 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.

Course outcomes:

- Understand soft computing techniques and their role in problem solving.
- Conceptualize and parameterize various problems to be solved through basic soft computing techniques.
- Analyze and integrate various soft computing techniques in order to solve problems effectively and efficiently.

19250E33A – ADVANCED DATABASE TECHNOLOGY

OBJECTIVES:

Be able to

- Know the operations of parallel and distributed databases.
- Understand the structures and standards of object relational databases.
- Get familiar with the concepts of XML, Mobile and Multimedia Databases.

Course outcomes:

- Be able to develop new methods in databases based on knowledge of existing techniques.
- Ability to apply acquired knowledge for developing holistic solutions based on database systems/database techniques.

17250E33B - Mobile Communication and Computing

OBJECTIVES:

- 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.

Course outcomes:

- Understand fundamentals of wireless communications.
- Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
- Demonstrate basic skills for cellular networks design.
- Apply knowledge of TCP/IP extensions for mobile and wireless networking.
-

19250E33C - Green Computing

OBJECTIVES:

- 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.

Course outcomes:

- give an account of the concept green IT
- give an account of environmental perspectives on IT use
- give an account of standards and certifications related to sustainable IT products
- describe green IT in relation to technology

19250E34A SOFTWARE QUALITY ASSURANCE

Objectives:

- 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 standards

Course outcomes:

- Apply the techniques learned to improve the quality of their own software development
- Prepare a software quality plan for a software project - to include sections on change management, configuration management, defect elimination, validation and verification and measurement.

19250E34B - Bio-Informatics

OBJECTIVES:

- 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 outcome:

- To get introduced to the basic concepts of Bioinformatics and its significance in Biological data analysis.
- Describe the history, scope and importance of Bioinformatics and role of internet in Bioinformatics.
- Overview about types and Biological data and database search tools.

19250E34C - Wireless Application Protocols

OBJECTIVE:

- 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 applications.

Course outcome:

- Understand fundamentals of wireless communications.
- Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
- Demonstrate basic skills for cellular networks design.
- Apply knowledge of TCP/IP extensions for mobile and wireless networking.

19250CRMRESEARCH METHODOLOGY

Objectives:

- To understand the approaches towards and constraints in good research.
- To identify various statistical tools used in research methodology
- To appreciate and compose the manuscript for publication
- To train in basic computational and excel- skills for research in engineering.

Course outcome:

Ability to develop research questions and the various research strategies, and compile research results in terms of journal manuscripts.

19250L17ADVANCED WEB TECHNOLOGIES LAB

Objectives:

- 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

Course outcomes:

- Students are able to develop a dynamic webpage by the use of java script and DHTML.
- Students will be able to write a well formed / valid XML document.
- Students will be able to connect a java program to a DBMS and perform insert, update

and delete operations on DBMStable.

19250L26.NET TECHNOLOGIES LAB

Objectives:

- Introduce to .Net IDE ComponentFramework.
- Programming concepts in .NetFramework.
- Creating website using ASP.NetControls.

Course outcomes:

- Create user interactive web pages usingASP.Net.
- Create simple data binding applications using ADO.Netconnectivity.
- Performing Database operations for Windows Form and webapplications.

192TECWRTECHNICAL WRITING /SEMINARS

Objectives:

- Provide a clear understanding of the role and purpose of **technical** documents or the specifications.
- Present a framework for organizing and producing**technical**documents and specifications.
- Define the key steps involved in creating effective **technical**documents.

Course outcomes:

- Students will understand and know how to follow the stages of the writing process (prewriting/writing/rewriting)andapplythemtottechnicalandworkplacewritingtasks.
- Students will be able to produce a set of documents related to technology and writing in the workplace and will have improved their ability to write clearly andaccurately.
- Students will understand the basic components of definitions, descriptions, process explanations, and other common forms of technicalwriting.

19250CRSRESEARCH LED SEMINAR

Objectives:

- Data statistics and discussion details to be observed during the seminarpresentation.

Course outcomes:

- Key themes were observed from research led seminarpresentation.

19250CBRPARTICIPATION IN BOUNDED RESEARCH

Objectives:

- Task allotment and completion schedule to beformatted.

Course outcomes:

- The detailed report for the completion of task is enclosed and evaluation report submitted.

19250CSRDESIGN/SOCIO TECHNICAL PROJECT

Objectives:

- Task allotment and completion schedule to beformatted.

Course outcomes:

- The detailed report for the completion of task is enclosed and evaluation report submitted.

19250P41PROJECT WORK:

Objectives:

- To develop the ability to solve a specific problem right from its identificationand

literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination

Course outcomes:

- 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.



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THANJAVUR – 613 403 - TAMILNADU

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech – Full Time 2019R

Programme Educational Objectives

Bachelor of Electrical and Electronics Engineering curriculum is designed to prepare the graduates having attitude and knowledge to

1. Have successful technical and professional careers in their chosen fields such as circuit theory, Field theory, control theory and computational platforms.
2. Engross in life long process of learning to keep themselves abreast of new developments in the field of Electronics and their applications in power engineering.

Programme Outcomes

The graduates will have the ability to

- a. Apply the Mathematical knowledge and the basics of Science and Engineering to solve the problems pertaining to Electronics and Instrumentation Engineering.
- b. Identify and formulate Electrical and Electronics Engineering problems from research literature and be able to analyze the problem using first principles of Mathematics and Engineering Sciences.
- c. Come out with solutions for the complex problems and to design system components or process that fulfill the particular needs taking into account public health and safety and the social, cultural and environmental issues.
- d. Draw well-founded conclusions applying the knowledge acquired from research and research methods including design of experiments, analysis and interpretation of data and synthesis of information and to arrive at significant conclusion.
- e. Form, select and apply relevant techniques, resources and Engineering and IT tools for Engineering activities like electronic prototyping, modeling and control of systems and also being conscious of the limitations.

f. Understand the role and responsibility of the Professional Electrical and Electronics Engineer and to assess societal, health, safety issues based on the reasoning received from the contextual knowledge.

g. Be aware of the impact of professional Engineering solutions in societal and environmental contexts and exhibit the knowledge and the need for Sustainable Development.

h. Apply the principles of Professional Ethics to adhere to the norms of the engineering practice and to discharge ethical responsibilities.

i. Function actively and efficiently as an individual or a member/leader of different teams and multidisciplinary projects.

j. Communicate efficiently the engineering facts with a wide range of engineering community and others, to understand and prepare reports and design documents; to make effective presentations and to frame and follow instructions.

k. Demonstrate the acquisition of the body of engineering knowledge and insight and Management Principles and to apply them as member / leader in teams and multidisciplinary environments.

l. Recognize the need for self and life-long learning, keeping pace with technological challenges in the broadest sense

Course Objectives

Course Code	Title of the Course	COs
19147S11	Communicative English	Students will heighten their awareness of correct usage of English grammar in writing and speaking
		Students will improve their speaking ability in English both in terms of fluency and comprehensibility.
		Students will give oral presentations and receive feedback on their performance
		Students will increase their reading speed and comprehension of academic articles
19148S12	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.
19149S13	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,
		The students will understand the basics of crystals, their structures and different crystal growth techniques.
19149S14	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.
19154S15	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.
		visualize and to project isometric and perspective sections of simple solids
19150S16	Problem Solving and Python programming	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.
19150L17	Problem Solving and Python programming	Write, test, and debug simple Python programs.
		Implement Python programs with conditionals and loops

	Laboratory	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.
19149L18	Physics and Chemistry Laboratory	To apply principles of elasticity, optics and thermal properties for engineering applications.
191VEA19	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 conviction to practice values and ethics in life.
		Students will become value based professionals.
		Students will contribute in building a healthy nation
19147S21	Technical English	Read technical texts and write area- specific texts effort
		Listen and comprehend lectures and talks in their area of specialization successfully.
		Speak appropriately and effectively in varied formal and informal contexts.
		Write reports and winning job applications.
19148S22 A	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.
		Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
19149S23B	Physics for Electronics Engineering	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 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.
19149S24 A	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
19153S25C	Circuit Theory	Ability to analyse electrical circuits
		Ability to apply circuit theorems
		Ability to analyse transients
19154S26C	Basic Civil and Mechanical Engineering	Understand the energy sources and working principle of power plants and apply the knowledge of power plants to diagnose and solve the Engineering problem.
		Understand the working principle of IC Engines.
		Understand the function of refrigeration and air conditioning system.
		An ability to identify, formulate and solve engineering problems
19154L27	Electric Circuits Laboratory	Understand and apply circuit theorems and concepts in engineering applications. Simulate electric circuits.
19153L28 C	Engineering Practices Laboratory	Ability to design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.
		Ability to design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit.
		Ability to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder
		Ability to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring.
		Ability to design and model various basic prototypes in the trade of Welding such as Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint.
1911CA29	Fundamentals of Indian Constitution and	explain the key concepts of political economy
		analyze the significant developments in the political

	Economy	ideologies
		describe the salient features of the constitution of India
		interpret, integrate and critically analyze the political economy of Indian international relations.
		apply their knowledge and skills acquired to write civil service examinations
19149S31C	Transforms and Partial Differential Equations	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.
19153C32	Digital Logic 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.
19153C33	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
19153C34	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
19153C35	Electron Devices and Circuits	Ability to 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
19153C36	Power Plant Engineering	Ability to Explain the layout, construction and working of the components inside a thermal power plant.
		Ability to Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
		Ability to Explain the layout, construction and working of the components inside nuclear power plants.
		Ability to Explain the layout, construction and working of the components inside Renewable energy power plants.
		Ability to 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.
19153L37	Electronics Laboratory	Ability to understand and analyse electronic circuits.
19153L38	Electrical Machines Laboratory - I	Ability to understand and analyze DC Generator
		Ability to understand and analyze DC Motor
		Ability to understand and analyse Transformers
19149C41 C	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.
19153C42	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
		Ability to understand the construction and working principle of Special Machines
		Ability to predetermine the performance characteristics of Synchronous Machines.
19153C43	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.
19153C44	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.

19153C45	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.
19153C46	Control Systems	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
		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.
19153L47	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
19153L48	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
		Ability to Design and implement counters using specific counter IC.
19153L49	Technical Seminar	Students will demonstrate the ability to perform close and critical readings.

		Students will demonstrate the ability to evaluate, credit, and synthesize sources.
19153CRS	Research Led Seminar	To effectively communicate by making an oral presentation before an evaluation committee
		To study research papers for understanding of a new field, in the absence of a textbook , to summarise and review them
19153C51	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 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
19153C52	Microprocessors and Microcontrollers	Ability to acquire knowledge in Addressing modes & instruction set of 8085 & 8051.
		Ability to need & use of Interrupt structure 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
19153C53	Power Electronics	Ability to analyse AC-AC and DC-DC and DC-AC converters.
		Ability to choose the converters for real time applications.
19150FE54 A	Database Management System	Understand database concepts and structures and query language
		Understand Functional Dependency and Functional Decomposition.
		Apply various Normalization techniques
		Understand query processing and techniques involved in query optimization.
		Understand the principles of storage structure and recovery management.
19152FE54 A	Basics of Biomedical	Identify and describe operation of biomedical instrumentation.

	Instrumentation	Analyze where and how sensors are used in healthcare.
		Study design parameter of ECG, EEG.
		Study of non electric parameter measurement.
		Study of assisting & therapeutic equipments.
19154FE54 A	Renewable Energy Sources	Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
		Know the need of renewable energy resources, historical and latest developments.
		Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc.
		Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications.
		Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications
		Compare Solar, Wind and bio energy systems, their prospects, Advantages and limitations.
		Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.
19155FE54 A	Air Pollution and Control Engineering	Characterize the elements of air pollution
		Describe current air pollution issues at all scales (from local to global)
		list the main air pollutants and their effects on human health, welfare and the environment
		Quantify environmental engineering parameters with appropriate metrics and units, and be able to convert between units of measurement.
		Discuss several types of air pollution problems and the chemistry and physics affecting them
		Solve simple problems related to dispersion and air quality modeling
		Develop a broad overview understanding of the strategies, regulations and policies to manage air pollution
19150FE54 B	Cloud computing	Define Cloud Computing and memorize the different Cloud service and deployment models

		Describe importance of virtualization along with their technologies.
		Use and Examine different cloud computing services
		Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing
		Describe the key components of Amazon web Service
		Design & develop backup strategies for cloud data based on features
19152FE54 B	Sensors and Transducers	Use concepts in common methods for converting a physical parameter into an electrical quantity
		Classify and explain with examples of transducers, including those for measurement of temperature, strain, motion, position and light
		Choose proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc
		Predict correctly the expected performance of various sensors
		Locate different type of sensors used in real life applications and paraphrase their importance
		Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system.
19154FE54 B	Automatic System	Understand and apply the knowledge of different type of sensors in systems
		Develop analogy for spring-mass damping system with electrical systems, thermal system, flow system
		Understand and apply the knowledge of different types of pneumatic and hydraulic control actions
		Understand and apply the knowledge of stability of control system
19155FE54 B	Geographic Information System	Comprehend fundamental concepts and practices of Geographic Information Systems (GIS) and advances in Geospatial Information Science and Technology (GIS&T).
		Apply basic graphic and data visualization concepts such as color theory, symbolization, and use of white space.
		Demonstrate organizational skills in file and database management.

		Give examples of interdisciplinary applications of Geospatial Information Science and Technology.
		Apply GIS analysis to address geospatial problems and/or research questions.
19153C55	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 understand the types of filters and their design for digital implementation.
		Ability to acquire knowledge on programmability digital signal processor & quantization effects.
19153C56	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
19153L57	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.
19153L58	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.
19153L59	Professional Communication	Participate confidently in Group Discussions.
		Attend job interviews and be successful in them.
		Develop adequate Soft Skills required for the workplace

19153CR M	Research Methodology	understand some basic concepts of research and its methodologies
		identify appropriate research topics
		select and define appropriate research problem and parameters
		prepare a project proposal (to undertake a project)
		organize and conduct research (advanced project) in a more appropriate manner
		write a research report and thesis
		write a research proposal (grants)
19153C61	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.
		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
19153C62	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.
		Ability to study about the apparatus protection, static and numerical relays.
19153C63	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.

19153E64 A	Advanced Control System	Apply fundamental state-space-techniques in the analysis and design of linear feedback control systems, as they arise in a variety of contexts
		Formulate and solve constrained optimisation problems for control system synthesis
		Use software tools to simulate and design the linear behaviour of automatic control systems.
19153E64 B	Visual Languages and Applications	To understand and apply computing platform and software for engineering problems.
19153E64 C	Design of Electrical Apparatus	Ability to understand basics of design considerations for rotating and static electrical machines
		Ability to design of field system for its application.
		Ability to design sing and three phase transformer.
		Ability to design armature and field of DC machines.
		Ability to design stator and rotor of induction motor.
19153E64 D	Power Systems Stability	Perform fundamental computation and modeling of power system control and stability.
		Develop skills to model control devices that can be incorporated in power system simulations.
		Analyse dynamic behavior of power control systems subject to various disturbances from the aggregated behavior of the many dynamic devices.
19153E64E	Modern Power Converters	Understand the overview of different types loads with single phase thyristor controlled converter.
		To understand the operation, characteristics and performance parameters three phase thyristor controlled converter.
		Analyze the different types of dc-dc converters.
		Understand the single-phase bi-directional controllers with R, L and R-L loads & 3-phase controllers
		Understand the Principle of operation, single phase and three phase Cycloconverters
19153E64F	Intellectual Property Rights	Skill to understand the concept of intellectual property rights.
		Develops procedural knowledge to Legal System and solving the problem relating to intellectual property rights.
		Skill to pursue the professional programs in Company Secretaryship, Law, Business(MBA), International Affairs, Public Administration and Other fields.

		Employability as the Compliance Officer, Public Relation Officer and Liaison Officer.
		Establishment of Legal Consultancy and service provider.
19153E65 A	Principles of Robotics	Ability to understand basic concept of robotics.
		To analyze Instrumentation systems and their applications to various
		To know about the differential motion add statics in robotics
		To know about the various path planning techniques.
		To know about the dynamics and control in robotics industries.
19153E65 B	Special Electrical Machines	Ability to analyze and design controllers for special Electrical Machines.
		Ability to acquire the knowledge on construction and operation of stepper motor.
		Ability to acquire the knowledge on construction and operation of stepper switched reluctance motors.
		Ability to construction, principle of operation, switched reluctance motors.
		Ability to acquire the knowledge on construction and operation of permanent magnet brushless D.C. motors.
		Ability to acquire the knowledge on construction and operation of permanent magnet synchronous motors.
		Ability to select a special Machine for a particular application.
19153E65 C	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.
19153E65 D	EHVAC Transmission	Ability to understand the principles and types of EHVAC system.
		Ability to analyze the electrostatic field of AC lines
		Ability to study about the compensation.
		Ability to study about the corona in E.H.V. lines

		Ability to understand the EHV capabilities.
		Ability to analyze the steady state and transient limits.
19153E65E	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.
19153L66	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.
19153L67	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.
19153MP68	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.
19153CBR	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
19153C71	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.
		Ability to understand various types of over voltages in power system.
		Ability to measure over voltages.
		Ability to test power apparatus and insulation coordination

19153C72	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
19153C73	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.
19150FE74 A	Introduction to C Programming	Develops basic understanding of computers, the concept of algorithm and algorithmic thinking.
		Develops the ability to analyze a problem, develop an algorithm to solve it.
		Develops the use of the C programming language to implement various algorithms, and develops the basic concepts and terminology of programming in general.
		Introduces the more advanced features of the C language
19152FE74 A	Robotics	Ability to learn about knowledge for the design of robot
		Ability to Apply and demonstrate the learned knowledge and skills in practical robotics applications.
		Ability to Plan, design and implement robotic systems, algorithms and software capable of operating in complex and interactive environments.
		Ability to Develop programming principles and languages for a robot control system
19154FE74 A	Industrial safety	Evaluate workplace to determine the existence of occupational safety and health hazards
		Identify relevant regulatory and national consensus standards along with best practices that are applicable and Select appropriate control methodologies based on the hierarchy of controls

		Analyze injury and illness data for trends.
19155FE74 A	Green Building Design	Identify and compare existing energy codes, green building codes and green rating systems.
		Identify and use construction materials and methods that more easily allow for salvage and re-use of building materials.
		Perform demolition in ways that allow for salvage of re-usable 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.
19150FE74 B	Datastructures and Algorithms	Ability to analyze algorithms and aalgorithm correctness.
		Ability to summarize searching and sorting techniques
		Ability to describe stack,queue and linked list operation.
		Ability to have knowledge of treeand graphs concepts
19152FE74 B	Electronic Devices	Understand the current voltage characteristics of semiconductor devices
		Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation
		Design and analyze of electronic circuits
		Evaluate frequency response to understand behavior of Electronics circuits
19154FE74 B	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 cont temporary issues regarding failure of structures due to unsuitable materials.
19155FE74 B	Waste water Treatment	Formulate a preliminary design of a waterand/or wastewater treatment plant.
		Identify the parameters that characterize the constituents found in potable water and wastewater;
19153E75 A	Disaster Management	Ability to Understanding foundations of hazards, disasters and associated natural/social phenomena
		Familiarity with disaster management theory
		Ability to Humanitarian Assistance before and after disaster

		Technological innovations in Disaster Risk Reduction: Advantages and problems
		Experience on conducting independent DM study including data search, analysis and presentation of disaster case study
19153E75 B	Human Rights	Ability to identify and assess primary sources as well scholarly literature about human rights
		Ability to identify, contextualise and use information about the human rights situation in a given country,
		Ability to critically appraise source material, including cases from human rights committees and tribunals and reports and summary records from treaty bodies
		Ability to analyse a country's situation or an international situation in terms of human rights and formulate human rights-based initiatives and policies
19153E75 C	Operations Research	Understand variety of problems such as assignment, transportation, travelling salesman etc.
		Solve the problems mentioned in point 4 using linear programming approach using software.
		Understand different queuing situations and find the optimal solutions using models for different situations.
19153E75 D	Probability and Statistics	A good understanding of exploratory data analysis.
		Ability to write a short-report describing a simple statistical data set.
		A good understanding of elementary probability theory and its application
19153E75E	Fiber Optics and Laser Instrumentation	Understand the principle, transmission, dispersion and attenuation characteristics of opticalfibers
		Apply the gained knowledge on optical fibers for its use as communication medium and as sensor as well which have important applications in production, manufacturing industrial and biomedical applications.
		Understand laser theory and laser generation system.
		Students will gain ability to apply laser theory for the selection of lasers for a specific Industrial and medical application.
19153E76 A	System Identification and Adaptive Control	Ability to understand classical system identification and the development and properties of the various methods.
		Ability to understand on-line parameter estimation and the development and properties of the various methods.

19153E76 B	Computer Architecture	Ability to Understand how to implement memory chips, boards, modules and caches.
		Ability to Relate to arithmetic for ALU implementation.
		Ability to Understand the basics of hardwired and micro-programmed control of the CPU.
19153E76 C	Control of Electrical Drives	Examine various applications in industrial and domestic areas where use of electric drives are essential.
		Classify types of electric drives systems based on nature of loads, control objectives, performance and reliability.
		Combine concepts of previously learnt courses such as, electrical machines, Control and power electronics to cater to the need of automations in industries.
		Design and justify new control and power conversion schemes for implementing alternative solutions considering the critical and contemporary issues.
19153E76 D	VLSI Design	Express the Layout of simple MOS circuit using Lambda based design rules.
		Apply the Lambda based design rules for subsystem design
		Differentiate various FPGA architectures.
		Design an application using Verilog HDL.
19153E76E	Power Systems Transients	Ability to understanding the source and characteristics of lightning, switching, and temporary overvoltages.
		Ability to understand travelling wave propagation on transmission lines.
		Ability to understand the critical switching transient situations.
		Ability to set up differential equations for RLC circuits and solve it via stationary and transient solutions.
		Ability to understand the physical and electrical construction of high voltage systems.
19153E76F	Total Quality Management	Ability to operate the methodologies, methods, and tools of lean manufacturing system.
		Ability to apply these concepts of total quality management and lean manufacturing for investigation and synchronisation of manufacturing processes.
19153L77	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
19153L78	Renewable Energy Systems Laboratory	Ability to understand and analyze Renewable energy systems.
19153CSR	Participation in Scaffolded Research (Design / Socio Technical Project)	Sensitization of social needs for innovation
		Team work towards interdisciplinary synchronous research strategy
		Development of critical thinking and synergistic research approach.
19153E81 A	Flexible AC Transmission Systems	Ability to understand, analyze and develop analytical model of FACTS controller for power system application.
		Ability to understand the concepts about load compensation techniques.
		Ability to acquire knowledge on facts devices.
		Ability to understand the start-of-art of the power system
		Ability to analyze the performance of steady state and transients of facts controllers.
		Ability to study about advanced FACTS controllers
19153E81 B	Soft Computing Techniques	Ability to understand the concepts of ANN, different features of fuzzy logic and their modelling, control aspects and different hybrid control schemes.
		Ability to understand the basics of artificial neural network.
		Ability to get knowledge on modelling and control of neural.
		Ability to get knowledge on modelling and control of fuzzy control schemes.
		Ability to acquire knowledge on hybrid control schemes.
		Ability to understand the concepts of Adaptive Resonance Theory
19153E81 C	Power Systems Dynamics	Ability to get knowledge on the basics of dynamics and stability problems
		Ability to design and modelling of synchronous machines
19153E81 D	SMPS and UPS	Ability to analyze the state space model for DC – DC converters
		Ability to acquire knowledge on switched mode power converters.
		Ability to understand the importance of Resonant Converters.
		Ability to analyze the PWM techniques for DC-AC converters

		Ability to acquire knowledge on modern power electronic converters and its applications in electric power utility.
		Ability to acquire knowledge on filters and UPS
19153E81E	Electric Energy Generation, Utilization and conservation	To identify an appropriate method of heating for any particular industrial application.
		To evaluate domestic wiring connection and debug any faults occurred.
		To construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application
19153E81F	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.
19153E81G	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.
19153E82A	Energy Management and Auditing	Ability to acquire knowledge on Energy management in lighting systems
		Ability to impact concepts behind economic analysis and Load management.
		Ability to understand the importance of Energy management on various electrical equipment and metering.
		Ability to acquire knowledge on HVAC.
19153E82B	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.
19153E82C	High Voltage Direct Current Transmission	Ability to get knowledge about Planning of DC power transmission and comparison with AC power transmission
		Ability to understand the importance of power flow in HVDC system under steady state.
19153E82D	Microcontroller Based System Design	Ability to understand and apply computing platform and software for engineering problems.
		Ability to understand the concepts of Architecture of PIC microcontroller
		Ability to acquire knowledge on Interrupts and timers.
		Ability to understand the importance of Peripheral devices for data communication.

		Ability to understand the basics of sensor interfacing
		Ability to acquire knowledge in Architecture of ARM processors
19153E82 E	Smart Grid	Learners will study about different Smart Grid technologies
		Learners will acquire knowledge about different smart meters and advanced metering infrastructure.
		Learners will have knowledge on power quality management in Smart Grids Learners will develop more understanding on LAN, WAN and Cloud Computing for Smart Grid applications
19153E82 F	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.
		Ability to explain the medical assistance/techniques, robotic and therapeutic equipments.
19153E82 G	Fundamentals of Nano Science	Will familiarize about the science of nanomaterials
		Will demonstrate the preparation of nanomaterials
		Will develop knowledge in characteristic nanomaterial
19153P81	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.
19153CEC	Comprehensive Exit Course	Ability to review, present and prepare technological developments



**PONNIAIAH RAMAJAYAM INSTITUTE OF SCIENCE AND TECHNOLOGY
(PRIST)**

(Institution Deemed to be University U/S 3 of UGC Act 1956)

MBA PROGRAM OUTCOMES

CURRICULUM (2017 ONWARDS)

- The program provides recent graduates with the opportunity to acquire contemporary business knowledge and skills that enable them to take up management positioning with private, public and nonprofit organizations.
- The program facilitates the graduates to acquire the capabilities required to become a leader who is transformational, global and socially responsible.
- The program enables the graduates to become lifelong learners skills and competencies necessary to adopt and manage global business challenges.
- The program promises entrepreneurial ability than to seek employment
- The program gives flexibility to the students to be equipped with cross functional management skills and expand his professional wings
- Graduates are able to use business design thinking to provide innovative solutions to contemporary business problems
- The program provides avenues to the graduates to acquire research attitude and pragmatic approach to analyze business situation

PROGRAM SPECIFIC OUTCOMES

- To enable the students to apply the knowledge of Accounting standards, financial analytical tools, costing techniques etc.
- Analyzing the financial performance of an organization applying various tools that aid in decision making.
- The students will be able to identify the relevance of Financing, Investing & Dividend decisions that impact the growth of the firm
- The students are enabled to enhance their knowledge on various financial markets and services provided by the different Financial Institutions
- The students are able to accumulate knowledge of the various services offered by the Banking

- The students will be able to identify the importance of various Insurance products.
- To analyze and understand the financial perspective of risk management in a broader context
- To identify the various avenues of Investment in the per view of risk and return.



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COURSE OUTCOMES (MBA)

Course code	Course Name	Course Outcomes
17260SEC11	Management Concepts	Gives exposure to the practice of management in contemporary organizations from a conceptual, analytical perspective. Create ability to analyze and understand management as well as exploring and developing their own personal philosophy of management.
17260SEC12	Organizational Behaviour	Students will have a better understanding of human behavior in organization. They will know the framework for managing individual and group performance
17260SEC21	Financial Management	Learners can recall and understand Indian financial systems. Evaluate the investments projects and companies. Prepare capital budget and appropriations. Decide upon the capital structure and working capital budgeting decisions. Take decision on higher dividend payout or lower dividend payout.
17260SEC22	Human Resource Management	Understanding of importance of Human Resource Management Understanding of concepts and practices of Human Resource Management Designing strategies in Human Resource Management Ability to take up activities in Human Resource Management. Basic knowledge about prevailing legislations related to
17260SEC23	Marketing Management	knowledge of analytical skills in solving marketing related problems, awareness of marketing management process Explain Wholesaling, Retailing, Franchising, Direct marketing , e- Commerce Marketing Practices
17260SEC26	Strategic Management	Create knowledge and understanding of management policies and strategies within a changing context to meet stakeholder interests information systems to learn from failure key tools and techniques for the analysis and design of information systems, including their human and organizational as well as technical aspects
17260SEC41	Entrepreneurial Development	Students will gain knowledge and skills needed to run a business. Gives required competencies to run the successful enterprise. Prepared to become an entrepreneur



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BBA PROGRAM OUTCOMES

CURRICULUM (2017 ONWARDS)

- To understand of broad business concepts and principles.
- To identify and define problems and opportunities.
- Demonstrate use of appropriate techniques to effectively manage business challenges.
- Capable of recognizing and resolving ethical issues.
- Effectively communicate business issues, management concepts, plans and decisions both in oral and written form using appropriate supportive technologies.
- Develop various real time applications using latest technologies and programming languages.
- Possess strong foundation for their higher studies.
- Blend analytical, logical and managerial skills with the technical aspects to resolve real world issues.
- Become employable in various IT companies and government jobs.

BBA PROGRAM SPECIFIC OUTCOMES

CURRICULUM (2017 ONWARDS)

- The ability to understand, analyze and apply management concepts in the areas related to marketing, human resources and finance for efficient running of the business organisation of varying complexity in competitive era.
- Students will develop as effective management professionals and take on more responsibilities in future and to give outstanding results in the area of their interest



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COURSE OUTCOMES (BBA)

Course code	Course Name	Course Outcomes
17160SEC13	Principles of Management	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
17160SEC14	Managerial Economics	To educate the students to understand the fundamentals of economics To understand the application of economics in business decisions To familiarize the Students with economic tools for business analysis.
17160AEC15	Business Communication	Understand communication process and barriers to communication. Develop skills for Verbal and Non-verbal communication. Have ability to give Effective Presentations.
17160AEC25	Business Environment	Identify and evaluate the complexities of business environment and their impact on the business. Analyze the relationships between Government and business and understand the political, economic, legal and social policies of the country
17160AEC45	Retail Management	Apply a broad theoretical and technical knowledge of retail management to understand opportunities and challenges for creating excellent retailing experience. Critically analyze and summarize market information to assess the retailing environment and formulate effective retail strategies
17160SEC51	Financial Management	Maximization of value of the firm. Determination of patterns of determining capital structure
17160SEC52	Services Marketing	Understand the fundamental concepts of service marketing and its functions. Identify the role and significance of various elements of service marketing mix.
17160SEC62	Entrepreneurial Development	Become aware of entrepreneurship opportunities available in the society for the entrepreneur. Acquaint them with the challenges faced by the entrepreneur. Develop the motivation to enhance entrepreneurial competency.
17160SEC63	Logistics and Supply Chain Management	Understand ever growing importance of Production and Operations management in uncertain business environment. Gain an in-depth understanding resource utilization of an organization.



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY [PRIST]
(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)
THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT: EDUCATION

UG	B.Ed
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PEOs, POs, PSOs & COs

B.Ed., Programme Educational Objective - PEOs

Bachelor of Education curriculum is designed to prepare the graduates having attitude and knowledge to

1. acquire knowledge of Education:
2. understand the process, functions of education and knowledge;
3. state the theory of knowledge and facets of knowledge;.
4. Have the teacher's favorable attitudes and adequate interest which will enable them to foster all round development?
5. Make the teacher efficient enough to offer educational guidance and counseling to individual learners.
6. Enable the teacher trainees undertake action research to solve their professional problems.
7. Reduce the gap between theory and practice, teacher and education curriculum and school realities.
8. The course (B.Ed) will provide adequate theoretical orientation regarding the objectives of education in the Indian Background.

B.Ed., Programme Outcome - POs

The graduates will have the ability to

- a. Acquire knowledge about the different methods of teaching in education
- b. Describe the concept of education and understand the knowledge of schools .
- c. Explore the educational thoughts of great thinkers and understand the issues and challenges in Indian Society and educational solutions.
- d. Understand the constitutional provisions for education and identify the ways and means for including values.
- e. Study the Social Customs prevailing in the local community and submit a report.

- f. Study the religious diversities existing in the community and describe the root causes for such diversities.
- g. Education and vertical/ Horizontal Social Mobility – Conduct a Survey in a village/ward and prepare a report.
- h. Study the Social Stratification in a Village/ ward and prepare a report on it.
- i. Study the Essential skills & Life skills in education and prepare a report on it.
- j. Survey the continuous and comprehensive assessment practices followed in sc Role play of different innovative methods of teaching
- k. Role play of different innovative methods of teaching
- l. Identify the nutritional disturbance of the students

B.Ed., Programme Specific Outcome - PSOs

The graduates will have the ability to

1. Understand basic concepts and ideas of educational theory.
2. Build understanding and perspective on the nature of the learner, diversity and learning.
3. Comprehend the role of the systems of governance and structural – functional provisions that support school education.
4. Develop understanding about teaching, pedagogy, school management and community involvement.
5. Build skills and abilities of communication, reflection, art, aesthetics, theatre, self expression and ICT.

B.Ed., Programme Course Outcome - COs

SEMESTER - I

PSYCHOLOGY OF LEARNERS AND LEARNING -I

COURSE CODE: 19130PE11

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. Acquire knowledge about the approaches to educational psychology.
- CO2. Comprehend the concepts growth and development and various theories of growth and development.
- CO3. Know about learning and memory.
- CO4. Understand motivation and its influence on human behavior.

EDUCATION IN CONTEMPORARY INDIA – I

COURSE CODE: 19130PE12

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Describe the concept of philosophy and education and understand the knowledge of Eastern and Western schools of philosophy.
- CO2. Explore the educational thoughts of great thinkers and understand the issues and challenges in Indian Society and educational solutions.
- CO3. Understand the constitutional provisions for education and identify the ways and means for including values.
- CO4. Explain the intergrated and holistic approach to education and analyse how yoga and yoga practices that are important for healthy living.

EDUCATION AND SOCIALIZATION – I

COURSE CODE: 19130PE13

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Learn the process of socialization.
- CO2. Comprehend the interface between society and school.
- CO3. Familiar with the emergence of ‘person’ and Identity.
- CO4. Experience empirically with various determinants of Identification.
- CO5. The formation of schooling and identity is well understood.

PEDAGOGY OF TAMIL: PART - I

COURSE CODE: 19130CP14A

fw;wypd; tpisTfs;:

- CO1. cah;epiy> Nkdpiy tFg;Gj; jkpo;g; ghlq;fspd; fw;wy; Nehf;fq;fis njhpe;J nfhs;fpwhd;.
- CO2. ,yf;fpak; fw;gpg;gjw;fhd Kiwfisj; njhpe;J nfhs;fpwhd;
- CO3. jkpo;g; ghlq;fisj; jpwk;glf; fw;gpg;gjw;fhd Kd; nray;fis gofpf; nfhs;fpwhd;.
- CO4. cah;epiy> Nkdpiyj; jkpo;g; ghlq;fis fw;gpj;jypy; nghUj;jkhd tsh;twp> njhFepiy tpdhf;fisj; jahhpf;ff; fw;Wf; nfhs;fpwhd;.

PEDAGOGY OF ENGLISH: PART – I

COURSE CODE: 19130CP14B

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Realize the value of English.
- CO2. Understand the quality of English.
- CO3. Understand the micro teaching skills and to practice in their carrier.
- CO4. Understand the evaluation techniques.
- CO5. Learn the value of lesson plan.
- CO6. Follow the modern techniques in their class rooms.

PEDAGOGY OF MATHEMATICS: PART - I

COURSE CODE: 19130CP14C

COURSE OUTCOMES

By the end of the course, the student teacher will be able to:

- CO1. Understand the school content and nature and scope of Mathematics.
- CO2. Comprehend the aims and objectives of teaching Mathematics.
- CO3. Explore in teaching and learning Mathematics.

- CO4. Develop ability to construct school Mathematics.
- CO5. Acquire competence in teaching Mathematics and strutting.
- CO6. Acquire skill in constructing tests.

PEDAGOGY OF PHYSICAL SCIENCE: PART - I

COURSE CODE: 19130CP14D

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. acquire the knowledge about the objectives in teaching physical science
- CO2. understand the core of science
- CO3. relate physical science to everyday life
- CO4. understanding the objective of teaching physical science at various levels.
- CO5. understand the relationship between process and product.
- CO6. understand the steps involved in a micro teaching cycle
- CO7. develop skills in writing a lesson plan and unit plan
- CO8. acquire knowledge about CAI
- CO9. develop effective classroom climate
- CO10. prepare self instructional units

PEDAGOGY OF BIOLOGICAL SCIENCE: PART – I

COURSE CODE: 19130CP14E

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. Become self made professional teachers.
- CO2. Understand psychological foundations of education and learning theories
- CO3. Keep themselves abreast of latest trends and issues in secondary education
- CO4. Reduce the gap between theory and practice ie., Teacher- education curriculum and school realities.
- CO5. Rationalize curricular areas of teacher education to develop I CT knowledge-base.
- CO6. Become self made humane teachers.
- CO7. Develop knowledge in the emerging teaching and learning technology of Biological science.

PEDAGOGY OF SOCIAL SCIENCE: PART – I

COURSE CODE: 19130CP14F

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. Understand the nature and importance of Social science.
- CO2. Acquire knowledge in lesson plan, Unit plan and resource plan.
- CO3. Comprehend the aims and objectives of teaching social science.
- CO4. Appreciate the need of planning for teaching.
- CO5. Equip with resources, strategies and approaches of learning.

PEDAGOGY OF COMMERCE AND ACCOUNTANCY: PART - I

COURSE CODE: 19130CP14G

COURSE OUTCOMES

By the end of the course the student teacher will be able to:

- CO1. Review Commerce and Accountancy syllabus.

- CO2. Learn the significance of professional development of a commerce teacher.
- CO3. Create proper learning atmosphere in the classroom.
- CO4. Enable the students' creative thinking and innovative deeds.
- CO5. Acquire the skill of solving the problems encountered by the students.

PEDAGOGY OF COMPUTER SCIENCE: PART - I

COURSE CODE: 19130CP14H

COURSE OUTCOMES:

By the end of the course, the student teachers will be able to,

- CO1. Acquire knowledge about methods of teaching computer science
- CO2. Understand the various skills in Microteaching
- CO3. Gain knowledge about planning for teaching – learning of computer science.
- CO4. Understand the needs of Computer Science.
- CO5. Identify the various learning resources

PEDAGOGY OF ECONOMICS: PART - I

COURSE CODE: 19130CP14I

COURSE OUTCOMES

By the end of the course, the student teachers will be able to,

- CO1. Understand the meaning and nature of Economics.
- CO2. Develop knowledge on various strategies in teaching and learning Economics.
- CO3. To acquire knowledge on various concepts of Economics.
- CO4. Develop interest on the aim and objectives of teaching and learning Economics.
- CO5. Appreciate the need of planning for teaching.

PEDAGOGY OF HISTORY: PART - I

COURSE CODE: 19130CP14J

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. acquire knowledge about the school history text books from VI to XII;
- CO2. understand the aims and objectives of teaching History;
- CO3. develop effective teaching skills;
- CO4. adopt the different teaching-learning strategies;
- CO5. understand the steps involved in lesson planning;
- CO6. equip with resources and approaches of learning;

PEDAGOGY OF GEOGRAPHY: PART - I

COURSE CODE: 19130CP14K

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. get sensitized to the school content in Geography;
- CO2. comprehend the aims and objectives of teaching Geography;
- CO3. acquire various teaching skills
- CO4. develop competence in structuring lesson plans;
- CO5. explore the methods and techniques of teaching Geography;

ASSESSMENT OF LEARNING

COURSE CODE: 19130AL15

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. understand the basic concepts of Test, Assessment and Evaluation
- CO2. acquire the knowledge of commonly used Tests in schools
- CO3. understand the purpose of Diagnostic Test
- CO4. develop Teaching Competency Assessment Scale
- CO5. develop knowledge on Continuous and Comprehensive Evaluation
- CO6. understand the Tools of Evaluation
- CO7. understand the process of Standardization of Tests
- CO8. identify the various types of Intelligence Tests
- CO9. understand the various types of Personality
- CO10. Aptitude and Interest Tests
- CO11. understand the various aspects of Curriculum Evaluation

ELECTIVE -YOGA, HEALTH AND PHYSICAL EDUCATION

COURSE CODE: 19130EP16A

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. Define the concept of Yoga.
- CO2. Classify the sanas and Pranayama.
- CO3. Understand the meaning and significance of Pranayama, mudra, kriyas and meditation.
- CO4. Comprehend the aims and objectives of Health Education.
- CO5. Appreciate the important of food and nutrition.

ELECTIVE - GUIDANCE AND COUNSELLING

COURSE CODE: 19130EP16B

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. elucidate the need of guidance and counselling in schools
- CO2. describe the different services in the school guidance programme
- CO3. understand the various therapies in counselling
- CO4. acquire the skills necessary to administer and interpret standardized tools
- CO5. know the qualities required for a good counsellor
- CO6. understand the various types of counselling
- CO7. understand the group guidance and counseling
- CO8. describe the various testing devices in guidance

ELECTIVE - EDUCATIONAL ADMINISTRATION AND MANAGEMENT

COURSE CODE: 19130EP16C

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. acquire knowledge of the terms used in educational administration and management
- CO2. understand the role of head master and his/her duties
- CO3. develop the mode of inspection and supervision of function
- CO4. know the role of teacher in decision making
- CO5. develop the skills in employing and developing new educational administration and management
- CO6. develop interest in the educational administration and management techniques

- CO7. understand the development and management of resources
- CO8. develop appropriate skills for planning, decision making and leadership qualities

ELECTIVE - PRE –PRIMARY EDUCATION

COURSE CODE: 19130EP16D

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. gain the knowledge of the development of Pre-Primary education
- CO2. acquaint with the policy perspectives of ECCE in India and world
- CO3. systematize experiences and strengthen the professional competencies of pre-school teachers
- CO4. organize meaningful learning experiences for pre-school children
- CO5. develop skills required in selecting and organizing learning experiences
- CO6. comprehend the developmental needs of pre-school children

SEMESTER – II

PSYCHOLOGY OF LEARNERS AND LEARNING -II

COURSE CODE: 19130PE21

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Learn the concepts and theories of personality.
- CO2. Understand in –depth the concepts of intelligence and creativity.
- CO3. Identify the various adjustment mechanisms.
- CO4.** Understand the types of guidance and counseling programme

EDUCATION IN CONTEMPORARY INDIA – II

COURSE CODE: 19130PE22

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Describe the concept of philosophy and education and understand the knowledge of Eastern and Western schools of philosophy.
- CO2. Explore the educational thoughts of great thinkers and understand the issues and challenges in Indian Society and educational solutions.
- CO3. Understand the constitutional provisions for education and identify the ways and means for including values.
- CO4. Explain the intergrated and holistic approach to education and analyse how yoga and yoga practices that are important for healthy living.

EDUCATION AND SOCIALIZATION - II

COURSE CODE: 19130PE23

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Accommodate with Identity formation.
- CO2. Cope-up with competition and conflicts.
- CO3. Understand the role of education as a critical pedagogy.

- CO4. Act upon socialization processes.
- CO5. Evolve Identity as a teacher.

PEDAGOGY OF TAMIL: PART - II
COURSE CODE: 19130CP24A

fw;wypd; tpiSTfs;:

- CO1. cah;epiy> Nkdpiy tFg;Gj; jkpo;g; ghlq;fspd; fw;wy; Nehf;fq;fis njhpe;J nfhs;fpwhd;.
- CO2. ,yf;fpak; fw;gpg;gjw;fhd Kiwfijsj; njhpe;J nfhs;fpwhd;
- CO3. jkpo;g; ghlq;fisj; jpwk;glf; fw;gpg;gjw;fhd Kd; nray;fis gofpf; nfhs;fpwhd;.
- CO4. cah;epiy> Nkdpiyj; jkpo;g; ghlq;fis fw;gpj;jypy; nghUj;jkhd tsh;twp> njhFepiy tpdhf;fisj; jahhpf;ff; fw;Wf; nfhs;fpwhd;.

PEDAGOGY OF ENGLISH: PART – II
COURSE CODE: 19130CP24B

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Realize the aims and objectives of teaching English.
- CO2. Prepare and use different kinds of instructional materials.
- CO3. Learn to cope up with ICT.
- CO4. Get familiarized with the various strategies of teaching English.
- CO5. Learn the art of class room management.
- CO6. Obtain knowledge about the evaluation process, types of tests and the basics of Educational Statistics.

PEDAGOGY OF MATHEMATICS: PART - II
COURSE CODE: 19130CP24C

COURSE OUTCOMES:

The student teacher will be able to

- CO1. Preparing power point presentation.
- CO2. Preparation of Lesson plan, unit plan and Year plan.
- CO3. Preparing digital lesson plan.
- CO4. Practice of skills in Micro teaching.
- CO5. Test construction – Achievement and Diagnostic
- CO6. Critical analysis of content course of standard XI – XII Syllabus

PEDAGOGY OF PHYSICAL SCIENCE: PART - II
COURSE CODE: 19130CP24D

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. understand the principles of curriculum construction and organization of subject matter
- CO2. understand the criteria in selecting a good textbook and to evaluate a Science textbook
- CO3. identify the role of physical science teacher
- CO4. select various book the science library.
- CO5. design physical science laboratory
- CO6. frame co-curricular activities
- CO7. evaluate the use of cooperative and collaborative learning

- CO8. analyse the techniques of teaching
- CO9. understand the web based learning.
- CO10. understand the techniques of evaluating Science teaching and to construct achievement test to evaluate the progress of pupils
- CO11. complete the assignment and self evaluation test.

PEDAGOGY OF BIOLOGICAL SCIENCE: PART-II

COURSE CODE: 19130CP24E

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Become self made professional teachers.
- CO2. Understand psychological foundations of education and learning theories
- CO3. Keep themselves abreast of latest trends and issues in secondary education
- CO4. Reduce the gap between theory and practice ie., Teacher- education curriculum and school realities.
- CO5. Rationalize curricular areas of teacher education to develop ICT knowledge-base.
- CO6. Become self made humane teachers.
- CO7. Develop knowledge in the emerging teaching and learning technology of Biological science.

PEDAGOGY OF SOCIAL SCIENCE - PART - 11

COURSE CODE: 19130CP24F

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. Organize curricular and co-curricular activities in social science.
- CO2. Understand the principles of curriculum construction.
- CO3. Equip themselves with the current technological teaching aids and support.
- CO4. Acquire knowledge on professional development of teacher.
- CO5. Evaluate measure and assess student learning.

PEDAGOGY OF COMMERCE AND ACCOUNTANCY: PART - II

COURSE CODE: 19130CP24G

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. Learn Problems and Issues in Teaching Commerce.
- CO2. Know the Recent developments in Global Level.
- CO3. Realize the need for life- long education.
- CO4. Know the Mandatory Role of various Educational organizations.
- CO5. Understand the need and necessity of In – Service Training.

PEDAGOGY OF COMPUTER SCIENCE: PART -II

COURSE CODE: 19130CP24H

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Acquire the knowledge about curriculum in Computer Science.
- CO2. Gain knowledge about Instructional Resources in Computer Science.
- CO3. Understands the laboratory and Co-Curricular Activities.

PEDAGOGY OF ECONOMICS: PART-11

COURSE CODE: 19130CP24I

COURSE OUTCOMES

By the end of the course, the student teacher will be able to

- CO1. Apply skills effectively on the resources available to teach economics.
- CO2. Create positive attitude on the curriculum of economics.
- CO3. Acquire knowledge on professional development of teacher.
- CO4. Develop interest in service programmes.
- CO5. Organize professional skills and understand individual differences in classroom teaching.
- CO6. Evaluate measure and assess student learning.

PEDAGOGY OF HISTORY: PART - II

COURSE CODE: 19130CP24J

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. know the principles underlying history curriculum;
- CO2. plan the classroom management;
- CO3. realize the implications of teaching learning materials;
- CO4. identifying the diverse needs of students and develop suitable programmes;
- CO5.** Use of various tools for evaluation.

PEDAGOGY OF GEOGRAPHY: PART - II

COURSE CODE: 19130CP24K

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. integrate and organize Geography curriculum.
- CO2. identify the various learning resources.
- CO3. understand the diversified needs of the students;
- CO4. acquire classroom management; skills
- CO5.** construct appropriate assessment tools for evaluation of Geography learning.

ESSENTIALS OF TEACHING AND LEARNING

COURSE CODE: 19130ET25

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. acquire the knowledge the concept, terms and procedures in teaching and learning;
- CO2. understand the principles and maxims of teaching;
- CO3. understand the tasks of teaching;
- CO4. acquire knowledge on the various theories of teaching;
- CO5. apply various models of teaching to teaching situation;

ELECTIVE – ENVIRONMENTAL EDUCATION

COURSE CODE: 19130EP26A

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Understand the objectives, scope and nature of environment education
- CO2. Develop an understanding of natural resources

- CO3. Understand the causes and remedies for environmental hazards and pollution
- CO4. Understand the causes and control measures for environmental degradation
- CO5. Understand the need for remedial ways to protect the environment in daily life
- CO6. Acquire knowledge of environmental issues and policies in India
- CO7. Understand the need for inclusion of environmental education in school curriculum

ELECTIVE – EXPLORING LIBRARY AND OTHER LEARNING RESOURCES

COURSE CODE: 19130EP26B

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Enumerate the functions and objectives of library.
- CO2. Explain information sources and services.

TEACHING OF EARLY CHILDHOOD EDUCATION

COURSE CODE: 19130EP26C

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. develop an awareness about the importance of Early Childhood Education.
- CO2. acquire a sound knowledge about the contributions of various philosophers to the cause of early childhood education.
- CO3. develop an understanding about organizing different types of early childhood education programmes.
- CO4. acquire knowledge about various instructional strategies to teach young children.
- CO5. develop an awareness about the various developmental aspects of children.
- CO6. develop the ability to deal children with minor/major behavioural disorders.

PROFESSIONAL COURSE FOR TEACHER PROFICIENCY

COURSE CODE: 19130EP26D

COURSE OUTCOMES:

- CO1. Acquire knowledge on various concepts of pedagogy.
- CO2. Understand the human growth development.
- CO3. Identify professional ethics of teacher.
- CO4. Analyze text-Books for VI, VII and VIII standards.
- CO5. Virtualizes leadership profile of the teacher.

SEMESTER – III

KNOWLEDGE AND CURRICULUM

COURSE CODE: 19130PE31

Learning Out comes:

- CO1. The Epistemological and social bases of Education are highly valued.
- CO2. The concepts of Nationalism, Universalism and Secularism well appreciated.
- CO3. The need and value of Education are understood properly.
- CO4. The concepts of Democracy and Democratic Education are comprehended.
- CO5. The Need and importance of innovative curriculum to satisfy the growing needs of the society is felt.

PEDAGOGY OF TAMIL- PART – III

Course Code: 19130CP32A

fw;wypd; tpisTfs;:

CO1. nkhopapd; mbg;gil ,yf;fzq;fis mwpe;J nfhs;fpwhd;.

CO2. jkpo; ,yf;fpaq;fspy; cs;s ePjpf; fUj;Jf;fisAk; gz;ghl;L czh;TfisAk; njhpe;J nfhs;fpwhd;.

CO3. jkpohpd; xOf;f czh;it mwpe;J nfhs;fpwhd;.

CO4. jkpo; tsh;j;j rhd;Nwhh;fis mwpe;J nfhs;fpwhd;.

CO5. jw;fhyj; njhy;ypay; Ma;Tfisg;gw;wpg; Ghpe;J nfhs;fpwhd;.

PEDAGOGY OF ENGLISH: PART – III

COURSE CODE: 19130CP32B

COURSE OUTCOMES

After completion of the course the student teachers will be able to:

CO1. Acquire knowledge about different aspects of language.

CO2. Use language for effective communication. Familiarize with nature and structure of English language.

CO3. Master content, pedagogical and technical knowledge.

CO4. Enable them to professionalize teaching of language based on constructive approach.

CO5. Understand about different objectives of teaching English.

CO6. Learn and use different methods and approaches of teaching English

PEDAGOGY OF MATHEMATICS PART - III

COURSE CODE 19130CP34C

LEARNING OUT COMES: The student teachers

CO1. To Identify concepts to be transected at various level with special emphasis on mathematics content.

CO2. To Explain the planning for theory of set and function.

CO3. To Develop sequences and series of real numbers.

CO4. To Organise the concept for teaching – learning of algebra.

CO5. To Identify learners matrices and geometry.

CO6. To Use of school in lesson plan and models.

PEDAGOGY OF PHYSICAL SCIENCE: PART - III

COURSE CODE: 19130CP32D

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

CO1. Gain insight on the meaning and nature of physical science

CO2. Develop attitude of students towards teaching of physical science

CO3. Appreciate that physical science is a dynamic and expanding body of knowledge

CO4. Understand the process of physical science and role of laboratory in teaching learning situations

CO5. Use effectively different activities and experiences for teaching – learning of physical science

CO6. Integrate on physical science knowledge with other school subject

- CO7. Analysis the content of physical science with respect to its branches
- CO8.** Organize the concepts for teaching-learning of physics and chemistry
- CO9.** Identify the application of physical and chemical phenomenon in day-to-day life and human welfare

PEDAGOGY OF BIOLOGICAL SCIENCE - PART – III

COURSE CODE: 19130CP32E

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Become self made professional teachers.
- CO2. Understand psychological foundations of education and learning theories.
- CO3. Keep themselves abreast of latest trends and issues in secondary education.
- CO4. Reduce the gap between theory and practice i.e., Teacher – education curriculum and school realities.
- CO5. Rationalize curricular areas of teacher education to develop ICT knowledge – base.
- CO6. Become self made humane teachers.
- CO7. Develop knowledge in the emerging teaching and learning technology of Biological Science.

PEDAGOGY OF SOCIAL SCIENCE- PART – III

COURSE CODE: 19130CP32F

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Develop the fundamental social values in school curriculum.
- CO2. Equip with resources, strategies and approaches of learning.
- CO3. Comprehend the nature, aims and scope of teaching social science.
- CO4. Develop professional skills and understand individual differences in classroom teaching.
- CO5. Comprehend the Philosophical Principles related to school curriculum.

PEDAGOGY OF COMMERCE AND ACCOUNTANCY- PART – III

COURSE CODE: 19130CP32G

COURSE OUTCOMES:

- CO1. Ancient Trade and Commerce are effectively analysed.
- CO2. Essential Need for Warehouses and the importance of Transport are highly appreciated.
- CO3. Recent development in Global Banking is thoroughly comprehended.
- CO4. The importance of Insurance is clearly understood.
- CO5. The value of Advertisement is clearly understood.

PEDAGOGY OF COMPUTER SCIENCE: PART - III

COURSE CODE: 19130CP32H

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1.** Acquire knowledge of the approaches to computer science in level I
- CO2. Obtain in depth knowledge about teaching of computer science
- CO3. Comprehend the concepts of growth and development of computer science in education
- CO4. Know about various policies
- CO5. Understand integrating ICT in teaching
- CO6. Apply the knowledge in actual classroom in teaching computer science

PEDAGOGY OF ECONOMICS: PART – III

COURSE CODE: 19130CP32I

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Create positive attitude on the curriculum of Economics.
- CO2. Applies skill on the problems of teaching Economics.
- CO3. Develops skill in lifelong learning.
- CO4. Understand the meaning and scope of Economics.
- CO5. Develop knowledge on various methods in teaching and learning Economics.
- CO6. Appreciate the role of various educational organizations.

PEDAGOGY OF HISTORY- PART – III

COURSE CODE: 19130CP32J

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Understand the dimensions and classifications of History.
- CO2. Develop effective teaching skills.
- CO3. Acquire knowledge of the nature, scope, structure and concept of History.
- CO4. Get familiarize with the various learning resources for professional effectiveness.
- CO5. Acquire knowledge of the nature, scope, structure and concept of History.

PEDAGOGY OF GEOGRAPHY- PART – III

COURSE CODE: 19130CP32K

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Acquire adequate knowledge of contents in Geography.
- CO2. Read and interpret maps, graphs and weather charts.
- CO3. Understand the nature and scope of Geography.
- CO4. Acquire knowledge on the current trends in Geography Curriculum.
- CO5. Provide practical experience in making and using software material.

DRAMA AND ART IN EDUCATION

COURSE CODE: 19130EP33A

Learning out comes:

- CO1. To enable learners to perceptive the social and environmental issues through drama and art.
- CO2. To develop understanding of the local culture through drama and art.
- CO3. To widen the understanding of learners by integrating global culture.

ELECTIVE – PEACE EDUCATION

COURSE CODE: 19130EP33B

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Understand the concept of peace and value education.
- CO2. Understand the dynamics of transformation of violence into peace.
- CO3. Realize the significance of Values in Self-development.
- CO4. Familiarize the nature of conflicts and their resolutions.

- CO5. imbibe the knowledge, attitudes and skills needed to achieve and sustain a
- CO6. Global culture of peace and values.
- CO7. Adopt peace and value education in the curriculum.
- CO8. Understand the constitutional values and their importance for social harmony
- CO9. Understand the contribution of Mahatma Gandhi, Swami Vivekananda and The Dalai Lama in peace Building
- CO10. Understand the need and importance of Peace Education

ELECTIVE - STRENGTHENING LANGUAGE PROFICIENCY

COURSE CODE: 19130EP33C

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Enhance one's facility in the language of instruction is thus a vital need of student-teachers, irrespective of the subject areas that they are going to teach.
- CO2. visualize as a range of primarily text-based language activities, which will aid in strengthening the ability to 'read', 'think', 'discuss and communicate' as well as to 'write' in the language of instruction.
- CO3. Develop a taste for and abilities in reading and making meaning of different kinds of texts.

ELECTIVE – GENDER ISSUES IN EDUCATION

COURSE CODE: 19130EP33D

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. develop basic understanding and familiarity with key concepts—gender, gender bias, gender stereotype, empowerment, gender parity, equity and equality, patriarchy and feminism;
- CO2. understand the gradual paradigm shift from women's studies to gender studies and some important landmarks in connection with gender and education in the historical and contemporary period;
- CO3. learn about gender issues in school, curriculum, textual materials across disciplines, pedagogical processes and its intersection with class, caste, religion and region; and
- CO4.** Understand how gender, power and sexuality relate to education (in terms of access, curriculum and pedagogy).

SEMESTER - IV

CREATING AN INCLUSIVE SCHOOL

COURSE CODE: 19130PE41

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. To develop an understanding of the concept of learning disabilities.
- CO2. Critically evaluate the models of disability.
- CO3. Discuss the contributions of national and international agencies to inclusive education.
- CO4. To develop an understanding of the concept of disability.
- CO5. Identify the need and importance of inclusive education.

GENDER, SCHOOL AND SOCIETY

COURSE CODE: 19130PE42

Learning Out comes:

- CO1. The role of Gender in society and reasons for Gender inequalities are understood.
- CO2. The process at Gender identity and socialization practices in family. School and organization comprehended.
- CO3. A great amount of knowledge on developed school curriculum for equality and gender just society is gained.
- CO4. The importance of safety of girls and women against sexual abuse and violence of school home and work place is realized greatly.
- CO5. Gender roles in mass media related to identity and equality are strongly understood.

LANGUAGE ACROSS THE CURRICULUM

COURSE CODE: 19130PE43

Learning out comes:

- CO1. Develop knowledge diversity of students in the class –room
- CO2. Capable of processing nature of communication
- CO3. Comprehend the different Content area
- CO4. Develop multilingual awareness in the class -room

PEDAGOGY OF TAMIL – PART - IV

COURSE CODE: 19130CP44A

fw;wypd; tpisTfs;:

- CO1. nkhopg;gapw;wha;Tf; \$lj;jpd; gad;ghl;ilj; njhpe;J nfhs;fpwhd;.
- CO2. tFg;giw ,iltpidg; gFg;gha;tpidg; gw;wpg; Ghpe;J nfhs;fpwhd;.
- CO3. ghl ,izr; nray;fisg; gofpf; nfhs;fpwhd;.
- CO4. mwptpay; njhopy;El;gr; nrhw;fisj; jha;nkhopapy; gilj;Jf; nfhs;fpwhd;.
- CO5. jkpo; ,yf;fpaj;jpd; cah; kjpg;Gf;fis kdjpy; gjpa itj;Jf; nfhs;fpwhd;.

PEDAGOGY OF ENGLISH: PART – IV

COURSE CODE: 19130CP44B

After completion of the course the student teachers will be able to:

- CO1. Acquire knowledge about different aspects of language.
- CO2. Use language for effective communication. Familiarize with nature and structure of English language.
- CO3. Master content, pedagogical and technical knowledge.
- CO4. Enable them to professionalize teaching of language based on constructive approach.
- CO5. Understand about different objectives of teaching English.
- CO6. Learn and use different methods and approaches of teaching English

PEDAGOGY OF MATHEMATICS PART - IV

COURSE CODE 19130CP44C

LEARNING OUT COMES: The student teachers

- CO1. To identify concepts to be transected at various level with special emphasis on mathematics content.

- CO2. To explain the planning for trigometry, statistics and probability.
- CO3. To develop sequences and practical geometry of co – ordinate geometry.
- CO4. To organist the concept for teaching – learning of complex numbers.
- CO5. To identify learning resources in mathematics.
- CO6. To use of teaching aids and models in school.

PEDAGOGY OF PHYSICAL SCIENCE: PART - IV

COURSE CODE: 19130CP44D

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Identify and use of learning resources in physical science
- CO2. Develop indicators for performance
- CO3. Develop assessment framework in physics and chemistry
- CO4. Explain professional development programmed for physics and chemistry teachers
- CO5. Explore different ways of creating learning situations in learning different concept of physical science
- CO6. Formulate meaningful enquiry episodes
- CO7. Facilitate development of scientific attitude in learners.
- CO8. Examine different pedagogical issues in learning physical science
- CO9. Construct appropriate assessment tools for evaluating learning of physical science

PEDAGOGY OF BIOLOGICAL SCIENCE - PART – IV

COURS CODE: 19130CP44E

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Become self made professional teachers.
- CO2. Understand psychological foundations of education and learning theories.
- CO3. Keep themselves abreast of latest trends and issues in secondary education.
- CO4. Reduce the gap between theory and practice i.e., Teacher – education curriculum and school realities.
- CO5. Rationalize curricular areas of teacher education to develop ICT knowledge – base.
- CO6. Become self made humane teachers.
- CO7. Develop knowledge in the emerging teaching and learning technology of Biological Science.

PEDAGOGY OF SOCIAL SCIENCE- PART – IV

COURSE CODE: 19130CP44

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. Acquire the aims and objectives of teaching political science.
- CO2. Understand the school content in their respective subjects.
- CO3. Apply the educational innovation in teaching learning process.
- CO4. Comprehend the psychological principles related to school curriculum.
- CO5. Learn interaction analysis in handling social science for an effective classroom.

PEDAGOGY OF COMMERCE AND ACCOUNTANCY- PART – IV

COURSE CODE: 19130CP44G

COURSE OUTCOMES:

- Explore the individual differences existing among the learners for effective teaching of commerce and accountancy by the student teachers.
- Help the student teachers familiarize the scholastic and non-scholastic commerce curriculum to acquire the difference skills and abilities relating to formation of commerce department and its activities.
- Enable the student teachers for using different strategies and approaches in teaching of Commerce & Accountancy.
- Help the student teachers to understand the instructional materials employed in teaching of Commerce & Accountancy.

PEDAGOGY OF COMPUTER SCIENCE: PART - IV

COURSE CODE: 19130CP44H

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

CO1. Acquire knowledge of the approaches to computer science in level II

CO2. Develop assessment framework in computer science

CO3. Organize the concepts for teaching-learning of computer science

CO4. Identify the application of computer science phenomenon in day-to-day life and human welfare

CO5. Explain professional development programmes for computer science teachers

PEDAGOGY OF ECONOMICS: PART – IV

COURSE CODE: 19130CP44I

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

CO1. Understand the recent developments in Economics.

CO2. To develop understanding the use of various support materials required for teaching of Economics.

CO3. Apply the educational innovation in teaching learning process.

CO4. Develop positive attitude on the text book of Economics.

CO5. Apply skills effectively on the resources available to teach Economics.

CO6. Acquire knowledge on professional development of teacher.

PEDAGOGY OF HISTORY- PART – IV

COURSE CODE: 19130CP44J

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

CO1. To develop understanding the use of various support materials required for teaching of History.

CO2. Apply the educational innovation in teaching and learning process.

CO3. Acquire adequate knowledge of contents in History.

CO4. Know the importance of co-curricular activities in History.

CO5. Explore learning in History.

CO6. Ability to organize history exhibitions in the school.

PEDAGOGY OF GEOGRAPHY- PART – IV

COURSE CODE: 19130CP44K**COURSE OUTCOMES:**

By the end of the course, the student teacher will be able to

- CO1. Organise Co-Curricular activities in Geography.
- CO2. Ability to organize Geography laboratory in the school.
- CO3. Understand and appreciate the objectives of Teaching Geography.
- CO4. Apply the educational technology in teaching learning process.
- CO5. Develop different skills in using computer for Teaching Geography.

ELECTIVE – CRITICAL UNDERSTANDING OF ICT**COURSE CODE: 19130EP45A****LEARNING OUT COME:**

By the end of course, the student teacher will be able to

- CO1. understand the concept of Information and Communication Technology
- CO2. acquire knowledge about new horizons in ICT
- CO3. comprehend the theory of communication
- CO4. appreciate enriched learning experiences using ICT
- CO5. comprehend the role played by ICT in Education
- CO6. attain the knowledge of internet and its applications
- CO7. appreciate the use of multimedia and web content for teaching learning
- CO8. use ICT in educational institutions
- CO9. organize and learn through ICT
- CO10. analyze the role of ICT in Evaluation

UNDERSTANDING THE SELF**COURSE CODE: 19130EP45B****OBJECTIVES:****COURSE OUTCOMES:**

By the end of the course, the student teacher will be able to

- CO1. Different dimension of self and personality are understood.
- CO2. Positive self esteem and Emotional Integration are developed.
- CO3. The capacities for Empathic listening and communications skills are developed.
- CO4. Peace, Progress and harmony are established.
- CO5. The aims of becoming a self reflective practitioner is achieved.

ELECTIVE – HUMAN RIGHTS**COURSE CODE: 19130EP45C****COURSE OUTCOMES:**

By the end of the course, the student teacher will be able to

- CO1. acquires knowledge on the concept, meaning and theories of human rights
- CO2. understand the role of UNO in human rights development
- CO3. develop interest on Indian Constitutional provision of human rights
- CO4. Secure knowledge on the role and functions of international institutions to enforce human rights.
- CO5. understand the power and functions of various Human right Commissions in India
- CO6. Apply knowledge on the issues related to human rights violations with regard to the marginalized sections.

ELECTIVE - ADDRESSING SPECIAL NEEDS IN THE CLASSROOM

COURSE CODE: 19130EP45D

COURSE OUTCOMES:

By the end of the course, the student teacher will be able to

- CO1. demonstrate knowledge of different perspectives in the area of education of children with disabilities;
- CO2. reformulate attitudes towards children with special needs;
- CO3. identify needs of children with diversities;
- CO4. plan need-based programmed for all children with varied abilities in the classroom;
- CO5. use human and material resources in the classroom;
- CO6. use specific strategies involving skills in teaching special needs children in inclusive classrooms;

Dean

Signature of HOD



PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY [PRIST]

(Institution Deemed to be University – U/s 3 of the UGC Act, 1956)

THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT: EDUCATION

PG | **M.Ed**

PEOs, POs, PSOs & COs

M.Ed., Programme Educational Objective - PEO

Master of Education curriculum is designed to prepare the graduates having attitude and knowledge to

1. Understand The Nature Of Education As A Discipline
2. Develop Specialized Knowledge And Understanding Of The Bases Of Education
3. Develop National And International Perspectives On Educational Theory And Practice
4. Develop Understanding Of Human Behaviour And Personality For Guiding Efficient And Effective Learning
5. Acquire Skills Required To Take Up Leadership Roles In The Areas Of Education
6. Develop A Rational Conceptualization Of Educational Research
7. Enhance Essential ICT Skills Required For Educational Practice And Professional Empowerment

M.Ed., Programme Outcome - PO

The graduates will have the ability to

- a. Review critically the concerns arises from vision of school education and teacher education and also the vision of great Educational exponents.
- b. Reflect on the multiple contexts in which the school and teacher education institutions are interlinked with each other
- c. Emerge new dimensions of school education and Teacher education
- d. Link with education and other development sectors
- e. Improve the support systems in Education like multimedia and ICT.
- f. Understand the sociological foundations of Education

- g. Realise the functions of family and other agencies of education towards effective socialization at school level.
- h. Analyse critically social stratification and mobility
- i. Practice the aims in the Basic Scheme and the Kothari Commission Report
- j. Make Educational Planning for a changing environment
- k. Appreciate inter-relatedness and interdependence of individual and society in context of human development.
- l. Identify group dynamics and its bearing on teaching- Learning.

M.Ed., Programme Specific Outcome - PSOs

The graduates will have the ability to

- 1. Build perspective and understanding of concepts, theories, ideas and practices in Education.
- 2. Develop reflective and analytical skills and understanding of critical issues in Education.
- 3. Understand different facets of Educational policies and practices.
- 4. Build research skills, data analysis abilities and capacity to visualize, conduct and present research.
- 5. Provide research related experiences to develop research abilities leading to writing of a Dissertation.
- 6. Enable rich understanding and a critical perspective about specialized areas of Education like Mathematics Education, ICT & Education, Inclusion and Diversity, Social Science Education, Science Education, etc.

M.Ed., Programme Course Outcome - COs

SEMESTER - I

HISTORY AND POLITICAL ECONOMY OF EDUCATION - I

COURSE CODE: 19230PC11

LEARNING OUTCOMES:

- CO1. A Knowledge of History of Education acquired.
- CO2. Critical analization of Educational Politics Practised
- CO3. Political perspectives of education is learnt properly
- CO4. Proper understanding of political economy of education achieved

ADVANCED EDUCATIONAL PSYCHOLOGY -I

COURSE CODE: 19230PC12

LEARNING OUTCOMES:

- CO1. Student teachers acquired knowledge of basic concept of educational psychology.
- CO2. They gained knowledge of methods of educational psychology.
- CO3. They understood the various schools of psychology.

- CO4. Adolescent's growth, development and their problems have been realized.
- CO5. Various theories of motivation have been understood.
- CO6. They acquired the knowledge about the changing concept of intelligence theories and creativity.

CURRICULUM DESIGN AND DEVELOPMENT - I

COURSE CODE: 19230PC13

LEARNING OUTCOMES:

- CO1. The contribution of psychologists to the field of curriculum achieved.
- CO2. Made acquaintance to the students for the need and urgency to change the curriculum.
- CO3. Implementation and evaluation of curriculum achieved.

TOOL COURSE – III – BASICS IN EDUCATIONAL RESEARCH-I

COURSE CODE: 19230TC14

LEARNING OUTCOMES:

- CO1. acquired knowledge of research in the field of education.
- CO2. familiarized with various types of research.
- CO3. awareness developed in the research process.
- CO4. developed the skill of selecting a research problem in education and formulate hypotheses.
- CO5. acquired skills to construct suitable tests and tools.
- CO6. acquired skills to select appropriate sampling techniques

TEACHER EDUCATION IN INDIA ELEMENTARY LEVEL - I

COURSE CODE: 19230TE15

LEARNING OUTCOMES:

- CO1. the context of elementary education knowledge acquired.
- CO2. the objectives, rationale, challenges and extent of success of Universal Elementary Education (UEE) realized.
- CO3. knowledge acquired about elementary education in India since independence
- CO4. strategies and programmes of UEE adopted.

STRUCTURE, STATUS, ISSUES IN SECONDARY EDUCATION

COURSE CODE: 19230SC16A

LEARNING OUTCOMES:

- CO1. Accomplished Knowledge the context of secondary Education
- CO2. Achieved the concept, objectives, rationale and context of secondary education
- CO3. Learnt the challenges and extent of success of Universal Elementary
- CO4. Leant Education (UEE) and their influence on secondary Education

WOMEN EDUCATION AND EMPOWERMENT

COURSE CODE: 19230SC16B

LEARNING OUTCOMES:

- CO1. the implications of gender perspectives on women realized
- CO2. various Perspectives on Development and Developmental initiatives exercised.
- CO3. adopted nationally and internationally.
- CO4. acquired and apply knowledge about Feminism, Women Entrepreneurs and Challenges

INCLUSIVE EDUCATION

COURSE CODE: 19230SC16C

LEARNING OUTCOMES:

- CO1. identified the global and national commitments towards the education of children with diverse needs,
- CO2. developed the need for promoting inclusive practice and the roles and responsibilities of all concerned personnel,
- CO3. developed critical understanding of the recommendations of various commissions and committees towards teacher preparation for inclusive education,
- CO4. the nature of difficulties encountered by children.

SEMESTER - II

HISTORY AND POLITICAL ECONOMY OF EDUCATION - II

COURSE CODE: 19230C21

LEARNING OUTCOMES:

- CO1. Acquired knowledge about education under British rule.
- CO2. Proper understanding of the preamble of Indian constitution achieved.
- CO3. Positive attitude towards nationalism inculcated.
- CO4. Concepts of peace living and global education were established.

ADVANCED EDUCATIONAL PSYCHOLOGY-II

COURSE CODE: 19230C22

LEARNING OUTCOMES:

- CO1. Student teachers understood the various theories of motivation
- CO2. They acquired knowledge about creativity
- CO3. Various theories of personality have been understood.
- CO4. They could identify the different types of adjustment mechanism.
- CO5. They could classify learning disabilities
- CO6. They could differentiate the concept of mental health and mental hygiene.

CURRICULUM DESIGN AND DEVELOPMENT - II

COURSE CODE: 19230PC23

LEARNING OUTCOMES:

- CO1. Concept and principles of curriculum development and design experienced.
- CO2. Gained insight in to the development of new curriculum
- CO3. The continuous Curriculum reconstruction appreciated
- CO4. Teaching-learning process of curriculum learnt.

TOOL COURSE- BASICS IN EDUCATIONAL RESEARCH-II

COURSE CODE: 19230PC24

LEARNING OUTCOMES:

- CO1. acquired knowledge of research in the field of education.
- CO2. Familiarized with various types of research.
- CO3. developed an awareness of the steps involved in the research process.
- CO4. developed the skill of selecting a research problem in education and formulate hypotheses.

CO5. acquired skills to construct suitable tests and tools.

TEACHER EDUCATION IN INDIA ELEMENTARY LEVEL-II

COURSE CODE: 19230TE25

LEARNING OUTCOMES:

- CO1. Sensitise the student teachers with the need and relevance of Elementary Education as a basic foundation stage.
- CO2. Reflect on the various concerns of Elementary Education including Access, Enrolment, Retention & Achievement
- CO3. Gain insight into factors promoting the Universalisation of Elementary Education
- CO4. Develop a critical outlook towards measures taken for the achievement of quality at the Elementary Education stage

ADVANCED EDUCATIONAL TECHNOLOGY

COURSE CODE: 19230SC26A

LEARNING OUTCOMES:

- CO1. Understand the meaning of Educational Technology
- CO2. Understand the fundamentals of computer
- CO3. Attain knowledge about behavioural technology
- CO4. Understand the meaning and nature of instructional technology
- CO5. Acquire knowledge about communication technology
- CO6. Understand the features, working and use of the Internet and web
- CO7. Understand ICT application in education
- CO8. Appreciate the use of multimedia and web content for teaching learning
- CO9. Attain knowledge about e-learning
- CO10.** Acquire knowledge about new horizons of educational technology

EARLY CHILDHOOD EDUCATION

COURSE CODE: 19230SC26B

LEARNING OUTCOMES:

- CO1. understand the need and significance of early childhood care and education • understand the policy perspectives on ECCE in India and world
- CO2. understand social and personal development of children (3-6 years)
- CO3. understand the quality dimensions i.e. curriculum, programmes and work force for ECCE

VALUE EDUCATION

COURSE CODE: 19230SC26C

LEARNING OUTCOMES:

- CO1. acquired sufficient knowledge about the foundations of values of philosophical, sociological and psychological.
- CO2. organized family life, family responsibility and understand the values of sharing and caring.
- CO3. suitable methods and media for inculcation of values in the students life are learnt.
- CO4. learned to live together in the society.

SEMESTER - III

PHILOSOPHICAL AND SOCIOLOGICAL PERSPECTIVES IN EDUCATION-III

COURSE CODE: 19230PC31

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. acquire the knowledge of the concepts and meaning of philosophy and education
- CO2. describe the philosophy of Indian schools of thought
- CO3. describe the philosophy of Western schools of thought
- CO4. analyse the educational contributions of Indian and Western thinkers
- CO5. explain the basic concepts of sociology of education
- CO6. explain the relationship between social system and education

PLANNING, ADMINISTRATION AND MANAGEMENT OF SECONDARY AND HIGHER SECONDARY EDUCATION-III

COURSE CODE: 19230PC32

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. understand the structure of secondary education in India
- CO2. comprehend the development of secondary education in India
- CO3. compare the Indian secondary education system with other countries
- CO4. understand the role and functions of governing agencies of secondary education in India
- CO5. critically evaluate the planning of secondary education in India
- CO6. suggest the areas for research in secondary education

CURRICULUM, PEDAGOGY AND ASSESSMENT AT SECONDARY LEVEL-III

COURSE CODE: 19230PC33

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. differentiate the curriculum and syllabus
- CO2. understand the theoretical perspectives of curriculum
- CO3. understand the models of curriculum theory
- CO4. understand the models of curriculum design
- CO5. understand the implication of educational theories for today's classroom teachers
- CO6. understand the influence of views of educational pioneers on today's school

ADVANCED EDUCATIONAL RESEARCH AND STATISTICS-III

COURSE CODE: 19230TC34

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. understand the process of conducting research
- CO2. acquire knowledge about the quantitative research designs
- CO3. understand the different types of qualitative research designs
- CO4. understand the mixed methods of research
- CO5. acquire knowledge about the action research

CO6. know the process of collecting ,analyzing, interpreting quantitative data

TEACHER EDUCATION IN INDIA- SECONDARY AND HIGHER SECONDARY LEVEL-III

COURSE CODE: 19230TE35

LEARNING OUTCOMES:

The prospective teacher-educators could

CO1. understand the historical background of secondary teacher education in India

CO2. understand the objectives and structure of secondary teacher education

CO3. analyse the commissions and committees recommendations on secondary teacher education

CO4. compare the Indian secondary teacher education programme other countries

CO5. analyse the functioning of various agencies of secondary teacher education

CO6. understand the major issues in secondary teacher education

CO7. analyse the secondary teacher education curriculum and its transaction mode

ADVANCED TECHNIQUES OF EDUCATION

COURSE CODE: 19230SC36A

LEARNING OUTCOMES:

The prospective teacher-educators could

CO1. understand mobile learning

CO2. use whiteboard for teaching

CO3. design instructional games

CO4. apply peer tutoring

CO5. explain active learning methods

CO6. describe teaching- learning process model

CO7. use student-centred teaching methods

EDUCATION FOR DIFFERENTLY ABLED LEARNERS

COURSE CODE: 19230SC36B

LEARNING OUTCOMES:

The prospective teacher-educators could

CO1. enable the learner to understand the concept of Inclusive, Integrated and special education, need of special education and its practices.

CO2. understand the various suggestions of recent commissions of education for the differently abled for realizing the concept of universalisation of education.

CO3. enable the learner with the new trends in education for the differently abled with respect to the curriculum.

CO4. enable the learner to identify the specific needs characteristics and modalities of identification of various types of differently abled.

TRENDS IN INDIAN HIGHER EDUCATION

COURSE CODE: 19230SC36C

LEARNING OUTCOMES:

The prospective teacher-educators could

CO1. understand the historical background of the Indian Higher Education

CO2. get familiarized with the various committees and commissions on Higher Education

CO3. understand the role of various regulatory agencies in Higher Education

- CO4. Comprehend the knowledge on Indian Higher Education and Workforce development
- CO5. analyze the need for access and equity in Higher Education
- CO6. understand the quality assurance mechanism in Higher Education

SEMESTER - IV

PHILOSOPHICAL AND SOCIOLOGICAL PERSPECTIVES IN EDUCATION-IV COURSE CODE: 19230PC41

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. explain the basic concepts of sociology of education
- CO2. explain the relationship between social system and education
- CO3. analyse the role of education in cultural change
- CO4. explain various agencies of education
- CO5. identify the role of education in promoting the national integration and international understandings
- CO6. discuss the diverse trends in education.

PLANNING, ADMINISTRATION AND MANAGEMENT OF SECONDARY AND HIGHER SECONDARY EDUCATION-IV

COURSE CODE: 19230PC42

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. critically evaluate the planning of secondary education in India
- CO2. suggest the areas for research in secondary education
- CO3. discuss the implications of five year plans on secondary education
- CO4. analyze the need for technology integration in planning and administration of secondary education
- CO5. describe the emerging trends in secondary education and
- CO6. understand the need for quality enhancement of secondary education.

CURRICULUM, PEDAGOGY AND ASSESSMENT AT SECONDARY LEVEL - IV COURSE CODE: 19230PC43

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. understand the influence of views of educational pioneers on today's school
- CO2. analyze the various pedagogical approaches
- CO3. understand the different types of assessment techniques

- CO4. recognize the different methods of curriculum evaluation
- CO5. understand the future directions for curriculum development

ADVANCED EDUCATIONAL RESEARCH AND STATISTICS - IV

COURSE CODE: 19230TC44

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. acquire knowledge about the action research
- CO2. know the process of collecting ,analyzing, interpreting quantitative data
- CO3. know the process of collecting ,analyzing, interpreting qualitative data
- CO4. recognize the different types of parametric tests
- CO5. comprehend the different types of non-parametric tests
- CO6. comprehend the various components in the research report

TEACHER EDUCATION IN INDIA- SECONDARY LEVEL-IV

COURSE CODE: 19230TE45

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. analyze the functioning of various agencies of secondary teacher education
- CO2. understand the major issues in secondary teacher education
- CO3. analyze the secondary teacher education curriculum and its transaction mode
- CO4. understand the importance of preparing special education teachers

GUIDANCE AND COUNSELLING

COURSE CODE: 19230SC46A

OBJECTIVES

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. Understand the meaning, need and types of guidance
- CO2. Get acquainted with the tools and techniques of appraisal of an individual
- CO3. Understand the meaning, characteristics and types of counseling
- CO4. Get acquainted with process and techniques of Counseling

SPECIAL EDUCATION

COURSE CODE: 19230SC46B

LEARNING OUTCOMES:

The prospective teacher-educators could

- CO1. acquire knowledge and understanding of Special education and its curriculum.
- CO2. enable the prospective teacher to acquire knowledge and understanding about different areas of disability (Mentally Retardation, Learning Disability, Gifted, Creative children, Backward Children).
- CO3. acquaint the prospective teacher with Educational Programmes, Equipments, and Aids for education of the disabled.
- CO4. acquaint the prospective teacher with the role of Formal, Informal and Non formal in the context of Special children.

INFERENCE STATISTICS

COURSE CODE: 19230SC46C

LEARNING OUTCOMES:

The prospective teacher-educators could

CO1. understand the scope and application of educational statistics.

CO2. acquire himself with statistical theories and its application in Educational Research.

CO3. appropriate the role of parametric and non-parametric statistics in various types of educational research.

CO4. understand the importance of educational statistics and its relationship with of educational research.

Dean

Signature of HOD



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THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT:

EDUCATION

PG

M.Phil

PEOs, POs, PSOs & COs

M.Phil., Programme Educational Objective - PEO

The graduates will have the ability to

- understand the various schools and methods of psychology
- understand adolescent's growth, development and their problems
- acquaint with the significance of learning and the various theories of learning
- understand the biogenic and sociogenic motives and different theories of motivation
- understand the concepts and theories of intelligence and creativity
- Analyse the approaches of curriculum organization
- Understand the models of curriculum implementation
- Understand the factors influencing effective teaching
- Recognize the various approaches and models of curriculum evaluation
- Comprehend the strategies and models of curriculum change.

M.Phil., Programme Outcome – PO

The graduates will have the ability to

- Student teachers acquired knowledge of basic concept of educational psychology.
- They gained knowledge of methods of educational psychology.
- They understood the various schools of psychology.
- Adolescent's growth, development and their problems have been realized.
- Various theories of motivation have been understood.
- They acquired the knowledge about the changing concept of intelligence theories and creativity.
- Concept and principles of curriculum development and design experienced.

- Gained insight in to the development of new curriculum
- The continuous Curriculum reconstruction appreciated
- Teaching-learning process of curriculum learnt.

M.Phil., Programme Specific Outcome - PSOs

The graduates will have the ability to

1. Develop research acumen through critical analysis, discussion, academic debate and seminar presentations.
2. Specialize in any two chosen areas of Education.
3. Develop the ability to visualize, design, conduct and write research culminating in a Dissertation.
4. Build capacity to write book reviews, present seminar papers and make conference presentations.

M.Phil., Course Outcomes – CO

RESEARCH METHODOLOGY

SUB CODE – 193EDE11

LEARNING OUTCOMES:

The graduates will have the ability to

- CO1. Study a chosen area of Education in depth.
- CO2. Develop research interest in the specialized area.
- CO3. Develop an understanding about research processes by engaging with fieldwork and examining existing research studies.
- CO4. Learn to critically analyse not only the research process and papers but also one's own experiences as a researcher.

ADVANCED EDUCATIONAL PHILOSOPHY AND PSYCHOLOGY

SUB CODE – 193EDE12

LEARNING OUTCOMES:

- CO1. Student teachers acquired knowledge of basic concept of educational psychology.
- CO2. They gained knowledge of methods of educational psychology.
- CO3. They understood the various schools of psychology.
- CO4. Adolescent's growth, development and their problems have been realized.
- CO5. Various theories of motivation have been understood.

CO6. They acquired the knowledge about the changing concept of intelligence theories and creativity.

CURRICULUM DESIGN AND DEVELOPMENT

SUB CODE – 193EDC13

LEARNING OUTCOMES:

CO1. Concept and principles of curriculum development and design experienced.

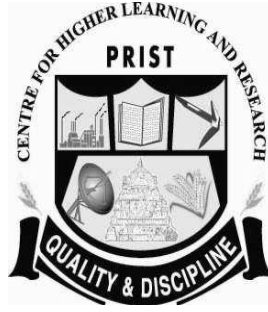
CO2. Gained insight in to the development of new curriculum

CO3. The continuous Curriculum reconstruction appreciated

CO4. Teaching-learning process of curriculum learnt.

Dean

Signature of HOD



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B.Sc. (Hons) Agriculture Syllabus

2018-2019 Regulation

Programme educational objectives

The educational objectives are intended to impart high quality education so as to produce not just agricultural graduates but agro technocrats with practical and conceptual skills. With precise and deliberate course modules, which provides education, research and training along with first hand field experiences, the students would sure be transformed as skilled human resources.

During the programme of four year duration, the students will undergo 65 courses in the domain of agriculture, horticulture, agricultural engineering, and information technology including linguistics. The students would gain in depth expertise in scientific farm management and post harvest technologies. The students are also taught with elective courses on mushroom cultivation, sericulture, tissue culture crops and bio fertilizer production, which could explore the graduates' entrepreneurial skills and also add students 'competitive values' in job market.

Programme outcome

At the end of the programme, the graduate should be able to:

1. Recognize the importance of agriculture in providing food, fibre and income as well as nation building.
2. Understand scientific methods of cultivation of field crops and horticultural crops along with animal production.
3. Establish agro based start-ups for the upliftment of rural community
4. Initiate rural enterprises there by providing jobs for the jobless.
5. Carry out basic and applied research geared towards augmentation of crop and animal production
6. Transfer of agro technologies to the farming community via public and private sector stakeholders.
7. Pursue advanced courses and trainings in International and National institutions