REGULATION
2022

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THANJAVUR- 613 403 - TAMIL NADU

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REGULATION – 2022

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1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global development needs which is reflected in programme outcomes (POs) and course outcomes (Cos) of the programme by the university 22UGEDUGE & 22PGEDUGE

SCHOOL OF EDUCATION

DEPARTMENT OF EDUCATION

2022 REGULATION

Local need	
Regional need	
National need	
Global need	

SCHOOL OF EDUCATION
2022- REGULATION B.Ed.,
1.1.1 CO-PO-PSO Mapping of Curriculum

Sem	Course code	Course title	CO's	PO's												
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13
I	22130 PE11	Psychology of Learners and Learning	CO1: Acquire knowledge about various methods of psychology.	*	*			*		*			*	*	*	
			CO2: Gain knowledge about the concept of Learning and its related theories.	*			*		*		*	*				*
			CO3: Get to know about motivation and its Influence on human behavior.	*	*				*		*		*		*	*

			CO4: Acquire knowledge about concepts of Intelligence and creativity.		*			*		*			*		*	
			CO5: Familiarize with the concepts and theories of personality.	*	*				*	*		*			*	*
	22130 PE12	Assessment for Learning	CO1: Gain knowledge of judging and scoring of student performance.		*		*			*	*		*			*
			CO2: Know the principles of assessment practices.	*	*			*	*		*			*	*	
			CO3: Differentiate between the types of assessment	*			*		*		*	*				*
			CO4: Point out the key issues in classroom assessment	*			*		*		*	*				*
			CO5: Understand how assessment can be possible in inclusive settings	*			*			*		*		*		*
	22130 CP13 A	Pedagogy of Tamil: Part - I	CO1: Analyze the aims and objectives of teaching of Tamil	*	*			*	*		*		*	*	*	
			CO2: Practice micro teaching skills in the class.		*		*		*		*		*		*	*
			CO3: Write model lesson plans for teaching a prose and poetry.		*		*		*		*		*		*	*
			CO4: Handle various methods of teaching Tamil	*		*			*	*	*		*		*	*

	22130 CP13 B	Pedagogy of English: Part - I	CO1: Analyze the aims and objectives of teaching of English	*		*		*	*	*		*		*	*	*
			CO2: Practice micro teaching skills in the class.	*		*		*		*	*		*		*	*
			CO3: Write model lesson plans for teaching a prose and poetry.	*			*		*		*	*					*
			CO4: Handle various methods of teaching English.	*			*		*		*	*					*
			CO5: Analyze the different use of Mass Media in classroom instruction	*			*		*	*		*		*	*	*
	22130 CP13 C	Pedagogy of Mathematics: Part - I	CO1: Understand the aims, objective, need and significance of teaching Mathematics. CO2: Develop appropriate Micro Teaching Skills in Macroteaching.	*		*		*		*	*		*		*	*
			CO3: Prepare a Lesson Plan to teach Mathematics.		*		*		*	*	*		*	*	*	*	*
			CO4: Analyze various Teacher Centered Methods and Learner Centered Methods of teaching Mathematics	*		*		*		*		*	*	*	*		
			CO5: Utilize ICT skills for teaching Mathematics.		*		*		*		*		*	*	*	*	*
	22130 CP13 D	Pedagogy of Physical Science: Part - I	CO1: Examine the need and significance of teaching Physical Science.	*		*		*		*	*		*	*	*	*	*
			CO2: Formulate the instructional objectives of a lesson.		*		*		*	*		*	*	*	*		

			CO3: Practice the microteaching skills in Physical Science.	*		*		*	*		*	*	*	*		*
			CO4: Interprets various methods of teaching Physical Science.	*	*			*		*			*	*	*	
			CO5: Analyse and use the resources for teaching Physical Science.		*			*		*		*		*	*	*
	22130 CP13 E	Pedagogy of Biological Science: Part - I	CO1: Examine the Aims and Objectives of pedagogy of Biological Science.	*	*				*	*	*		*	*	*	*
			CO2: Discuss the ways of planning for instruction	*	*		*		*		*		*	*	*	*
			CO3: Analyse the importance of teaching skills.	*		*		*		*		*		*	*	*
			CO4: Construct a lesson plan for teaching Biological Science.	*		*	*	*	*			*		*	*	*
			CO5: Use the resources for teachingBiological Science.	*		*		*		*	*		*	*	*	*
	22130 CP13 F	Pedagogy of Computer Science: Part - I	CO1: Explain the aims and objectives of teaching Computer Science.	*			*		*	*		*	*	*	*	
			CO2: Select and use appropriate teaching skills in their teaching.		*		*		*	*		*	*	*	*	
			CO3: Write lesson plans and unit plans on their own.	*		*			*	*	*		*	*	*	*
			CO4: Develop programmed instruction for the lessons in Computer Science.	*	*			*		*			*	*	*	

			CO5: Explain the various instructional media to be used in teaching Computer Science.		*		*		*	*		*	*	*	*	
	22130 CP13 G	Pedagogy of Social Science: Part - I	CO1: Explain the aims and objectives of teaching social science.	*		*		*		*	*		*	*	*	*
			CO2: Demonstrate the micro teaching skills.	*		*		*		*	*		*	*	*	*
			CO3: realize the macro teaching skills	*	*			*		*			*	*	*	
			CO4: Identify the different methods in teaching social Science.	*	*			*		*			*	*	*	
			CO5: Generalize the various ICT resources in teaching social science.		*		*		*	*		*	*	*	*	
	22130 CP13 H	Pedagogy of Commerce and Accountancy : Part - I	CO1: Analyze the aims and objectives Of teaching of Commerce.	*		*			*	*		*	*	*	*	
			CO2: Practice micro teaching skills in the class.	*		*		*		*	*		*	*	*	*
			CO3: Write model lesson plans for teaching Commerce and Accountancy.	*	*			*		*			*	*	*	
			CO4: Handle various methods of teaching Commerce and Accountancy.	*	*			*		*			*	*	*	
			CO5: Analyse the different use of Mass Media in classroom instruction.		*			*	*		*	*	*	*		*
	22130 CP13I	Pedagogy of Economics: Part - I	CO1: Examine the Aims and Objectives of pedagogy of economics.	*		*		*		*	*		*	*	*	*
			CO2: Discuss the ways of planning for instruction.	*		*		*		*	*		*	*	*	*

			CO3: Analyse the importance of teaching skills.	*	*			*		*			*	*	*	
			CO4: Construct a lesson plan for teaching economics.	*	*			*		*			*	*	*	
			CO5: Use the resources for teaching economics.	*		*		*		*	*		*	*	*	*
	22130 CP13J	Pedagogy of History: Part - I	CO1: Describe the need and importance of Teaching History.	*	*		*		*	*		*	*	*	*	
			CO2: Demonstrate the various Teaching skills.	*	*		*		*	*	*		*	*	*	*
			CO3: Prepare a Lesson Plan.	*	*		*		*			*		*	*	*
			CO4: Handle various Methods of Teaching History.	*	*			*		*			*	*	*	
			CO5: Utilize various instructional media in Teaching History.		*	*			*	*		*		*	*	
	22130 CP13 K	Pedagogy of Geography: Part - I	CO1: Describe the need and importance of Teaching Geography.	*		*		*		*	*		*	*	*	
			CO2: Demonstrate the various Teaching skills.	*		*		*	*		*		*	*	*	*

			CO3: Prepare a Lesson Plan.	*		*		*		*		*		*	*	*
			CO4: Handle various Methods of Teaching Geography.	*	*		*		*		*		*	*	*	*	*
			CO5: utilize various instructional media in Teaching Geography	*		*		*	*	*		*	*	*	*		
	22130 EP14 A	Yoga, Health and Physical Education	CO1: Apply the aims and objective of yoga in real life situation.	*	*		*			*	*		*	*	*	*	*
			CO2: Analyse the scope of health education and methods of import health education in schools.	*	*		*		*	*		*	*	*	*		
			CO3: Infer ideas about the different cause and symptoms of different communicable diseases	*	*		*		*	*		*	*	*	*		
			CO4: Analyse the scope, need and importance of physical education. CO5: Distinguish between intramural and extramural competitions.	*		*		*		*	*		*	*	*	*	*
	22130 EP14 B	Guidance and Counselling	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.	*	*			*		*			*	*	*	
	22130 EP14 C	Education administration and Management	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 interest in the educational administration and management techniques			*	*		*		*		*	*	*	*
	22130 EP14 D	PRE – Primary Education	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	*			*		*	*						

	22130 CRS	Research Led Seminar	CO1: Reflect on the role of research in teaching and overall professional development.	*		*		*		*						
			CO2: Discuss ways of ensuring integrity and ethics in conducting research.	*	*			*		*			*	*	*	
			CO3: Understand the process of research.	*	*			*		*			*	*	*	
			CO4: Comprehend the research design and research plan.	*	*			*		*			*	*	*	
			CO5: Recognize the research problem.	*		*		*		*						
	22130 PE21	Contemporary India and Education	CO1: Identify aims of education and types of education.	*	*			*		*						
	22130 PE22	Teaching and Learning	CO2: Explain the nature of social diversity in India and the role of education in creating positive attitude towards diversity.	*		*		*		*						
			CO3: interpret the issues in contemporary India like industrialization, Universalization of education and integrated education and inclusive education.		*		*		*		*	*	*	*	*	*
			CO4: Infer about the Language policies during Pre-independent and Post-independent	*		*			*		*	*	*	*	*	*

			India.														
			CO5: Summarize about equality in constitutional provisions and elimination of social in equalities through education.	*		*			*		*	*	*	*	*	*
	22130 CP23 A	Pedagogy of Tamil: Part – II	CO1: analyse the concept of pedagogy, andragogy and heutagogy.	*			*									
			CO2: practise Carl Roger's Non- directive model in a new learning situation	*	*			*		*			*	*	*	
			CO3: practise activity- based Instruction concept like Role play, simulation, gaming and prioritising.	*	*			*		*			*	*	*	
			CO4: analyse different types of Educational Resources in Classroom learning.	*	*			*		*			*	*	*	
			CO5: set achievement test and evaluate Tamil based instruction.	*		*		*	*	*	*	*	*	*	*	*
II	22130 CP23 B	Pedagogy of English: Part - II	CO1: analyse the concept of pedagogy, andragogy and heutagogy.	*	*		*		*	*	*	*	*	*	*	*
			CO2: practise Carl Roger's Non- directive model in a new learning situation	*	*			*	*	*	*	*	*	*	*	*
			CO3: practise activity- based Instruction concept like Role play, simulation, gaming and	*	*			*		*			*	*	*	

			prioritising.															
			CO4: analyse different types of Educational Resources in Classroom learning.	*	*	*	*	*	*	*	*	*	*	*	*	*
			CO5: set achievement test and evaluate English based instruction.	*	*			*	*	*	*	*	*	*	*	*
	22130 CP23 C	Pedagogy of Mathematics: Part - II	CO1: explain the concept of critical Pedagogy.						*	*	*	*	*	*	*	*
			CO2: adopt various teaching Models in teaching Mathematics.	*		*		*		*	*	*	*	*	*	*
			CO3: demonstrate Activity Based Instruction and Group Controlled Instruction.		*		*		*	*	*	*	*	*	*	*
			CO4: develop the various Educational Resources for teaching and learning Mathematics.	*	*			*		*			*	*	*	
			CO5: analyse the difference between Assessment and Evaluation.	*		*		*	*	*	*	*	*	*	*	*
	22130 CP23 D	Pedagogy of Physical Science: Part - II	CO1: examine the importance of Critical Pedagogy.	*		*			*	*	*	*	*	*	*	*
			CO2: appreciate the various models of teaching.			*			*	*	*	*	*	*	*	*
			CO3: practise Activity Based Instruction in teaching Physical Science.		*		*		*	*	*	*	*	*	*	*
			CO4: analyse and use the resources for teaching Physical Science.	*	*			*		*			*	*	*	

			CO5: handle various types of evaluation in teaching Physical Science	*		*			*	*	*	*	*	*	*	*
	22130CP23E	Pedagogy of Biological Science: Part - II	CO1. Examine the importance of Critical Pedagogy.	*		*			*	*	*	*	*	*	*	*
			CO2. Appreciate the various models of teaching.	*		*		*	*	*	*	*	*	*	*	*
			CO3. Practise Activity Based Instruction in teaching of Biological science.	*	*			*		*			*	*	*	
			CO4. Analyse and use the resources for teaching Biological science.	*	*			*		*			*	*	*	
			CO5. Handle various types of evaluation in teaching Biological science.	*				*	*		*	*	*	*	*	*
	22130CP23F	Pedagogy of Computer Science: Part - II	CO1. Analyse the concept of Pedagogy, Andragogy andHeutagogy.	*		*		*		*	*	*	*	*	*	*
			CO2. Demonstrate Carl Roger's Non- directive model in a new learning situation.	*	*			*		*			*	*	*	
			CO3. Practise activity-based Instruction concept like Role play, simulation, gaming and prioritising.	*	*		*		*	*	*	*	*	*	*	*
			CO4. Analyse different types of Educational Resources in Classroom learning.	*	*			*		*			*	*	*	
			CO5.construct an achievement test and evaluate computer-based instruction	*		*			*		*	*	*	*	*	*
	22130CP23G	Pedagogy of Social Science: Part - II	CO1: explain the Paradigm shift.	*		*		*	*		*	*	*	*	*	*

			CO2: demonstrate the various teaching models.	*		*		*	*		*	*	*	*	*	*
			CO3: identify activity based and group-controlled instructions.	*		*		*	*		*	*	*	*	*	*
			CO4: establish various resource centres in teaching Social Science.	*	*			*		*			*	*	*	
			CO5: generalise multiple assessment tools in teaching and learning.	*			*	*	*		*	*	*	*	*	*
	22130 CP23 H	Pedagogy of Commerce and Accountancy : Part – II	CO1: examine the importance of Critical Pedagogy.	*				*	*	*	*	*	*	*	*	*
			CO2: appreciate the various models of teaching.	*		*		*		*	*	*	*	*	*	*
			CO3: practise Activity Based Instruction in teaching of Commerce and Accountancy.		*		*		*		*	*	*	*	*	*
			CO4: analyse and use the resources for teaching Commerce and Accountancy.	*	*			*		*	*	*	*	*	*	*
			CO5: demonstrate various types of evaluation in teaching Commerce and Accountancy.		*			*	*	*	*	*	*	*	*	*
	22130 CP23I	Pedagogy of Economics: Part - II	CO1. examine the importance of Critical Pedagogy.	*		*		*		*	*	*	*	*	*	*
			CO2.appreciate the various models of teaching.		*		*		*		*	*	*	*	*	*
			CO3.practise Activity Based Instruction in teaching of Economics.	*	*			*		*			*	*	*	

			CO4.analyse and use the resources for teaching Economics	*	*			*		*			*	*	*	
			CO5. Demonstrate various types of evaluation in teaching Economics	*		*		*		*	*	*	*	*	*	*
	22130 CP23J	Pedagogy of History: Part - II	CO1: explain the Paradigm shift.		*			*		*	*	*	*	*	*	*
			CO2: demonstrate the various teaching models.			*		*		*	*	*	*	*	*	*
			CO3. Identify activity based and group-	*	*			*		*			*	*	*	
			controlled instruction.	*	*			*		*			*	*	*	
			CO4. Establish various resource centres in		*		*			*	*	*	*	*	*	*
	22130 CP23 K	Pedagogy of Geography: Part - II	CO1: explain the Paradigm shift from Pedagogy	*	*			*		*	*	*	*	*	*	*
			to Andragogy to Heutagogy.			*				*	*	*	*	*	*	*
			CO2: demonstrate the various teaching models.	*	*			*		*			*	*	*	
			CO3: identify activity based and group-	*	*			*		*			*	*	*	
			controlled instruction.	*	*		*	*	*	*	*	*	*	*	*	*
II	22130 EP24	Environmental Education	CO1. Understand the need for environmental education.	*	*	*	*		*	*	*	*	*	*	*	*

	A		CO2. Name the natural resources and its associated problems.	*	*			*		*	*	*	*	*	*	*
			CO3. Identify the different types of pollution, its impact and management of pollution.	*	*	*	*	*	*		*	*	*	*	*	*
			CO4. Appreciate the policies and programmes initiated to protect the environment.	*	*	*	*	*	*	*	*	*	*	*	*	*
			CO5. Analyse the environmental education curriculum.	*	*	*			*	*	*	*	*	*	*	*
	22130 EP24 B	Exploring library and other learning resources	CO1: Enumerate the functions and objectives of library.	*	*					*	*	*	*	*	*	*
			CO2: Explain information sources and services.	*	*		*		*	*	*	*	*	*	*	*
			CO3: Understand the place of MOOCs in the changing scenario.	*	*			*		*			*	*	*	
			CO4: develop an understanding about organizing different types of library	*	*			*		*			*	*	*	
			CO5: acquire knowledge about various instructional strategies to teach the		*	*		*	*	*	*	*	*	*	*	*
	22130 EP24 C	Teaching Early Child Hood Education	CO1: develop 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.		*		*		*	*		*	*	*	*	*
	22130 EP24 D	Professional Course for teacher proficiency	CO1: Acquire knowledge on various concepts of pedagogy.	*		*		*		*						
			CO2:Understand the human growth development.	*	*			*		*			*	*	*	
			CO3: Identify professional ethics of teacher.0	*	*			*		*			*	*	*	
			CO4: Analyze text-Books for VI, VII and VIII standards.	*	*			*		*			*	*	*	
			CO5: Virtualizes leadership profile of the teacher.	*		*		*		*		*	*	*	*	*

	22130 CRM	Research Methodology	CO1: understand the steps in research process and the suitable methods.	*	*	*	*	*	*	*	*	*	*			
			CO2: identify various research communications and their salient features.		*		*		*	*		*	*	*	*	*
			CO3: carry out basic literature survey using the common data-bases.	*		*		*		*	*	*	*	*	*	*
			CO4: give exposure to MATLAB platform for effective computational and graphic worksRequired for quality research.	*	*	*	*	*	*	*	*	*	*	*	*	*
			CO5: Understand the process of research		*		*		*			*	*	*	*	
	22130 CBR	Participation in Bounded Research	CO1: understand the steps in research process and the suitable methods.	*	*		*	*								
			CO2: identify various research communications and their salient features.	*			*		*			*	*	*	*	
			CO3: carry out basic literature survey using the common data-bases.	*	*			*		*			*	*	*	
			CO4: give exposure to MATLAB platform for effective computational and graphic worksRequired for quality research.		*			*		*						

			CO5: Understand the process of research	*	*		*	*			*	*	*	*		
	22130 PE31	Knowledge and Curriculum	CO1: recognize the types, categories of knowledge.	*		*		*		*		*	*	*		
			CO2: generalize the Principles of Curriculum Development.		*			*		*						
			CO3: compare the various Curriculum design and organization of Curriculum.			*		*		*		*	*	*	*	
			CO4: determine the various models of Curriculum.	*	*			*		*			*	*	*	
			CO5: summarize the Evaluation Phases.	*		*				*		*	*	*		
	22130 CP32 A	Pedagogy of Tamil: Part - III	CO1: Acquire knowledge about different aspects of language.	*	*		*			*		*	*	*	*	
			CO2: Use language for effective communication.	*		*			*							
			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.		*			*		*			*	*	*	*

	22130 CP32 B	Pedagogy of English: Part - III	CO1: Acquire knowledge about different aspects of language.	*		*			*				*	*	*	*
			CO2: Use language for effective communication.			*				*		*	*	*	*	
			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.	*	*	*	*	*	*	*						
III	22130 CP32 C	Pedagogy of Mathematics: Part - III	CO1: identify concepts to be transected at various levels with special emphasis on mathematics content.	*	*		*			*		*	*	*	*	
			CO2: explain the planning for theory of set and function.	*	*			*		*			*	*	*	
			CO3: develop sequences and series of real numbers.		*		*			*			*	*	*	*
			CO4: organise the concept for teaching – learning of algebra.	*	*			*		*			*	*	*	
			CO5: identify learner’s matrices and geometry.	*	*			*				*	*	*	*	

	22130 CP32 D	Pedagogy of Physical Science: Part - III	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	*		*		*		*	*	*	*	*		
	22130 CP32 E	Pedagogy of Biological Science: Part - III	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.	*			*		*		*	*	*	*	*	
	22130 CP32 F	Pedagogy of Computer Science: Part - III	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 polices		*			*					*	*	*		
	22130 CP32 G	Pedagogy of Social Science: Part - III	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.	*		*		*		*			*	*			
	22130 CP32 H	Pedagogy of Commerce and Accountancy : Part - III	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.	*	*			*		*			*	*	*	
	22130 CP32I	Pedagogy of Economics: Part – III	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.	*	*			*	*					*	*	*
	22130 CP32J	Pedagogy of History: Part - III	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.		*		*		*						*	*
	22130 CP32 K	Pedagogy of Geography: Part - III	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.	*		*	*		*			*	*	*		
III	22130 EP33 A	Peace Education	CO1: examine the need and importance of value education.	*	*		*		*				*	*	*	

			CO2: discuss the ways of fostering values in children. .	*		*	*		*	*				*	*	*
			CO3: analyse the importance of peace education.	*	*			*		*			*	*	*	
			CO4: construct the culture of developing peace education.	*	*			*		*			*	*	*	
			. CO5: use the approaches of value inculcation in children.	*			*		*	*				*	*	*
	22130 EP33 B	Drama and Art in Education	CO1: enable learners to perceptive the social and environmental issues through drama and art.	*	*		*			*		*	*	*		
			CO2: develop understanding of the local culture through drama and art.	*	*			*		*			*	*	*	
			CO3: widen the understanding of learners by integrating global culture.	*	*			*		*			*	*	*	
			CO4: understand the functions of drama and art.	*	*			*		*			*	*	*	
			CO5: learn low to integrate drama and art in the school curriculum.	*	*		*	*	*		*	*	*			
	22130 EP33 C	Strengthening language proficiency	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.	*		*		*		*				*	*	
			CO4: Develop a taste for and abilities in reading and making meaning of different kinds of texts.	*		*		*		*		*	*	*		
	22130 EP33 D	Gender Issues in Education	CO1: Explain Various Education programmes for CWSN.	*			*		*					*	*	*
			CO2: Analyse the different Barriers to Inclusive Education.	*		*			*	*		*	*	*		
			CO3: Examines the strategies to build inclusive learning environment in School.	*	*			*		*			*	*	*	
			CO4: Demonstrates the importance of curriculum adaptation.	*	*			*		*			*	*	*	
			CO5: Interprets the common issues and challenges in management of inclusive classroom.	*		*		*		*		*	*	*	*	
	22130 PE41	Creating an Inclusive school	CO1: discuss the reasons for gender inequalities		*		*		*					*	*	*
			CO2: analyze the gender role and responsibilities in schools	*		*		*	*				*	*	*	*
			CO3: integrate gender roles in School and curriculum.	*	*			*		*			*	*	*	

			CO4: debate on preventive measures of Sexual Abuse and Violence	*	*			*		*			*	*	*	
			CO5: explain about the Gender equalities and role of mass media.	*		*			*	*				*	*	*
	22130 PE42	Gender, School and Society	CO1: discuss the reasons for gender inequalities	*		*		*		*		*	*	*		
			CO2: analyze the gender role and responsibilities in schools	*	*		*		*		*	*	*	*		
			CO3: integrate gender roles in School and curriculum.		*		*		*				*	*	*	*
			CO4: debate on preventive measures of Sexual Abuse and Violence	*	*			*		*			*	*	*	
			CO5: explain about the Gender equalities and role of mass media.		*		*		*					*	*	*
	22130 PE43	Language across the Curriculum	CO1: Generalize the principles of language across the curriculum	*		*	*	*	*	*		*	*	*	*	
			CO2: Practice language proficiency skills.	*		*		*	*	*	*	*	*	*		
			CO3: apprehend the models of curriculum integration.	*	*			*		*			*	*	*	
			CO4: Summarize the theories of language learning.	*	*			*		*			*	*	*	

			CO5: Interpret the language related issues.	*		*		*	*		*	*	*	*		
	22130 CP44 A	Pedagogy of Tamil: Part – IV	CO1: analyse the concept of pedagogy, andragogy and heutagogy.	*		*		*		*	*	*	*	*	*	
			CO2: practise Carl Roger's Non- directive model in a new learning situation.	*		*			*			*	*	*	*	
			CO3: practise activity- based Instruction concept like Role play, simulation, gaming and prioritising..	*	*			*		*			*	*	*	
			CO4: analyse different types of Educational Resources in Classroom learning.	*	*			*		*			*	*	*	
			CO5: set achievement test and evaluate English based instruction	*	*		*		*		*	*	*	*	*	
	22130 CP44 B	Pedagogy of English: Part - IV	CO1: analyse the concept of pedagogy, andragogy and heutagogy.	*	*		*		*			*	*	*	*	*
			CO2: practise Carl Roger's Non- directive model in a new learning situation.	*	*	*	*						*	*	*	*
			CO3: practise activity- based Instruction concept like Role play, simulation, gaming and prioritising..	*	*			*		*			*	*	*	
			CO4: analyse different types of Educational Resources in Classroom learning.	*	*			*		*			*	*	*	
			CO5: set achievement test and evaluate English based instruction.				*		*				*	*	*	*
VI	22130 CP44 C	Pedagogy of Mathematics: Part - IV	CO1: identify concepts to be transected at various levels with special emphasis on mathematics content.		*	*		*	*		*	*	*	*	*	
			CO2: explain the planning for trigometry, statistics and probability.	*		*		*		*			*	*	*	
			CO3: develop sequences and practical geometry of co – ordinate geometry.	*	*			*		*			*	*	*	

			CO4: organist the concept for teaching – learning of complex numbers.	*	*			*		*			*	*	*	
			CO5. Identify learning resources in mathematics.		*			*	*			*	*	*	*	
VI	22130 CP44 D	Pedagogy of Physical Science: Part - IV	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		*	*	*	*	*	*		*	*	*	*	
	22130 CP44 E	Pedagogy of Biological Science: Part - IV	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.	*	*					*			*	*	*	
	22130 CP44 F	Pedagogy of Computer Science: Part - IV	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.	*	*			*		*			*	*		
	22130 CP44 G	Pedagogy of Social Science: Part - IV	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.	*	*			*		*			*			
	22130 CP44 H	Pedagogy of Commerce and Accountancy : Part - IV	CO1: Explore the individual differences existing among the learners for effective teaching of commerce and accountancy by the student teachers.	*		*	*	*		*			*	*	*	
			CO2: 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.	*	*			*		*			*	*	*	
			CO3: Enable the student teachers for using different strategies and approaches in teaching of Commerce & Accountancy.	*	*			*		*			*	*	*	
			CO4: Help the student teachers to understand the instructional materials employed in teaching of Commerce & Accountancy.	*	*			*		*			*		*	
	22130 CP44I	Pedagogy of Economics: Part - IV	CO1: Understand the recent developments in Economics.			*	*	*		*			*	*	*	
			CO2: 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.	*	*			*		*			*	*	*	
	22130 CP44J	Pedagogy of History: Part - IV	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	*	*			*		*			*	*	*	
	22130 CP44 K	Pedagogy of Geography: Par t – IV	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.	*	*	*	*	*		*			*	*	*	
	22130 EP45 A	Critical Understanding of ICT	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 expenses using ICT	*	*			*		*			*	*	*	
			CO5: comprehend the role played by ICT in Education.	*	*			*		*			*	*	*	
			CO1: understand the concept of Information and Communication Technology	*	*			*		*			*	*	*	
	22130 EP45 B	Understanding the Self	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 achieve.	*	*			*		*			*	*	*	
	22130 EP45 C	Human Rights	CO1: Identify the concept of human rights and list out the components.	*	*	*		*		*			*	*	*	
			CO2: Summarize the duties and responsibilities and explain the Harmony and Conflict.	*	*			*		*			*	*	*	
			CO3: Discriminate the various issues related to status of women and compare the Indian and Westerncountries.	*	*		*	*		*			*	*	*	
			CO4: Relies the societal Problem and apply the knowledge RTE & POSCO Act.	*	*			*		*			*	*	*	
			CO5: summarize the problems of enforcement of human rights in India.	*	*			*		*			*	*	*	
	22130 EP45 D	Addressing special needs in Classroom	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;	*	*			*		*			*	*	*	
	Program Exit Examination	22130PEE	CO1: Realize the value of English.	*	*			*		*			*	*	*	
22130PEE			CO2: acquire knowledge about new horizons in ICT	*	*			*		*			*	*	*	
			CO3: Understand the need for inclusion of environmental education in school curriculum													
			CO4: acquire the knowledge of commonly used Tests in schools	*			*	*	*		*	*		*		
			CO5: describe the various testing devices in guidance	*	*			*		*			*	*	*	
			CO1: Realize the value of English.	*	*			*		*			*	*	*	

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SCHOOL OF EDUCATION
2022 - REGULATION M.Ed.,

Sem	Course code	Course title	CO's	PO's																
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17
I	22230PC11	History And Political Economy Of Education In India	Developunderstandingabouttheeducationalsystemofancient,medievalIndia	*		*		*	*	*				*	*	*	*	*	*	
			Developunderstandingabouttheconstitutional provisionsforeducationconstitution.			*	*	*		*		*		*		*		*	*	
			Analyze the major recommendation so various educational committees and commissions after Indian independence.	*	*	*			*		*		*		*		*		*	*	
			Examine the impact of Indian political policy on education.	*	*			*	*			*		*		*		*	*	*
			Critically evaluate the changing economic policy on education	*	*		*		*		*		*		*		*	*	*	

	22230PC12	ADVANCED EDUCATIONAL PSYCHOLOGY	Enable students to understand the psychological orientation to education		*		*		*		*		*		*		*	*	*	
			Make students to comprehend the various schools and methods of psychology	*	*		*		*		*		*		*		*	*	*	
			Encourage age student stalest the biogenic and socio-genie motives of learner	*	*			*	*			*		*		*		*	*	*
			Motivatestudentstoexplorethefactorsthatinfluencingself-regulationoflearners	*	*			*	*			*		*		*		*	*	*
			Train students to narrate the orgies of intelligence and it assessment		*		*		*		*		*		*		*	*	*	
	22230TC13	BasicsinEducational Research	Make the students to explore the differently persevere search	*		*		*		*		*		*		*		*	*	*
			Encourage students to identify suitable research problem pertaining to his/her dissertation work	*	*			*	*			*		*		*		*	*	*
			Make the student stocomprehend the review of literature and arrange the min rightful	*	*			*	*			*		*		*		*	*	*
			Train the students to write are search proposal	*		*		*		*		*		*		*		*	*	*
			Enable the students to determine the best sampling techniques		*	*			*	*		*		*		*		*	*	*
	22230TE14	Teacher Education In India Elementary & Secondary	Comprehend the concept, objectives, rationale, challenges and extent of success	*		*			*	*		*		*		*		*	*	*
			Realize the importance of preparing special education teachers.	*		*		*		*		*		*		*		*	*	

		Level																			
			Analyze the various assessment procedures used in elementary education.	*	*			*	*			*		*		*		*	*	*
			Familiarize evaluation in elementary teacher education.	*	*			*	*			*		*		*		*	*	*
			Understandthehistoricalbackgroundofsecondaryteachereducationin India.	*			*		*	*		*		*		*		*	*	
	22230SC15A	Early Child Care and Education	Know the historical development of early childhood care and education.		*		*		*		*		*		*		*		*	*	
			Understand the different as pacts of child development.		*		*		*	*		*		*		*		*			
			Review the various committees and commissions suggestions nearly childhood	*	*			*	*			*		*		*		*		*	*
			Explain the various organization contribution sincerely childhood care and education.	*		*		*		*		*		*		*		*		*	
			Executetheprinciplesofplanningandmanagementofearlychildhoodcareandeducation.		*		*		*		*		*		*		*		*	*	
	22230SC15B	Women Education and Empowerment	To acquire knowledge on women's education	*		*		*		*	*		*		*		*		*	*	
			To analyze the policies related to women's empowerment	*	*			*	*			*		*		*		*		*	*	*

			To understand the fundamental rights of the women	*	*			*	*			*		*		*		*	*	*
			To examine the role of mass media on gender education		*		*		*	*		*		*		*	*	*		
			To analyze the role of education on women's powerment.	*		*		*		*	*		*		*		*	*	*	
	22230SC15C	Inclusive Education	Enable studentstounderstandthehistoricalperspective soneducationofchildrenwithdiverseneeds	*	*			*	*		*		*		*		*	*	*	
			Develop critical understanding of the recommendations of various commissions and committees towards inclusive education,	*	*		*		*	*		*		*		*		*	*		
			Understand the nature of difficulties encountered by children and prepare conducive teaching learning environment in inclusive schools,	*	*		*	*		*	*		*		*		*		*	*	
			Analyze special education, integrated education, mainstream and inclusive education practices, Identify and utilize existing sources for promoting inclusive practice.	*	*			*	*			*		*		*		*		*	*
			To develop awareness of learner towards inclusive education and its practices.	*	*			*	*			*		*		*		*	*	*	*
			Enable studentstounderstandthehistoricalperspectiveson educationofchildrenwithdiverseneeds	*	*		*		*												

	22230CRS	Research Led Seminar	Reflectontheroleofresearchinteachingandoverallprofessionaldevelopment	*		*			*	*		*		*		*	*	*	*	
			Discuss ways of ensuring integrity and ethics in conducting research	*	*			*	*			*		*		*		*	*	*
			Understand the process of research		*		*		*	*		*		*		*	*	*		
			Comprehend the research design and research plan.	*	*			*	*			*		*		*		*	*	*
			Recognize the research problem		*		*		*	*		*		*		*	*	*	*	
	22230PC21	Philosophy of Education	Enable the students to acquire knowledge on the concepts and meaning of philosophy andeducation.	*		*		*		*	*		*		*		*	*		
			MotivatethestudentstounderstandtherelationshipbetweenPhilosophyandeducation.	*		*		*		*	*		*		*		*	*	*	*
			Make the students to comprehend the different Indian schools of philosophy.		*	*		*		*	*		*		*		*	*	*	*
			Enable the students to explain the concept of Western schools of philosophy.	*		*		*		*	*	*		*		*		*		*
			EnablethestudentstoanalysetheeducationalcontributionsofIndianandWestern thinkers.		*		*		*					*		*		*		*
	22230PC22	Curriculum Design and Development	**Enable the students to acquire knowledge on the concepts and meaning of philosophy and education.**	*		*		*		*		*		*		*		*	*	*
			Motivate the students to understand there lationship between Philosophy and education.	*		*		*		*		*		*		*		*	*	*

			Make the students to comprehend the different Indian schools of philosophy.	*		*		*		*	*	*	*		*		*		*	*
			Enable the students to explain the concept of Western schools of philosophy.	*		*		*		*	*	*	*		*		*		*	*
			Enable the students to analyses the educational contribution of Indian and Western thinkers	*		*		*		*	*		*		*		*	*	*	*
	22230TC23	Advanced Educational Research and Statistics	**To acquire the knowledge of the nature and foundations of the curriculum**	*	*		*		*			*		*		*		*	*	*
			To understand the dimensions and approaches of curriculum design		*		*		*		*		*		*		*		*	*	*
			To analyze the phases of curriculum process and models of curriculum development		*		*		*	*		*		*		*		*	*	*	
			To create the models of curriculum implementation and to plan effective curriculum transaction	*		*		*		*	*	*	*		*					*	
			To evaluate the need and importance of curriculum evaluation		*		*		*		*		*		*			*			*
	22230TE24	Planning and Administration of Elementary & Secondary Education	**Enable the students to know about the process of conducting research.**	*		*		*		*		*		*		*		*			
			Enable them to select suitable research design for their study.	*		*		*		*	*	*	*		*		*		*	*	*
			Enable the mounded stand the significance of qualitative study in research	*		*		*		*	*	*	*		*		*		*	*	*
			Provide knowledge about the significance of mixed method of research	*		*		*		*	*	*	*		*		*		*	*	*

			Enable students to understand the step presenting action research.	*		*		*		*	*	*	*		*		*		*	*
	22230SC25A	Advanced Educational Technology	Understand the meaning of Educational Technology	*		*		*		*	*	*	*		*		*		*	*
			Attain knowledge about behavioral technology	*		*		*		*	*	*	*		*		*		*	*
			Understand the features, working and use of the Internet and web	*		*		*		*	*	*	*		*		*		*	*
			Appreciate the use of multimedia and web content for teaching learning	*		*		*		*	*	*	*		*		*		*	*
			Attain knowledge about-learning	*		*		*		*	*	*	*		*		*		*	*
	22230SC25B	**Pre-Service and In-Service Teacher Education**	**Understand the roles and responsibilities soft teachers and teacher educators**	*		*		*		*	*	*	*		*		*		*	*
			Critically examine the growth and development of teacher education in the country	*		*		*		*	*	*	*		*		*		*	*
			Developunderstandingofvariousstrategiesofteacherprofessionaldevelopment	*		*		*		*	*	*	*		*		*		*	*
			Gaininsightintothestatusofteacher'sin-serviceeducationinthecountry	*		*		*		*	*	*	*		*		*		*	*
			Usevarioustechniquesfortheevaluationofin-serviceteachereducationprogrammes	*		*		*		*	*	*	*		*		*		*	*
	22230SC25C	Value Education	Acquires the knowledge of them earning, scope and significance of value education.	*		*		*		*	*	*	*		*		*		*	*
			Uses suitable methods and media for inculcation of values in the student's life.	*		*		*		*	*	*	*		*		*		*	*

			Developcriticalunderstandingofthevariouscommissionreportstowardsvalueeducation	*		*		*		*	*	*	*		*		*		*	*
			Understands the professional values and ethics.	*		*		*		*	*	*	*		*		*		*	*
			Appreciates basic values underlying major religion of the world	*		*		*		*	*	*	*		*		*		*	*
	22230PT 26	**Practicum**	**Critically examine the growth and development of teacher education in the country**	*		*		*		*	*	*	*		*		*		*	*
			Developunderstandingofvariousstrategiesofteacherprofessionaldevelopment	*		*		*		*	*	*	*		*		*		*	*
			Gaininsightintothestatusofteacher'sin-serviceeducationinthecountry	*		*		*		*	*	*	*		*		*		*	*
			Developcriticalunderstandingofthevariouscommissionreportstowardsvalueeducation	*		*		*		*	*	*	*		*		*		*	*
			Understands the professional values and ethics.	*		*		*		*	*	*	*		*		*		*	*
	22230CBR	Participation in Bounded Research	Developcriticalunderstandingofthevariouscommissionreportstowardsvalueeducation	*		*		*		*	*	*	*		*		*		*	*
			Understands the professional values and ethics.	*		*		*		*	*	*	*		*		*		*	*
			Developcriticalunderstandingofthevariouscommissionreportstowardsvalueeducation	*		*		*		*	*	*	*		*		*		*	*
			Understands the professional values and ethics.	*		*		*		*	*	*	*		*		*		*	*
			Comprehend the concept, meaning and nature of measurement and evaluation	*		*		*		*	*	*	*		*		*		*	*

	22230PC31	Sociology of Education	Understand the relationship between measurement and evaluation.	*		*		*		*	*	*	*		*		*		*	*
			Motivate the students to explore the relationship between social system and education	*		*		*		*	*	*	*		*		*		*	*
			Make the students to analyze the role of education in cultural change	*		*		*		*	*	*	*		*		*		*	*
			Enable the students to identify various agencies of education	*		*		*		*	*	*	*		*		*		*	*
			Make the students to examinetherole of education impromptu in gnationalintegration and international launders standing	*		*		*		*	*	*	*		*		*		*	*
	22230PC32	Advanced Technique so fin striation	Gain knowledge of instructional technology	*		*		*		*	*	*	*		*		*		*	*
			Developcriticalunderstandingofthevariouscommissionreportstowardsvalueeducation	*		*		*		*	*	*	*		*		*		*	*
			Understands the professional values and ethics.	*		*		*		*	*	*	*		*		*		*	*
			Developcriticalunderstandingofthevariouscommissionreportstowardsvalueeducation	*		*		*		*	*	*	*		*		*		*	*
			Understands the professional values and ethics.	*		*		*		*	*	*	*		*		*		*	*
	22230TC33	Educational Measurement Evaluation	**Comprehend the concept, meaning and nature of measurement and evaluation**	*		*		*		*	*	*	*		*		*		*	*
			Understand the relationship between measurement and evaluation.	*		*		*		*	*	*	*		*		*		*	*
			Acquire knowledge about various tools of measurement and evaluation in existence.	*		*		*		*	*	*	*		*		*		*	*

			Develop skills on using psychological test for measurement and evaluation.	*		*		*		*	*	*	*		*		*		*	*
			Get hand son SPSS to learn various statistical measurement and its analysis.	*		*		*		*	*	*	*		*		*		*	*
	22230TE34	Curriculum, pedagogy and assessment at elementary & secondary level	To acquire the knowledge of curriculum planning and alignment	*		*		*		*	*	*	*		*		*		*	*
			To analyze the curriculum and pedagogy as envisaged by various education alpine's	*		*		*		*	*	*	*		*		*		*	*
			To understand the theory and practice of curriculum	*		*		*		*	*	*	*		*		*		*	*
			To acquire knowledge of philosophical perspectives of curriculum	*		*		*		*	*	*	*		*		*		*	*
			To recognize the different assessment techniques and evaluation models	*		*		*		*	*	*	*		*		*		*	*
	22230SC35A	Trends in Indian Higher Education	Enable the students to understand the growth and expansion of Indian higher education.	*		*		*		*	*	*	*		*		*		*	*
			Explain the students about the impact of IR4.0 on higher education.	*		*		*		*	*	*	*		*		*		*	*
			Make the students to realize the importance of quality in Indian higher education.	*		*		*		*	*	*	*		*		*		*	*
			Enablethestudentstorecognisethedifferentsectorsofgovernanceinindianhighereducation.	*		*		*		*	*	*	*		*		*		*	*
			Explain the significance of internationalizing India higher education.	*		*		*		*	*	*	*		*		*		*	*
	22230SC35B	Education for differently bled	Enable students to understand RPWD Act and education a implications of learning	*		*		*		*	*	*	*		*		*		*	*

		learners	Makestudentstocomprehendlearningresource sandstrategiesforinclusivepedagogy	*		*		*		*	*	*	*		*		*		*	*
			Enable student to understand the concept to funiversalde sign for learning (UDL) in the context of inclusive education.	*		*		*		*	*	*	*		*		*		*	*
			Create awareness on inclusive learning environments for successful inclusive education	*		*		*		*	*	*	*		*		*		*	*
			Encourage students to understand curriculum and the importance of guidelines given by National	*		*		*		*	*	*	*		*		*		*	*
	22230SC35C	Educational Planning Management and Financing Education	Identify the need, scope and purpose of educational planning.	*		*		*		*	*	*	*		*		*		*	*
			Roundest and the issues and challenges in education atman agreement and administration in India.	*		*		*		*	*	*	*		*		*		*	*
			To develop familiarities with various sources of financing in India,	*		*		*		*	*	*	*		*		*		*	*
			Understand the issues related to planning and management of education.	*		*		*		*	*	*	*		*		*		*	*
			Critically analyses the policies of educational finance and its implications of efficiency of the system	*		*		*		*	*	*	*		*		*		*	*
	22230PC41	Educational Studies	Understand the theoretical perspectives of education as a discipline in terms of social	*		*		*		*	*	*	*		*		*		*	*
			Explore the widening of inter disciplinary knowledge in education with respect to philosophy	*		*		*		*	*	*	*		*		*		*	*
			Incorporate the socio-cultural context of India	*		*		*		*	*	*	*		*		*		*	*

			Acquire knowledge about multiple school contexts and its personnel management system	*		*		*		*	*	*	*		*		*		*	*
			Acquaint with institutions	*		*		*		*	*	*	*		*		*		*	*
	22230PC42	Comparative Education	Understand the need, scope and history of comparative education.	*		*		*		*	*	*	*		*		*		*	*
			Comprehendtheprimaryandsecondaryeducation'saimsandmethodsofinstructionin U.S.A,U.K, Japan, Finland and India.	*		*		*		*	*	*	*		*		*		*	*
			Analyze the role of national and state government on education.	*		*		*		*	*	*	*		*		*		*	*
			Explorethecomparativeeducationofprimaryandsecondaryeducationof U.S.A,U.K, Japan,Finlandand India.	*		*		*		*	*	*	*		*		*		*	*
			Realizetheissuesandchallengesinprimaryandsecondaryeducationofperspectiveofcountries :U.S.A.,U.K,Japan,Finlandand India	*		*		*		*	*	*	*		*		*		*	*
	22230TC43	ICT on Teaching and Learning	Develop the professional ability in ICT	*		*		*		*	*	*	*		*		*		*	*
			Understand the impact of ICT	*		*		*		*	*	*	*		*		*		*	*
			Explain the various educational resources	*		*		*		*	*	*	*		*		*		*	*
			Describe the various assessment techniques	*		*		*		*	*	*	*		*		*		*	*
			Explain ways to create online community	*		*		*		*	*	*	*		*		*		*	*

	22230SC44A	Guidance and Counseling	Enable the students to explain the conceptual aspects of Guidance and procedural aspects of guidance services.	*		*		*		*	*	*	*		*		*		*	*
			Makethestudentstounderstandtheknowledgeabouttheoreticalandprocedural issues in Educational and Vocational guidance.	*		*		*		*	*	*	*		*		*		*	*
			Enable the students to explain the role of counselor, and Teacher in the guidance programme.	*		*		*		*	*	*	*		*		*		*	*
			Enable the students to identify the different activities rendered by the different guidance personnel	*		*		*		*	*	*	*		*		*		*	*
			Makethestudentstofamiliarizewithself,groupandcareerappraisaltechniques	*		*		*		*	*	*	*		*		*		*	*
	22230SC44B	Special Education	Acquireknowledgeandunderstandingofspecialeducationanditscurriculum.	*		*		*		*	*	*	*		*		*		*	*
			Enable the prospective teacher to acquire knowledge and understanding about different areas of disability (Mentally Retardation, Learning Disability, Gifted, Creative children, Backward Children).	*		*		*		*	*	*			*		*		*	*
			Acquaint the prospective teacher with Educational Programmers, Equipment's, and Aids for education of the disabled.	*		*		*		*	*	*	*		*		*		*	*
			Acquaint the prospective teacher with the role of Formal, Informal and Non formalin the context of Special children.	*		*		*		*	*	*	*		*		*		*	*
			Aware the students with the various trends in the area of Special Education	*		*		*		*	*	*	*		*		*		*	*
	22230SC44C	Inferential Statistics	Understand the scope and application of education a statistics.	*		*		*		*	*	*	*		*		*		*	*

			Acquire himself with statistical the orisons its application in Educational Research.	*		*		*		*	*	*	*		*		*		*	*
			Appropriatetheroleofparametricandnon-parametricstatisticsinvarioustypesofeducationalre-search.	*		*		*		*	*	*	*		*		*		*	*
			Understand the importance of educational statistics and its relationship with of educational re-search.	*		*		*		*	*	*	*		*		*		*	*
			Enablethemtocomprehendthedifferenttypesofparametricandnon-parametrictests	*		*		*		*	*	*	*		*		*		*	*
	22230PT45	**Practicum-Dissertation**	Enablestudentstounderstandthevariousdimensionsofhumangrowthanddevelopment	*		*		*		*	*	*	*		*		*		*	*
			Attain the knowledge of internet and its applications	*		*		*		*	*	*	*		*		*		*	*
			Explorethecommissionsandcommittees‘recommendationsofsecondaryteachereducation.	*		*		*		*	*	*	*		*		*		*	*
			Acquire the knowledge of commonly used Tests in schools	*		*		*		*	*	*	*		*		*		*	*
			Describe the various testing devices in guidance	*		*		*		*	*	*	*		*		*		*	*
	22230PEE	Programme Exit Examination	Identify the need, scope and purpose of educational planning.	*		*		*		*	*	*	*		*		*		*	*
			Roundest and the issues and challenges in education atman agreement and administration in India.	*		*		*		*	*	*	*		*		*		*	*
			To develop familiarities with various sources of financing in India,	*		*		*		*	*	*	*		*		*		*	*

			Understand the issues related to planning and management of education.	*		*		*		*	*	*	*		*		*		*	*

PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY (PRIST)

Declared as DEEMED-TO-BE-UNIVERSITY
U/s 3 of UGC Act, 1956

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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

COURSE OBJECTIVE R-(2022)

LOCAL NEEDS	
REGIONAL NEEDS	
NATIONAL NEEDS	
GLOBAL NEEDS	

LOCALNEEDS REGIONALNEEDS NATIONALNEEDS GLOBALNEEDS

SCHOOLOFENGINEERINGANDTECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMMEOUTCOMES

B.TECH(FT& PT)

EngineeringGraduateswillbeableto:

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

PO2:Problem analysis: Identify, formulate, review research literature, and analyze complexengineeringproblemsreachingsubstantiatedconclusionsusingfirstprinciplesofmathematics,natural sciences, andengineeringsciences.

PO3:Design/development of solutions: Design solutions for complex engineering problemsanddesignsystemcomponentsorprocessesthatmeetthespecifiedneedswithappropriate consideration for the public health and safety, and the cultural, societal, andenvironmentalconsiderations.

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

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

PO6:The engineer and society: Apply reasoning informed by the contextual knowledge toassesssocietal,health,safety,legalandculturalissuesandtheconsequentresponsibilitiesrelevant to the professionalengineeringpractice.

PO7:Environmentandsustainability:Understandtheimpactoftheprofessionalengineeringsolutionsinsocietalandenvironmentalcontexts,anddemonstratetheknowledgeof,and needforsustainabledevelopment.

PO8:Ethics: Apply ethical principles and commit to professional ethics and responsibilitiesandnorms ofthe engineeringpractice.

PO9:Individual and team work: Function effectively as an individual, and as a member orleaderin diverseteams,and in multidisciplinarysettings.

PO10: Communication: Communicate effectively on complex engineering activities with theengineeringcommunityandwithsocietyatlarge,suchas,beingabletocomprehendand write effective reports and design documentation, make effective presentations, andgive and receiveclear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of theengineeringandmanagementprinciplesandapply thesetoone‘sownwork,asamemberandleaderinateam,tomanageprojectsandinmultidisciplinaryenvironments.

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

LOCALNEEDS REGIONALNEEDS NATIONALNEEDS GLOBALNEEDS

SCHOOLOFENGINEERINGANDTECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMMEOUTCOMES
M.TECH(FT&PT)
M.TECH-COMMUNICATION SYSTEMS (FullTime-2Yrs; PartTime–3Yrs)

ProgrammeOutcomes

PO1. Graduates will Demonstrate the ability to Formulate and Solve Manufacturing RelatedProblemsbyapplyingFundamental Principles.

PO2. Graduates will Demonstrate ability to Design and Conduct Experiments, Interpret andAnalyzesData and Report Results.

PO3. Graduates will Demonstrate ability to Design and Develop a Manufacturing System or aProcess.

PO4. Graduates will be able to Independently Analyze Complex Problems with their CourseBackgroundand Dissertation Work carriedout duringProgram.

PO5. GraduateswillbefamiliarwithCAD,CAEandPLMToolsforManufacturingApplications.

PO6. GraduateswillhavetheConfidencetoapplyEngineeringSolutionsinGlobalandSocietal Contexts.

PO7. Graduates will have the ability to Design and Evaluate a Manufacturing System/Processwhich is Environment Friendly with Appropriate consideration for Public Health andSafety.

PO8. GraduateswillDemonstrateanUnderstandingoftheirProfessionalEthicalResponsibilities.

PO9. Graduates will Demonstrate ability to Function Effectively Individually and also as aTeamMember in Multidisciplinaryactivities.

PO10. Graduates willbeabletoCommunicate EffectivelyinbothVerbalandWrittenForms.

PO11. Graduates will be capable of Self-Education and clearly Understand the value of Life-longLearningin ContinuingProfessional Development.

PO12. Graduates will have the ability to Employ Effective Project Management Skills toDevelopa Project Plan.

LOCALNEEDS REGIONALNEEDS NATIONALNEEDS GLOBALNEEDS

SCHOOLOFENGINEERINGANDTECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMMESPECIFICOUTCOMES

B.TECH(FT& PT)

PSO1:GraduatewilltakeupcareersinThermal,Manufacturing, DesignandAutomobilerelatedsectors.

PSO2: Graduates will design and develop products, utilize their knowledge and skills asengineerstart their own ventures as entrepreneurs.

PSO3:Graduateswilltakeupeducationalprograminmasteringmechanicalengineeringscienceandmanagement.

M.TECH(FT &PT)

PSO1: Advancedknowledgeinmanufacturingtools,solutionstoindustrialapplications;Identify,formulateandsolvemechanicalengineeringproblemsrelatedtoadvancedmanufacturingenvironment.

PSO2: Tospreadingtherecentdevelopmentsinmanufacturingengineeringfieldthrougheducatingthestudentsusingnewtechnologies,software'susagesandrecenttrendsinmanufacturingtechnology.

PSO3: To design a system, components, or process and meet specific objectives keeping inview the economical approaches, availability of materials and manufacturability with increasedlife.

LOCALNEEDS REGIONALNEEDS NATIONALNEEDS GLOBALNEEDS

BTECH-(P-T)
R-2022

Course code	Course name	Course outcomes
22148S11P	Transforms and Partial Differential Equations	SolvedifferentialequationsusingFourierseri eanalysiswhichplaysavitalroleinengineerin gapplications. Becapableofmathematicallyformulatingcer tainpracticalproblemsintermsofpartialdiffer ential equations, solve them and physicallyinterprettheresults. HavegainedawellfoundedknowledgeofFour ier series, their different possible forms andthefrequentlyneededpracticalharmonica nalysis that an engineer may have to make fromdiscretedata. Have obtained capacity to formulate and identifcertain boundary value problems encountered inengineering practices, decide on applicability ofthe Fourier series method of solution, solve themandinterpret theresults. Havegraspedtheconceptofexpressionofafun ction, under certain conditions, as a doubleintegralleadingtoidentificationoftran sformpair,andspecializationonFouriertransf ormpair,theirproperties,thepossiblespecialc ases withattentionto theirapplications.
22152C12P	Electromagnetic Fields	• Display an understanding of fundamental electromagnetic laws and concepts • Write Maxwell's equations in integral, differential and phasor forms and explain their physicalmeaning • Explain electromagnetic wave propagation in lossy and in lossless media • Solve simple problems requiring estimation of electric and magnetic field quantities based onthese concepts and laws
		Use digital electronics in the present

LOCALNEEDS REGIONALNEEDS NATIONALNEEDS GLOBALNEEDS

22152C13P	Digital Electronics	contemporary world • Design various combinational digital circuits using logic gates • Do the analysis and design procedures for synchronous and asynchronous sequentialcircuits • Use the semiconductor memories and related technology • Use electronic circuits involved in the design of logic gates
22152C14P	Electronic Circuits - I	• Acquire knowledge of Working principles, characteristics and applications of BJT and FET • Frequency response characteristics of BJT and FET amplifiers • Analyze the performance of small signal BJT and FET amplifiers - single stage and multistage amplifiers • Apply the knowledge gained in the design of Electronic circuits
22152C15P	Signals and Systems	• To be able to determine if a given system is linear/causal/stable • Capable of determining the frequency components present in a deterministic signal • Capable of characterizing LTI systems in the time domain and frequency domain • To be able to compute the output of an LTI system in the time and frequency domains
22148S21BP	Probability and Random Processes	• Understand the fundamental knowledge of the concepts of probability and have knowledgeof standard distributions which can describe real life phenomenon. • Understand the basic concepts of one and two dimensional random variables and apply inengineering 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 acquiringskills in handling situations involving more than one variable. Able to analyze the

		responseof random inputs to linear time invariant systems.
22152C22P	Communication Theory	Design AM communication systems • Design Angle modulated communication systems • Apply the concepts of Random Process to the design of Communication systems • Analyze the noise performance of AM and FM systems • Gain knowledge in sampling and quantization
22152C23P	Linear Integrated Circuits	Design linear and non linear applications of OP – AMPS Design applications using analog multiplier and PLL Design ADC and DAC using OP – AMPS Generate waveforms using OP – AMP Circuits Analyze special function ICs
22152C24P	Electronic Circuits – II	Analyze different types of amplifier, oscillator and multivibrator circuits Design BJT amplifier and oscillator circuits Analyze transistorized amplifier and oscillator circuits Design and analyze feedback amplifiers Design LC and RC oscillators, tuned amplifiers, wave shaping circuits,multivibrators, power amplifier and DC convertors.
22152C25P	Transmission Lines and Waveguides	• Explain the characteristics of transmission lines and its losses • Write about the standing wave ratio and input impedance in high frequency transmission lines • Analyze impedance matching by stubs using smith charts • Analyze the characteristics of TE and TM waves

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22148S31BP	Numerical Methods	o Appreciate the numerical techniquesofinterpolationinvariousintervalsandapplythenumericaltechniquesofdifferentiationandintegrationforengineeringproblems. o Understandtheknowledgeofvarioustechniques and methods for solving first andsecondorderordinarydifferentialequations. SolvedifferentialequationsusingFourierseriesanalysiswhichplaysavitalroleinengineering applications.
22152C32P	Microprocessor and Microcontrollers	• Understand and execute programs based on 8086 microprocessor. • Design Memory Interfacing circuits. • Design and interface I/O circuits. • Design and implement 8051 microcontroller based systems.
22152C33P	Digital Signal Processing	• Apply DFT for the analysis of digital signals and systems • Design IIR and FIR filters •Characterize the effects of finite precision representation on digital filters •Design mutilate filters • Apply adaptive filters appropriately in communication systems
22152C34P	Digital Communication	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

LOCALNEEDS REGIONALNEEDS NATIONALNEEDS GLOBALNEEDS

22152L35P	Microprocessor and Microcontrollers Lab	Write ALP Programmes for fixed and Floating Point and Arithmetic operations • Interface different I/Os with processor •Generate waveforms using Microprocessors • Execute Programs in 8051 • Explain the difference between simulator and Emulator
22152C41P	Medical Electronics	Know the human body electro- physiological parameters and recording of bio-potentials □ Comprehend the non-electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood cell count, blood flow meter etc. □ Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventilators □ Comprehend physical medicine methods eg. ultrasonic, shortwave, microwave surgical diathermies , and bio-telemetry principles and methods □ Know about recent trends in medical instrumentation
22152C42P	Antenna and Wave Propagation	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
22152C43P	Computer Networks	• To introduce the students the functions of differentlayers. • To introduce IEEE standards employed in computernetworking

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22152L45P	Networks and Communication Lab	• Communicate between two desktop computers • Implement the different protocols • Implement and compare the various routing algorithms • Use the simulation tool. • Simulate & validate the various functional modules of acommunication system Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system
22152C51P	Optical Communication and Networks	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.
22152C52P	Microwave Engineering	• To study passive microwave components and their S-Parameters. • To study Microwave semiconductor devices &applications. To study Microwave sources and amplifiers
21160C53P	Principles of Management	Upon completion of the course, students will be able to have clear understanding □ Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management.

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22152L55P	Optical Communication and Microwave Lab	• Analyze the performance of a simple optical link. • Test microwave and optical components. • Analyse the mode characteristics of fiber Analyse the radiation pattern of the antenna
22152C61P	Wireless Communication	Characterize a wireless channel and evolve the system design specifications • Design a cellular system based on resource availability and traffic demands • Identify suitable signaling and multipath mitigation techniques for the wirelesschannel and system under consideration.
22152C62P	VLSI Design	Realize the concepts of digital building blocks using MOS transistor. □ Design combinational MOS circuits and power strategies. □ Design and construct Sequential Circuits and Timing systems. □ Design arithmetic building blocks and memory subsystems. □ Apply and implement FPGA design flow and testing
22152C63P	Embedded and Real Time Systems	Describe the architecture and programming of ARM processor □ Outline the concepts of embedded systems □ Explain the basic concepts of real time operating system design □ Model real-time applications using embedded-system concepts
22152L65P	VLSI and Embedded Systems Lab	Write programs in ARM for a specific Application Interface memory, A/D and D/A convertors with ARM system. Analyze the performance of interrupt Write program for interfacing keyboard, display, motor and sensor. Formulate a mini project using embedded system

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21160S71P	Total Quality Management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
22152C72P	Wireless Networks	Conversant with the latest 3G/4G networks and its architecture □ Design and implement wireless network environment for any application using latest wireless protocols and standards □ Ability to select the suitable network depending on the availability and requirement □ Implement different type of applications for smart phones and mobile devices with latest network strategies.
22152C73P	Telecommunication Switching and Networks	• To introduce the concepts of Frequency and Time division multiplexing. • To introduce digital multiplexing and digital hierarchynamely SONET / SDH • To introduce the concepts of space switching, time switching and combination switching, example of a switch namely No.4 ESS Toll switch. • To introduce the need for network synchronization and study synchronization issues. To outline network control and management issues. To study the enhanced local loop systems in a digital environment. To introduce ISDN, DSL / ADSL, and fiber optic systems in the subscriber loop.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSEOBJECTIVE

M.TECH(P.T)(R-2022)

Course code	Course name	Course outcomes
22248S11BP	Applied Mathematics for Electronics Engineering	○ Concepts on vector spaces, linear transformation, inner product spaces, eigenvalues and generalized eigenvectors. ○ Apply various methods in linear algebra to solve systems of linear equations. ○ Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for solving linear programming problems. ○ Numerical solution of differential equations by single and multistep methods. ○ Computation of probability, random variables and their associated distributions, correlations and regression.
22271C12P	Advanced Digital Signal Processing	• Formulate time domain and frequency domain description of Wide Sense Stationary process in terms of matrix algebra and relate to linear algebra concepts. • State W-K theorem, spectral factorization theorem, spectrum estimation, bias and consistency of estimators. • Wiener filtering, LMS algorithms, Levinson recursion algorithm, applications of adaptive filters • Decimation, interpolation, Sampling rate conversion, Applications of multirate signal processing

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22271C13P	Advanced Digital Communication Techniques	• 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.
22271L14P	Communication Systems Lab - I	○ 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.
22271C21P	Mobile Communication Networks	• 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
22271C22P	Advanced Microwave Systems	• Capability to design Microwave circuits. • To be able to analyze microwave integrated circuits. • Design and operation of passive microwave devices such as power dividers, couplers and filters Create
22271L24P	Communication Systems Lab - II	• Apply knowledge to identify a suitable architecture and systematically design an RF system. • Comprehensively record and report the measured data, and would be capable of analyzing, interpreting the experimentally measured data and producing meaningful conclusions. • Design and develop microstrip filters.
22271C31P	Electromagnetic Interference and Compatibility □	• Identify Standards • Compare EMI test methods

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		• Discuss EMI mitigation techniques
22271C32P	Advanced Radiation Systems	• Ability to understand antenna concepts • Ability to design antenna for various applications • Knowledge of modern antenna design
22271C41P	Wireless Sensor Networks	○ 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.
22271C42P	Optical Networks	○ Design and Analyze Network Components ○ Assess and Evaluate optical networks
22271E23BP	DSP PROCESSOR ARCHITECTURE AND PROGRAMMING	• Become Digital Signal Processor specialized engineer • DSP based System Developer
22271E33BP	Digital Image Processing	○ Explain the fundamentals of digital image processing. ○ Describe image various segmentation and feature extraction techniques for image analysis. ○ Discuss the concepts of image registration and fusion.
22271E43BP	Soft Computing Techniques	• Design data converters • Evaluate smart antennas • Discuss digital hardware and software choices
22271E51BP	Satellite Communication	• Discuss satellite navigation and global positioning system • Outline deep space networks and inter planetary missions
22271E52BP	High Performance Communication Networks	• • 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.
22271E53CP	Mobile ADHOC networks	• 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.
22271E23AP	High Speed Switching Architecture	• 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
22271E23CP	DIGITAL SPEECH PROCESSING	○ 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.

LOCAL NEEDSREGIONAL NEEDSNATIONAL NEEDSGLOBAL NEEDS

School: ENGINEERINGAND TECHNOLOGY

Dept: ECE

Mapping of COs and Pos-PSO

2022 regulation- PG (FT)

Sem	Course Code	Title of the Course	COs	POS										
				PO 1	PO 2	PO 3	PO 4	PO5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12
I	22248S11B	Applied Mathematics for Electronics Engineering	• The primary aim 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.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	22271C12	Advanced Digital Signal Processing	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,	✓	✓	✓	✓	✓		✓					✓

Mapping of COs and Pos-PSO

			prediction and filtering concepts and techniques. • Apply various techniques in solving differential equations.												
	22271C13	Advanced Digital Communication Techniques	• 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	✓	✓	✓	✓		✓		✓		✓			

Mapping of COs and Pos-PSO

			• The students will understand the basics of crystals, their structures and different crystal growth techniques.											
	22271C14	Optical Networks	• 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.	✓	✓	✓	✓			✓				✓
	22271C15	Advanced Radiation Systems	• 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.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Mapping of COs and Pos-PSO

			• Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.											
	22271E16_	**Elective-I**												
	22271L17	Communication Systems Lab – I	• 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.	✓	✓	✓	✓	✓		✓					✓
	22271E16A	Internetworking and	• Write, test, and debug simple Python	✓	✓	✓	✓		✓		✓		✓		

Mapping of COs and Pos-PSO

		Multimedia	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.												
	22271E16B	Digital Image Processing	Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications. • To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.	✓	✓	✓	✓			✓					✓

Mapping of COs and Pos-PSO

			• To acquaint the students with the determination of molecular weight of a polymer by viscometery.												
	22271E16C	LASER Communication	• To learn about philosophy of Life and Individual qualities • To learn and practice social values and responsibilities • To learn and practice mind culture, forces acting on the body • To learn more of Responsibilities and Rights as Professional and facing Global Challenges • Emerge as responsible citizen with clear conviction to be a role-model in the society.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
II	22271C21	Mobile Communication Networks	• Read technical texts and write area- specific texts effortlessly. • Listen and comprehend lectures	?	?	?	?	✓	✓	✓	✓	✓	✓	✓	✓

Mapping of COs and Pos-PSO

			and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.												
	22271C22	Advanced Microwave Systems	• 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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Mapping of COs and Pos-PSO

			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.												
	22271C23	Electromagnetic Interference and Compatibility	• Gain knowledge on classical and quantum electron theories, and energy band structuues, • Acquire knowledge on basics of semiconductor physics and its applications in various devices, • Get knowledge on magnetic and dielectric properties of materials, • Have the necessary understanding on the functioning of optical materials for optoelectronics,	✓	✓	✓	✓	✓		✓					✓

Mapping of COs and Pos-PSO

			• Understand the basics of quantum structures and their applications in spintronics and carbon electronics.											
	22271E24_	**Elective-II**												
	22271E25_	**Elective-III**												
	22271L26	Communication Systems Lab – II	• 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	✓	✓	✓	✓		✓		✓		✓		
	222TECWR	Technical Writing /Seminars	• Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time • Design and understand and evaluate the AC and DC circuits.	✓	✓	✓	✓			✓					✓

Mapping of COs and Pos-PSO

	22271E24A	High Speed Switching Architecture	• 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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	22271E24B	DSP Processor Architecture and Programming	• 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	✓	✓	✓	✓	✓		✓						✓

Mapping of COs and Pos-PSO

			of smithy, foundary and fittings • Carry out basic home electrical works and appliances • Measure the electrical quantities • Elaborate on the components, gates, soldering practices.												
	22271E24C	Digital Speech Processing	• Analyze the characteristics of basic electronic devices • Design RL and RC circuits • Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems	✓	✓	✓	✓		✓		✓		✓		
III	22271C31	Wireless Sensor Networks	• Identify the various control system components and their representations. • Analyze the vario	✓	✓	✓	✓	✓		✓					✓

Mapping of COs and Pos-PSO

			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.												
	22271E32_	**Elective – IV**													
	22271E33_	**Elective – V**													
	22271E34_	**Elective – VI**													
	22271E25A	Digital Communication Receivers	• 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	✓	✓	✓	✓		✓		✓		✓		

Mapping of COs and Pos-PSO

			problem • Modify or suggest new data structure for an application • Appropriately choose the sorting algorithm for an application												
	22271E25B	Soft Computing Techniques	• 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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	22271E25C	Communication Network Security	• To be able to determine if a given system is	✓	✓	✓	✓	✓		✓					✓

Mapping of COs and Pos-PSO

			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											
	22271E32A	Software Defined Radio	• Acquire knowledge of o Working principles, characteristics and applications of BJT and FET o Frequency response characteristics of BJT and FET amplifiers • Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage	✓	✓	✓	✓		✓		✓		✓		

Mapping of COs and Pos-PSO

			amplifiers • Apply the knowledge gained in the design of Electronic circuits												
	22271E32B	Satellite Communication	• 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	✓	✓	✓	✓			✓					✓
	22271E32C	CDMA Systems	• 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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Mapping of COs and Pos-PSO

			stage and multi stage amplifier • Measure CMRR in differential amplifier • Simulate and analyze amplifier circuits using PSpice. • Design and Test the digital logic circuits.											
	22271E33A	Wavelets and Multi Resolution Processing	• 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.	✓	✓	✓	✓	✓		✓				✓

Mapping of COs and Pos-PSO

	22271E33B	High Performance Communication Networks	• 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	✓	✓	✓	✓		✓		✓		✓			

Mapping of COs and Pos-PSO

			response of random inputs to linear time invariant systems.												
	22271E33C	Advanced Microprocessors and Microcontrollers	• 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.	✓	✓	✓	✓			✓					✓
IV	22271P41	Project Phase – II	• Design AM communication systems • Design Angle modulated communication systems • Apply the concepts of Random Process to the design of	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Mapping of COs and Pos-PSO

			Communication systems • Analyze the noise performance of AM and FM systems • Gain knowledge in sampling and quantization											
	22271E34A	Space Time Wireless Communication	• 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	✓	✓	✓	✓	✓		✓				✓
	22271E34B	Medical Imaging	• Design linear and non linear applications of OP	✓	✓	✓	✓		✓		✓		✓	

Mapping of COs and Pos-PSO

			– 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												
	22271E34C	Mobile ADHOC Networks	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

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

School: ENGINEERINGAND TECHNOLOGY

Dept: ECE

Mapping of COs and Pos-PSO

M.TECH-PT- REGULATION-2022

Sem	Course Code	Title of the Course	COs	POS											
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

Mapping of COs and Pos-PSO

I	22148S11BP	Transforms and Partial Differential Equations	• Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results. • Have gained a well founded knowledge of Fourier series, their different possible forms and	✓	✓	✓	✓	✓						✓	✓

Mapping of COs and Pos-PSO

	22152H12P	Electromagnetic Theory	• analyze fields a potentials due to static changes • evaluate static magnetic fields • understand how materials affect electric and magnetic fields • understand the relation between the fields under time varying situations • understand principles of prop	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H13P	Digital Electronics	• introduce number systems and codes • introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions • introduce the methods for simplifying Boolean expressions • outline the formal procedures for the analysis and des	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H14P	Electronic Circuits - I	• The methods of biasing transistors • Design of simple amplifier circuits • Mid – band analysis of amplifier circuits using small - signal equivalent circuits to determine gain input impedance and output impedance • Method of calculating cutoff fre	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H15P	Signals and Systems	• To study the properties and representation of discrete and continuous signals. • To study the sampling process and analysis of discrete systems using z-transforms. • To study the analysis and synthesis of discrete time systems.• To study the properties	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

II	22148S21P	Numerical Methods	• The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where analytical methods fail to give solution. • When huge amounts of experimen	✓	✓	✓	✓	✓						✓	✓

Mapping of COs and Pos-PSO

	22152S22P	Electrical Engineering and Control Systems	• To understand the operation of Electrical machines and transformers • To understand the open loop and closed loop (feedback) systems • To understand time domain and frequency domain analysis of control systems required for stability analysis. • To unde	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H23P	Linear Integrated Circuits	• To introduce the basic building blocks of linear integrated circuits. • To teach the linear and non-linear applications of operational amplifiers. • To introduce the theory and applications of analog multipliers and PLL. • To teach the theory of ADC and	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H24P	Electronic Circuits - II	• The advantages and method of analysis of feed back amplifiers • Analysis and design of RC and LC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, blocking oscillators and time based generators. • The advantages and method of analysi	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H25P	Transmission Lines and Waveguides	• To become familiar with propagation of signals through lines • Understand signal propagation at Radio frequencies • Understand radio propagation in guided systems • To become familiar with resonators • To become familiar with propagation of sig	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

III	22148S31BP	Probability and Random Processes	• Have a fundamental knowledge of the basic probability concepts. • Have a well – founded knowledge of standard distributions which can describe real life phenomena. • Acquire skills in handling situations involving more than one random variable and funct	✓	✓	✓	✓	✓						✓	✓

Mapping of COs and Pos-PSO

	22152H32P	Microprocessor Interfacing and Applications	• To introduce the architecture and programming of 8085 microprocessor. • To introduce the interfacing of peripheral devices with 8085 microprocessor. • To introduce the architecture and programming of 8086 microprocessor. • To introduce the applications,	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H33P	Digital Signal Processing	• To study DFT and its computation • To study the design techniques for digital filters • To study the finite word length effects in signal processing • To study the non-parametric methods of power spectrum estimations • To study the fundamentals of digit	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H34P	Communication Theory	• To provide various Amplitude modulation and demodulation systems. • To provide various Angle modulation and demodulation systems. • To provide some depth analysis in noise performance of various receiver. • To study some basic information theory with so	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152L35P	Digital Signal Processing and Microprocessor Lab	• Carryout basic signal processing operations • Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals • Interface different I/Os with processor • Generate waveforms using Microprocessors •	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

IV	22152H41P	Digital Communication	• To study pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals. • To learn baseband pulse transmission, which deals with the transmission of pulse-amplitude, modu	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H42P	Antenna and Wave Propagation	• To study radiation from a current element. • To study antenna arrays • To study aperture antennas • To learn special antennas such as frequency independent and broad band antennas. • To study radio wave propagation. • To study radiation from a current e	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H43P	Computer Networks	• To introduce the students the functions of different layers. • To introduce IEEE standard employed in computer networking. • To make students to get familiarized with different protocols and network components.• To introduce the students the functions o	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	221__E44_P	**Elective-I**												
	22152E44AP	High Speed Networks	• Students will get an introducti on about ATM and Frame relay. • Students will be provided with an up-to-date survey of developm ents in High Speed Networks. • Enable the students to know techniques involved to support real-time traffic and congestion cont	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152E44BP	Advanced Digital Signal Processing	• To study the parametric methods for power spectrum estimation . • To study adaptive filtering techniques using LMS algorithm and to study the applicatio ns of adaptive filtering. • To study multirate signal processing fundament als. • To study the analysis	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152E44CP	Speech Processing	• To introduce the models for speech production • To develop time and frequency domain techniques for estimating speech parameters • To introduce a predictive technique for speech compression • To understand speech recognition, synthesis and speaker ident	✓	✓	✓	✓	✓	✓						✓

Mapping of COs and Pos-PSO

	22152E44DP	Fuzzy Logic and Neural Networks	• To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience • To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems • To prov	✓	✓	✓	✓	✓	✓					✓

Mapping of COs and Pos-PSO

	22152E44FP	Digital Audio Engineering	• 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. • Analyze	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

Mapping of COs and Pos-PSO

	22152L45P	Networks and Communication Lab	• Communicate between two desktop computers • Implement the different protocols • Implement and compare the various routing algorithms • Use the simulation tool. • Simulate & validate the various functional modules of a communication system • Apply variou	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

V	22152H51P	Optical Communication and Networks	• To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures. • To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. Design optimization o	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H52P	Microwave Engineering	• To study passive microwave components and their S-Parameters. • To study Microwave semiconductor devices & applications. • To study Microwave sources and amplifiers. • To study passive microwave components and their S-Parameters. • T	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H53P	VLSI Design	• To learn the basic CMOS circuits. • To learn the CMOS process technology. • To learn techniques of chip design using programmable devices. • To learn the concepts of designing VLSI subsystems. • To learn the concepts of modeling a digital system using H	✓	✓	✓	✓	✓	✓					✓	✓
	221__E54_P	**Elective II**													

Mapping of COs and Pos-PSO

	22149E54AP	Environmental Science and Engineering	• Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in standard of living has lead to serious environmental disasters• Public awareness of environmental is a	✓	✓		✓		✓	✓	✓			✓	✓

Mapping of COs and Pos-PSO

	22152E54BP	Optoelectronic Devices	• To know the basics of solid state physics and understand the nature and characteristics of light. • To understand different methods of luminescence, display devices and laser types and their applications. • To learn the principle of optical detection me	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152E54DP	Digital Image Processing	• To study the image fundamentals and mathematical transforms necessary for image processing. • To study the image enhancement techniques • To study image restoration procedures. • To study the image compression procedures. • To study the image segmentati	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

Mapping of COs and Pos-PSO

	22152E54EP	Engineering Acoustics	• To provide mathematical basis for acoustics waves • To introduce the concept of radiation reception absorption and attenuation of acoustic waves. • To present the characteristic behaviour of sound in pipes, resonators and filters. • To introduce the pro	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152E54FP	Software Engineering	• Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓

Mapping of COs and Pos-PSO

	22152L55P	Optical Communication and Microwave Lab	• Analyze the performance of simple optical link. • Test microwave and optical components. • Analyse the mode characteristics of fiber • Analyse the radiation of pattern of antenna.• Analyze the performance of simple optical link. • Test microwave and op	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

VI	22152H61P	Mobile and Wireless Communication	• It deals with the fundamental cellular radio concepts such as frequency reuse and handoff. This also demonstrates the principle of trunking efficiency and how trunking and interference issues between mobile and base stations combine to affect the overal	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152H62P	Medical Electronics	• To study the methods of recording various biopotentials • To study how to measure biochemical and various physiological information • To understand the working of units which will help to restore normal functioning • To understand the use of radiation f	✓	✓	✓	✓	✓						✓	✓

Mapping of COs and Pos-PSO

	22152H63P	Micro Controller and Embedded systems	• To study 8051 architecture • To write assembly language programming • To study the embedded architecture and real time applications. • To study 8051 architecture • To write assembly language programming • To study the embedded architecture and real time	✓	✓	✓	✓	✓	✓					✓	✓
	221__E64_P	**Elective III**													

Mapping of COs and Pos-PSO

	22160E64AP	Principles Of Management	• Upon completion of the course, students will be able to have clear understanding • Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management • Upon completion of t						✓	✓	✓		✓	✓	✓

Mapping of COs and Pos-PSO

	22152E64BP	Satellite Communication	• Overview of satellite systems in relation to other terrestrial systems. • Study of satellite orbits and launching. • Study of earth segment and space segment componen ts • Study of satellite access by various users. • Study of DTH and compressi on standar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

Mapping of COs and Pos-PSO

	22152E64CP	Robotics	• The course has been so designed to give the students an overall view of the mechanical components and mathematics associated with the same. • Actuators and sensors necessary for the functioning of the robot. • The course has been so designed to give the	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓

Mapping of COs and Pos-PSO

	22152E64DP	Remote sensing	• Principles of Remote Sensing and GIS • Analysis of RS and GIS data and interpreting the data for modeling applications • Principles of Remote Sensing and GIS • Analysis of RS and GIS data and interpreting the data for modeling applications	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22150E64FP	Transducer Engineering	• to model and analyze transducers	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152L65P	VLSI and Embedded systems Lab	• Write HDL code for basic as well as advanced digital integrated circuit • Import the logic modules into FPGA Boards • Synthesize Place and Route the digital IPs • Write programs in ARM for a specific Applicatio n • Interface memory, A/D and D/A convertor	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

VII	22160S71P	Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.						✓	✓	✓		✓	✓	✓

Mapping of COs and Pos-PSO

	22152H72P	Wireless Networks	• To understand physical as wireless MAC layer alternatives techniques. • To learn planning and operation of wireless networks. • To study various wireless LAN and WAN concepts. • To understand WPAN and geo-location systems.	✓	✓	✓	✓	✓						✓	✓

Mapping of COs and Pos-PSO

	22152H73P	Telecommunication Switching and Networks	• To introduce the concepts of Frequency and Time division multiplexing. • To introduce digital multiplexing and digital hierarchy namely SONET / SDH • To introduce the concepts of space switching, time switching and combination switching, example of a sw	✓	✓	✓	✓	✓						✓	✓

Mapping of COs and Pos-PSO

	221__E74_P	**Elective IV**												
	22152E74AP	Power Electronics	• To study about power electronic circuits for voltage and current control and protection. • To learn the switching characteristics of transistors and SCRs. Series and parallel functions of SCRs, Programmable triggering methods of SCR. • To learn controll	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152E74BP	Advanced Microprocessors	• To introduce the concepts in internal programming model of Intel family of microprocessors. • To introduce the programming techniques using MASM, DOS and BIOS function calls. • To introduce the basic architecture of Pentium family of processors. • To in	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152E74CP	Electromagnetic Interference and Compatibility	• To understand EMI Sources, EMI problems and their solution methods in PCB level / Subsystem and system level design. • To measure the emission. immunity level from different systems to couple with the prescribed EMC standards	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152E74DP	Solid State Electronic Drives	• To learn crystal structures of elements used for fabrication of semiconductor devices. • To study energy band structure of semiconductor devices. • To understand fermi levels, movement of charge carriers, Diffusion current and Drift current. • To study	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152E74FP	Space TimeWireless Communication	• 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 detectio	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos-PSO

	22152P75P	Project Work & Viva Voce	• apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. •	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OBJECTIVE B.TECH(P.T)(R-2022)

Course code	Course name	Course outcomes
22148S11P	Transforms & Partial Differential Equations	• Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. • Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results. • Have gained a well founded knowledge of Fourier series, their different possible forms and the frequently needed practical harmonic analysis that an engineer may have to make from discrete data. • Have obtained capacity to formulate and identify certain boundary value problems encountered in engineering practices, decide on applicability of the Fourier series method of solution, solve them and interpret the results. • Have grasped the concept of expression of a function, under certain conditions, as a double integral leading to identification of transform pair, and specialization on Fourier transform pair, their properties, the possible special cases with attention to their applications.
22154C12P	Electrical drives and controls	• Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance • Explain the working principle and applications of electrical machines • Analyze the characteristics of analog electronic devices • Explain the basic concepts of digital electronics • Explain the operating principles of measuring • instruments
22154C13P	Engineering Thermodynamics	• Apply the first law of thermodynamics for simple open and closed systems under steady • unsteady conditions. • Apply second law of thermodynamics to open and closed systems • calculate entropy and availability. • Apply Rankine cycle to steam power plant and compare few cycle improvement methods
22154C14P	Fluid Mechanics and Machinery	• Apply mathematical knowledge to predict the properties and characteristics of a fluid.

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		• 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.
22154C15P	Manufacturing Technology - I	• 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.
22148S21P	Numerical Methods	• The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where analytical methods fail to give solution. • When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values. • The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information. • Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.
22154C22P	Manufacturing Technology - II	• Explain the mechanism of material removal processes. • Describe the constructional and operational features of centre lathe and other special purpose lathes. • Describe the constructional and operational features of shaper, planner, milling, drilling,

		• sawing and broaching machines. • Explain the types of grinding and other super finishing processes apart from gear manufacturing processes. • Summarize numerical control of machine tools and write a part program.
22154C23P	Thermal Engineering	• Apply thermodynamic concepts to different air standard cycles and solve problems. • Solve problems in single stage and multistage air compressors • Explain the functioning and features of IC engines, components and auxiliaries. • Calculate performance parameters of IC Engines. • Explain the flow in Gas turbines and solve problems.
22154C24P	Strength of Materials	• Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes. • Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment. • Apply basic equation of simple torsion in designing of shafts and helical spring • Calculate the slope and deflection in beams using different methods. • Analyze and design thin and thick shells for the applied internal and external pressures.
22154C25P	Engineering Materials and Metallurgy	• Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification. • Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes. • Clarify the effect of alloying elements on ferrous and non-ferrous metals • Summarize the properties and applications of non metallic materials. • Explain the testing of mechanical properties. .

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OBJECTIVE M.TECH(F.T)(R-2022)

Course code	Course name	Course outcomes
22248S11	Advanced Engineering Mathematics	• Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems. • Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications. • Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in quality control systems. • Find the point and interval estimates, derive confidence intervals and understand the methods of estimation and analyze data statistically and interpretation of the results in inventory control and knowledge to ANOVA: One – way, Two – way with/without interactions, Latin Squares ANOVA technique. • Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control.
22254C12	Theory of Metal Cutting	• Understand the basic structures of concept of tools and tool materials and Apply cutting mechanics to metal machining based on cutting force and power consumption. • Impart fundamental knowledge about forces and chips formed during the metal machining process. • Impart fundamental knowledge on tool materials, tool life, cutting fluids and tool wear mechanisms • Distinguish between orthogonal and oblique cutting and Understand the Heat distribution during machining. • Learn Importance of Chatter in various machining and avoidance of chatter.
22254C13	Advanced Manufacturing Processes	• Understand the basic structures of cutting tool materials and cutting parameters in non thermal energy advanced machining processes. • Understand the various input and output parameters that influence in the performance of newer electric energy based advanced machining processes. • Impart the knowledge about laser beam, electron beam, and Ion beam types advanced machining process and its characteristics. • Ability to understand the operation of micro devices,

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		micro systems and their applications. • Ability to design the micro devices, micro systems using the micro fabrication process.
22254C14	Advances in Casting & Welding	• 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.
22254C15	Automated Computer Integrated Manufacturing Systems	• Become familiar on the basic concepts of Cad, Cam & Computer Integrated Manufacturing and its importance in the global competitive market. • Understand the material transfer mechanism in automated manufacturing, anatomy of industrial robots and their application in various areas of automated manufacturing and storage systems used • Understand the usage of group technology concept and clustering algorithms in modern manufacturing systems and Understand the concepts of Flexible manufacturing system. • Make the students to get knowledge about Computer Aided Process Planning approaches. • Get familiarizes with the concepts process control and monitoring and automatic data capture techniques.
22254E16A	Materials Management and Logistics	• 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.
22254L17	CAD/CAM Laboratory	• Use parametric 3D CAD software tools in the correct manner for making geometric part models, assemblies • automated drawings of mechanical components and assemblies. • Evaluate design, analyze and optimize using commercial

		CAD, CAE software as black box for required mass properties/ stress, deflection / temperature distribution etc. under realistic loading and constraining conditions • Apply the concepts of machining for the purpose of selection of appropriate machining centers, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program • operate CNC milling and turning equipment.
22254C21	Tooling for Manufacturing	• 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.
22254C22	MEMS and Nano Technology	• The students are expected to understand MEMS and Students will able to design MEMS and apply knowledge of Nano-technology • Students will be able to explain about fabrication processes and levels of micro system packaging • Students will be able to explain micro sensors, micro-actuators, their types and applications Students get knowledge about Nano materials and various Nano measurements and to familiarize about various equipments. • Bring out the importance of material characterization and various methods and Students will able to select special materials for MEMS • Students will able to calculate the static and dynamic behavior of simple mechanical Microsystems, e.g. cantilevers and membranes Students will able to perform special Nano finishing techniques
22254C23	Manufacturing Metrology and Quality Control	• Understand the methods of measurement and selection of measuring instruments ,standards of measurement • Identify and apply various measuring instruments • Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design • Recommend the Quality Control Techniques and Statistical Tools appropriately Analyze the Data collected • Develop an ability of problem solving and decision making by identifying and analyzing the cause for

		variation and recommend suitable corrective actions for quality improvement
22254E24B	Lean Manufacturing	• 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
22254E25B	Maintenance Management	• 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.
22254L26	Automation Lab	• Hands on exposure to problem solving tools in contemporary research • Evolve research intuitiveness and orientation • Familiarize with cutting edge research trends • An understanding of professional and ethical responsibility and communicate effectively.
222TECWR	Technical Writing/Seminar	• Participate actively in writing activities that model effective scientific and technical communication in the workplace. • Understand how to apply technical information and knowledge in practical documents. • Practice the unique qualities of professional writing style, including sentence conciseness, readability, clarity, accuracy, honesty, etc., • Collect, analyze, document, and report research clearly, concisely, logically, and ethically. • Develop professional work habits, including those necessary for effective collaboration and cooperation with other students, instructors, and Service.

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OBJECTIVE M.TECH(P.T)(R-2022)

Course code	Course name	Course outcomes
22248S11EP	Advanced Engineering Mathematics	• Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems. • Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications. • Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in quality control systems. • Find the point and interval estimates, derive confidence intervals and understand the methods of estimation and analyze data statistically and interpretation of the results in inventory control and knowledge to ANOVA: One – way, Two – way with/without interactions, Latin Squares ANOVA technique. • Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control.
22254C12P	Theory of Metal Cutting	• Understand the basic structures of concept of tools and tool materials and Apply cutting mechanics to metal machining based on cutting force and power consumption. • Impart fundamental knowledge about forces and chips formed during the metal machining process. • Impart fundamental knowledge on tool materials, tool life, cutting fluids and tool wear mechanisms • Distinguish between orthogonal and oblique cutting and Understand the Heat distribution during machining. • Learn Importance of Chatter in various machining and avoidance of chatter.
22254C13P	Advanced Manufacturing Processes	• Understand the basic structures of cutting tool materials and cutting parameters in non thermal energy advanced machining processes. • Understand the various input and output parameters that influence in the performance of newer electric energy based advanced machining processes. • Impart the knowledge about laser beam, electron beam, and Ion beam types advanced machining process and its characteristics. • Ability to understand the operation of micro devices,

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		micro systems and their applications. • Ability to design the micro devices, micro systems using the micro fabrication process.
22254L14P	CAD/CAM Laboratory	• Use parametric 3D CAD software tools in the correct manner for making geometric part models, assemblies • automated drawings of mechanical components and assemblies. • Evaluate design, analyze and optimize using commercial CAD, CAE software as black box for required mass properties/ stress, deflection / temperature distribution etc. under realistic loading and constraining conditions • Apply the concepts of machining for the purpose of selection of appropriate machining centers, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program • operate CNC milling and turning equipment.
22254C21P	Tooling for Manufacturing	• 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.
22254C22P	MEMS and Nano Technology	• The students are expected to understand MEMS and Students will able to design MEMS and apply knowledge of Nano-technology • Students will be able to explain about fabrication processes and levels of micro system packaging • Students will be able to explain micro sensors, micro-actuators, their types and applications Students get knowledge about Nano materials and various Nano measurements and to familiarize about various equipments. • Bring out the importance of material characterization and various methods and Students will able to select special materials for MEMS • Students will able to calculate the static and dynamic behavior of simple mechanical Microsystems, e.g. cantilevers and membranes Students will able to perform special Nano finishing techniques
22254E23BP	Lean Manufacturing	• Study of sensors, Hydraulic and Pneumatic actuators and

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		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
22254L24P	Automation Lab	• Hands on exposure to problem solving tools in contemporary research • Evolve research intuitiveness and orientation • Familiarize with cutting edge research trends • An understanding of professional and ethical responsibility and communicate effectively.
222TECWRP	Technical Writing/Seminar	• Participate actively in writing activities that model effective scientific and technical communication in the workplace. • Understand how to apply technical information and knowledge in practical documents. • Practice the unique qualities of professional writing style, including sentence conciseness, readability, clarity, accuracy, honesty, etc., • Collect, analyze, document, and report research clearly, concisely, logically, and ethically. • Develop professional work habits, including those necessary for effective collaboration and cooperation with other students, instructors, and Service.

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
M.E. MANUFACTURING ENGINEERING- FULL TIME (PG_2022)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES	PO					
			1	2	3	4	5	6
22248S11	ADVANCED ENGINEERING MATHEMATICS	Analyze the performance in terms of probabilities and distributions achieved by the determined solutions.	2	-	-	-	-	2
		Be familiar with some of the commonly encountered two dimensional random variables and be equipped for a possible extension to multivariate analysis.	-	-	-	-	-	-
		Apply the basic principles underlying statistical inference(hypothesis testing).	2	-	-	-	1	2
		Demonstrate knowledge of applicable large sample theory of estimators and tests.	-	-	3	1	-	-
		Obtain a better understanding of the importance of the methods in modern industrial processes.	-	-	3	-	-	2
		Avg.	**2**	**-**	**3**	**1**	**1**	**2**
22254C12	THEORY OF MACHINE CUTTING	Basics of orthogonal cutting, oblique cutting and chip formation	1	-	-	-	-	1
		Different tool materials, tool life and tool wear mechanisms	-	-	2	3	2	-
		Necessity for a cutting fluid and cutting efficiency	1	-	-	-	2	1
		Single and Multipoint cutting tools	-	-	-	-	-	2
		Effect of vibrations and surface roughness during machining	2	-	3	-	-	-
		Avg.	**1.33**	**-**	**2.5**	**3**	**2**	**1.33**

22254C13	**ADVANCED MANUFACTURING PROCESSES**	Analyze the processes and evaluate the role of each process parameter during machining of various advanced materials.	1	-	-	-	-	-
		Understand requirements to achieve maximum material removal rate and best quality of machined surface while machining various industrial engineering materials.	-	-	-	-	2	-
		Analyze the different bulk metal forming process mechanics using different analysis	-	-	3	-	-	2
		Acquire the knowledge in mechanical micromachining processes.	1	-	-	-	2	-
		Demonstrate the knowledge of Additive Manufacturing and Rapid Prototyping Technologies	-	-	-	1	-	-
		Avg.	1	-	3	1	2	2
22254C14	**ADVANCES IN CASTING & WELDING**	At the end of this course the students are expected to impart knowledge on basic concepts and advances in casting and welding processes.	1	-	-	-	-	1
		Know and perform solid state and special welding processes.	-	-	2	3	2	-
		Understand and analyze the material structures after welding.	1	-	-	-	2	1
		Design the weldments for various materials.	-	-	-	-	-	2
		Attain the knowledge about various welding defects and inspection methods.	2	-	3	-	-	-
		Avg.	**1.33**	**-**	**2.5**	**3**	**2**	**1.33**
22254C15	**AUTOMATED COMPUTER INTEGRATED MANUFACTURING SYSTEMS**	Recognize the importance of CAD, CAM, CIM, Engineering product specification and interpreting geometric specifications.	-	-	-	2	2	-
		Improve knowledge on the integration of CAD and CAM.	-	-	-	-	2	1

		Exhibit competency in manual part program and generation of CNC part program using CAM packages.	1	2	-	3	-	-
		Describe the implementation of CAD and CAM in manufacturing processes.	2	-	-	-	1	2
		Explain applications of IOT in computer aided manufacturing.	-	-	-	-	3	1
		Avg.	1.5	2	-	2.5	2	1.33
22254E16C	**MANUFACTURING INFORMATION SYSTEMS**	Able to acquire knowledge on facility, and problems associated with it.	2	1			1	
		Ability to learn the various capacity and layout planning models	2	1			1	
		Understand the concepts of demand forecasting and project management with relevant case studies.	2	1			1	
		Able to understand the concepts of production planning and scheduling.	2	1				
		Understand the various inventory and maintenance management techniques.	2	1				
		Avg	(10/5) =2	(5/5) =1			(3/3) =1	
22254L17	**CAD/CAM LABORATORY**	Interpret mechanical drawings for components, assemblies and use parametric 3D CAD software tools in the correct manner for creating their geometric part models, assemblies and automated drawings.	1	-	-	-	2	1
		Apply the concepts of machining for the purpose of selection of appropriate machining centres, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program, and operate CNC milling and turning equipment.	-	-	-	3	2	1
		Create and validate NC part program data using manual data input (MDI) and automatically using standard commercial CAM package for	-	-	-	-	2	1

		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.	-	2	-	2	3	-
		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.	-	-	-	-	-	2
		Avg.	1	2	-	2.5	2.25	1.25
22254C21	**TOOLING FOR MANUFACTURING**	At the end of this course the students will be expected to introduce the various optimization techniques and their advancements.	2	-	-	3	2	-
		Ability to go in research by applying optimization techniques in problems of Engineering and Technology	1	-	-	2	3	-
		Use classical optimization techniques and numerical methods of optimization.	1	-	-	2	2	-
		Describe the basics of different evolutionary algorithms	-	2	-	-	-	-
		Ability to solve the mathematical results and numerical techniques of optimization theory to concrete Engineering problems by using computer software	1	-	-	3	-	2
		Avg.	1.25	2	-	2.5	2.33	2
22254C22	**MEMS AND NANO TECHNOLOGY**	Realise the need of micro electromechanical systems.	1	-	-	2	-	1
		Develop a knowledge to select a sensor for an application	1	-	-	2	2	-
		Develop a nano material	-	-	3	2	-	-
		characterize the Nano material	-	-	3	2	-	-
		Develop an Electromechanical systems	-	-	-	2	2	2
		Avg	1	-	3	2	2	1.5
22254C23	**MANUFACTURING METROLOGY AND**	Understand the advanced measurement principles with ease.	1	-	-	1	1	-

	QUALITY CONTROL	Operate sophisticated and accurate measuring instruments.	1	-	-	1	-	2
		Understand the various inspection methods and tools	1	-	3	-	2	1
		Design and develop new measuring methods.	1	-	-	1	2	1
		Apply computers in Measurement	-	-	-	1	2	1
		Avg.	1	-	3	1	1.75	1.25
22254E24B	**LEAN MANUFACTURING**	To know the necessity for a Lean Manufacturing system	1	-	-	-	-	-
		To Differentiate between the conventional Mass production system with Lean system	-	1	3	-	1	-
		In effectively implement the principles of JIT	-	-	3	-	-	-
		To apply the Inspection tools effectively in the Lean systems	1	-	-	2	-	1
		To apply Hoshin planning system to create a Lean culture in Industry	1	2	-	-	2	2
		Avg.	1	1.5	3	2	1.5	1.5
22254E25B	**MAINTENANCE MANAGEMENT**	An understanding of sustainability management as an approach to aid in evaluating and minimizing environmental impacts while achieving the expected social impact.	3	3	2	1	2	2
		An understanding of corporate sustainability and responsible Business Practices	3	2	2	2	1	2
		Knowledge and skills to understand, to measure and interpret sustainability performances	3	3	1	2	2	3
		Knowledge of innovative practices in sustainable business and community management	3	3	2	1	1	2
		Deep understanding of sustainable management of resources and commodities	3	3	2	1	2	2
22254L26	**AUTOMATION LAB**	To impart practical knowledge on bulk metal forming processes	-	2	1	2	-	-

		Know various symbols used in Hydraulic and Pneumatic circuits	-	2	-	2	-	-
		Conduct few sheet metals forming processes and analyse the parameters	-	2	-	-	3	1
		Design hydraulic circuits for industrial applications	-	2	-	-	2	1
		Learnt how to use automation studio	-	2	-	-	2	1
		Avg.	-	2	1	2	2.33	1
222TECWR	**TECHNICAL WRITING/SEMINAR**	To develop skills to search, read, write, comprehend and present research papers in the areas of manufacturing engineering.	1	1	-	-	2	-
		Updated with the latest technology in the field of Manufacturing Engineering	1	2	3	-	2	-
		Able to plot graph, sketch, bring out the visual about his understanding on various topics	1	2	3	-	2	-
		Avg.	1	1.66	3	-	2	-
22254C31	**METAL FORMING PROCESS**	At the end of this course the students are expected to upgrade their knowledge on various metal forming techniques and formability	-	-	-	-	-	-
		Apply the theory of plasticity for various types of metal forming process.	1	-	-	-	-	-
		Apply the concept of powder metallurgy to make prismatic components	1	-	-	2	1	2
		Understand Non-traditional forming processes.	1	-	2	2	-	-
		Understand the purpose of surface treatment in metal forming applications	-	-	1	-	2	3
		Avg.	1	-	1.5	2	1.5	2.5
22254E32A	**PROCESS PLANNING AND COST ESTIMATION**	Explain the concept of selection and steps in process planning, tooling,equipment selection and material evaluation	1	-	2	-	-	1

		Calculate process parameters and select Jig, Fixtures and quality assurance methods	2	-	-	3	-	2
		Apply the methods of costing and to explain the concept of estimation.	-	1	2	-	-	-
		Compute the cost of the product in various shops of production.	1	-	3	2	1	2
		Calculate the machining time for various operation	1	1	-	3	-	3
		Avg.	1.66	1	2.33	2.66	1	2
22254E33A	**PRODUCT DESIGN AND DEVELOPMENT**	Identify the need for a New Product	2	-	-	3	-	1
		design and develop various products	1	-	3	1	1	1
		Work out the cost of developing a product	-	-	-	2	2	1
		Will be able to prototype the product	1	-	3	3	2	1
		Know how to patent the new design or the product	1	-	-	-	2	2
		Avg.	1.25	-	3	2.25	1.75	1.2
22254E34B	**INDUSTRIAL SAFETY**	Expected to gain knowledge and skills needed to run an industry with utmost safety precautions.	1	-	-	2	1	1
		Understand the industrial laws, regulations and source models.	-	-	3	2	1	-
		Apply the methods of prevention of fire and explosions.	1	1	-	2	2	2
		Analyse the effect of release of toxic substances	1	1	-	2	-	2
		Understand the methods of hazard identification and preventive measures.	-	1	-	2	1	2
		Avg.	1	1	3	2	1.25	1.75
22254P35	**PROJECT WORK PHASE I**	Design and analyze, an identified problem using scientific tools	1	2		3	2	
		Simulation/ Theoretical analysis of a physical system	2	2		1		
		Integrate various domain knowledge for a sustainable solution.	2	2	3	3	2	
		Set Goals, Targets, timeline, plan and execute activities of the project	2	2		3		2

		Disseminate work both in oral and written format**.**	-	2	2			2
		Avg	1.75	2	2.5	2.5	2	2
22254P41	**PROJECT WORK PHASE II**	Design and analyze, an identified problem using scientific tools and research	1	2		3	2	
		simulation/ Theoretical analysis of a physical system	2	2		1		
		Integrate various domain knowledge in carrying out experimental work and provide a sustainable solution.	2	2	3	3	2	
		Set Goals, Targets, timeline, plan and execute activities of the project	2	2		3		2
		Disseminate work both in oral and written format.	-	2	2			2
		Avg	1.75	2	2.5	2.5	2	2

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
M.E. MANUFACTURING ENGINEERING- PART TIME (PG_2022)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES	PO					
			1	2	3	4	5	6
22248S11EP	ADVANCED ENGINEERING MATHEMATICS	Analyze the performance in terms of probabilities and distributions achieved by the determined solutions.	2	-	-	-	-	2
		Be familiar with some of the commonly encountered two dimensional random variables and be equipped for a possible extension to multivariate analysis.	-	-	-	-	-	-
		Apply the basic principles underlying statistical inference(hypothesis testing).	2	-	-	-	1	2
		Demonstrate knowledge of applicable large sample theory of estimators and tests.	-	-	3	1	-	-
		Obtain a better understanding of the importance of the methods in modern industrial processes.	-	-	3	-	-	2
		Avg.	**2**	**-**	**3**	**1**	**1**	**2**
22254C12P	THEORY OF MACHINE CUTTING	Basics of orthogonal cutting, oblique cutting and chip formation	1	-	-	-	-	1
		Different tool materials, tool life and tool wear mechanisms	-	-	2	3	2	-
		Necessity for a cutting fluid and cutting efficiency	1	-	-	-	2	1
		Single and Multipoint cutting tools	-	-	-	-	-	2
		Effect of vibrations and surface roughness during machining	2	-	3	-	-	-
		Avg.	**1.33**	**-**	**2.5**	**3**	**2**	**1.33**

22254C13P	**ADVANCED MANUFACTURING PROCESSES**	Analyze the processes and evaluate the role of each process parameter during machining of various advanced materials.	1	-	-	-	-	-
		Understand requirements to achieve maximum material removal rate and best quality of machined surface while machining various industrial engineering materials.	-	-	-	-	2	-
		Analyze the different bulk metal forming process mechanics using different analysis	-	-	3	-	-	2
		Acquire the knowledge in mechanical micromachining processes.	1	-	-	-	2	-
		Demonstrate the knowledge of Additive Manufacturing and Rapid Prototyping Technologies	-	-	-	1	-	-
		Avg.	1	-	3	1	2	2
22254L14P	**CAD/CAM LABORATORY**	Interpret mechanical drawings for components, assemblies and use parametric 3D CAD software tools in the correct manner for creating their geometric part models, assemblies and automated drawings.	1	-	-	-	2	1
		Apply the concepts of machining for the purpose of selection of appropriate machining centres, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program, and operate CNC milling and turning equipment.	-	-	-	3	2	1
		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.	-	-	-	-	2	1
		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.	-	2	-	2	3	-
		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.	-	-	-	-	-	2
		Avg.	1	2	-	2.5	2.25	1.25

22254C21P	**TOOLING FOR MANUFACTURING**	At the end of this course the students will be expected to introduce the various optimization techniques and their advancements.	2	-	-	3	2	-
		Ability to go in research by applying optimization techniques in problems of Engineering and Technology	1	-	-	2	3	-
		Use classical optimization techniques and numerical methods of optimization.	1	-	-	2	2	-
		Describe the basics of different evolutionary algorithms	-	2	-	-	-	-
		Ability to solve the mathematical results and numerical techniques of optimization theory to concrete Engineering problems by using computer software	1	-	-	3	-	2
		Avg.	1.25	2	-	2.5	2.33	2
22254C22P	**MEMS AND NANO TECHNOLOGY**	Realise the need of micro electromechanical systems.	1	-	-	2	-	1
		Develop a knowledge to select a sensor for an application	1	-	-	2	2	-
		Develop a nano material	-	-	3	2	-	-
		characterize the Nano material	-	-	3	2	-	-
		Develop an Electromechanical systems	-	-	-	2	2	2
		Avg	1	-	3	2	2	1.5
22254E23BP	**LEAN MANUFACTURING**	To know the necessity for a Lean Manufacturing system	1	-	-	-	-	-
		To Differentiate between the conventional Mass production system with Lean system	-	1	3	-	1	-
		In effectively implement the principles of JIT	-	-	3	-	-	-
		To apply the Inspection tools effectively in the Lean systems	1	-	-	2	-	1
		To apply Hoshin planning system to create a Lean culture in Industry	1	2	-	-	2	2
		Avg.	1	1.5	3	2	1.5	1.5
22254L24P	**AUTOMATION LAB**	To impart practical knowledge on bulk metal forming processes	-	2	1	2	-	-

		Know various symbols used in Hydraulic and Pneumatic circuits	-	2	-	2	-	-
		Conduct few sheet metals forming processes and analyse the parameters	-	2	-	-	3	1
		Design hydraulic circuits for industrial applications	-	2	-	-	2	1
		Learnt how to use automation studio	-	2	-	-	2	1
		Avg.	-	2	1	2	2.33	1
222TECWRP	**TECHNICAL WRITING/SEMINAR**	To develop skills to search, read, write, comprehend and present research papers in the areas of manufacturing engineering.	1	1	-	-	2	-
		Updated with the latest technology in the field of Manufacturing Engineering	1	2	3	-	2	-
		Able to plot graph, sketch, bring out the visual about his understanding on various topics	1	2	3	-	2	-
		Avg.	1	1.66	3	-	2	-
22254C31P	**ADVANCES IN CASTING & WELDING**	At the end of this course the students are expected to impart knowledge on basic concepts and advances in casting and welding processes.	1	-	-	-	-	1
		Know and perform solid state and special welding processes.	-	-	2	3	2	-
		Understand and analyze the material structures after welding.	1	-	-	-	2	1
		Design the weldments for various materials.	-	-	-	-	-	2
		Attain the knowledge about various welding defects and inspection methods.	2	-	3	-	-	-
		Avg.	**1.33**	**-**	**2.5**	**3**	**2**	**1.33**
22254C32P	**AUTOMATED COMPUTER INTEGRATED**	Recognize the importance of CAD, CAM, CIM, Engineering product specification and interpreting geometric specifications.	-	-	-	2	2	-

	MANUFACTURING SYSTEMS	Improve knowledge on the integration of CAD and CAM.	-	-	-	-	2	1
		Exhibit competency in manual part program and generation of CNC part program using CAM packages.	1	2	-	3	-	-
		Describe the implementation of CAD and CAM in manufacturing processes.	2	-	-	-	1	2
		Explain applications of IOT in computer aided manufacturing.	-	-	-	-	3	1
		Avg.	1.5	2	-	2.5	2	1.33
22254E33CP	**MANUFACTURING INFORMATION SYSTEMS**	Able to acquire knowledge on facility, and problems associated with it.	2	1			1	
		Ability to learn the various capacity and layout planning models	2	1			1	
		Understand the concepts of demand forecasting and project management with relevant case studies.	2	1			1	
		Able to understand the concepts of production planning and scheduling.	2	1				
		Understand the various inventory and maintenance management techniques.	2	1				
		Avg	(10/5)=2	(5/5)=1			(3/3)=1	
22254C41P	**MANUFACTURING METROLOGY AND QUALITY CONTROL**	Understand the advanced measurement principles with ease.	1	-	-	1	1	-
		Operate sophisticated and accurate measuring instruments.	1	-	-	1	-	2
		Understand the various inspection methods and tools	1	-	3	-	2	1
		Design and develop new measuring methods.	1	-	-	1	2	1
		Apply computers in Measurement	-	-	-	1	2	1
		Avg.	1	-	3	1	1.75	1.25

22254C42P	**METAL FORMING PROCESS**	At the end of this course the students are expected to upgrade their knowledge on various metal forming techniques and formability	-	-	-	-	-	-
		Apply the theory of plasticity for various types of metal forming process.	1	-	-	-	-	-
		Apply the concept of powder metallurgy to make prismatic components	1	-	-	2	1	2
		Understand Non-traditional forming processes.	1	-	2	2	-	-
		Understand the purpose of surface treatment in metal forming applications	-	-	1	-	2	3
		Avg.	1	-	1.5	2	1.5	2.5
22254E43BP	**MAINTENANCE MANAGEMENT**	An understanding of sustainability management as an approach to aid in evaluating and minimizing environmental impacts while achieving the expected social impact.	3	3	2	1	2	2
		An understanding of corporate sustainability and responsible Business Practices	3	2	2	2	1	2
		Knowledge and skills to understand, to measure and interpret sustainability performances	3	3	1	2	2	3
		Knowledge of innovative practices in sustainable business and community management	3	3	2	1	1	2
		Deep understanding of sustainable management of resources and commodities	3	3	2	1	2	2
22254P44P	**PROJECT WORK PHASE I**	Design and analyze, an identified problem using scientific tools	1	2		3	2	
		Simulation/ Theoretical analysis of a physical system	2	2		1		
		Integrate various domain knowledge for a sustainable solution.	2	2	3	3	2	
		Set Goals, Targets, timeline, plan and execute activities of the project	2	2		3		2

		Disseminate work both in oral and written format**.**	-	2	2			2
		Avg	1.75	2	2.5	2.5	2	2
22254E51AP	**PROCESS PLANNING AND COST ESTIMATION**	Explain the concept of selection and steps in process planning, tooling,equipment selection and material evaluation	1	-	2	-	-	1
		Calculate process parameters and select Jig, Fixtures and quality assurance methods	2	-	-	3	-	2
		Apply the methods of costing and to explain the concept of estimation.	-	1	2	-	-	-
		Compute the cost of the product in various shops of production.	1	-	3	2	1	2
		Calculate the machining time for various operation	1	1	-	3	-	3
		Avg.	1.66	1	2.33	2.66	1	2
22254E52AP	**PRODUCT DESIGN AND DEVELOPMENT**	Identify the need for a New Product	2	-	-	3	-	1
		design and develop various products	1	-	3	1	1	1
		Work out the cost of developing a product	-	-	-	2	2	1
		Will be able to prototype the product	1	-	3	3	2	1
		Know how to patent the new design or the product	1	-	-	-	2	2
		Avg.	1.25	-	3	2.25	1.75	1.2
22254E53BP	**INDUSTRIAL SAFETY**	Expected to gain knowledge and skills needed to run an industry with utmost safety precautions.	1	-	-	2	1	1
		Understand the industrial laws, regulations and source models.	-	-	3	2	1	-
		Apply the methods of prevention of fire and explosions.	1	1	-	2	2	2
		Analyse the effect of release of toxic substances	1	1	-	2	-	2
		Understand the methods of hazard identification and preventive measures.	-	1	-	2	1	2
		Avg.	1	1	3	2	1.25	1.75
22254P61P	**PROJECT WORK PHASE II**	Design and analyze, an identified problem using scientific tools and research	1	2		3	2	

		simulation/ Theoretical analysis of a physical system	2	2		1		
		Integrate various domain knowledge in carrying out experimental work and provide a sustainable solution.	2	2	3	3	2	
		Set Goals, Targets, timeline, plan and execute activities of the project	2	2		3		2
		Disseminate work both in oral and written format.	-	2	2			2
		Avg	1.75	2	2.5	2.5	2	2

PRIST
DEEMED TO BE
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THANJAVUR – 613 403 - TAMIL NADU

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

AND
ENGINEERING
2022R

Local Needs Regional Needs National Needs Global Needs

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

1.1.1 PROGRAMME OUTCOMES
B.TECH

Engineering Graduates will be able to:

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

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

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

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

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

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

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

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

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

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

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

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

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

Local Needs Regional Needs National Needs Global Needs

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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

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

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

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

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

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

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

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

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

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

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

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

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

Local Needs Regional Needs National Needs Global Needs

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAMME SPECIFIC OUTCOMES

B.TECH

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

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

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

M.TECH

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

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

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

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22152S12P	DIGITALSYSTEMS	To introduce number systems and codes • To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions • To introduce the methods for simplifying Boolean expressions To outline the formalprocedures for the analysis and design of combinational circuits and sequential circuits • To introduce the concept of memories devices.
22150H13P	DATASTRUCTURESAN DALGORITHMS	To learn the systematic way of solving problems • To understand the different methods of organizing large amounts of data • To efficiently implement solutions for specific problems To gain knowledge ofvarious sorting techniques. • To efficiently implement the different data structures
22150H14P	COMPUTERARCHITECTU READ ORGANIZATION	• 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
22150H1 5P	PROBLEMSOLVIN GANDPYTHONPR OGRAMMING	To know the basics of algorithmic problem solving • To read and write simple Python programs.

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		• 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
22148S21P	NUMERICALMETHODS	Demonstrate knowledge and understanding of numerical methods to solve ordinary differential equations • Demonstrate knowledge and understanding of numerical methods to solve simple partial differential equations • Introduce to students numerical methods and scientific computation techniques for dealing with important computational problem
22150H22P	MICROPROCESSORSAND INTERFACING	To study the architecture and Instruction set of 8085 and 8086 • To develop assembly language programs in 8085 and 8086 . To design and understand multiprocessor configurations • To study different peripheral devices and their interfacing to 8085/8086. • To study the architecture and programming of 8051 microcontroller
22150H23P	DATABASEMANAGEMENT SYSTEMS	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.
22150H24P	DESIGNANDANALYSIS OF ALGORITHM	To prove the correctness and analyze the running time of the basic algorithms • To apply the algorithms and design techniques to solve problems. To analyzethe complexities of various problems in different domains
22150H25P	PROGRAMMINGINC	To develop C programs using arrays and strings • To develop applications in C usingfunctions, pointers and structures • To do input/output and filehandlingin C

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22148S31P	DISCRETEMATHEMATICS	Write a clear statement of a problem as a theorem in mathematical notation; Prove and disprove assertions using a variety of techniques. Understand the logic of Propositional and informal reasoning, truth tables, validity. Understand the Proving of propositional and predicate formulas in a structured way. Know the basic set theory. Relations, graphs, and orders
22150H32P	OPERATINGSYSTEM	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
22150H33P	ARTIFICIALINTELLIGENCE	To study various complex problem solvingAI tools like Search and optimization • To facilitate of logic, Probabilistic methodsfor uncertain reasoning, Classifiersand statistical learning methods, Neural networks, Control theory & Languages. • To develop programming skills for AIapplications. • To provide exposure to logic programmingwith practical topics.
22150H34P	COMPUTERNETWORKS	To understand the concepts of data communications. • To study the functions of different layers. • To introduce IEEE standards employed incomputer networking. • To make the students to get familiarizedwith different protocols and network components
22150H41P	SOFTWAREENGINEERINGFUNDAMENTALS	To know the generic models to structurethe software development process. • To understand different notion of complexity at both the module and systemlevel. • To be aware of some widely known design methods. • To understand the role and contents of testing activities in different life cycle phases.

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22150H42P	INTERNETPROGRAMMING	To understand different Internet Technologies. • To learn java-specific web servicesarchitecture to design a contextfree grammar for any given language
22150H43P	C#AND.NETFRAMEWORK	• An ability to understand C# program structure, language syntax, and implementation details.
22150H51P	OBJECT ORIENTED ANALYSIS AND DESIGN	• 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 SystemSequence Diagrams. • To study implementation related issues. • To study and learn how to apply advanced techniques including Architectural Analysisand Design Patterns.
22150H52P	SOFTWARE QUALITY MANAGEMENT	Software quality models. • Quality measurement and metrics. • Quality plan, implementation and documentation. • Quality tools including CASE tools. • Quality control and reliability of qualityprocess. • Quality management system models. • Complexity metrics and Customer Satisfaction. • International quality standards – ISO, CMM.
22150H53P	GRAPHICS AND MULTIMEDIA	Explain two and three dimensional concepts and their applications. • Identify all techniques related to modern graphics programming concepts. • Identify the media used in multimedia systems and to assess their relative advantages and disadvantages relative toboth user and system points of view. • Explain the interaction problems introduced by multimedia (e.g., compression and synchronization).
22150H61P	CRYPTOGRAPHYANDNETWORKSECURITY	To understand Cryptography Theories, Algorithms and Systems. • To understand necessary Approaches and Techniques to build protection mechanismsin order to secure computer networks..
22150H62P	ADVANCEDJAVAPROGRAMMING	Use Java to implement OOAD. • to have in depth knowledge about Object serialization, reflection,RMI,Swing,JAR files . • an ability to Write Servlets and Java ServerPages . • Gain an in-depth understanding of database programming in Java using JDBC.

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		• Learn Java's security model and how to do security programming in Java.
22150H63P	SOFTWARETESTING	• 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 Testafter maintenance and enhancement changes. To measure the success of testing efforts.
22150L65P	JAVA PROGRAMMING LAB	. To learn & practice the Object Oriented concepts like Inheritance, Overloading etc.2. To learn & practice Interfaces and Packages 3. To learn &practice Java appletprogramming
22160S71P	TOTALQUALITYMANAGEMENT	Develop the ability to adopt new techniquesand synthesize new knowledge. • Analyze basic operational and research data using TQM techniques in a systematic way. Cooperate efficiently and effectivelyin a team to apply TQM techniques and tools for accomplishing pre-determined goals. • Identify opportunities for improvement inthe business, service, administrative and manufacturing environments of applying the methodology such as Six Sigma, Kaizen,and other appropriate tools to achieve breakthrough improvements in these processes.
22150H72P	GRIDANDCLOUDCOMPUTING	Understand how Grid computing helps in solving large scale scientific problems. • Gain knowledge on the concept of virtualization that is fundamental to cloud computing. • Learn how to program the gridand the cloud. • Understand the security issues in the grid and the cloud environment
22150H73P	MIDDLEWARETECHNOLOGIES	Students can able to • Understand that middleware is an intermediary software layer between the application and the operating system, whichencapsulates the heterogeneity of the underlyingcommunication network, operating system or hardware platform. • Acquire the knowledge of integratingthese systems by using middleware technologies.
22150E44AP	THEORYOFCOMPUTATION	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 canor not be computed, and if they can, how • efficiently

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22150E44BP	DATAWAREHOUSINGANDDATA MINING	To understand data warehouse concepts, architecture, business analysis and tools • To understand data pre-processing anddata visualization techniques • To study algorithms for finding hidden and interesting patterns in data • To understand and apply various classification and clustering techniquesusing tools.
22150E44CP	PROFESSIONAL ETHICSINENGINEERING	To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and SocialValues and Loyalty and to appreciate the rights of others
22150E44DP	ADVANCEDDATABASES	• Be able to design high-quality relational databases and database applications. • Have developed skills in advanced visual &conceptual modeling anddatabase design. Be able to translate complex conceptualdata models into logical andphysical database designs. • Have developed an appreciation of emerging database trends as theyapply tosemistructured data, the internet, and object-oriented databases
22150E54AP	ADHOCANDSENSORNETWORKS	Understand the design issues in ad hoc and sensor networks. • Learn the different types of MACprotocols. • Be familiar with different types of adhoc routing protocols. • Be expose to the TCP issues in adhocnetworks. • Learn the architecture and protocols of wireless sensor networks.
22150E54BP	PRINCIPLES OFCOMPILERDESIGN	To understand the functions of the various phases of a complier. To learn the overview of the design of lexical analyzer and parser. • To study the design of the other phases in detail. • To learn the use of compiler constructiontools.
22150E54CP	DISTRIBUTEDSYSTEMS	To understand distributed computing system models and introduction to distributes databases.To have an in-depth knowledge of distributed algorithms . To understand asynchronous shared memory model, mutual exclusion, resource allocation, consensus, asynchronous network model, basic asynchronous network algorithms, shared memory Vs networks and introduction to parallel distributed processing. To understand thevarious security algorithms in distributing environment

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22160E64AP	PRINCIPLES OFMANAGEMENT	• Knowledge on the principles ofmanagement is essential for allkinds ofpeople in all kinds of organizations. • Afterstudying this course, students will be able tohave a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge on international aspect of • management.
22150E64BP	UNIXINTERNALS	• An ability to understand design and implementation of a multi-programmable operating system. • A good understanding of the fundamentals of a monolithic kernel. • A basic-to-intermediate experience in kernel and driver/module programming.
22150E64CP	GRAPH THEORYAND APPLICATIONS	Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able tohave a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain somebasic knowledge on international aspect of management.
22150E64DP	PROGRAMMINGPARADIGMS	Develop an in-depth understanding of functional, logic, and object-orientedprogramming paradigms. Implement several programs in languagesother than the one emphasized in the core curriculum (Java/C++). • Understand design/implementation issues involved with variable allocationand binding, control flow, types, subroutines, parameter passing. • Develop an understanding of thecompilation process
22150E74AP	HIGHSPEEDNETWORKS	Good understanding of packet-switched networking concepts and principles of operation. • Good understanding of Internet protocolsand architectures (e.g., IP protocol stack). • Solid foundation in computer operating systems fundamentals. • Ability to perform independent research, analyze findings in high speed networks.
22150E74BP	INFORMATION RETRIEVALTECHNIQUES	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

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22150E74CP	SOFTWARE PROJECTMANAGEMENT	Understand Project planning and management • Identify Client management and project definition • Understand testing based approach to development • Team management and ongoing schedule tracking
22150E74DP	CYBERFORENSICS	To learn computer forensics • To become familiar with forensics tools • To learn to analyze and validate forensicsdata
22248S11A	HIGHERMATHEMATICS	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 onmany levels. • Be aware of a class of functions which transform afinite set into another finite set which relates to input output functions in computer science.
22250H12	MODERNOPERATINGSYSTEM	To have an overview of different types of operatingsystems. • To know the components of an operating system. • To have a thorough knowledge of processmanagement. • To have a thorough knowledge of storagemanagement. • To know the concepts of I/O and file systems. • To know the concepts of multimedia operatingsystems.
22250H13	MACHINELEARNINGTECHNIQUES	To introduce students to the basic concepts and techniques of Machine Learning. To have a thoroughunderstanding of the Supervised and Unsupervised learning techniques To study the various probability based learning techniques To understand graphical models of machine learning algorithm
		A broad overview of the state of wireless and ad hocnetworking. The overview of the

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22250H14	ADHOCANDSENSORNETWORK	physical, networking and architectural issues of ad hoc networks. • The technologies that will enable the next generation of ad hoc networks and the proliferationof ubiquitous computing. • The sensor networks and the unique set of designchallenges that they introduce
22250H15	ADVANCEDDATASTRUCTURESAND ALGORITHMS	The Different Heap Structures, Search Structures andMultimedia Structures. • The various coding scheduling and algorithms. • The various multimedia structures
22250H21	MIDDLEWARETECHNOLOGIES	To study the set of services that a middleware systemconstitutes of. To understand how middleware facilitates the development of distributed applications in heterogeneous environments. • To study how it helps to incorporate applicationportability, distributed application component interoperability and integration. • To learn the object oriented middleware basicsthrough the example of the following CORBA objects. • To understand the basics of Web services that is the • most often-used middleware technique.
22250H22	OBJECTORIENTED SOFTWAREENGINEERING	To learn about software prototyping, analysis anddesign. • To learn UML and its usage. • Case studies to apply the principles.
22250H23	INTERNETOFTHINGS	To understand the fundamentals of Internet of Things • To learn about thebasicsofIOT protocols • To build a smallowcostembeddedsystem usingRaspberry Pi
22250H31	SOFTWAREPROJECTMANAGEMENT	Understand Project planning and management , Identify Client management and project definition. • Understand testing based approach todevelopment. • Team management and ongoing schedule tracking

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22250E16A	MULTIMEDIASYSTEMS	To study the graphics techniques and algorithms. To study the multimedia concepts and various I/Otechnologies
22250E16B	WEBENGINEERING	Understand the characteristics of web applications • Learn to Model web applications • Be aware of Systematic design methods • Be familiar with the testing techniques for webapplications
22250E16C	SOFTWARE METRICS	• To introduce an integrated approach to softwaredevelopment incorporating quality management methodologies. • To study about the quality improvements in software
22250E24A	ADVANCEDDISTR IBUTED COMPUTING	• learn about distributed transaction • study about the distributed databases
22250E24B	DATAWAREHOUSING& DATA MINING	• To introduce the concept of data mining with in detailcoverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules
22250E24C	INFORMATIONRE TRIEVAL TECHNIQUES	• understand the basics of information retrieval with pertinence to modeling, query operations and indexing • To get an understanding of machine learning techniques for text classification and clustering. • To understand the various applications of information retrieval giving emphasis to multimedia IR, web search • To understand the concepts of digital libraries •

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22250E32A	CLOUDCOMPUTING	Identify cloud computing models, characteristics, and technologies. • Get knowledge about the different architectures in cloud. • Identify the information about service management and cloud securities.
22250E32B	SPEECHPROCESSINGAND SYNTHESIS	To understand the mathematical foundations needed for speech processing To understand the basic concepts and algorithms of speech processing and synthesis To familiarize the students with the various speech signal representation, coding and recognition techniques To appreciate the use ofspeech processing in current technologies and to expose the students to real– world applications of speech processing
22250E32C	SOFTCOMPUTING	To introduce the ideas of Neural networks, fuzzy logic and use of heuristics base on human experience. • To have a general understanding of soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy clustering techniques andgenetic 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.
22250E33A	ADVANCEDDATABASE TECHNOLOGY	Know the operations of parallel and distributed databases. Understand the structure s and standardsof object relational databases. Get familiar with the concepts of XML, Mobile and Multimedia Databases
22250E33B	RECONFIGURABLE COMPUTING	To understand the need for reconfigurable computing • To expose the students to various device architectures

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		• To examine the various reconfigurable computing systems • To understand the different types of compute models for programming reconfigurable • architectures • To expose the students to HDL programming and familiarize with the development • environment • To expose the studentsto the various placement and routing protocols • To develop applications with FPGAs
22250E33C	GREENCOMPUTING	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 disposalrequirements.
22250E34A	SOFTWAREQUALITY ASSURANCE	To introduce an integrated approach to software development incorporating quality management methodologies. • To study about the quality improvements in software • To understand the Software Quality software standards
22250E34B	BIO-INSPIREDCOMPUTING	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.
22250E34C	WIRELESSAPPLICATION PROTOCOLS	•Be able to discuss current and emerging technology in Wireless technology •. Understand fundamental trends of technological evolution of Wireless technology. •Have hands-on knowledge in developing simple and •comprehensive WAP contents. •Be able to create simple Wireless applicaitions.

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22248S11AP	Higher Mathematics	Have knowledge of the concepts needed to test the logic of a program. • Have gained knowledge which has application in expert system, in data base anda basic for the prolog language. • Have an understanding in identifying patterns on many levels. • Be aware of a class of functions which transform a finite set into another finite set which relates to input output functions in computer science. • Be exposed to concepts and properties of algebraic structures such as semigroups, monoids and groups.
22250H12P	Adhoc & Sensor Net works	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. • The technologies that will enable the next generation of ad hoc networks and the proliferation of ubiquitous computing. • The sensor networks and the unique set of design challenges that they introduce.
22250H13P	Advanced Data Structures	The Different Heap Structures, Search Structures and Multimedia Structures. • The various coding scheduling and algorithms. • The various multimedia structures
22250H21P	Middleware Technologies	To study the set of services that a middleware system constitutes of. • To understand how middleware facilitates the development of distributed applications in

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		heterogeneous environments. • To study how it helps to incorporate application portability, distributed application component interoperability and integration. • To learn the object oriented middleware basics through the example of the following CORBA objects. • To understand the basics of Web services that is the most often-used middleware technique.
22250H22P	Internet of Things	• To understand the fundamental so Internet of Things • To learn about the basics of IOT protocols • To build small allow cost embedded system using Raspberry Pi. To apply the concept to Internet of Things in the real world scenario.
22250H31P	Modern Operating System	To have an overview of different types of operating systems. • To know the components of an operating system. • To have a thorough knowledge of process management. • To have a thorough knowledge of storage management. • To know the concepts of I/O and file systems. • To know the concepts of multimedia operating systems.
22250E32P	MachineLearningTechniques	To introduce students to the basic concepts and techniques of Machine Learning. • To have a thorough understanding of the Supervised and Unsupervised learning techniquesTo study the various probability based learning techniques

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		• To understand graphical models of machine learning algorithm
22250H41P	Object Oriented Software Engineering	To learn about software prototyping, analysis and design. • To learn UML and its usage. • Case studies to apply the principles
22250H42P	Software Project Management	Understand Project planning and management. • Identify Client management and project definition. • Understand testing based approach to development. • Team management and ongoing schedule tracking
22250CRM	Research Methodology	• To understand the approaches towards and constraints in good research. To identify various statistical tools used in research methodology • To appreciate and composethe manuscript for publication To train in basic computational and excel- skills for research in engineering
22250E23AP	AdvancedDistributedComputing	• Processing .distributed systems, operatingsystem issues. • learn about distributed transaction • study about the distributed databases.
22250E23BP	DataWarehousing &Data Mining	• To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with. • To introduce the concept of data • warehousing with special emphasis on architecture and design
Artificial Neural Networks	Artificial Neural Networks	To introduce the concepts of artificial neural networks such as biological neural networks,

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		Clustering And Structures • To Study The Linear Models For Regression ,Classification, Kernel Methods And Feed Forward Neural Networks
22250e33ap	Multimedia systems	To Study The Graphics Techniques AndAlgorithms. • To Study The Multimedia Concepts And Various I/O Technologies
22250e33bp	Web engineering	Understand And Be Able To Apply FundamentalGa Theory. 2. Be Able To Implement Or Modify Simple Genetic Algorithms. 3. Be Able To Apply Gas To Problems In The Student's Field. 4. To Find Exact Or Approximate Solutions To Optimization And Search Problems.
22250e33cp	Software metrics	To Introduce An Integrated Approach To Software Development Incorporating QualityManagement Methodologies. • To Study About The Quality Improvements InSoftware • To Understand The Software Quality Software Standards
22250e43ap	Service oriented architecture	Understand Soa, Service Orientation And Web Services • Analyzing And Designing Business Based OnSoa Principles. • Learning The Concepts Of Xml.
22250e43bp	High speed networkS	Describe And Interpret The Basics Of HighSpeed Networking Technologies. • Apply The Concept Learnt In This Course ToOptimize And Troubleshoot High-Speed Network . Demonstrate The Knowledge Of Network Planning And Optimization
22250e43cp	Embedded Systems	To Introduce Students To The Embedded Systems, Its Hardware And Software.

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		• To Introduce Devices And Buses Used ForEmbedded Networking. • To Explain Programming Concepts AndEmbedded Programming In C And C++. • To Explain Real Time Operating Systems, Inter-Task Communication And An ExemplaryCase Of MUCOS – IIRTOS.
22250E51AP	Cloud computing	Identify Cloud Computing Models,Characteristics, And Technologies. • Get Knowledge About The DifferentArchitectures In Cloud. • Identify The Information About Service Management And Cloud Securities.
22250E51BP	Speech processing And synthesis	To Understand The Mathematical FoundationsNeeded For Speech Processing To UnderstandThe Basic Concepts And Algorithms Of Speech Processing And Synthesis To Familiarize The Students With The Various Speech Signal Representation, Coding And Recognition Techniques To Appreciate The Use Of Speech Processing In Current Technologies And To Expose The Students To Real– World Applications Of Speech Processing
22250E51CP	Soft computingg	• To Introduce The Ideas Of Neural Networks,Fuzzy Logic And Use Of Heuristics Base On Human Experience. • To Have A General Understanding Of Soft Computing Methodologies, Including ArtificialNeural 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, FuzzyModels, Fuzzy Clustering Applications.

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22250e52ap	Advanced DatabasetechnolOgy	Know The Operations Of Parallel And Distributed Databases. Understand The Structure S And Standards Of Object RelationalDatabases. Get Familiar With The Concepts Of Xml, Mobile And Multimedia Databases
22250e52bp	Reconfigurable Computing	To understand the need for reconfigurable Computing • To expose the students to various device architectures • To examine the various reconfigurable computing Systems • To understand the different types of computer for programming Reconfigurable • Architectures • To expose the students to hdl programming andFamiliarize with the development Environment • To expose the students to the various placement And routing protocols • To develop applications With Fp gas
22250e52cp	Green computing	Understanding Scientific And SocialEnvironment. • Minimizing Energy Consumption From The ItEstate. Purchasing Green Energy And Using Green Suppliers. • Reducing The Paper And Other ConsumablesUsed. • Minimizing Equipment Disposal Requirements.
22250e53ap	Software Quality assurance	To Introduce An Integrated Approach To Software Development Incorporating QualityManagement Methodologies. • To Study About The Quality Improvements In Software

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		• To Understand The Software Quality Software Standards
22250e53bp	Bio- Inspired computing	Build A Solid Foundation And Acquire The Vocabulary You Need To Supervise Or To Communicate With Others Who Use TheseTools. • To Have Ability To Design Drugs. • To Understand Evolutionary Trees AndPhylogeny. • Learn The Key Methods And Tools Used In Bioinformatics.
22250e53cp	Wireless application protocols	• Be Able To Discuss Current And EmergingTechnology In Wireless Technology. • Understand Fundamental Trends OfTechnological Evolution Of Wireless Technology. • Have Hands-On Knowledge In DevelopingSimple And Comprehensive Wap Contents . Be Able To Create Simple Wireless Applicaitions.

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NAAC ACCREDITED
THANJAVUR – 613 403 - TAMIL NADU

Dept: COMPUTER SCIENCE AND ENGINEERING

BTECH (PT)- 2022R

Mapping of COs and POs

Course Code	Title of the Course	COs	POS										
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
22148S11P	Transforms and Partial Differential Equations	Expand a function in terms of Fourier Series and apply it for solving engineering problems.	1	1	1	1								
		Gain knowledge on Fourier Transforms	1	1	-	1								
		Model and solve higher order partial differential equations	1	3	1	1								
		Apply the methods of solving PDE in practical problems	1	1	2	1								
		Handle problems in Z transforms and apply it to solve difference equations	2	1	1	1								
22152S12P	Digital Systems	Simplify Boolean functions using KMap	1	1	2									
		Design and Analyze Combinational and Sequential Circuits	1	2	1						1	2	1	1
		Implement designs using Programmable Logic Devices	1	1	2	1								
		Write HDL code for combinational and Sequential Circuits	1	2	1	1	2			1	2	1	1	2
22150H13P	Data Structures and algorithms	Implement abstract data types for linear data structures	1	2	1									
		Apply the different linear and non-	1	1	2							1	2	1

		linear data structures to problem solutions.												
		Critically analyze the various sorting algorithms	1	-	1	1	2							
22150H14P	Computer Architecture and Organization	Understand the basics structure of computers, operations and instructions	1	2	1						1	2	1	1
		Design arithmetic and logic unit.	1	1	2									
		Understand pipelined execution and design control unit.	1	2	1									
		Understand parallel processing architectures.	1	-	1	1	2	1					1	3
22150H15P	Problem Solving And PythonProgramming	Write, test, and debug simple Python programs.	1	2	1									
		Implement Python programs with conditionals and loops.	2	1	1						1			
		Develop Python programs step-wise by defining functions and calling them					1	2	3					
		Read and write data from/to files in Python.									2	1	1	
22148S21P	Numerical Methods	Determine the solution of algebraic and transcentendal system of linear equations	1	1										
		To interpolate the values of unknown functions using Newton's Formula	2	1	-	2				1	2	1	1	2

		Estimate the numerical values of the derivatives and integrals of Unknown function	2	1	1	2								
		Solve first and second order initial value problem	1	2	1	1								
		Solve Numerically boundary value problem	2	1	-	2								
22150H22P	Microprocessors and Interfacing	Understand and execute programs based on 8086/8085 microprocessor.	1	1	2						1	2	1	1
		Classify the instructions with the help of Addressing modes of 8085 with necessary programs	1	1	1									
		Design Memory Interfacing circuits.	1	-	1	1	2	1						
		Design and interface I/O circuits.	1	1	1	1								
		Design and implement 8051 microcontroller based systems.	1	1	-	1								
22150H23P	Database Management Systems	Classify the modern and futuristic database applications based on size and complexity	1	3	1	1					1	2	1	1
		Map ER model to Relational model to perform database design effectively	1	1	2	1								
		Write queries using normalization criteria and optimize queries	2	1	1	1								
		Compare and contrast various indexing strategies in different database systems	1	1	2						1	2	1	1
		Appraise how advanced databases differ from traditional databases.	1	2	1									
22150H24P	Design and Analysis Of Algorithms	Design algorithms for various computing problems. Analyze the time and space complexity of algorithms.	1	1	2	1								

		Critically analyze the different algorithm design techniques for a given problem	1	2	1	1	2				1	2	1	1
		Modify existing algorithms to improve efficiency	1	2	1									
22150H25P	Programming in C	Identify the key activities in managing a software project.	1	1	2						1	2	1	1
		Compare different process models	1	-	1	1	2							
		Understand Concepts of requirements engineering and Analysis Modeling.	1	2	1									
		Apply systematic procedure for software design and deployment	1	1	2						1	2	1	1
		Compare and contrast the various testing and maintenance	1	2	1									
		Manage project schedule, estimate project cost and effort requir	1	-	1	1	2	1					1	3
22148S31P	Discrete Mathematics	Have an understanding in identifying structures on many levels.	1	1	1	1								
		Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	1	1	-	1					1	2	1	1
		Be aware of the counting principles.	1	3	1	1								
		Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	1	1	2	1			1	2	1	1	2	
		Have knowledge of the concepts needed to test the logic of a program.	2	1	1	1					1	2	1	1
22150H32P	Operating System	Analyze various scheduling algorithms.	1	1	2									
		Understand deadlock, prevention and avoidance algorithms.	1	2	1					1	2	1	1	2
		Perform administrative tasks on Linux Servers.	1	1	2	1								

		Compare and contrast various memory management schemes.	1	2	1	1	2								
		Understand the functionality of file systems.	1	2	1						1	2		1	1
		Compare iOS and Android Operating Systems	1	1	2										
22150H33P	Artificial Intelligence	Identify problems that are amenable to solution by AI methods.	1	-	1	1	2			1	2		1	1	
		Identify appropriate AI methods to solve a given problem.	1	2	1										
		Formalise a given problem in the language/framework of different AI methods.	1	1	2										
		Implement basic AI algorithms.	1	2	1					1	2		1	1	2
		Design and carry out an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.	1	1	1	1									
22150H34P	Computer Networks	Identify the components required to build different types of networks	1	1	-	1				1	2		1	1	2
		Choose the required functionality at each layer for given application	1	3	1	1									
		Identify solution for each functionality at each layer	1	1	2	1				1	2		1	1	2
		Trace the flow of information from one node to another node in the network	2	1	1	1									
22150L35P	Operating Systems and Networking Lab	Analyze various scheduling algorithms.	1	1	2					1	2		1	1	2
		Understand deadlock, prevention and avoidance algorithms.	1	2	1										
		Identify the components required to build different types of networks	1	1	2	1									

		Choose the required functionality at each layer for given application	1	2	1	1	2				1	2	1	1
22150H41P	Software Engineering Fundamentals	Apply cryptographic algorithms for encrypting and decryption for secure data transmission	1	2	1									
		Understand the importance of Digital signature for secure edocuments exchange	1	1	2						1	2	1	1
		Understand the program threats and apply good programming practice	1	-	1	1	2							
		Get the knowledge about the security services available for internet and web applications	1	2	1									
		Understand data vulnerability and sql injection Gain the knowledge of security models and published standards	1	1	2					1	2	1	1	2
22150H43P	C# And .Net Framework	Write various applications using C# Language in the .NET Framework.	1	2	1									
		Create mobile applications using .NET compact Framework.	1	1	2	1				1	2	1	1	2
		Develop distributed applications using .NET Framework	1	2	1	1	2							
22150E44AP	Theory of Computation	Design Finite State Machine, Pushdown Automata, and Turing Machine.	1	2	1					1	2	1	1	2
		Explain the Decidability or Undecidability of various problems	1	1	2									
22150E44BP	Data Warehousing and DataMining	Explain the basic concepts of real time Operating system design	1	-	1	1	2							
		Use the system design techniques to develop software for embedded systems	1	2	1					1	2	1	1	
		Differentiate between the general purpose operating system and the real time operating system	1	1	2									

22150E44CP	Professional Ethics in Engineering	Design Web pages using HTML/XML and style sheets	1	2	1						1	2	1	1
		Create user interfaces using Java frames and applets.	1	1	1	1						1	2	1
		Create dynamic web pages using server side scripting.	1	1	-	1								
		Write Client Server applications.	1	3	1	1								
		Use the frameworks JSP Strut, Hibernate, Spring	1	1	2	1				1	2	1	1	2
22150E44DP	Advanced Databases	design a database using ER diagrams and map ER intoRelations and normalize the relations	2	1	1	1								
		Acquire the knowledge of query evaluation to monitor the performance of the DBMS	1	1	2						1	2	1	1
		Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.	1	2	1									
22150L45P	Internet Programming Lab	Create 3D graphical scenes using open graphics library suits	1	1	2	1				1	2	1	1	2
		Implement image manipulation and enhancement	1	2	1	1	2							
		Create 2D animations using tools	1	2	1									
22150H51P	Object Oriented Analysis and	Design and implement projects using OO concepts.	1	1	2									
		Use the UML analysis and design diagrams.	1	-	1	1	2							
		Apply appropriate design patterns.	1	2	1						1	2	1	1
		Create code from design.	1	1	2									
		Compare and contrast various testing techniques.	1	2	1									
22150H52P	Software Quality Management	Perform functional and nonfunctional tests in the life cycle of the software	1	-	1	1	2	1					1	3

		product												
		Understand system testing and test execution process.	1	1	1	1								
		Identify defect prevention techniques and software quality assurance metrics.	1	1	1	1								
		Apply techniques of quality assurance for typical applications.	1	1	-	1								
22150H53P	Graphics and Multimedia	Gain proficiency in 3D computer graphics API programming	1	3	1	1				1	2	1	1	2
		Able to understand different realizations of multimedia tools	1	1	2	1								
		Able to develop interactive animations using multimedia tools	2	1	1	1				1	2	1	1	2
		Gain the knowledge of different media streams in multimedia transmission	1	1	2									
		Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.	1	2	1				1	2	1	1	2	1
22150E54AP	Ad hoc and Sensor Networks	Apply suitable soft computing techniques for various applications.	1	1	2	1								
		Integrate various soft computing techniques for complex problems.	1	2	1	1	2							
22150E54BP	Principles of Compiler Design	Design and implement a prototype compiler.	1	2	1					1	2	1	1	2
		Apply the various optimization techniques.	1	1	2									
		Use the different compiler construction tools.	1	-	1	1	2			1	2	1	1	2
22150E54CP	Distributed Systems	Discuss trends in Distributed Systems.	1	2	1									
		Apply network virtualization.	1	1	2									
		Apply remote method invocation and	1	2	1									

		objects												
		Design process and resource management systems.	1	-	1	1	2	1					1	3
22150E54DP	Mobile Computing	Explain the basics of mobile telecommunication system	1	1	1	1								
		Choose the required functionality at each layer for given application	1	1	1	1								
		Identify solution for each functionality at each layer	1	1	-	1			1	2	1	1	2	1
		Use simulator tools and design Ad hoc networks	1	3	1	1								
		Develop a mobile application.	1	1	2	1								
22150L55P	Software Development Lab	Design and Implement various mobile applications using emulators.	2	1	1	1								
		Deploy applications to hand-held devices	1	1	2				1	2	1	1	2	
22150H61P	Cryptography and Network Security	Able to design and control real time control systems	1	2	1									
		Able to understand the functionality of 8085 microprocessor	1	1	2	1				1	2	1	1	2
		Able incorporate enhanced features in the embedded systems through software	1	2	1	1	2							
		Able to rectify minor problems by troubleshooting	1	2	1						1	2	1	1
		Acquire the knowledge of real time operating system and implement real time functions	1	1	2									
22150H62P	Advanced Java programming	Develop Java programs using OOP principles	1	-	1	1	2				1	2	1	1
		Develop Java programs with the concepts inheritance and interfaces	1	2	1									
		Build Java applications using exceptions and I/O streams	1	1	2						1	2	1	1
		Develop Java applications with	1	2	1									

		threads and generics classes												
		Develop interactive Java programs using swings	1	-	1	1	2	1					1	3
22150H63P	Software Testing	Design test cases suitable for a software development for different domains.	1	1	1	1								
		Identify suitable tests to be carried out	1	1	1	1								
		Prepare test planning based on the document.	1	1	-	1								
		Document test plans and test cases designed.	1	3	1	1								
		Use automatic testing tools.	1	1	2	1					1	2	1	1
		Develop and validate a test plan.	2	1	1	1								
22160E64AP	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	1	1	2									
22150E64BP	Unix Internals	Explain UNIX Operating system and usage of file system.	1	2	1						1	2	1	1
		Apply Shell Commands for a given task using filter and pipe commands.	1	1	2	1								
		Develop and implement the Shell scripts in VI editor.	1	2	1	1	2							
		Discuss the various techniques used for optimising the cache performance	1	2	1						1	2	1	1
		Design hierarchal memory system	1	1	2									
2215064CP	Graph Theory And Applications	optimize sequential code for fastest possible execution	1	-	1	1	2				1	2	1	1
		Develop, analyze and implement algorithms for parallel computers	1	2	1									

22150E64DP	Programming paradigms	Identify and discuss the design principles of a given language or paradigms	1	1	2					1	2	1	1	
		compare different programming languages from the point of view underlying design principles	1	2	1									
22150L65P	Java Programming Lab	Create 3D graphical scenes using open graphics library suits	1	-	1	1	2	1					1	3
		Implement image manipulation and enhancement	1	1	1	1								
		Create 2D animations using tools	1	1	-	1								
22160S71P	Total Quality Management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	1	3	1	1								
22150H72P	Grid and Cloud Computing	Apply grid computing techniques to solve large scale scientific problems.	1	1	2	1					1	2	1	1
		Apply the concept of virtualization.	2	1	1	1								
		Use the grid and cloud tool kits.	1	1	2									
		Apply the security models in the grid and the cloud environment.	1	2	1									
22150H73P	Middleware Technologies	To understand how middleware facilitates the development of distributed applications in heterogenous environments	1	1	2	1					1	2	1	1
		to learn the object oriented middleware basics through the example of cobra objects	1	2	1	1	2							
		To understand the basics of web services that is the most often used middleare techniques	1	2	1									
22150E74AP	High Speed Networks	Will be able to analyze the various parameters of networking	1	1	2									
		Will be able to understand the algorithm and technologies involved	1	-	1	1	2							

		in internet and associated networks												
22150E74BP	Information Retrieval Techniques	Knowledge and awareness of basic principles and concepts of biology, computer science and mathematics	1	2	1						1	2	1	1
		Existing software effectively to extract information from large databases and to use this information in computer modeling	1	1	2									
22150E74CP	Software Project Management	Identify the key activities in managing a software project.	1	1	1	1			1	2	1	1	2	
		Compare different process models.	1	1	-	1								
		Concepts of requirements engineering and Analysis Modeling.	1	3	1	1				1	2	1	1	2
		Apply systematic procedure for software design and deployment.	1	1	2	1								
		Compare and contrast the various testing and maintenance.	2	1	1	1								
22150E74DP	Cyber Forensics	Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2Dtransforms.	1	1	2				1	2	1	1	2	1
		Operate on images using the techniques of smoothing, sharpening and enhancement	1	2	1					1	2	1	1	
		Understand the restoration concepts and filtering techniques.	1	1	2	1								
		Learn the basics of segmentation, features extraction, compression	1	2	1	1	2			1	2	1	1	2
22150P75P	Project	To independently carry out research	1	2	1									
		To write and present a report	1	1	2									
		To identify the problem in the existing power system and to develop software / hardware solution by doing research.	1	-	1	1	2			1	2	1	1	2

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COMPUTER SCIENCE AND ENGINEERING

M.TECH (FT)- 2022R

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Course Code	Title of the Course	Course Objectives	POS											
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
22248S11A	Higher Mathematics	Have knowledge of the concepts needed to test the logic of a program	3	3	1	1	0	0	0	0	2	0	2	3
		Have gained knowledge which has application in expert system, in data base and a basic for the prolog language	3	3	1	1	0	0	0	0	2	0	2	3
		Have an understanding in identifying patterns on many levels	3	3	1	1	0	0	0	0	2	0	2	3
22250H12	Modern Operating System	To have an overview of different types of operating systems.	1	1	3	1	3	-	-	-	3	2	2	2
		To know the components of an operating system.	2	1	3	2	1	-	-	-	2	1	1	3
		To have a thorough knowledge of process management.	3	3	1	2	2	-	-	-	3	2	1	2
22250H13	MachineLearning Techniques	Explain the basic concepts of machine learning	2	2	1	2	2	-	-	-	1	1	1	2
		Construct unsupervised learning algorithms	2	1	-	1	1	-	-	-	2	1	1	2
		Evaluate and compare different models	2	2	1	2	2	1	1	-	1	2	1	3
		Construct supervised learning models	3	3	1	2	2	-	-	-	3	2	1	2
22250H14	Adhoc and Sensor Network	A broad overview of the state of wireless and ad hoc networking.	3	1	2	2	2	-	-	-	1	2	1	3
		The overview of the physical, networking and architectural issues of ad hoc networks	1	1	2	3	2	-	-	-	3	2	1	2
22250H15	Advanced Data Structures and Algorithms	The Different Heap Structures, Search Structures and Multimedia Structures.	1	1	3	1	3	-	-	-	3	2	2	2
		The various coding scheduling and algorithms.	2	1	3	2	1	-	-	-	2	1	1	3

		The various multimedia structures.	3	3	1	2	2	-	-	-	3	2	1	2
22250E16A	Multimedia Systems	To study the graphics techniques and algorithms.	2	2	1	2	2	-	-	-	1	1	1	2
		To study the multimedia concepts and various I/O technologies	2	1	-	1	1	-	-	-	2	1	1	2
22250E16B	Web Engineering	Explain the characteristics of web applications.	2	2	1	2	2	1	1	-	1	2	1	3
		Model web applications..	3	3	1	2	2	-	-	-	3	2	1	2
		Design and Test web applications.	3	1	2	2	2	-	-	-	1	2	1	3
22250E16C	Software Metrics	To introduce an integrated approach to software development incorporating quality management methodologies.	3	3	1	2	2	-	-	-	3	2	1	2
		To study about the quality improvements in software	2	2	1	2	2	-	-	-	1	1	1	2
		To understand the Software Quality software standards	2	1	-	1	1	-	-	-	2	1	1	2
22250L17	Advanced Web Technologies Lab	On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies To create fully functional website/web application with MVC architecture	2	2	1	2	2	1	1	-	1	2	1	3
22250H21	Middleware Technologies	To study the set of services that a middleware system constitutes of.	3	3	1	2	2	-	-	-	3	2	1	2
		To understand how middleware facilitates the development of distributed applications in heterogeneous environments.	3	1	2	2	2	-	-	-	1	2	1	3
		To study how it helps to incorporate application portability, distributed application component interoperability and integration.	1	1	3	1	3	-	-	-	3	2	2	2
22250H22	Object Oriented Software Engineering	To learn about software prototyping, analysis and design.	2	1	3	2	1	-	-	-	2	1	1	3
		To learn UML and its usage.	3	3	1	2	2	-	-	-	3	2	1	2
		Case studies to apply the principles	2	2	1	2	2	-	-	-	1	1	1	2
22250H23	Internet of Things	Define the infrastructure for supporting IoT deployments	2	1	-	1	1	-	-	-	2	1	1	2

		Understand the usage of IoT protocols for communication between various IoT devices	2	2	1	2	2	1	1	-	1	2	1	3
		Design portable IoT using Arduino/Raspberry Pi /equivalent boards.	3	3	1	2	2	-	-	-	3	2	1	2
		Understand the basic concepts of security and governance as applied to IoT	3	1	2	2	2	-	-	-	1	2	1	3
		Analyze and illustrate applications of IoT in real time scenarios	3	3	1	2	2	-	-	-	3	2	1	2
22250E24A	Advanced Distributed Computing	processing, distributed systems, operating system issues.	2	2	1	2	2	-	-	-	1	1	1	2
		learn about distributed transaction	2	2	1	2	2	-	-	-	1	1	1	2
		study about the distributed databases	2	1	-	1	1	-	-	-	2	1	1	2
22250E24B	Data Warehousing & Data Mining	To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.	2	2	1	2	2	1	1	-	1	2	1	3
		To introduce the concept of data warehousing with special emphasis on architecture and design	3	3	1	2	2	-	-	-	3	2	1	2
22250E24C	Information Retrieval Techniques	Build an Information Retrieval system using the available tools.	3	1	2	2	2	-	-	-	1	2	1	3
		Identify and design the various components of an Information Retrieval system	3	3	1	2	2	-	-	-	3	2	1	2
		Model an information retrieval system	2	2	1	2	2	-	-	-	1	1	1	2
		Design an efficient search engine and analyze the Web content structure.	2	1	3	2	1	-	-	-	2	1	1	3
22250E25A	Service Oriented Architecture	Understand SOA, service orientation and web services	3	3	1	2	2	-	-	-	3	2	1	2
		Analyzing and designing business based on SOA principles.	2	2	1	2	2	-	-	-	1	1	1	2
		Learning the concepts of XML	2	1	-	1	1	-	-	-	2	1	1	2
22250E25B	High Speed Networks	Describe and interpret the basics of high speed networking technologies.	2	2	1	2	2	1	1	-	1	2	1	3

		Apply the concept learnt in this course to optimize and troubleshoot high-speed network.	3	3	1	2	2	-	-	-	3	2	1	2
		Demonstrate the knowledge of network planning and optimization	3	1	2	2	2	-	-	-	1	2	1	3
22250E25C	Language Technologies	To tag a given text with basic Language features	3	3	1	2	2	-	-	-	3	2	1	2
		To design an innovative application using NLP components.	3	3	1	2	2	-	-	-	3	2	1	2
		To implement a rule based system to tackle morphology/syntax of a language	3	1	2	2	2	-	-	-	1	2	1	3
		To design a tag set to be used for statistical processing for real-time applications	3	3	1	2	2	-	-	-	3	2	1	2
22250L26	.NET Technologies Lab	Create Simple application using web controls	2	2	1	2	2	-	-	-	1	1	1	2
		Work with States of ASP.NET Pages & Adrotator Control Use of calendar control, Treeview control & Validation controls	1	1	3	1	3	-	-	-	3	2	2	2
222TECWR	Technical Writing /Seminars	Understand professional writing by studying management communication	2	1	3	2	1	-	-	-	2	1	1	3
22250H31	Software Project Management	Understand Project planning and management.	3	3	1	2	2	-	-	-	3	2	1	2
		Identify Client management and project definition.	2	2	1	2	2	-	-	-	1	1	1	2
		Understand testing based approach to development.	2	1	-	1	1	-	-	-	2	1	1	2
22250E32A	Cloud Computing	Identify cloud computing models, characteristics, and technologies.	3	3	1	2	2	-	-	-	3	2	1	2
		Get knowledge about the different architectures in cloud.	3	1	2	2	2	-	-	-	1	2	1	3
		Identify the information about service management and cloud securities	3	3	1	2	2	-	-	-	3	2	1	2
		Identify the various temporal, spectral and cepstral features required for identifying speech units – phoneme, syllable and wor	2	2	1	2	2	-	-	-	1	1	1	2

22250E32B	Speech Processing and Synthesis	Determine and apply Mel-frequency cepstral coefficients for processing all types of signals	1	1	3	1	3	-	-	-	3	2	2	2
		Identify the apt approach of speech synthesis depending	3	3	1	2	2	-	-	-	3	2	1	2
22250E32C	Soft Computing	To introduce the ideas of Neural networks, fuzzy logic and use of heuristics base on human experience.	2	2	1	2	2	-	-	-	1	1	1	2
		To have a general understanding of soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy clustering techniques and genetic algorithms;	2	1	-	1	1	-	-	-	2	1	1	2
		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	3	3	1	2	2	-	-	-	3	2	1	2
22250E33A	Advanced Database Technology	Know the operations of parallel and distributed databases.	3	1	2	2	2	-	-	-	1	2	1	3
		Understand the structure s and standards of object relational databases.	3	3	1	2	2	-	-	-	3	2	1	2
		Get familiar with the concepts of XML, Mobile and Multimedia Databases	2	2	1	2	2	-	-	-	1	1	1	2
22250E33B	Reconfigurable Computing	Identify the need for reconfigurable architectures.	1	1	3	1	3	-	-	-	3	2	2	2
		Discuss the architecture of FPGAs	2	1	3	2	1	-	-	-	2	1	1	3
		Point out the salient features of different reconfigurable architectures.	3	3	1	2	2	-	-	-	3	2	1	2
		Develop applications using any HDL and appropriate tools.	2	2	1	2	2	-	-	-	1	1	1	2
22250E33C	Green Computing	Understanding scientific and social environment.	2	1	-	1	1	-	-	-	2	1	1	2
		Minimizing energy consumption from the IT estate.	3	3	1	2	2	-	-	-	3	2	1	2
		Purchasing green energy and using green suppliers.	2	2	1	2	2	-	-	-	1	1	1	2

		Reducing the paper and other consumables used.	1		1			1	3			2		2
		Minimizing equipment disposal requirements	1	1	3	1	3	-	-	-	3	2	2	2
22250E34A	Software Quality Assurance	To introduce an integrated approach to software development incorporating quality management methodologies.	2	1	3	2	1	-	-	-	2	1	1	3
		To study about the quality improvements in software	3	3	1	2	2	-	-	-	3	2	1	2
		To understand the Software Quality software standards	2	2	1	2	2	-	-	-	1	1	1	2
22250E34B	Bio-inspired Computing	Implement and apply bio-inspired algorithms	2	1	-	1	1	-	-	-	2	1	1	2
		Explain random walk and simulated annealing	2	2	1	2	2	-	-	-	1	1	1	2
		Explain swarm intelligence and ant colony for feature selection	2	1	-	1	1	-	-	-	2	1	1	2
		Apply bio-inspired techniques in image processing.	3	3	1	2	2	-	-	-	3	2	1	2
22250E34C	Wireless Application Protocols	Be able to discuss current and emerging technology in Wireless technology.	2	2	1	2	2	-	-	-	1	1	1	2
		Understand fundamental trends of technological evolution of Wireless technology. Have hands-on knowledge in developing simple and comprehensive WAP contents.	1 1	1	1 3	1	3	1 -	3 -	-	3	2 2	2	2 2
		Be able to create simple Wireless applicaitions	2	1	3	2	1	-	-	-	2	1	1	3
22250P35	Project Work- Phase I	To independently carry out research /investigation to identify and solve practical problems	3	3	1	2	2	-	-	-	3	2	1	2
22250P41	Project Work- Phase II	To identify the problem in the existing power system and to develop software / hardware solution by doing research.	2	2	1	2	2	-	-	-	1	1	1	2

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Course Code	Title of the Course	Course Objectives	POS											
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
22248S11AP	Higher Mathematics	Have knowledge of the concepts needed to test the logic of a program	3	3	1	1	0	0	0	0	2	0	2	3
		Have gained knowledge which has application in expert system, in data base and a basic for the prolog language	3	3	1	1	0	0	0	0	2	0	2	3
		Have an understanding in identifying patterns on many levels	3	3	1	1	0	0	0	0	2	0	2	3
22250H12P	Adhoc & Sensor Networks	A broad overview of the state of wireless and ad hoc networking.	1	1	3	1	3	-	-	-	3	2	2	2
		The overview of the physical, networking and architectural issues of ad hoc networks	2	1	3	2	1	-	-	-	2	1	1	3
22250H13P	Advanced Data Structures	The Different Heap Structures, Search Structures and Multimedia Structures.	3	3	1	2	2	-	-	-	3	2	1	2
		The various coding scheduling and algorithms.	2	2	1	2	2	-	-	-	1	1	1	2
		The various multimedia structures.	2	1	-	1	1	-	-	-	2	1	1	2
22250L14P	Advanced Web Technologies Lab	On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies To create fully functional website/web application with MVC architecture	2	2	1	2	2	1	1	-	1	2	1	3
22250H21P	Middleware Technologies	To study the set of services that a middleware system constitutes of.	3	3	1	2	2	-	-	-	3	2	1	2

		To understand how middleware facilitates the development of distributed applications in heterogeneous environments.	3	1	2	2	2	-	-	-	1	2	1	3
		To study how it helps to incorporate application portability, distributed application component interoperability and integration.	1	1	2	3	2	-	-	-	3	2	1	2
22250H22P	Internet of Things	Define the infrastructure for supporting IoT deployments	1	1	3	1	3	-	-	-	3	2	2	2
		Understand the usage of IoT protocols for communication between various IoT devices	2	1	3	2	1	-	-	-	2	1	1	3
		Design portable IoT using Arduino/Raspberry Pi /equivalent boards.	3	3	1	2	2	-	-	-	3	2	1	2
		Understand the basic concepts of security and governance as applied to IoT	2	2	1	2	2	-	-	-	1	1	1	2
		Analyze and illustrate applications of IoT in real time scenarios	2	1	-	1	1	-	-	-	2	1	1	2
22250E23AP	Advanced Distributed Computing	processing, distributed systems, operating system issues.	2	2	1	2	2	1	1	-	1	2	1	3
		learn about distributed transaction	3	3	1	2	2	-	-	-	3	2	1	2
		study about the distributed databases	3	1	2	2	2	-	-	-	1	2	1	3
22250E23BP	Data Warehousing &Data Mining	To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.	3	3	1	2	2	-	-	-	3	2	1	2
		To introduce the concept of data warehousing with special emphasis on architecture and design	2	2	1	2	2	-	-	-	1	1	1	2
22250E23CP	Information Retrieval Techniques	Build an Information Retrieval system using the available tools.	2	1	-	1	1	-	-	-	2	1	1	2
		Identify and design the various components of an Information Retrieval system	2	2	1	2	2	1	1	-	1	2	1	3
		Model an information retrieval system	3	3	1	2	2	-	-	-	3	2	1	2
		Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.	3	1	2	2	2	-	-	-	1	2	1	3

		Design an efficient search engine and analyze the Web content structure.	1	1	3	1	3	-	-	-	3	2	2	2
22250L24P	.NET Technologies Lab	Create Simple application using web controls	2	1	3	2	1	-	-	-	2	1	1	3
		Work with States of ASP.NET Pages & Adrotator Control Use of calendar control, Treeview control & Validation controls	3	3	1	2	2	-	-	-	3	2	1	2
222TECWRP	Technical Writing /Seminars	Understand professional writing by studying management communication	2	2	1	2	2	-	-	-	1	1	1	2
22250H31P	Modern Operating System	To have an overview of different types of operating systems.	2	1	-	1	1	-	-	-	2	1	1	2
		To know the components of an operating system.	2	2	1	2	2	1	1	-	1	2	1	3
		To have a thorough knowledge of process management.	3	3	1	2	2	-	-	-	3	2	1	2
22250E32P	Machine Learning Techniques	Explain the basic concepts of machine learning	3	1	2	2	2	-	-	-	1	2	1	3
		Construct unsupervised learning algorithms	3	3	1	2	2	-	-	-	3	2	1	2
		Evaluate and compare different models	2	2	1	2	2	-	-	-	1	1	1	2
		Construct supervised learning models	2	2	1	2	2	-	-	-	1	1	1	2
22250E33AP	Multimedia Systems	To study the graphics techniques and algorithms.	2	1	-	1	1	-	-	-	2	1	1	2
		To study the multimedia concepts and various I/O technologies	2	2	1	2	2	1	1	-	1	2	1	3
22250E33BP	Web Engineering	Explain the characteristics of web applications.	3	3	1	2	2	-	-	-	3	2	1	2
		Model web applications..	3	1	2	2	2	-	-	-	1	2	1	3
		Design and Test web applications.	3	3	1	2	2	-	-	-	3	2	1	2
22250E33CP	Software Metrics	To introduce an integrated approach to software development incorporating quality management methodologies.	2	2	1	2	2	-	-	-	1	1	1	2
		To study about the quality improvements in software	1	1	3	1	3	-	-	-	3	2	2	2
		To understand the Software Quality software standards	2	1	3	2	1	-	-	-	2	1	1	3
22250H41P	Object Oriented Software Engineering	To learn about software prototyping, analysis and design.	3	3	1	2	2	-	-	-	3	2	1	2
		To learn UML and its usage.	2	2	1	2	2	-	-	-	1	1	1	2
		Case studies to apply the principles	2	1	-	1	1	-	-	-	2	1	1	2

2250H42P	Software Project Management	Understand Project planning and management.	2	2	1	2	2	1	1	-	1	2	1	3
		Identify Client management and project definition.	3	3	1	2	2	-	-	-	3	2	1	2
		Understand testing based approach to development.	3	1	2	2	2	-	-	-	1	2	1	3
22250E43AP	Service Oriented Architecture	Understand SOA, service orientation and web services	3	3	1	2	2	-	-	-	3	2	1	2
		Analyzing and designing business based on SOA principles.	3	3	1	2	2	-	-	-	3	2	1	2
		Learning the concepts of XML	3	1	2	2	2	-	-	-	1	2	1	3
22250E43BP	High Speed Networks	Describe and interpret the basics of high speed networking technologies.	3	3	1	2	2	-	-	-	3	2	1	2
		Apply the concept learnt in this course to optimize and troubleshoot high-speed network.	2	2	1	2	2	-	-	-	1	1	1	2
		Demonstrate the knowledge of network planning and optimization	1	1	3	1	3	-	-	-	3	2	2	2
22250E43CP	Language Technologies	To tag a given text with basic Language features	2	1	3	2	1	-	-	-	2	1	1	3
		To design an innovative application using NLP components.	3	3	1	2	2	-	-	-	3	2	1	2
		To implement a rule based system to tackle morphology/syntax of a language	2	2	1	2	2	-	-	-	1	1	1	2
		To design a tag set to be used for statistical processing for real-time applications	2	1	-	1	1	-	-	-	2	1	1	2
22250P44P	Project Work- Phase I	To independently carry out research /investigation to identify and solve practical problems	3	3	1	2	2	-	-	-	3	2	1	2
22250E51AP	Cloud Computing	Identify cloud computing models, characteristics, and technologies.	3	1	2	2	2	-	-	-	1	2	1	3
		Get knowledge about the different architectures in cloud.	3	3	1	2	2	-	-	-	3	2	1	2
		Identify the information about service management and cloud securities	2	2	1	2	2	-	-	-	1	1	1	2
22250E51BP	Speech Processing and Synthesis	Identify the various temporal, spectral and cepstral features required for identifying speech units – phoneme, syllable and wor	1	1	3	1	3	-	-	-	3	2	2	2
		Determine and apply Mel-frequency cepstral coefficients for processing all types of signals	2	1	3	2	1	-	-	-	2	1	1	3

		Justify the use of formant and concatenative approaches to speech synthesis	3	3	1	2	2	-	-	-	3	2	1	2
		Identify the apt approach of speech synthesis depending	2	2	1	2	2	-	-	-	1	1	1	2
22250E51CP	Soft Computing	To introduce the ideas of Neural networks, fuzzy logic and use of heuristics base on human experience.	2	1	-	1	1	-	-	-	2	1	1	2
		To have a general understanding of soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy clustering techniques and genetic algorithms;	3	3	1	2	2	-	-	-	3	2	1	2
		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	3	1	2	2	2	-	-	-	1	2	1	3
22250E52AP	Advanced Database Technology	Know the operations of parallel and distributed databases.	3	3	1	2	2	-	-	-	3	2	1	2
		Understand the structure s and standards of object relational databases.	2	2	1	2	2	-	-	-	1	1	1	2
		Get familiar with the concepts of XML, Mobile and Multimedia Databases	1	1	3	1	3	-	-	-	3	2	2	2
22250E52BP	Reconfigurable Computing	Identify the need for reconfigurable architectures.	2	1	3	2	1	-	-	-	2	1	1	3
		Discuss the architecture of FPGAs	3	3	1	2	2	-	-	-	3	2	1	2
		Point out the salient features of different reconfigurable architectures.	2	2	1	2	2	-	-	-	1	1	1	2
		Develop applications using any HDL and appropriate tools.	2	1	-	1	1	-	-	-	2	1	1	2
22250E52CP	Green Computing	Understanding scientific and social environment.	3	3	1	2	2	-	-	-	3	2	1	2
		Minimizing energy consumption from the IT estate.	2	2	1	2	2	-	-	-	1	1	1	2
		Purchasing green energy and using green suppliers.	1		1			1	3			2		2
		Reducing the paper and other consumables used.	1	1	3	1	3	-	-	-	3	2	2	2
		Minimizing equipment disposal requirements	2	1	3	2	1	-	-	-	2	1	1	3

22250E53AP	Software Quality Assurance	To introduce an integrated approach to software development incorporating quality management methodologies.	3	3	1	2	2	-	-	-	3	2	1	2
		To study about the quality improvements in software	2	2	1	2	2	-	-	-	1	1	1	2
		To understand the Software Quality software standards	2	1	-	1	1	-	-	-	2	1	1	2
22250E53BP	Bio-inspired Computing	Implement and apply bio-inspired algorithms	2	2	1	2	2	-	-	-	1	1	1	2
		Explain random walk and simulated annealing	2	1	-	1	1	-	-	-	2	1	1	2
		Apply bio-inspired techniques in image processing.	2	2	1	2	2	-	-	-	1	1	1	2
22250E53CP	Wireless Application Protocols	Be able to discuss current and emerging technology in Wireless technology.	1		1			1	3			2		2
		Understand fundamental trends of technological evolution of Wireless technology.	1	1	3	1	3	-	-	-	3	2	2	2
		Have hands-on knowledge in developing simple and comprehensive WAP contents.	2	1	3	2	1	-	-	-	2	1	1	3
		Be able to create simple Wireless applicaitions	3	3	1	2	2	-	-	-	3	2	1	2
22250P61P	Project Work- Phase II	To identify the problem in the existing power system and to develop software / hardware solution by doing research.	2	2	1	2	2	-	-	-	1	1	1	2

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SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

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SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ARTIFICIAL INTELLEGENCE AND DATA SCIENCE

1.1.1 PROGRAMME OUTCOMES
B.TECH

Engineering Graduates will be able to:

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

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

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

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

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

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

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

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

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

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

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

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

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

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PROGRAMME SPECIFIC OUTCOMES

B.TECH

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

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

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

PS04: Develop data analytics and data visualization skills, skills pertaining to knowledge acquisition, knowledge representation and knowledge engineering, and hence be capable of coordinating complex projects

PS05: Able to carry out fundamental research to cater the critical needs of the society through cutting edge technologies of AI

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE OBJECTIVE

Course code	Course name	Course outcomes
22147S11	Professional English-I	• 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.
22148S12	Matrices and Calculus	• Use the matrix algebra methods for solving practical problems. • Apply differential calculus tools in solving various application problems. • Able to use differential calculus ideas on several variable functions. • Apply different methods of integration in solving practical problems. • Apply multiple integral ideas in solving areas, volumes and other practical problems
22149S13	Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications • The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, • The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, • The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and • The students will understand the basics of crystals, their structures and different crystal growth techniques
22149S14	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

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22150S15	Problem Solving And Basics Of Python Programming	• Develop algorithmic solutions to simple computational problems • Read, write, execute by hand simple Python programs. • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries. • Read and write data from/to files in Python Programs
22150L16	Problem Solving And Basics Of Python Programming laboratory	• Write, test, and debug simple Python programs. • Implement Python programs with conditionals and loops. • Develop Python programs step-wise by defining functions and calling them. 28 • Use Python lists, tuples, dictionaries for representing compound data. Read and write data from/to files in Python.
22149L17	Physics And Chemistry Laboratory	• Apply principles of elasticity, optics and thermal properties for engineering applications. • The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
22147L18	Communication Laboratory – I	• 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.
22147S21	Professional English – II	• To compare and contrast products and ideas in technical texts. • To identify and report cause and effects in events, industrial processes through technical texts • To analyse problems in order to arrive at feasible solutions and communicate them in the written format. • To present their ideas and opinions in a planned and logical manner • To draft effective resumes in the context of job search
22149S23A	Physics For Information Science	• Gain knowledge on classical and quantum electron theories, and energy band structures, • Acquire knowledge on basics of semiconductor physics and its applications in various devices, • Get knowledge on magnetic properties of materials and their applications in data

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		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..
22148S22	Statistics and Numerical Methods	• 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. CO4:Understandthe knowledge of various techniques and methods for solving first and second order ordinary differential equations. • Slve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
22154S24	Engineering Graphics	• Use BIS conventions and specifications for engineering drawing. • Construct the conic curves, involutes and cycloid. • Solve practical problems involving projection of lines. • raw the orthographic, isometric and perspective projections of simple solids. • Draw the development of simple solids.
22153S25A	Basic Electrical and Electronics Engineering	• Compute the electric circuit parameters for simple problems • Explain the working principle and applications of electrical machines • Analyze the characteristics of analog electronic devices • Explain the basic concepts of digital electronics • Explain the operating principles of measuring instruments
221AIDS26	Data Structures Design	• explain abstract data types • design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications • design, implement, and analyse efficient tree structures to meet requirements such as 43 searching, indexing, and sorting • model problems as graph problems and implement efficient graph algorithms to solve them
22154L27	Engineering Practices Laboratory	• Draw pipe line plan; lay and connect various pipe fittings used in common household

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		plumbing work; • Saw; plan; make joints in wood materials used in common household wood work. • Wire various electrical joints in common household electrical wire work. • •Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly 51 of common household equipments; Make a tray out of metal sheet using sheet metal work. • Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.
221AIDL28	Data Structures Design Laboratory	• implement ADTs as Python classes • design, implement, and analyse linear data structures, • such as lists, queues, and stacks, according to the needs of different applications • design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting model problems as graph problems and implement efficient graph algorithms to solve them
22147L29	Communication Laboratory – II	• Speak effectively in group discussions held in a formal/semi formal contexts. • Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions • Write emails, letters and effective job applications. • Write critical reports to convey data and information with clarity and precision CO5:Give appropriate instructions and recommendations for safe execution of tasks
22148S31A	Discrete Mathematics	• Have knowledge of the concepts needed to test the logic of a program. • Have an understanding in identifying structures on many levels. • Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science. • Be aware of the counting principles. CO5:Be exposed to concepts and properties of algebraic structures such as groups, rings and fields
221AIDS32	Digital Principles and Computer Organization	• Design various combinational digital circuits using logic gates • Design sequential circuits and analyze the design procedures State the fundamentals of computer systems and analyze the execution of an instruction • Analyze different types of control design and

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		identify hazards Identify the characteristics of various memory systems and I/O communication
221AIDC33	Database Design and Management	• Understand the database development life cycle and apply conceptual modeling • Apply SQL and programming in SQL to create, manipulate and query the database • Apply the conceptual-to-relational mapping and normalization to design relational database • Determine the serializability of any non-serial schedule using concurrency techniques • Apply the data model and querying in Object-relational and No-SQL databases.
221AIDC34	Design and Analysis of Algorithm	• Analyze the efficiency of recursive and non-recursive algorithms mathematically • Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques • Implement and analyze the problems using dynamic programming and greedy algorithmic techniques. Solve the problems using iterative improvement techniques for optimization. • Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques.
221AIDC35	Data Exploration and Visualization	• Understand the fundamentals of exploratory data analysis. Implement the data visualization using Matplotlib. • Perform univariate data exploration and analysis. CO4: Apply bivariate data exploration and analysis. • Use Data exploration and visualization techniques for multivariate and time series data
221AIDC36	Artificial Intelligence	• Explain intelligent agent frameworks • Apply problem solving techniques • Apply game playing and CSP techniques • Perform logical reasoning • Perform probabilistic reasoning under uncertaint
221AIDL37	Database Design and Management Laboratory	• Understand the database development life cycle • Design relational database using conceptual-to-relational mapping, Normalization • Apply SQL for creation, manipulation and retrieval of data Develop a database applications for real-time problemsDesign and query object-relational databases
221AIDL38	Artificial Intelligence Laboratory	• Design and implement search strategies • Implement game playing and CSP techniques • Develop logical reasoning systems • Develop probabilistic reasoning systems

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221AIDL39	Professional Development	• Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements 67 • Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding • Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.
22148S41A	Probability and Statistics	• Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. 68 • Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. • 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 and statistical quality control. • Have the notion of sampling distributions and statistical techniques used in engineering and management problems
221AIDC42	Operating Systems	• Analyze various scheduling algorithms and process synchronization. • Explain deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Explain the functionality of file systems I/O systems, and Virtualization • Compare iOS and Android Operating Systems.
221AIDC43	Machine Learning	• Explain the basic concepts of machine learning. • Construct supervised learning models. • Construct unsupervised learning algorithms. • Evaluate and compare different models
221AIDC44	Fundamentals of Data Science and Analysis	• Explain the data analytics pipeline • Describe and visualize data • Perform statistical inferences from data • Analyze the variance in the data • Build models for predictive analytics
22149S46	Environmental Sciences and Sustainability	• To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation. • To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in

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		the society. • To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations. • To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development. • To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
221AIDL47	Data Science and Analysis Laboratory	• Write python programs to handle data using Numpy and Pandas • Perform descriptive analytics • Perform data exploration using Matplotlib • Perform inferential data analytics • Build models of predictive analytics
221AIDL48	Machine Learning Laboratory	• Apply suitable algorithms for selecting the appropriate features for analysis. • Implement supervised machine learning algorithms on standard datasets and evaluate the performance. • Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance. • Build the graph based learning models for standard data sets. Assess and compare the performance of different ML algorithms and select the suitable one based on the application
221AIDC51	Deep Learning	• Explain the basics in deep neural networks • Apply Convolution Neural Network for image processing Apply Recurrent Neural Network and its variants for text analysis • Apply model evaluation for various applications • Apply autoencoders and generative models for suitable applications
221AIDC52	Data and Information Security	• Understand the basics of data and information security • Understand the legal, ethical and professional issues in information security • Understand the various authentication schemes to simulate different applications. • Understand various security practices and system security standards • Understand the Web security protocols for E-Commerce applications
221AIDC53	Distributed Computing	• Explain the foundations of distributed systems (K2) • Solve synchronization and state consistency problems (K3) Use resource sharing

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		techniques in distributed systems (K3) Apply working model of consensus and reliability of distributed systems (K3) • Explain the fundamentals of cloud computing (K2)
221AIDC54	Big Data Analytics	• Describe big data and use cases from selected business domains. • Explain NoSQL big data management. • Install, configure, and run Hadoop and HDFS • Perform map-reduce analytics using Hadoop. • se Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics
22152S61	Embedded Systems and IOT Design	• Explain the architecture of embedded processors. • Write embedded C programs. • Design simple embedded applications. • Compare the communication models in IOT • Design IoT applications using Arduino/Raspberry Pi /open platform
22147S71	Human Values and Ethics	• Identify the importance of democratic, secular and scientific values in harmonious functioning of social life Practice democratic and scientific values in both their personal and professional life. • Find rational solutions to social problems. • Behave in an ethical manner in society CO5 : Practice critical thinking and the pursuit of truth.
221AIDC81	Project Work/ Internship	• Formulate a real world problem identify requirement and develop the design solutions. • Express the technical ideas strategies and methodologies. • Utilize the new tools algorithms, techniques that contribute the obtain the solution of the project. • Test and validate through conformance of the developed prototype and analysis the cost effectiveness. • Prepare report and present the oral demonstrations.
221AIDC55A	Knowledge Engineering	• Understand the basics of Knowledge Engineering. • Apply methodologies and modelling for Agent Design and Development. • Design and develop ontologies. • Apply reasoning with ontologies and rules. • Understand learning and rule learning.
221AIDC55B	RecommenderSystems	• Understand the basic concepts of recommender systems. Implement machine-learning and data-mining algorithms in recommender systems data sets. • Implementation of Collaborative Filtering in

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		• carrying out performance evaluation of recommender systems based on various metrics. • Design and implement a simple recommender system. Learn about advanced topics of recommender systems. CO6:Learn about advanced topics of recommender systems application
221AIDC55C	Soft Computing	• Understand the fundamentals of fuzzy logic operators and inference mechanisms • Understand neural network architecture for AI applications such as classification and clustering C • Learn the functionality of Genetic Algorithms in Optimization problems • Use hybrid techniques involving Neural networks and Fuzzy logic • Apply soft computing techniques in real world applications
221AIDC55D	Text and Speech Analysis	• Explain existing and emerging deep learning architectures for text and speech processing • Apply deep learning techniques for NLP tasks, language modelling and machine translation • Explain coreference and coherence for text processing Build question-answering systems, chatbots and dialogue systems • Apply deep learning models for building speech recognition and text-to-speech systems
221AIDC55E	Business Analytics	• Explain the real world business problems and model with analytical solutions. • Identify the business processes for extracting Business Intelligence • Apply predictive analytics for business fore-casting • Apply analytics for supply chain and logistics management CO5: Use analytics for marketing and sales.
221AIDC55F	Image and videoanalytics	• Understand the basics of image processing techniques for computer vision and video analysis. • Explain the techniques used for image pre-processing. Develop various object detection techniques. • Understand the various face recognition mechanisms. Elaborate on deep learning-based video analytics.
221AIDC55G	Computer Vision	• To understand basic knowledge, theories and methods in image processing and computer vision. • To implement basic and some advanced image processing techniques in OpenCV.

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		110 CO3:To apply 2D a feature-based based image alignment, segmentation and motion estimations. • To apply 3D image reconstruction techniques • To design and develop innovative image processing and computer vision applications.
221AIDC55H	Big Data Analytics	• Describe big data and use cases from selected business domains. • Explain NoSQL big data management. • Install, configure, and run Hadoop and HDFS. • Perform map-reduce analytics using Hadoop. • Use Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics
221AIDC56A	Cloud Computing	• Understand the design challenges in the cloud. • Apply the concept of virtualization and its types. • Experiment with virtualization of hardware resources and Docker. • Develop and deploy services on the cloud and set up a cloud environment. • Explain security challenges in the cloud environment.
221AIDC56B	App Development	• Develop Native applications with GUI Components. Develop hybrid applications with basic event handling. Implement cross-platform applications with location and data storage capabilities. • Implement cross platform applications with basic GUI and event handling. • Develop web applications with cloud database access
221AIDC56C	Cloud Services Management	• Exhibit cloud-design skills to build and automate business solutions using cloud technologies. • Possess Strong theoretical foundation leading to excellence and excitement towards adoption of cloud-based services • Solve the real world problems using Cloud services and technologies
221AIDC56D	UI and UX Design	• Build UI for user Applications • Evaluate UX design of any product or application Demonstrate UX Skills in product development • Implement Sketching principles • Create Wireframe and Prototype
221AIDC56E	Software Testing and Automation	• Understand the basic concepts of software testing and the need for software testing • Design Test planning and different activities involved in test planning • Design effective test cases that can uncover critical defects in the application • Carry out advanced types of testing

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		• Automate the software testing using Selenium and TestNG
221AIDC56F	Web Application Security	• Understanding the basic concepts of web application security and the need for it • Be acquainted with the process for secure development and deployment of web applications • Acquire the skill to design and develop Secure Web Applications that use Secure APIs • Be able to get the importance of carrying out vulnerability assessment and penetration testing • Acquire the skill to think like a hacker and to use hackers tool sets
221AIDC56G	Dev-ops	• Understand different actions performed through Version control tools like Git. • Perform Continuous Integration and Continuous Testing and Continuous Deployment using Jenkins by building and automating test cases using Maven & Gradle. • Ability to Perform Automated Continuous Deployment • Ability to do configuration management using Ansible Understand to leverage Cloud-based DevOps tools using Azure DevOps
221AIDC56H	Principles of Programming Languages	• Describe syntax and semantics of programming languages Explain data, data types, and basic statements of programming languages • Design and implement subprogram constructs • Apply object-oriented, concurrency, and event handling programming constructs and Develop programs in Scheme, ML, and Prolog CO5: Understand and adopt new programming languages
221AIDC63A	Cloud Computing	• Understand the design challenges in the cloud. • Apply the concept of virtualization and its types. • Experiment with virtualization of hardware resources and Docker. • Develop and deploy services on the cloud and set up a cloud environment. • Explain security challenges in the cloud environment.
CCS372	Virtualization	• Analyse the virtualization concepts and Hypervisor • Apply the Virtualization for real-world applications • Install & Configure the different VM platforms • Experiment with the VM with various software
221AIDC63D	Data Warehousing	• Design data warehouse architecture for

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		various Problems • Apply the OLAP Technology • Analyze the partitioning strategy • Critically analyze the differentiation of various schema for given problem CO5: Frame roles of process manager & system manage
221AIDC63E	Storage Technologies	• Demonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deployment • Illustrate the usage of advanced intelligent storage systems and RAID • Interpret various storage networking architectures - SAN, including storage subsystems and virtualization • Examine the different role in providing disaster recovery and remote replication technologies • Infer the security needs and security measures to be employed in information storage management
221AIDC63F	Software Defined Networks	• Describe the motivation behind SDN • Identify the functions of the data plane and control plane Design and develop network applications using SDN CO4: Orchestrate network services using NFV • Explain various use cases of SDN and NFV
221AIDC63G	Stream Processing	• Understand the applicability and utility of different streaming algorithms. • Describe and apply current research trends in data-stream processing. • Analyze the suitability of stream mining algorithms for data stream systems. • Program and build stream processing systems, services and applications. • Solve problems in real-world applications that process data streams.
221AIDC63H	Security and Privacy in Cloud	• Understand the cloud concepts and fundamentals. Explain the security challenges in the cloud. • Define cloud policy and Identity and Access Management. • Understand various risks and audit and monitoring mechanisms in the cloud. • Define the various architectural and design considerations for security in the cloud
22AIDC64A	Ethical Hacking	• To express knowledge on basics of computer based vulnerabilities • To gain understanding on different foot printing, reconnaissance and scanning methods. 137 CO3 To demonstrate the enumeration and vulnerability analysis methods • To gain knowledge on hacking options available in Web and wireless applications.

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		• To acquire knowledge on the options for network protection. • To use tools to perform ethical hacking to expose the vulnerabilities
22AIDC64B	Digital and Mobile Forensics works	• Have knowledge on digital forensics. • Know about digital crime and investigations. • Be forensic ready. • Investigate, identify and extract digital evidence from iOS devices. • Investigate, identify and extract digital evidence from Android device
22AIDC64C	Social Network Security	• Develop semantic web related simple applications • Address Privacy and Security issues in Social Networking Explain the data extraction and mining of social networks Discuss the prediction of human behavior in social communities 140 CO5: Describe the applications of social network
22AIDC64D	Modern Cryptography	• Interpret the basic principles of cryptography and general cryptanalysis. • Determine the concepts of symmetric encryption and authentication. • Identify the use of public key encryption, digital signatures, and key establishment. • Articulate the cryptographic algorithms to compose, build and analyze simple cryptographic solutions. • Express the use of Message Authentication Codes
22AIDC64E	Engineering Secure Software Systems	• Identify various vulnerabilities related to memory attacks. • Apply security principles in software development. Evaluate the extent of risks. • Involve selection of testing techniques related to software security in the testing phase of software development. • Use tools for securing software.
22AIDC64F	Crypto currency and Block chain Technologies	• Understand emerging abstract models for Blockchain Technology • Identify major research challenges and technical gaps existing between theory and practice in the crypto currency domain. • It provides conceptual understanding of the function of Blockchain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable. • Apply hyperledger Fabric and Ethereum platform to implement the Block chain Application.
22AIDC64G	Network Security	• Classify the encryption techniques • Illustrate the key management technique and authentication.

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		• Evaluate the security techniques applied to network and transport layer • Discuss the application layer security standards. • Apply security practices for real time applications
22AIDC64H	Security and Privacy in Cloud	
221AIDC65A	Augmented Reality/Virtual Reality	• Understand the basic concepts of AR and VR • Understand the tools and technologies related to AR/VR Know the working principle of AR/VR related Sensor devices • Design of various models using modeling techniques Develop AR/VR applications in different domains
221AIDC65B	Multimedia and Animation	• Get the bigger picture of the context of Multimedia and its applications • Use the different types of media elements of different formats on content pages • Author 2D and 3D creative and interactive presentations for different target multimedia applications. • Use different standard animation techniques for 2D, 21/2 D, 3D applications • • Understand the complexity of multimedia applications in the context of cloud, security, bigdata streaming, social networking, CBIR etc.,
221AIDC65C	Video Creation and Editing	• Compare the strengths and limitations of Nonlinear editing. • Identify the infrastructure and significance of storytelling. Apply suitable methods for recording to CDs and VCDs. • Address the core issues of advanced editing and training techniques. • Design and develop projects using AVID XPRESS DV 4
221AIDC65D	UI and UX Design	• Build UI for user Applications • Evaluate UX design of any product or application Demonstrate UX Skills in product development Implement Sketching principles CO5:Create Wireframe and Prototype
221AIDC65E	Digital marketing	• To examine and explore the role and importance of digital marketing in today's rapidly changing business environment.. • To focuses on how digital marketing can be utilized by organizations and how its effectiveness can be measured. To know the key elements of a digital marketing strategy. To study how the effectiveness of a digital marketing campaign can be measured • To demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs

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221AIDC65F	Multimedia Data Compression and Storage	• Understand the basics of text, Image and Video compression • Understand the various compression algorithms for multimedia content • Explore the applications of various compression techniques • Explore knowledge on multimedia storage on disks • Understand scheduling methods for request streams
221AIDC65G	Game Development	• Explain the concepts of 2D and 3d Graphics • Design game design documents. • Implementation of gaming engines. • Survey gaming environments and frameworks. Implement a simple game in Pygame.
221AIDC65H	Visual Effects	• To implement animation in 2D / 3D following the principles and techniques • To use CGI, color and light elements in VFX applications To create special effects using any of the state of the art tools • To apply popular visual effects techniques using advanced tools • To use compositing tools for creating VFX for a variety of applications
221AIDC66A	Augmented Reality/Virtual Reality	• Understand the basic concepts of AR and VR • Understand the tools and technologies related to AR/VR • Know the working principle of AR/VR related Sensor devices • Design of various models using modeling techniques • Develop AR/VR applications in different domains
221AIDC66B	Robotic Process Automation	• Enunciate the key distinctions between RPA and existing automation techniques and platforms. • Use UiPath to design control flows and work flows for the target process • Implement recording, web scraping andprocess mining by automation • Use UIPath Studio to detect, and handle exceptions in automation processes • Implement and use Orchestrator for creation, monitoring, scheduling, and controlling of automated bots and processes.
221AIDC66C	Neural Networks and Deep Learning	• Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains. • Implement deep learning algorithms and solve real-world problems.

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221AIDC66D	Cyber security	• Explain the basics of cyber security, cyber crime and cyber law (K2) • Classify various types of attacks and learn the tools to launch the attacks (K2) • Apply various tools to perform information gathering (K3) Apply intrusion techniques to detect intrusion (K3) • Apply intrusion prevention techniques to prevent intrusion (K3
221AIDC66E	Quantum Computing	• Understand the basics of quantum computing. • Understand the background of Quantum Mechanics. • Analyze the computation models. • Model the circuits using quantum computation. environments and frameworks. • Understand the quantum operations such as noise and error–correction.
221AIDC66G	Game Development	• Explain the concepts of 2D and 3d Graphics • Design game design documents. • Implementation of gaming engines • Survey gaming environments and frameworks. Implement a simple game in Pygame.
221AIDC66H	3D Printing and Design	• Outline and examine the basic concepts of 3D printing technology • Outline 3D printing workflow` • xplain and categorise the concepts and working principles of 3D printing using inkjet technique • Explain and categorise the working principles of 3D printing using laser technique • Explain various method for designing and modeling for industrial application
22160E75A	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
22160E75B	Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes
22160E75C	Industrial Management	• Explain basic concepts of management; approaches to management; contributors to management studies; various forms of business organization and trade unions function in professional organizations. • Discuss the planning; organizing and staffing functions of management in professional organization. • Apply the leading; controlling and decision making functions of management in

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		professional organization. Discuss the organizational theory in professional organization. • Apply principles of productivity and modern concepts in management in professional organization.
22150FE67A	IoT Concepts and Applications (CSE)	• Define the infra structure for supporting IOT deployments • Understand the usage of Iot protocols for communication between various Ito devices. • Design portable Iot using raspberries/ arduino / equivalent borads • Understand the basic concept of security and coverers as applied to IOT
22150FE67B	Augmented and Virtual Reality (CSE)	• Understand the basic concepts of AR and VR • Understand the tools and technologies related to AR/VR Know the working principle of AR/VR related Sensor devices • Design of various models using modeling techniques Develop AR/VR applications in different domains
22150FE75A	Data Science Fundamentals (CSE)	• Explain the data analytics pipeline Describe and visualize data • perform statistical inferences from data • Analyze the variance in the dataBuild models for predictive analytics
22150FE75B	Artificial Intelligence and Machine Learning Fundamentals	• Explain intelligent agent frameworks Apply problem solving techniques • Apply game playing and CSP techniquesCO4: Perform logical reasoningPerform probabilistic reasoning under uncertainty
22153FE76A	Renewable Energy Technologies(EEE)	• Discuss the Indian and global energy scenario • Discuss the various solar energy technology and its application • Explain the various wind energy technology • Explore the various bio energy technology • Discuss the ocean and geo thermal technologies
22153FE76B	Electric and Hybrid Vehicle(EEE)	• Understand the operation and architecture of electric and hybrid vehicles • Identify various energy source options like

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		battery and fuel cell • Select suitable electric motor for applications in hybrid and electric vehicles. • Explain the role of power electronics in hybrid and electric vehicles • Analyze the energy and design requirement for hybrid and electric vehicles.
22154FE76A	Introduction to non-destructive testing (MECHANICAL)	• Be able to list and define different defects that occur in welding show through non destructive examination / destructive testing • Be able to identify the types of equipment used for each nondestructive and destructive examination. • Be able to explain the purpose of the equipment , application and standard techniques require to perform major non destructive and destructive examination of the welds • Be able to go to specific code and standard are specification related to each testing method. • Have the knowledge and essential skills to identify strength and weakness in materials used in fabrication
22154FE76B	Industrial Management	• Introduction: Elements, functions & characteristics of Instruments. 2. Pressure measurement: Study on pressure measuring devices. 3. Temperature measurement: Study on temperature measuring devices Flow measurement: Study on Flow measuring devices 5. Liquid level measurement: Study on Level measuring devices 6. Study of some miscellaneous instruments.
22152FE76A	Biomedical Instrumentation (ECE)	• Understand the physiology of biomedical system K2CO2 Measure biomedical and physiological information K2CO3 Discuss the application of Electronics in diagnostics and therapeutic area
22152FE76B	Fundamentals of Electronic Devices and Circuits(ECE)	• Obtain an overview of automotive components, subsystems, design cycles, communication protocols and safety systems employed in today's automotive industry. CO2 Interface automotive sensors and actuators with microcontrollers CO3 Develop, simulate and integrate control algorithms for ECUs with hardware
22154FE77A	Additive Manufacturing (MECHANICAL)	• Recognize the development of AM technology and how AM technology propagated into various businesses and developing opportunities. • Acquire knowledge on process vat polymerization and material extrusion processes and its applications. • Elaborate the process and applications of

		• powder bed fusion and binder jetting. • Evaluate the advantages, limitations, applications of material jetting and directed energy deposition processes. • Acquire knowledge on sheet lamination and direct write technology.
22154FE77B	Industrial safety (MECHANICAL)	• Describe, with example, the common work-related diseases and accidents in occupational setting • Name essential members of the Occupational Health team • What roles can a community health practitioners play in an Occupational setting to ensure the protection, promotion and maintenance of the health of the employe
22153FE77A	Sensors (EEE)	• List common types of sensor and actuators used in vehicles. • Design measuring equipment's for the measurement of pressure force, temperature and flow. • Generate new ideas in designing the sensors and actuators for automotive application • Understand the operation of thesensors, actuators and electronic control. CO5:Design temperature control actuators for vehicles
22153FE77B	Electrical, Electronic and Magnetic materials (EEE)	• Understand various types of dielectric materials, their properties in various conditions. • Evaluate magnetic materials and their behavior. • Evaluate semiconductor materials and technologies. Select suitable materials for electrical engineering applications. CO5:Identify right material for optical and optoelectronic applications
22152FE77A	Wearable devices (ECE)	• Describe the concepts of wearable system. • Explain the energy harvestings in wearable device. • Use the concepts of BAN in health care. • Illustrate the concept of smart textile • Compare the various wearable devices in healthcare system
22152FE77B	Medical Informatics (ECE)	• Explain the structure and functional capabilities of Hospital Information System. • Describe the need of computers in medical imaging and automated clinical laboratory. • Articulate the functioning of information storage and retrieval in computerized patient record system. • Apply the suitable decision support system for automated clinical diagnosis. • Discuss the application of virtual reality and telehealth technology in medical industry

22147MC57A	Introduction to Women and Gender Studies	• Students will be able to understand the relevance of literature in human life and appreciate its aspects in developing finer sensibilitie
22147MC57B	Elements of Literature	• To make the students aware about the finer sensibilities of human existence through an art form. The students will learn to appreciate different forms of literature as suitable modes of expressing human experience
22147MC57C	Film Appreciation	• A Reader containing important articles on films will be prepared and given to the students. The students must read them and present in the class and have discussion on these.
22147MC57D	Disaster Management	• To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR) • To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction To develop disaster response skills by adopting relevant tools and technology • Enhance awareness of institutional processes for Disaster response in the country and • Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivit
22147MC67A	Well Being with Traditional Practices (Yoga, Ayurveda and Siddha)	• Learn the importance of different components of health Gain confidence to lead a healthy life • Learn new techniques to prevent lifestyle health disorders • Understand the importance of diet and workouts in maintaining health
22147MC67B	History of Science and Technology in India	• Learn the importance of Indian History
22147MC67C	Political and Economic Thought for a Humane Society	• The students will get an understanding of how societies are shaped by philosophy, political and economic system, how they relate to fulfilling human goals & desires with some case studies of how different attempts have been made in the past and how they have fared.
22147MC67D	State, Nation Building and Politics in India	• It is expected that this course will make students aware of the theoretical aspect of the state, its organs, its operationalization aspect, the background and philosophy behind the founding of the present political system, broad streams and challenges of national integration and nation-building in India. It will equip the students with the real understanding of our political system/ process in correct perspective and make them sit up

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			and think for devising ways for better participation in the system with a view to making the governance and delivery system better for the common man who is often left unheard and unattended in our democratic setup besides generating a lot of dissatisfaction and difficulties for the system

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NAAC ACCREDITED
THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
B.TECH- FULL TIME (UG_2022)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES	PO												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
21147S11	PROFESSIONAL ENGLISH - I	To use appropriate words in a professional context	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
		To gain understanding of basic grammatical structures and use them in right context.	1	1	1	1		3	3	3	1	3	-	3	-	-	-
		To read and infer the denotative and connotative meanings of technical texts	2	3	2	3		3	3	3	2	3	3	3	-	-	-
		To read and interpret information presented in tables, charts and other graphic forms	2	3		3	2	3	3	3	2	3	3	3	-	-	-
		To write definitions, descriptions, narrations and essays on various topics	2	3		3		3	3	3	2	3	-	3	-	-	-
		AVg.	1.6	2.2	1.8	2.2	1.5	3	3	3	1.6	3	3	3	-	-	-

21148S12	MATRICES AND CALCULUS	Use the matrix algebra methods for solving practical problems.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
		Apply differential calculus tools in solving various application problems.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
		Able to use differential calculus ideas on several variable functions.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
		Apply different methods of integration in solving practical problems.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
		Apply multiple integral ideas in solving areas, volumes and other practical problems	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
		Avg	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
21149S13	ENGINEERING PHYSICS	Understand the importance of mechanics.	3	3	2	1	1	1	-	-	-	-	-	-	-	-	-
		Express their knowledge in electromagnetic waves.	3	3	2	1	2	1	-	-	-	-	-	-	-	-	-
		Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	3	3	2	2	2	1	-	-	-	-	-	1	-	-	-
		Understand the importance of quantum physics.	3	3	1	1	2	1	-	-	-	-	-	-	-	-	
		Comprehend and apply quantum mechanical principles towards the formation of energy bands.	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
		AVG	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-	-	-
21149S14	ENGINEERING CHEMISTRY	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-

		To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	2	-	-	1	-		2	-	-	-	-	-	-	-	-
		To apply the knowledge of phase rule and composites for material selection requirements.	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
		To recommend suitable fuels for engineering processes and applications.	3	1	1	-	-	1	2	-	-	-	-	-	-	-	-
		To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	3	1	2	1	-		2	-	-	-	-	2	-	-	-
		Avg.	2.8	1.3	1.6	1	-	.5	1.8	-		-	-	1.5	-	-	-
21150S15	PROBLEM SOLVING AND PYTHON PROGRAMMING	Develop algorithmic solutions to simple computational problems	3	3		3	2		-	-	-	-	2	2	3	3	
		Develop and execute simple Python programs.	3	3		3	2		-	-	-	-	2	2	3	-	
		Write simple Python programs using conditionals and looping for solving problems.	3	3		3	2		-	-	-	-	2	-	3	-	
		Decompose a Python program into functions	2	2		2	2		-	-	-	-	1	-	3	-	
		Represent compound data using Python lists, tuples, dictionaries etc	1	2			1		-	-	-	-	1	-	2	-	
		AVg.	2	2			2		-	-	-	-	1	-	2	-	
21150L16	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	Dvelop algorithmic solutions to simple computational problems Develop and execute simple Python programs.	3	3	3	3	3	-	-		-	-	3	2	3	-	-

		Implement programs in Python using conditionals and loops for solving problems.	3	3	3	3	2	-	-		-	-	2	-	3	-	-
		Deploy functions to decompose a Python program.	3	2	-	2	2	-	-		-	-	1	-	3	-	-
		Process compound data using Python data structures.	1	2	-		1	-	-		-	-	1	-	2	-	-
		Process Value data using Python data structures.	2	-	-		2	-	-		-	-	1	-	2	-	-
		AVg.	2	3	3	3	2	-	-		-	-	2	2	3	3	-
21149L17	PHYSICS AND CHEMISTRY LABORATORY	Understand the functioning of various physics laboratory equipment.	3	2	3	1	1	-	-		-	-	-	-	-	-	-
		Use graphical models to analyze laboratory data.	3	3	2	1	1	-	-		-	-	-	-	-	-	-
		Use mathematical models as a medium for quantitative reasoning and describing physical reality.	3	2	3	1	1	-	-		-	-	-	-	-	-	-
		Access, process and analyze scientific information.	3	3	2	1	1	-	-		-	-	-	-	-	-	-
		Solve problems	3	2	3	1	1	-	-		-	-	-	-	-	-	-
		AVG	3	2.4	2.6	1	1										
21147L18	COMMUNICATION LABORATORY-I	To listen to and comprehend general as well as complex academic information		3	3	3	1	3	3	3		3	3	3	-	-	
		To listen to and understand different points of view in a discussion		3	3	3	1	3	3	3		3	3	3	-	-	
		To speak fluently and accurately in formal and informal communicative contexts		3	3	3	1	3	3	3		3	3	3	-	-	

		To describe products and processes and explain their uses and purposes clearly and accurately		3	3	3	1	3	3	3		3	3	3	-	-	
		To express their opinions effectively in both formal and informal discussions		3	3	3	1	3	3	3		3	3	3	-	-	
		AVg.		3	3	3	1	3	3	3		3	3	3	-	-	
21147S21	PROFESSIONAL ENGLISH - II	To compare and contrast products and ideas in technical texts.	3	3		3	3	3	3	3	2	3	3	3	-	-	-
		To identify and report cause and effects in events, industrial processes through technical texts	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
		To analyse problems in order to arrive at feasible solutions and communicate them in the written format.	3	3		3	3	3	3	3	2	3	3	3	-	-	-
		To present their ideas and opinions in a planned and logical manner	3	3		3	2	3	3	3	2	3	3	3	-	-	-
		To draft effective resumes in the context of job search.	-	-	-	-	-	-	-	-	3	3	3	3	-	-	-
		AVg.	3	3		3	2.75	3	3	3	2.2	3	3	3	-	-	-
21148S22	STATISTICS AND NUMERICAL METHODS	Apply the concept of testing of hypothesis for small and large samples in real life problems.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
		Apply the basic concepts of classifications of design of experiments in the field of agriculture.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
		Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-

		Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
		Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
		Avg	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
22149S23A	PHYSICS FOR INFORMATION SCIENCE	gain knowledge on classical and quantum electron theories, and energy band structures	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
		acquire knowledge on basics of semiconductor physics and its applications in various devices	3	1	2	-	-	-	-	-	-	-	-	-	-	-	-
		get knowledge on magnetic properties of materials and their applications in data storage,	3	-	-	1	2	1	1	-	-	-	-	-	-	-	-
		have the necessary understanding on the functioning of optical materials for optoelectronics	3	-	2	1	3	-	1	-	-	-	-	-	-	-	-
		understand the basics of quantum structures and their applications and basics of quantumcomputing	3	2	2	2	2	1	2	-	-	-	-	2	-	-	-
		AVG	3	1.3	2	1.3	2.3	1	1.3	-	-	-	-	2	-	-	-
21153S25A	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	Compute the electric circuit parameters for simple problems	2	2	1					1				2			1
		Explain the working principle and applications of electrical machines	2	2	1					1				2			1
		Analyze the characteristics of analog electronic devices	2	1	1					1				2			1
		Explain the basic concepts of digital electronics	2	2	1					1				2			1
		Explain the operating principles of measuring instruments	2	2	1					1				2			1

		CO/PO & PSO Average	2	1.8	1					1				2			1
21154S24	ENGINEERING GRAPHICS	Use BIS conventions and specifications for engineering drawing.	3	1	2		2					3		2	2	2	
		Construct the conic curves, involutes and cycloid.	3	1	2		2					3		2	2	2	
		Solve practical problems involving projection of lines.	3	1	2		2					3		2	2	2	
		Draw the orthographic, isometric and perspective projections of simple solids.	3	1	2		2					3		2	2	2	
		Draw the development of simple solids.	3	1	2		2					3		2	2	2	
		Avg.	3	1	2		2					3		2	2	2	
221AIDS26	DATA STRUCTURES DESIGN	explain abstract data types	3	1	2		2					3		2			
		design, implement, and analyse linear data structures, such as lists, queues, and stacks,according to the needs of different applications	3	1	2		2					3		2			
		design, implement, and analyse efficient tree structures to meet requirements such assearching, indexing, and sorting	3	1	2		2					3		2			
		model problems as graph problems and implement efficient graph algorithms to solve them	3	1	2		2					3		2			
			3	1	2		2					3		2			

21154L27	ENGINEERING PRACTICES LABORATORY	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	3	2			1	1	1					2	2	1	1
		Wire various electrical joints in common household electrical wire work.	3	2			1	1	1					2	2	1	1
		Weld various joints in steel plates using arc welding work; Machine various simple processeslike turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	3	2			1	1	1					2	2	1	1
		Avg.	3	2			1	1	1					2	2	1	1
		Average															
221AIDL28	DATA STRUCTURES DESIGN LABORATORY	implement ADTs as Python classes	3	3	3	3	3	-	-		-	-	3	2	3	3	-
		design, implement, and analyse linear data structures, such as lists, queues, and stacks,according to the needs of different applications	3	3	3	3	3	-	-		-	-	3	2	3	-	-
		design, implement, and analyse efficient tree structures to meet requirements such assearching, indexing, and sorting	3	3	3	3	2	-	-		-	-	2	-	3	-	-
		model problems as graph problems and implement efficient graph algorithms to solve them	3	2	-	2	2	-	-		-	-	1	-	3	-	-
			3	3	3	3	2	-	-		-	-	2	2	3	3	-
22148S31A	DISCRETE MATHEMATICS	Have knowledge of the concepts needed to test the logic of a program.	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-

		Have an understanding in identifying structures on many levels.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
		Be aware of a class of functions which transform a finite set into another finite set which relatesto input and output functions in computer science.	-	3	2	-	-	2	-	-	-	3	-	-	-	-	-
		Be aware of the counting principles	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-
		Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	-	2	2	2	-	-	-	-	-	2	-	-	-	-	-
		Avg	1	3	2	1	-	-	-	-	-	1	-	-	-	-	-
221AIDS32	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION	Design various combinational digital circuits using logic gates	3	3	3	3	3			1	1	1		3	2	3	3
		Design sequential circuits and analyze the design procedures	3	3	3	3	2			1	1	1		3	1	2	2
		State the fundamentals of computer systems and analyze the execution of an instruction	3	3	3	3	2			1	1	1		3	2	3	1
		Analyze different types of control design and identify hazards	3	3	3	3	1			1	1	1		2	1	3	1
		Identify the characteristics of various memory systems and I/O communication	3	3	3	3	1			1	1	1		2	1	2	1
			3	3	3	3	1			1	1	1		2	1	2	1
221AIDC33	DATABASE DESIGN AND MANAGEMENT	Understand the database development life cycle and apply conceptual	2	2		3	-			-	3	1		1	2	3	3
		Apply SQL and programming in SQL to create, manipulate and query the database	2	3		3	1			-	1	2		1	3	3	3
		Apply the conceptual-to-relational mapping and normalization to design relational database	2	2		1	1			-	2	3		2	1	1	2

		Determine the serializability of any non-serial schedule using concurrency techniques	2	2		1	-			-	1	2		2	2	2	2
		Apply the data model and querying in Object-relational and No-SQL databases	3	1		2	1			-	1	3		1	2	1	1
		AVG	2	2		2	1			-	2	2		1	2	2	2
221AIDC 34	Design and Analysis of Algorithm	Analyze the efficiency of recursive and non-recursive algorithms mathematically	3	3	2	2	1	2	2	1	2	1	1	2	3	2	3
		Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transformand conquer algorithmic techniques	3	3	3	2	1	2	2	1	2	1	1	2	3	2	3
		Implement and analyze the problems using dynamic programming and greedy algorithmictechniques.	3	3	3	3	1	2	2	1	2	1	1	2	3	3	3
		Solve the problems using iterative improvement techniques for optimization.	3	3	3	3	1	2	2	1	2	1	1	3	3	2	2
		Compute the limitations of algorithmic power and solve the problems using backtracking andbranch and bound techniques.	3	3	3	3	1	2	2	1	2	1	1	3	3	2	2
221AIDC 35	Data Exploration and Visualization	Understand the fundamentals of exploratory data analysis	3	1		3	-			-	2	3		3	2	2	2
		Implement the data visualization using Matplotlib.	2	2		1	1			-	3	2		1	3	1	3
		Perform univariate data exploration and analysis.	2	1		1	1			-	3	2		2	2	2	1

		Apply bivariate data exploration and analysis.	2	2		1	-			-	1	2		3	1	3	2
		Explain the testing of mechanical properties	3	1		2	1			-	3	2		2	2	2	3
221AIDC 36	Artificial Intelligence	Explain intelligent agent frameworks	3	1		3	-			-	2	3		1	2	1	1
		Apply problem solving techniques	2	2		1	1			-	2	2		1	3	2	2
		Apply game playing and CSP techniques	2	1		1	-			-	2	1		3	1	2	1
		Perform logical reasoning	2	1		2	-			-	2	1		2	1	3	3
		Perform probabilistic reasoning under uncertainty 2 .		2		1	1			-	3	2		2	2	2	1
221AIDL 37	Database Design and Management Laboratory	Understand the database development life cycle	3	1	3	3			-	-	1	1	1	3	2	2	1
		Design relational database using conceptual-to-relational mapping, Normalization	2	2	1	3			-	-	3	2	3	1	1	1	2
		Apply SQL for creation, manipulation and retrieval of data	2	1	3	1			-	-	3	3	1	1	2	1	1
		Develop a database applications for real-time problems	2	2	3	1			-	-	2	3	2	1	2	1	2
		Design and query object-relational databases	3	3	1	3			-	-	1	3	2	3	3	3	2
221AIDL 38	Artificial Intelligence Laboratory	Design and implement search strategies	3						1		2			1	1	2	2
		Implement game playing and CSP techniques	3						1		2			1	1	2	2
		Develop logical reasoning systems	3						1		2			1	1	2	2
		Develop probabilistic reasoning systems	2	1		1	1			-	2	3		2	2	2	1

22148S41A	Probability and Statistics	Understand the fundamental knowledge of the concepts of probability and have knowledge ofstandard distributions which can describe real life phenomenon	3	2	1	1								1	2	1		
		Understand the basic concepts of one and two dimensional random variables and apply inengineering applications.	3	2	2	1								1	2	1		
		Apply the concept of testing of hypothesis for small and large samples in real life problems	3	2	2	1								1	2	1		
		Apply the basic concepts of classifications of design of experiments in the field of agricultureand statistical quality control.	3	2	1	1								1	2	1		
		Have the notion of sampling distributions and statistical techniques used in engineering andmanagement problems	3	2	1	1								1	2	1		
221AIDC42	Operating Systems	Analyze various scheduling algorithms and process synchronization.	2	1	1	1								1	2	1	1	
		Explain deadlock, prevention and avoidance algorithms.	2	1	1	1								1	2	1	1	
		Compare and contrast various memory management schemes.	2	1	1	1								1	2	1	1	
		Explain the functionality of file systems I/O systems, and Virtualization	2	1	1	1								1	2	1	1	
		Compare iOS and Android Operating Systems.	2	1	1	1								1	2	1	1	
221AIDC43	Machine Learning	Explain the basic concepts of machine learning.	2	1		1	-			-	3	3		2	2	2	1	
		Construct supervised learning models.	1	3		1	2			-	2	2		1	3	1	1	
		Construct unsupervised learning algorithms.	2	1		3	2			-	1	1		1	1	2	1	

		Evaluate and compare different models	2	3		2	1			-	3	2		2	1	2	1
			2	2		2	2			-	2	2		2	2	2	1
221AIDC 44	Fundamentals of Data Science and Analysis	Explain the data analytics pipeline	1	1		1	-			-	3	1		2	3	3	1
		Describe and visualize data	1	1		2	2			-	2	2		2	3	1	1
		Perform statistical inferences from data	1	1		1	1			-	2	3		1	2	3	1
		Analyze the variance in the data	2	3		3	1			-	3	3		3	3	2	2
		Build models for predictive analytics	2	1		1	2			-	3	3		3	2	2	1
221AIDC 45	Computer Networks	Explain the basic layers and its functions in computer networks.	3	1		3	-			-	1	1		1	3	2	1
		Understand the basics of how data flows from one node to another.	3	2		2	2			-	2	2		1	3	2	3
		Analyze routing algorithms.	2	2		2	1			-	3	3		2	1	1	3
		Describe protocols for various functions in the network	1	3		3	1			-	1	2		1	1	3	1
		Analyze the working of various application layer protocols	3	3		1	2			-	2	2		2	2	2	2
		Avg.	3	1		3	-			-	1	1		1	3	2	1
22149S46	Environmental Sciences and	To recognize and understand the functions of environment, ecosystems and biodiversity andtheir conservation.	2	1				2	3		-	-	-	2	-	-	-

	Sustainability	To identify the causes, effects of environmental pollution and natural disasters and contributeto the preventive measures in the society.	3	2				3	3		-	-	-	2	-	-	-
		To identify and apply the understanding of renewable and non-renewable resources andcontribute to the sustainable measures to preserve them for future generations.	3	-				2	2		-	-	-	2	-	-	-
		To recognize the different goals of sustainable development and apply them for suitabletechnological advancement and societal development.	3	2				2	2		-	-	-	2	-	-	-
		To demonstrate the knowledge of sustainability practices and identify green materials, energycycles and the role of sustainable urbanization.	3	2				2	2		-	-	-	1	-	-	-
		Avg.	2.8	1.8				2.2	2.4		-	-	-	1.8	-	-	-
221AIDL47	Data Science and Analysis Laboratory	Write python programs to handle data using Numpy and Pandas	2	2		3	-			-	2	2		3	3	2	1
		Perform descriptive analytics	1	2		2	2			-	1	2		1	3	2	1
		Perform data exploration using Matplotlib	2	2		2	2			-	3	1		2	2	3	1
		Perform inferential data analytics	2	3		3	2			-	2	3		2	2	1	3
		Build models of predictive analytics	3	1		1	2			-	1	2		3	2	2	1
221AIDL48	Machine Learning Laboratory	Apply suitable algorithms for selecting the appropriate features for analysis.	2	2	2	1			-	-	1	2	3	3	3	2	1
		Implement supervised machine learning algorithms on standard datasets and evaluate theperformance.	2	1	1	3			-	-	3	2	3	2	3	1	1
		Apply unsupervised machine learning algorithms on standard datasets and evaluate theperformance.	2	2	1	1			-	-	1	1	1	1	2	3	3

		Build the graph based learning models for standard data sets.	2	2	3	3			-	-	1	2	1	1	1	2	2
		Assess and compare the performance of different ML algorithms and select the suitable onebased on the application.	2	2	3	1			-	-	3	1	1	1	2	1	2
221AIDC 51	Deep Learning	Explain the basics in deep neural networks	3	2	2	3	1		-	-	2	3	1	2	3	3	3
		Apply Convolution Neural Network for image processing	2	2	2	3	3		-	-	1	2	2	3	1	1	3
		Apply Recurrent Neural Network and its variants for text analysis	3	3	3	3	3		-	-	2	1	1	2	2	1	3
		Apply model evaluation for various applications	3	3	1	1	1		-	-	1	3	1	3	2	1	1
		Apply auto encoders and generative models for suitable applications	3	2	2	2	3		-	-	2	3	2	2	2	3	3
221AIDC 52	Data and Information Security	Understand the basics of data and information security	3	2		1	-			-	1	3		2	3	1	1
		Understand the legal, ethical and professional issues in information security	1	3		3	2			-	1	2		2	1	2	2
		Understand the various authentication schemes to simulate different applications	2	3		3	1			-	1	3		2	1	2	1
		Understand various security practices and system security standards	3	3		1	1			-	3	1		3	2	3	3
		Understand the Web security protocols for E-Commerce applications	3	2		3	2			-	1	2		2	2	2	1
221AIDC 53		Explain the foundations of distributed systems (K2)	2	2	3	3					2	1	3	3	2	1	1
		Solve synchronization and state consistency problems (K3)	1	3	2	1					2	2	2	2	1	3	2

	Distributed Computing	Use resource sharing techniques in distributed systems (K3)	2	2	1	3					3	2	1	1	1	2	1
		Apply working model of consensus and reliability of distributed systems (K3)	1	2	2	3					3	3	2	1	3	1	1
		Explain the fundamentals of cloud computing (K2)	3	3	1	2					3	3	3	1	3	2	3
221AIDC 54	Big Data Analytics	Describe big data and use cases from selected business domains.	3	3	3	3	3				2	2	3	1	1	3	3
		Explain NoSQL big data management.	3	3	2	3	2				2	2	3	3	2	3	2
		Install, configure, and run Hadoop and HDFS.	3	3	3	2	3				2	2	1	2	2	3	3
		Perform map-reduce analytics using Hadoop.	2	3	3	3	3				2	2	3	2	3	3	2
		Use Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics.	3	3	3	3	3				3	1	3	2	3	2	3
22152S61	Embedded Systems and IOT Design	Explain the architecture of embedded processors.	3	1	1	3	1			-	3	1		3	2	1	1
		Write embedded C programs.	2	3	1	3	2			-	1	2		1	1	1	2
		Design simple embedded applications.	2	2	3	2	3			-	1	3		1	2	1	3
		Compare the communication models in IOT	2	2	2	1	1			-	1	3		1	2	2	3
		Design IoT applications using Arduino/Raspberry Pi /open platform.	3	2	1	1	3			-	3	2		2	1	3	1
221AIDC 55E	Business Analytics	Explain the real world business problems and model with analytical solutions.	2	2	3	1	1	-	-		1	2	1	1	3	2	1
		Identify the business processes for extracting Business Intelligence .	3	3	3	2	3	-	-		1	2	2	2	3	1	2

		Apply predictive analytics for business fore-casting																
		Apply analytics for supply chain and logistics management	2	2	3	3	2	-	-		3	1	1	3	3	1	2
		Use analytics for marketing and sales	2	1	1	2	2	-	-		3	3	2	1	1	3	1
221AIDC 56H	Principles of Programming Languages	Describe syntax and semantics of programming languages	2	2		2		-			-	-		3	2	3	-
		Explain data, data types, and basic statements of programming languages	3	3		2		-			-	-		3	2	3	-
		Design and implement subprogram constructs	3	3		2		-			-	-		3	2	3	-
		Apply object-oriented, concurrency, and event handling programming constructsand Develop programs in Scheme, ML, and Prolog	3	3		3		2			-	-		-	3	2	-
		Understand and adopt new programming lan	3	3		3		3			1	3		3	3	3	-
22AIDC64D	Modern Cryptography	Interpret the basic principles of cryptography and general cryptanalysis.	3	3	3	3	1	-	-		2	1	1	2	2	1	1
		Determine the concepts of symmetric encryption and authentication.	1	3	2	1	2	-	-		3	2	2	2	2	1	3
		Identify the use of public key encryption, digital signatures, and key establishment.	1	1	2	3	2	-	-		1	1	1	3	1	1	3
		Articulate the cryptographic algorithms to compose, build and analyze simple cryptographicsolutions.	3	1	2	1	3	-	-		3	2	1	2	3	2	1
		Express the use of Message Authentication Codes.	2	3	3	3	3	-	-		3	1	1	1	2	1	1
221AIDC 66B	Robotic Process	Enunciate the key distinctions between RPA and existing automation techniquesand platforms.	3	2	2	1	3	-	-		1	3	3	2	2	2	1

	Automation	Use UiPath to design control flows and work flows for the target process	1	1	2	3	3	-	-		1	2	3	1	3	2	1
		Implement recording, web scraping andprocess mining by automation	2	3	2	3	3	-	-		2	3	1	1	3	3	3
		Use UIPath Studio to detect, and handle exceptions in automation processes	1	2	1	2	2	-	-		1	2	1	3	3	3	2
		Implement and use Orchestrator for creation, monitoring, scheduling, andcontrolling of automated bots and processes.	3	3	3	3	3	-	-		3	1	1	1	3	2	1
22160E75A	Principles of Management	Upon completion of the course, students will be able to have clear understanding ofmanagerial functions like planning, organizing, staffing, leading & controlling.		1	2	1					1			1	1	2	1
		Have same basic knowledge on international aspect of management		1	2	1					1			1	1	2	1
		Ability to understand management concept of organizing.		1	2	1					1			1	1	2	1
		Ability to understand management concept of directing.		1	2	1					1			1	1	2	1
		Ability to understand management concept of controlling.		1	2	1					1			1	1	2	1
22150FE67A	IoT Concepts and Applications (CSE)	Explain the layout, construction and working of the components inside a thermal power plant.	3	1	1	1		1	3			1		1	2	2	1
		Explain the layout, construction and working of the components inside a Diesel, Gas and	3	1	1	1		1	3			1		1	2	2	1
		Combined cycle power plants.	3	1	1	1		1	3			1		1	2	2	1
		Explain the layout, construction and working of the components inside nuclear power plants.	3	1	1	1		1	3			1		1	2	2	1
		Explain the layout, construction and working of the components inside Renewable energy	3	1	1	1		1	3			1		1	2	2	1

221 53OE 61	Renewable Energy System	Attained knowledge about various renewable energy technologies	3	-	-	-	-	-	-	-	-	-	-	2	3	3	3
		Ability to understand and design a PV system.	3	2	-	-	-	-	-	-	-	-	-	2	3	3	3
		Understand the concept of various wind energy system.	3	2	-	-	-	-	-	-	-	-	-	2	3	3	3
		Gained knowledge about various possible hybrid energy systems	3	2	-	-	-	-	-	-	-	-	-	2	3	3	3
		Attained knowledge about various application of renewable energy technologies	3	2	-	-	-	-	-	-	-	-	-	2	3	3	3
22154 OE73B	Industrial Management	Understand the basic concepts of industrial management	3		1	1					1			1	3	1	2
		Identify the group conflicts and its causes.	3		1	1					1			1	3	1	2
		Perform swot analysis	1		3		3	3	3	3	1	3		3	-	-	-
		Analyze the learning curves	2				3		3	3	1	3		3	-	-	-
		Understand the placement and performance appraisal	3				3		3	3	3	3		3	-	-	-

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Vallam, Thanjavur - 613 403.

DEPARTMENT OF BIOCHEMISTRY

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) of the Programmes offered by the University 20UGBCGE

DEPARTMENT OF BIOCHEMISTRY

AQAR 2022-2023

Local Need	
Regional Need	
National Need	
Global Need	

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

B.Sc., BIOCHEMISTRY

2022 REGULATION

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 analyse, apply logical principles, validate assumptions, solve problems, 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.

B. Sc., CURRICULUM MAPPING

Programme Educational Objectives vs Programme Outcome

POs/PEO	PO1	PO2	PO3	PO4	PO5
PEO 1	*	*		*	
PEO 2	*		*		*
PEO 3			*	*	*
PEO 4	*		*	*	
PEO 5		*		*	*

COURSE OUTCOME (COs)
B.Sc., - BIOCHEMISTRY

S.No	Semester	Course Code/Name	Course Outcome
CO1	**I**	**Tamil I**	• நடிப்பாற்றலை வளர்க்க உதவும். • படைப்பாற்றலுக்கு வழிவகுக்கும். • உளவியல் சிந்தனைத்திறனை வளர்க்க உதவும். • தற்கால இலக்கியப் படைப்புகளை வாசிக்கும் ஆர்வத்தை உண்டாக்கும். • கட்டுரை எழுதும் திறனை ஏற்படுத்தும் • படைப்பாளர்களின் படைப்பாளுமையைத் தெரிந்துகொள்ள வாய்ப்பாக அமையும்.
CO2		**English I**	• Read and comprehend literature
CO3		**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
CO4		**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
CO5		**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.
CO6		**Volumetric Analysis Lab**	• To understand the apparatus used in volumetric analysis and correct volumetric analysis. • To know good laboratory practice.
CO7		**Indian constitution**	• Democrative values and citizenship training and gained • Awareness on fundamental rights is established • The functions of union government and state government are learning thoroughly • The power and functions of the judiciary learn thoroughly • Appreciation of democratic parliamentary rule is learnt
CO8		**Universal Human Values**	• Know about universal human values and understand the importance of values in individual, social circles, career path, and national life. • Learn from case studies of lives of great and successful people who followed and practiced human values and achieved self-actualisation. • Become conscious practitioners of human values. • Realize their potential as human beings and conduct themselves properly in the ways of the world.
CO9	**II**	**Tamil II**	• இறையடிவர்களின் அற்புதச் செயல்வழி இறைநம்பிக்கை வேரூன்றும். • தலபுராண வரலாற்றினை அறிவதன் மூலம்

			வாழ்வியல் சிக்கல் தீர்க்கும் இடங்களைஅறிய முடியும். • தத்துவக் கருத்துக்களின் வழி நல்லெண்ணங்கள் மனதில் தோன்றும். • பக்தி இலக்கியங்களே சிற்றிலக்கியத் தோற்றத்திற்குக் காரணம் என உணர்ந்து கொள்ள முடியும். • சொற்பொருள் கருத்தாழங்களை அறிய முடியும். • சமயக் கொள்கைகளை கற்றுக் கொள்ளும் வாய்ப்பு கிடைக்கும். • காப்பியங்களில் பொருந்தியிருக்கும் சமயக் கருத்துக்களை கண்டறிய வழி செய்யும்.
CO10		**English II**	• Read and comprehend literature
CO11		**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.
CO12		**Biochemical Techniques Lab-II**	• 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
CO13		**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.
CO14		**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
CO15		**Research Led Seminar**	• To examining the relationship between teaching and research • Clarify terminology and approaches to different facets of research-based teaching, in order better to explore institutional strengths and weaknesses in HERE countries. • Explore good practices in institution-driven, strategic approaches on how to integrate research and education missions.

CO16		**Communication Skills**	• Identify common communication problems that may be holding learners back • Identify what their non-verbal messages are communicating to others • Understand role of communication in teaching-learning process • Learning to communicate through the digital media • Understand the importance of empathetic listening • Explore communication beyond language.
CO17		**Basic Behavioral Etiquette**	• Gaining a perspective on importance of corporate etiquette • Knowing about the ABC of etiquette • Being able to form good impressions • Understanding the way of reading body language • Knowing the different etiquette in different cultures • Learning to be confident in social settings • Understanding to deal with etiquette dilemmas • Being able to develop proper email, telephonic and behavioural etiquette
CO18	**III**	**Tamil III**	• காப்பிய அறக்கருத்துக்கள் வாழ்க்கையைச் செம்மைப்படுத்த உதவும். • சமயக்கோட்பாடுகளை அறிந்து கொள்ள முடியும். • சிற்றிலக்கிய வகைகளை அறிந்து அவைகளைக் கற்கும் ஆர்வத்தை ஏற்படுத்தும். • காப்பியத்திற்கும் சிற்றிலக்கியத்திற்கும் இடையே உள்ள வேறுபாட்டை அறிந்து கொள்ள முடியும். • உரைநடை, செய்யுளின் மொழிநடை வேறுபாட்டை அறிந்து கொள்ள உதவும்.

CO19		**English III**	• Read and comprehend literature
CO20		**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 cell interaction • Enumerate the phases of cell cycle, events in cell division and mechanism of cell death.
CO21		**Cell Biology and Genetics Lab**	• By the end of the course, students can be able to demonstrate the importance of the protein chemistry and their wide applications • Understand and apply the principles and techniques of cell biology and genetics which prepares students for further education and/or employment in teaching, basic research, or the health professions.
CO22		**Programming in C**	• To learn the concept of programming • To understand input and output functions • To study about Structures • To learn Pointers in C Language
CO23		**Programming in C lab**	• After Completion of this course the student would be able to • Read, understand and trace the execution

			of programs written in C language. • Write the C code for a given algorithm. • Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor. • Write programs that perform operations using derived data types.
CO24		**Research Methodology**	• Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computational frame work used in mathematical research.
CO25		**Office Automation**	• students would be able to documents, spreadsheets, make small presentations and would be acquainted with the internet.
CO26		**Tamil IV**	• வாழ்வியல் நெறிமுறைகளின் முக்கியத்துவத்தைப் பெற முடியும். • சமூகவியல் அணுகுமுறைக்கு வழி வகுக்கும். • உளவியல் ஆய்வுக்கு அடிகோலும். • அனுபவமுள்ளவர்களின் அறிவுரைகள் வாழ்க்கையைச் செம்மைப்படுத்த உதவும் என்பதை அறிய முடியும். • சங்க இலக்கியம் கற்கும் ஆர்வத்தை ஏற்படுத்தும். • உயர்கல்விக்குச் செல்ல வேண்டுமென்ற ஆர்வம் ஏற்படும். • சங்க இலக்கியத்தை ஆராயும் மனப்பான்மையை உருவாக்கும்.
CO27		**English IV**	• Read and comprehend literature
CO28		**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.

CO29		**Biochemical Techniques Lab-II**	• By the end of the course, students can be able to demonstrate the importance of the protein chemistry and their wide applications
CO30		**Fundamentals of Computing**	• Understand how logic circuits and Boolean algebra forms as the basics of digital computer. • Bridge the fundamental concepts of computers with the present level of knowledge of the students. • To understand binary, hexadecimal and octal number systems and their arithmetic
CO31		**Web Design Lab**	• Create HTML Documents with formatting, images, tables, frames, embed multi-media objects and develop a static website using Hyper Text Mark-up Language.
CO32		**Environmental studies**	• Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale • Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment • Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community • Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues • Understand how politics and management have ecological consequences.
CO33		**Leadership and Management Skills**	• Help students to develop essential skills to influence and motivate others • Inculcate emotional and social

			intelligence, and integrative thinking for effective leadership • Create and maintain an effective and motivated team to work for the society • Nurture a creative and entrepreneurial mindset • Make students understand the personal values and apply ethical principles in professional and social contexts.
CO34		**General Aptitude and Quantitative Ability**	• Understand and practice quantitative aptitude • Understand and practice Logical reasoning • Understand and practice verbal reasoning • Understand different placement practice techniques
CO35		**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 as marker in various disease conditions
CO36		**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 homeostatis of glucose of metabolites by intrinsic and extrinsic control mechanism.
CO37		**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.
CO38		**Food and enzyme Analysis Lab**	• To illustrate various aspects of food engineering. • To understand mechanism of heat transfer in food processing • 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. Understand the optium activity of enzyme.
CO39		**Immunology Lab**	• Basic Understanding of Immunotechnology • This course has been designed to provide hands-on experience on the tools and techniques used in protein chemistry and 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 molecular weight. • Besides, students will get an opportunity to learn Diffusion and electrophoresis.
CO40		**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 and scaling techniques as well as the quantitative data analysis. • Have basis awareness of data analysis and hypothesis testing procedures.
CO41		**Discipline Specific Elective-I Pharmaceutical Chemistry 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 pharmaceutics in drug development within the pharmaceutical industry

CO42		**Basic Biotechnology**	• To understand principles of animal culture, media preparation. • To explain In vitro fertilization and embryo transfer technology. • 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.
CO43		**Biochemistry of Plants and Microbes**	• Understand the basic microbial structure and functions of various physiological groups of prokaryotes and eukaryotes and also learn the theory and practical skills in microscopy handling and staining techniques • Know various Culture media and their applications and understand various physical and chemical means of sterilization and also learn various techniques for isolation of pure cultures • Comprehend the various methods for identification of unknown microorganisms and study microbial metabolism – Autotrophy and heterotrophy modes of nutrition Understand the microbial physiology and know the various Physical and Chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement
CO44		**Hospital**	• Understand the theories of management.

		Managements	• Understand the management process and integrated approach in management. 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
CO45		**Professional Skills**	• Prepare their resume in an appropriate template without grammatical and other errors and using proper syntax • Participate in a simulated interview • Actively participate in group discussions towards gainful employment • Capture a self - interview simulation video regarding the job role concerned • Enlist the common errors generally made by candidates in an interview • Perform appropriately and effectively in group discussions • Explore sources (online/offline) of career opportunities • Identify career opportunities in consideration of their own potential and aspirations • Use the necessary components required to prepare for a career in an identified occupation
CO46		**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.
CO47		**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. • Explain the fundamental principles of phylogeny and systematics of the living world, with the application of the principles of classification. • Link the structure of tissues, organs, organ systems and organisms with their functions in plants and animals. • Compare the structure of eukaryotic cells with the structure of simpler prokaryotic cells and with the structure of viruses
CO48		**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 and the quality assurance and quality control measures used in evaluation. • Describe and identify inborn defects in metabolism and correlate them with deficiency of key metabolic enzymes, the enzymes assayed 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.
CO49		**Molecular Biology Lab**	• Exhibit a knowledge base in genetics, cell and molecular biology and anatomy • Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology. • It can explain the principles of molecular cloning and PCR, cell transfection and western blotting and interpret experimental data. To know the general safety routines for laboratory work in molecular biology.
CO50		**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
CO51		**Interview Skills Training and Mock**	• Use the STAR Method to describe relevant experiences in away that reflects knowledge of the job/internship position • description and employer. • Identify appropriate verbal and non-verbal communication skills/techniques for an interview (e.g. eye contact, use of filler words, hand gestures, and verbal pace). • Demonstrate professional behavior(s) including preparedness, professional attire, and respectful presentation. • Develop confidence in relationship to their interviewing skills.
CO52		**Community Engagement**	• Gain an understanding of rural life, culture and social realities

			• Develop a sense of empathy and the bonds of mutuality with the local community • Appreciate significant contributions of local communities to Indian society and economy • Learn to value the local knowledge and wisdom of the community • Identify opportunities for contributing to community's socio-economic improvements • Identify opportunities for contributing to the community's socio-economic improvements
CO53		**Open Elective Course - Tamil Ilakkiya Varalaru**	• தமிழ இலக்கிய வரலாறு - மு.வரதராசன சாகித்திய அகாடமி வெளியீடு. • தமிழ இலக்கிய வரலாறு - ச.சுபாஷ் சந்திரபோஸ், இயல் பதிப்பகம். • தமிழ இலக்கிய வரலாறு - முனைவர் பாக்யமேரி, NCBH சென்னை. • தமிழஇலக்கியவரலாறு - முனைவர் சு.ஆனந்தன், NCBH சென்னை
		Open Elective Course - Journalism	• Become a journalist
		Open Elective Course - 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.

CO54		**Open Elective Course - 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.
CO55		**Open Elective Course - Food and Adulteration**	• The students will have knowledge about different processing and preservation methods and principles involved.
CO56		**Open Elective Course - Web Technology**	• Explore markup languages features and create interactive web pages using them • Learn and design Client side validation using scripting languages
		Open Elective Course - E-Learning	• Develop e - learning application on their own. • Ability to develop contents for e-learning. • To perform course management using tools.
		Open Elective Course - Banking service	• To help to gather knowledge on banking and financial system in India • To provide knowledge about commercial banks and its products • To create awareness about modern banking services like e-banking-banking and internet banking, ATM System • To introduce recent trends in banking system • To make the student understand the basic concept of banking and financial institutions and expose various types of risk based by banks

2020 REGULATION

PROGRAMME EDUCATIONAL OBJECTIVE (PEO)		
PEO 1	**:**	Graduates will 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 able to critically evaluate research and a variety of clinical information and equipping themselves as researchers in multidisciplinary fields.
PEO 3	**:**	Graduates will able to access and relate the biochemical issues to the environment and broader societal contexts.
PEO 4	**:**	Graduates will 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 able to gain awareness on Biochemical ethical issues and ethical responsibilities.
PROGRAMME SPECIFIC OUTCOME (PSOs)		
PSO 1	**:**	Students can 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 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 able to understand the code of ethics in research through Basics of Patent and Bioethics & practice them Innovational
PSO 4	**:**	Students can 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)		
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	**:**	**Identification and Differential Diagnosis:** To acquire biochemist position in leading hospitals and scientist position in industries.
PO5	**:**	**Ethics:** Students learn about the significance of having right moral features to develop good interpersonal skills.

Mapping of PEOs and PO

M. Sc., Curriculum Mapping

Programme Educational Objectives vs Programme Outcome

POs	PO1	PO2	PO3	PO4	PO5
PEO I	*		*		
PEO II	*		*	*	*
PEO III	*	*	*	*	*
PEO IV		*			*
PEO V	*		*		

COURSE OUTCOME (COs)

M.Sc., - BIOCHEMISTRY

S.No	Semester	Course Code/Name	Course Outcome
CO1	**I**	**Biomolecules**	• To imparted complete knowledge about structure and function of different biomolecules (proteins, lipids, nucleic acids, and carbohydrates) found in living cells. • Also the course will provide the knowledge how biomolecules are synthesized and metabolized inside living cells.
CO2	**I**	**Biochemical and Instrumental analysis**	• The students learn various techniques and acquire the skills to use appropriate methods. • The students acquire the good laboratory practices.
CO3	**I**	**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. • Differentiate between equilibrium and steady state kinetics and analyzed simple kinetic data and estimate important parameter (Km. Vmax, Kcat etc)
CO4	**I**	**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.
CO5	**I**	**Research Red**	• Student develop their ability to write

		Seminar	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.
CO6	**II**	**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. • Relate properties of cancerous cells to mutational changes in gene function. •
CO7	**II**	**Metabolism and Regulation**	• Gain knowledge on glucose anabolic and catabolic pathways that ultimately control the glucose homeostatis. • 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 regukation.

			• Able to understand the energy homeostatis during starvation and energy excess.
CO8	**II**	**Neuro Biochemistry**	• Recognize the need for, and engage in life-long learning • Gain knowledge of contemporary issues • Use the techniques, skills, and modern engineering tools necessary for engineering practice.
CO9	**II**	**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. • 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.
CO10	**II**	**Research Methodology**	• Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computational frameworks used in mathematical researches.
CO11	**II**	**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.
CO12	**III**	**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.
CO13	**III**	**Clinical Biochemistry**	• 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
CO14	**III**	**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. • 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 organisation and planning of work. Read specialised texts both in English and ones own language.
CO15	**III**	**Molecular Basis of diseases**	• 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
CO16	**III**	**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
CO17	**III**	**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.
CO18	**III**	**Discipline Specific Elective I - Biostatistics I- A**	• 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 biostatics in interpretation of biological data.
CO19	**III**	**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. • 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. • Along with this the students will become aware about concept, synthesis and action mechanism of vaccines.
CO20	**III**	**Discipline Specific Elective II- Endocrinology II- A**	• To know the pathophysiology significance of the system with special reference to humans
CO21	**III**	**Clinical nutrition and dietetics II- B**	• 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.
CO22	**III**	**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 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.
CO23	**III**	**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.
CO24	**III**	**Pharmaceutical Biotechnology III- B**	• This course gives information on drug designing, novel techniques in drug discovery and the role of biotechnology in pharmaceutics.
CO25	**III**	**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.
CO26	**III**	**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.
CO27	**III**	**OPEN ELECTIVE: Writing for the Media**	• Understand the intricacies of mass media
CO28		**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
CO29	**IV**	**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
CO30	**IV**	**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 antiobiotics.
CO31	**IV**	**M-Marketing**	• Upon Completion of the course, the students should be able to: • Analyze various mobile marketing strategies. • Market Mobile based Applications. • Apply various tools in mobile marketing.
CO32	**IV**	**Financial Services**	• To introduces meaning and functions of Financial Intermediaries • To understand the role of merchant bank and its services • To provide information regarding management of mutual funds and Regulations • To understand the role and functions of financial services Marketing • To know the structure and types of debt Instruments • To realize Foreign Exchange Market
CO33	**IV**	**Participation in Scaffold Research (Design/Societal**	• In structural scaffolding is a process through which a teacher adds support for

		Project)	students in order to enhance learning and aid in the mastery of tasks. • 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.
CO34	**IV**	**Project Work**	• In the learning outcome-based approach, extensive deliberation has been made to identify the minimum learning outcome from a student after completing each course. This entire outcome shall be substantiated by the practical components. • 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.

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2022- 2023

DEPARTMENT OF BIOCHEMISTRY

B.SC., BIOCHEMISTRY

POs and COs Mapping

Sem	Course Code	Title of the Course	COs	POS						
				PO1	PO2	PO3	PO4	PO5	PO6	PO7
SEM I	**22110AEC11**	**Tamil I**	COI Learn the changes occurred in literature since classical period.		3					
			CO2 Make use of vocabulary systematically		3					
			CO3 Understand how to lead one's life realizing the modernity and its environment/atmosphere.		3					
	22111AEC11	**Advanced English-I**	CO1 Develop vocabulary		3					
			CO2 Read and comprehend literature		3					
			CO3 Read and comprehend literature		3					
	22111AEC12	**English-I**	CO1 Appreciate poetry and prose		3					
			CO2 Familiarize students with fiction.		3					
			CO3 Read and comprehend literature		3					
	22115AEC13	**Biomolecules**	CO1 Recognize water as a universal solvent and elixir of life by knowing its importance					3		
			CO2 Identify the properties and classification of carbohydrates					3		
			CO3 Recall the role of various lipids in biomembrane including signal transduction					3		
			CO4 Categories the amino acids and know their properties					3		

			CO5 List the functions and deficiency disease of fat and water soluble vitamins					3		
			CO6 Differentiate the structure, properties and functions of DNA and RNA					3		
	22115AEC14L	**Biomolecules Lab-I**	CO1 Trained on preparation of reagents and solution	3					3	
			CO2 Able to analyze biomolecules and vitamins qualitatively and quantitatively	3					3	
			CO3 To identify the structure of biomolecules	3					3	
			CO4 Handle the instruments associated with the practical	3					3	
			CO5 Gain knowledge on lab safety	3					3	
			CO5 Apply quantitative reasoning skills to matter and energy, and physical or chemical changes that occur.	3					3	
			CO6 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.	3					3	
	22114AEC15	Chemistry-I	CO1:Apply quantitative reasoning skills to matter and energy, and physical or chemical changes that occur.	3						3
			CO2: Use accepted models to describe the reactions between acids and basis and basic equilibrium concepts.	3						3
			CO3 Demonstrate competence in collecting and interpreting data in the laboratory.	3						3

	22114AEC16L	**Volumetric Analysis Lab**	CO1 To understand the apparatus used in volumetric analysis and correct volumetric analysis.	3					3	
			CO2 To know Good laboratory practice	3					3	
	221INDCONS	**Indian Constitution**	CO1 Democratic values and citizenship Training are gained.			3		3		
			CO2 Awareness on Fundamental Rights are established.			3		3		
			CO3 Learn the functions of union and State Governments			3		3		
			CO4Learn the power and functions of the Judiciary			3		3		
			CO5Appreciate of Democratic Parliamentary Rule			3		3		
SEM II	**22110AEC21**	**Tamil II**	CO1 Know what devotion really is.		3					
			CO2 Know the fruitfulness obtained through devotion.		3					
			CO3 Perceive the progress achieved in the society through devotion.		3					
	22111AEC21	**Advanced English-II**	CO1 Develop technological skill.		3					
			CO2 Able to write in a variety of formats		3					
			CO3 Read biographies and develop personality		3					
	22111AEC22	**English-II**	CO1 Appreciate different forms of literature		3					
			CO2 Acquire language skills through literature		3					
			CO3 Broadens the horizon of knowledge		3					

	22115AEC23	**Biochemical Techniques**	CO1 The units of this paper are crucial for implementation of research ideas at molecular level.	3			3		3	
			CO2 This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.	3			3		3	
			CO3 This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules	3			3		3	
			CO4 It trains the students in adopting various techniques in biological research.	3			3		3	
			CO5 To learn various techniques and acquire the skills to use appropriate methods	3			3		3	
			CO6 To acquire the good laboratory practices	3			3		3	
			CO7 This significantly enhances the employability of the candidates in Biotechnological, Pharmaceutical Industries and Analytical Laboratories and research institutes.	3			3		3	
	22115AEC24L	**Biochemical Techniques Lab-I**	CO1 Gain knowledge on lab safety				3		3	
			CO2 Trained on preparation of reagents and solution				3		3	
			CO3 Students will understand the concept of spectrophotometer				3		3	
			CO4 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				3		3	
			CO5 Able to analyze biomolecules qualitatively and quantitatively				3		3	

			CO6 Handle the instruments associated with the practical				3		3	
	22114AEC25	**Chemistry II**	CO1 Apply quantitative reasoning skills to matter and energy, and physical or Chemical changes that occur.	3						3
			CO2 Use accepted models to describe the reactions between acids and basis and basic equilibrium concepts.	3						3
			CO3 Demonstrate competence in collecting and interpreting data in the laboratory	3						3
	22114AEC26L	**Organic Analysis Lab**	CO1 Apply significant figures rules in all calculations providing the correct number of significant figures and units	3					3	
			CO2 convert between different units using conversion factors and dimensional analysis	3					3	
			CO3 Name elements, provide their symbols and determine the number of protons, neutrons, electrons and nuclei in elements and compounds	3					3	
			CO4 Calculate percent composition given a molecular formula and molecular formula given the percent composition	3					3	
			CO5 Name salt, acids, bases and covalent compounds and provide formulas for these given a molecular formula.	3					3	
			CO6 Explain the difference between solubility and dissociation in water and apply this knowledge to acids, bases and salts.	3					3	
			CO7 Identify weak and strong acids and bases and insoluble compounds using dissociation and solubility rules.	3					3	

			CO8 Construct molecular, total and net ionic equations for double displacement reactions	3					3	
	22111RLC27	**Research Led seminar**	CO1 Exposure to various research domains	3			3		3	
			CO2 Acquaintance with languages of research	3			3		3	
			CO3 Development of research aptitude	3			3		3	
SEM III	**22110AEC31**	**Tamil III**	CO1 Achieve one's goal by following the ancestral path		3					
			CO2 Learn to lead life of perfection by realizing the uncertainty in the life		3					
			CO3 Attain happiness through honesty		3					
	22111AEC31	**Advanced English-III**	CO1 Understand phonetics.		3					
			CO2 Develop writing skill		3					
			CO3 Able to develop creative writing		3					
	22111AEC32	**English-III**	CO1 Enable to appreciate different types of prose		3					
			CO2 Develop the conversational skills through one-act plays		3					
			CO3 Enhance the skill of making grammatically correct sentences.		3					
	22115AEC33	**Cell Biology and Genetics**	CO1 Differentiate the prokaryotic and eukaryotic cell	3		3				
			CO2 Understand the principle behind studying the cell morphology using various microscope	3		3				
			CO3 Identify the structure and functions of each organelle in cell	3		3				
			CO4 Recognise the mechanism behind the protein sorting and transport to their destinations like lysosome, mitochondria and chloroplast	3		3				

			CO5 Maintenance of cytoskeleton structure and function of micro, macro and intermediary filaments	3		3				
			CO6 Identify the proteins involved in cell interaction	3		3				
			CO7 Enumerate the phases of cell cycle, events in cell division and mechanism of cell death.	3		3				
	22115AEC34L	**Cell Biology and Genetics Lab**	CO1 By the end of the course, students can be able to demonstrate the importance of the chromatography and their wide applications	3		2	3	3	3	
			CO2 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.	3		2	3	3	3	
			CO3 would be able to separate the plant pigments, identify and distinguish different amino acid, protein, lipids	3		2	3	3	3	
			CO4 would be able to identify and outline the structure of an cell membrane at different magnification	3		2	3	3	3	
			CO5 It trains the students in adopting various techniques in biological research.	3		2	3	3	3	
	22120AEC35	**Programming in C**	CO1 Understanding a functional hierarchical code organization.	3						
			CO2 Ability to define and manage data structures based on problem subject domain.	3						
			CO3 Understanding a concept of object thinking within the framework of functional model.	3						

			CO4 Understanding a concept of functional hierarchical code organization.	3						
			CO5 Understand operators, expressions and preprocessors.	3						
			CO6 To learn the concept of programming	3						
	22120AEC36L	**Programming in C Lab**	CO1 : To know the proper lines of C++, Encapsulation, Inheritance and Polymorphism.	3						
			CO2 : To explain the various data types, operations and functions of C++.	3						
			CO3 : To know the concept of constructors and destructors.	3						
			CO4 : To explain the concept of inheritances, types of inheritance and polymorphism, virtual function Functions.	3						
			CO5 : To explain the types of streams, format and format of input and output operations.	3						
			C06:To Known the procedural and object oriented paradigmwith concepts of streams, classes, functions, data and objects.	3						
	22117RMC37	**Research Methodology**	CO1 Understanding research questions and tools				3	3	3	
			CO2 Experience in scientific writings				3	3	3	
			CO3 Practice in various aspects of scientific publications				3	3	3	
			CO4 Inculcation of research ethics				3	3	3	
	22120SEC01AL	**Package lab-III**	CO1 Indicate the names and functions of the **Excel** interface components.	3						
			CO2 Enter and edit data.	3						

			CO3 Format data and cells.	3							
			CO4 Construct formulas, including the use of built-in functions, and relative and absolute references.	3							
			CO5 Create and modify charts.	3							
			CO6 Preview and print worksheets.	3							
	22160SEC03B	**Soft skill – III**	Learn interpersonal relations and social responsibilities.		3						
	22111SEC03L	**Communicative english Lab-III**	CO1 Learn grammar.			3					
			CO2 Enhance their fluency in English			3					
			CO3 Develop speaking and writing skills			3					
			CO4 Develop individual perspectives that demonstrate critical thinking skills			3					
IV	**22110AEC41**	**Tamil-IV**	CO1 Realize how the ancient people changed their life style according to the ages			3					
			CO2 Learn how to change one's lifestyle according to the needs of the future			3					
			CO3 Accept the modern trend and its uses			3					
	22111AEC41	**Advanced english-IV**	CO1 Develop writing skill.			3					
			CO2 Comprehend and describe poems			3					
			CO3 Learn interviewing skills			3					
	22111AEC42	**English-IV**	CO1 Improve their ability to read and understand them			3					
			CO2 Know the genius of Shakespeare			3					
			CO3 Express in writing their views.			3					

	22115AEC43	**Human Physiology**	CO1 The purpose of this course is to promote knowledge in the integration of theories, methods and research in human physiology.	3		3		3	3	
			CO2 Understand Anatomy & Physiology of various systems in Human which gives a clear picture about various systems and their respective disorders.	3		3		3	3	
			CO3 Acquire good knowledge on Nervous & Muscular systems	3		3		3	3	
			CO4 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.	3		3		3	3	
			CO5 Understand "Anatomy & Physiology of various Systems such as Nervous system, Muscular system, Reproductive system, Liver.	3		3		3	3	
			CO6 It gives and exposure about human anatomy and physiology.	3		3		3	3	
	22115AEC44L	**Biochemical Techniques Lab-II**	CO1 This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.							
			CO2 This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules				3		3	
			CO3 Perform skillful specimen collection, identification and processing				3		3	
			CO4 Utilize communication skills necessary for working in the health care setting				3		3	

			CO5 Exhibit professionalism, initiative, positive interpersonal skills, teamwork, respect and integrity.				3		3	
			CO6 By the end of the course, students can be able to demonstrate the importance of the blood, buffer and their wide applications				3		3	
	22120AEC45	**Fundamentals of Computing**	CO1 Bridge the fundamental concepts of computers with the present level of knowledge of the students.	3						
			CO2 Familiarise operating systems, programming languages, peripheral devices, networking, multimedia and internet	3						
			CO3 Understand binary, hexadecimal and octal number systems and their arithmetic.	3						
			CO4 Understand how logic circuits and Boolean algebra forms as the basics of digital computer.	3						
			CO5 Demonstrate the building up of Sequential and combinational logic from basic gates.	3						
	22120AEC46L	**Web Design Lab**	CO 1: Acquire knowledge about functionalities of World Wide Web and E-Mail.	3						
			CO 2 :Apply a structured approach to identifying needs, interests, and functionality of a website.	3						
			CO 3: Write well-structured, easily maintained, standards-compliant, accessible HTML code,	3						
			Write CSS code to present html pages in different ways.	3						
			CO 5:ExploreMarkup languages features and create interactive web pages using them	3						

			CO 6: Design dynamic websites that meet specified needs and interests.	3						
			CO 7: Learn and design Client side validation using scripting languages	3						
			CO 8 :Acquire knowledge about Scripting libraries	3						
	221ENVTSTU	**Environmental Studies**	CO1 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.	3				2		3
			CO2 To learn natural curiosity and creativity for the immediate surroundings.	3				2		3
			CO3 To develop various processes/skills e.g. observation, discussion, explanation, experimentation, logical reasoning, through interaction with immediate surroundings.	3				2		3
			CO4 To develop sensitivity for the natural, physical and human resources in the immediate environment.	3				2		3
			CO5 point out/ raise issues related to equality, justice and respect for human dignity and rights.	3				2		3
			CO6 To Learn about environmental pollution.	3				2		3
			CO7 Familiarize with the social issues and the environment	3				2		3
SEM V	**22115AEC51**	**Enzymes**	CO1. Understand the basic concepts on enzymes							
			CO2 Relate the initial velocity and substrate concentration of enzymes and be able to understand the kinetics of inhibition reactions	3		3		3	3	

			CO3. Able to understand the regulation pattern of various enzymes	3		3		3	3	
			CO4. Relate the regulation pattern of enzymes for its application in health and diseases	3		3		3	3	
			CO5. Understand the application of enzymes in Industrial and therapeutic.	3		3		3	3	
			CO 6 Exposure to the nature of non-protein enzymes such as ribozymes.	3		3		3	3	
	22115AEC52	**Bioenergetics and Metabolism**	CO1 To shed knowledge on generation and transformation of energy in metabolic pathways.	3		3		3	3	
			CO2 To know the various metabolic pathways associated with carbohydrate, lipid , protein and nucleic acid metabolism, their regulation and associated disorders.	3		3		3	3	
			CO3 To understand the inter relationship of carbohydrate, lipid , protein and nucleic acid metabolism and understand the importance of TCA cycle.	3		3		3	3	
			CO4 To aware about the Biological oxidation	3		3		3	3	
			CO5 Understanding the importance of high energy compounds, electron transport chain, synthesis of ATP under aerobic and anaerobic conditions.	3		3		3	3	
			CO6 Understand the anabolic and catabolic processes associated with amino acids and nucleic acids and their regukation.	3		3		3	3	
	22115AEC53	**Immunology**	CO1 The students may understand the immune system, its components and various techniques used in bio manipulation.	3		3		3	3	

			CO2 Describe surface membrane barriers and their protective functions.	3		3		3	3	
			CO3 Explain the importance of phagocytosis and natural killer cells in innate body defense.	3		3		3	3	
			CO4 Describe the roles of different types of T cells, B cells and APCs.	3		3		3	3	
			CO5 Compare and contrast the origin, maturation process, and general function of B and T lymphocytes.	3		3		3	3	
			CO6 Along with this the students will become aware about concept, synthesis and action mechanism of vaccines.	3		3		3	3	
	22115AEC54L	**Food and enzyme Analysis Lab**	CO1 To illustrate various aspects of food engineering.	3			3	3	3	
			CO2 To know the sources of enzymes and study the extraction and partial purification of enzyme.	3			3	3	3	
			CO3 To standardize the optimum pH, optimum substrate concentration required for the maximum activity of enzyme.	3			3	3	3	
			CO4 The students will be expertise in estimation of minerals in food.	3			3	3	3	
			CO5 To understand the optimum activity of enzyme.	3			3	3	3	
			CO6 Students will gain an understanding of buffers and their importance in the context of pH control.	3			3	3	3	
	22115AEC55L	**Immunology Lab**	CO1 This course has been designed to provide hands-on experience on the tools and techniques used in immunology.	3			3	3	3	

			CO2 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	3			3	3	3	
			CO3 Besides, students will get an opportunity to learn diffusion and electrophoresis.	3			3	3	3	
			CO4 Basic understanding of Immunotechnology	3			3	3	3	
			CO5 Study the principle and applications of various immuno techniques ranging from precipitation and agglutination reactions.	3			3	3	3	
			CO6 To gain the experimental knowledge about ELISA, Radio immunoassay	3			3	3	3	
	22116DSC56A	**Pharmaceutical Chemistry A**	CO1 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.			3		3	3	3
			CO2 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 -			3		3	3	3
			CO3 Students be able to account for regulatory requirements within the biopharmaceutical area			3		3	3	3
			CO4 Students be able to describe the role of bio pharmaceutics in drug development within the pharmaceutical industry			3		3	3	3

			CO5 To describe action of different drugs			3		3	3	3
			CO6 To analyze drugs to inhibit the particular enzymes and treatment of diseases			3		3	3	3
	22116DSC56B	**Basic Biotechnology**	CO1 To understand principles of animal culture, media preparation.	3				3	3	
			CO2 To explain basic principles of cloning.	3				3	3	
			CO3 To describe culture and clonal propagation of plants on a commercial scale.	3				3	3	
			CO4 To get insight in applications or recombinant DNA technology in agriculture, production of therapeutic proteins.	3				3	3	
			CO5 To describe commercial production of fuels, microbial enzymes.	3				3	3	
			CO6 To explain the microbial degradation of pesticides, Bioremediation& Biofertilizers	3				3	3	
	22117BRC57	**Participation in Bounded Research**	CO1 Hands on exposure to problem solving tools in contemporary research				3			
			CO2 Evolution of research intuitiveness and orientation				3			
			CO3 Familiarity with cutting edge research trends				3			

SEM VI	**22115AEC61**	**Clinical Biochemistry**	CO1 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.			3	3		3	
			CO2 Describe the various disorders			3	3		3	
			CO3 Understand and explain the acid-base and water-electrolyte balance in the body.			3	3		3	
			CO4 Understand the difference between plasma,serum,normal and abnormal constituents in various body fluids. Blood clotting mechanism and anticoagulants.			3	3		3	
			CO5 Explain the nature and function of various enzymes ,normal levels and elevated levels in various diseases.			3	3		3	
			CO6 Comprehend that blood is a universal fluid for carrying different minerals, nutrients, proteins etc to and from various tissues.			3	3		3	

			CO7 Learn that many diseases result from imbalance in certain enzymes and helps in diagnosis of liver, cardiac, gastrointestinal, kidney diseases.			3	3		3	
			CO8 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 .			3	3		3	
	22115AEC62	**Molecular Biology**	CO1 Discuss the most significant discoveries and theories through the historical progress of biological scientific discoveries, and their impacts on the development of molecular biology.			3	3		3	
			CO2 Compare the structure of eukaryotic cells with the structure of simpler prokaryotic cells and with the structure of viruses			3	3		3	
			CO3 They will be familiarized with mechanism of action and resistance to antibiotics at molecular lev			3	3		3	
			CO4 They will be able to describe the mechanisms of protein transport to various sub cellular sites and process of protein degradation			3	3		3	
			CO5 Students will be able to describe how gene expression is regulated at the transcriptional and post-transcriptional level.			3	3		3	
			CO6 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.			3	3		3	

			CO7 They will be familiarized with mechanism of action and resistance to antibiotics at molecular level			3	3		3	
			CO8 To understand molecular concept of DNA, RNA			3	3		3	
	22115AEC63L	**Hematology and clinical biochemistry Lab**	CO1 Explain the origin of blood cells and articulate the process of erythropoiesis and leukopoiesis as it relates to health and disease.	3			3		3	
			CO2 Discuss the coagulation process and its role in maintaining hemostasis.	3			3		3	
			CO3 Demonstrate current hematological procedures used to diagnose, monitor and evaluate disorders.	3			3		3	
			CO4 Demonstrate the basic principles of hematology and clinical biochemistry instrumentation	3			3		3	
			CO5 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.	3			3		3	
			CO6 Relate laboratory results to clinical diagnosis and relationship to heart, liver, kidney and pancreas function.	3			3		3	
	22115SEC64L	**Molecular Biology Lab**	CO1 Exhibit a knowledge base in genetics, cell and molecular biology.	3			3		3	
			CO2 Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.	3			3		3	
			CO3 It can explain the principles of separation of DNA.	3			3		3	
			CO4 To know the general safety routines for laboratory work in molecular biology.	3			3		3	

			CO5 To gain the knowledge about isolation of Plasmid DNA from E.coli	3			3		3	
			CO6 To understand purity determination by UV absorption	3			3		3	
	22115DSC65A	**Biochemistry of Plants and Microbes**	CO1 The students are able to perform plant phytochemical pigments	3			3		3	3
			CO2 to study about water microbiology.	3			3		3	3
			CO3 Prepare stained smears, culture micro-organisms, perform tests to identify bacteria and fungi, and to study food microbiology	3			3		3	3
	22115DSC65B	**Hospital Managements**	CO1 Understand the theories of management.	3				3	3	
			CO2 Understand the management process and integrated approach in management.	3				3	3	
			CO3 Manage service organizations by accepting the inbuilt challenges.	3				3	3	
			CO4 Manage hospitals by understanding the complexity, levels and role of hospital administrator.	3				3	3	
			CO5 Understand the current issues that have an implication in administration practice hospital administration	3				3	3	
	22117PRW67	**Project Work**	CO1 To outcome are the changes or result that the organization expects to be achieved the successful completion of the project	3			3		3	
			CO2 The outcomes could be qualitative and qualitative or both	3			3		3	
			CO3 The outcomes are the changes or results that the organization expects to be achieved the successful completion of the project	3			3		3	

M.SC., BIOCHEMISTRY

POs and COs Mapping

Sem	Course Code	Title of the Course	COs	POS				
				PO1	PO2	PO3	PO4	PO5
SEMESTER I	22215SEC11	Biomolecules	CO1- Recognize water as a universal solvent and elixir of life by knowing its importance	**3**	**3**			**3**
			CO2- Identify the properties and classification of carbohydrates	**3**	**3**			**3**
			CO3 -Recall the role of various lipids in biomembrane including signal transduction	**3**	**3**			**3**
			CO4 -Categories the amino acids and know their properties	**3**	**3**			**3**
			CO5 -Differentiate the structure, properties and functions of DNA and RNA	**3**	**3**			**3**
			CO6 -List the functions and deficiency disease of fat and water soluble vitamins	**3**	**3**			**3**
	22215SEC12	Biochemical and Instrumental analysis	CO 1 This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.	3	3		3	
			CO2 Understanding the principles of Electrophoresis, Spectrophotometry and ELISA and their applications in biological investigations/experiments	3	3		3	
			CO3 This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules	3	3		3	
			CO 4 Develop competence in handing various chromatographic techniques and apply them in isolating and characterizing different biological molecules.	3	3		3	
			CO 5 Purify proteins by affinity chromatography	3	3		3	
			CO 6 Understanding the principles of Electrophoresis, Spectrophotometry and ELISA and their applications in biological investigations/experiments	3	3		3	
			CO 7 To learn various techniques and acquire the skills to use appropriate methods	3	3		3	
			CO 8 To acquire the good laboratory practices	3	3		3	
	22215SEC13	Enzymology	CO1 Upon successful completion of this course, the student will learn, the major classes of enzyme and their functions in the cell.	3	3			3
			CO2 The course also provides information pertaining to role of co-enzyme cofactor in enzyme catalyzed reaction, properties of enzymes and regulation of biochemical pathways.	3	3			3

		CO3 To acquire fundamental knowledge on enzymes and their importance in biological reactions.	3	3			3
		CO4 Exposure to the concept of activation energy and its importance in biological reactions.	3	3			3
		CO5 Understanding the role of enzymesin clinical diagnosis and industries.	3	3			3
		CO 6 Exposure to the nature of non-protein enzymes such as ribozymes.	3	3			3
		CO 7 Differentiate between equilibrium and steady state kinetics and analyzed simple kinetic data and estimate important parameter (Km. Vmax, Kcat etc)	3	3			3
22215SEC14L	Biochemical Techniques Lab - I	CO1 By the end of the course, students can be able to demonstrate the importance of the protein chemistry and their wide applications.					
		CO2 This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.	3	3		3	
		CO3 This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules	3	3		3	
		CO4 Perform skillful specimen collection, identification and processing	3	3		3	
		CO5 Utilize communication skills necessary for working in the health care setting	3	3		3	
		CO6 Exhibit professionalism, initiative, positive interpersonal skills, teamwork, respect and integrity.	3	3		3	
22215DSC15A	Biostatistics	CO1 To use basic analytical techniques to generate results	3				3
		CO2 interpret results of commonly used statistical analyses in written summaries	3				3
		CO3 demonstrate statistical reasoning skills correctly and contextually	3				3
		CO4 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 biostatics in interpretation of biological data.	3				3

			CO5 The students will understand the principles of collection of data in biological experiments, proper statistical analysis of the data and its presentation.	3				3
			CO6 Knowing statistical methods will help students in improving their analytical and interpretation skill.	3				3
	22215DSC15B	Immunology	CO1 The students may understand the immune system, its components and various techniques used in bio manipulation.	3	3			3
			CO2 The course will provide technical knowledge as to how different diseases are caused and various responses mediated by living cells to combat pathogen attack.	3	3			3
			CO3 Compare and contrast the origin, maturation process, and general function of B and T lymphocytes.	3	3			3
			CO4 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.	3	3			3
			CO5 To understand the principles of tolerance, autoimmunity and the role of immunity in protection against pathogens.	3	3			3
			CO6 Along with this the students will become aware about concept, synthesis and action mechanism of vaccines.	3	3			3
	22215RLC16	Research led seminar	CO1 Exposure to various research domains	3	3	3		
			CO2 Acquaintance with languages of research	3	3	3		
			CO3 Development of research aptitude	3	3	3		
SEMESTER II	22215SEC21	Cellular Biochemistry	CO1 Describe the general principles of gene organization and expression in both prokaryotic and eukaryotic organisms.	3	3			3
			CO2 Describe the structure and function of biological membranes including the roles of gradients in energy transduction.	3	3			3
			CO3 Explain the basic pathways and mechanisms in biological energy transduction from oxidation of metabolites to synthesis of ATP.	3	3			3
			CO4 Explain various levels of gene regulation and protein function including signal transduction and cell cycle control.	3	3			3

			CO5 To become aware with the variations in the levels of trigycerides and lipoproteins and their relationship with various diseases.	3	3			3
			CO6 Relate properties of cancerous cells to mutational changes in gene function.	3	3			3
	22215SEC22	Metabolism and Regulation	CO1 Gain knowledge on glucose anabolic and catabolic pathways that ultimately control the glucose homeostatis.	3	3			3
			CO2 Describe surface membrane barriers and their protective functions.	3	3			3
			CO3 Able to explain the role of lipids, their metabolism and their stringent control by hormones and other factors.	3	3			3
			CO4 To acquire knowledge related to the role of TCA cycle in central carbon metabolism, importance of anaplerotic reactions and redox balance.	3	3			3
			CO5 Understanding the importance of high energy compounds, electron transport chain, synthesis of ATP under aerobic and anaerobic conditions.	3	3			3
			CO6 Understand the anabolic and catabolic processes associated with amino acids and nucleic acids and their regukation.	3	3			3
			CO7 Able to understand the energy homeostatis during starvation and energy excess.	3	3			3
	22215SEC23	Neuro Biochemistry	CO1 To understand various neurological system	3	3			3
			CO2 Recognize the need for, and engage in life-long learning in neurological system	3	3			3
			CO3 To understand various Exocytosis of neurotransmitter	3	3			3
			CO4 To able to understand DNA microarrays, Methodology, types and applications	3	3			3
			CO5 To acquire knowledge related to LEARNING AND MEMORY	3	3			3
			CO6 Gain knowledge of contemporary issues	3	3			3

			CO7 to understand BIOCHEMISTRY OF VISION AND MUSCLE CONTRACTION	3	3			3
	22215SEC24L	Enzymology Lab- II	CO1 Students will gain an enhanced overall understanding of enzymology, enzyme assays, and in particular the influence of various physicochemical characteristics upon enzyme activity.	3	3		3	
			CO2 Acquiring training to estimate activity of enzymes.	3	3		3	
			CO3 To determine pH optimum, Km and Vmax of enzymes and to analyse enzyme kinetics	3	3		3	
			CO4 To determine optimum temperature for the activity of an enzyme.	3	3		3	
			CO5 Students will gain direct laboratory experience in spectrophotometry.	3	3		3	
			CO6 Students will gain an understanding of buffers and their importance in the context of pH control.	3	3		3	
			CO7 Students will gain an appreciation of working as part of an integrated research team.	3	3		3	
	22215DSC25A	Endocrinology	Apply the knowledge from this course while working in medical laboratory to diagnose different hormone disorders	3	3		3	
			Understand the scientific research that have been used to understand endocrine and hormone function	3	3		3	
			Explain recent laboratory methods in diagnosis hormone disorders	3	3		3	
			Knowledge and Understanding the synthesis of different endocrine gland hormones	3	3		3	
			Ability to analyze and solve problems related to hormone tests	3	3		3	
			Ø To know the pathophysiology significance of the system with special reference to humans	3	3		3	
	22215DSC25B	Clinical nutrition and dietetics	CO1 To learn glycemic index, balanced diet, micronutrient deficiencies and the remedies, nutraceuticals and their importance, junk foods and their hazards	3	3		3	

			CO2 Understanding merits and demerits of vegetarian and non-vegetarian foods	3	3		3	
			CO3 To understand the need for specialized food for people with special needs - diabetes, pregnancy, inherited genetic disorders.	3	3		3	
			CO4To know the use of alternate crops – cereals and pulses and their importance.	3	3		3	
			CO5 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.	3	3		3	
			CO6 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.	3	3		3	
	22215DSC25C	Bioinformatics	Ø The student will choose biological data, submission and retrieval from databases.	3	3		3	
			Ø The students will be able to experiment pair wise and multiple sequence alignment and will analyze the secondary and tertiary structures of protein sequences.	3	3		3	
			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.	3	3		3	
			to understand the Role of computers in Biology	3	3		3	
			To know the Software in Bioinformatics - C, C++, bioperl,Biopython and oracle	3	3		3	
			Ø 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.	3	3		3	

	22215RMC26	Research Methodology	CO1 Understanding research questions and tools	3	3		3	
			CO2 Experience in scientific writings	3	3		3	
			CO3 Practice in various aspects of scientific publications	3	3		3	
			CO4 Inculcation of research ethics	3	3		3	
	22215BRC27	Participation in Bounded Research	CO1 Hands on exposure to problem solving tools in contemporary research	3		3		3
			CO2 Evolution of research intuitiveness and orientation	3		3		3
			CO3 Familiarity with cutting edge research trends	3		3		3
SEMESTER III	22215SEC31	Molecular Biology	CO1 Understand the structure of nucleic acids and the DNA replication process	3	3		3	
			CO2 Learn about the process of transcription	3	3		3	
			CO3 Understand the mechanism of translation	3	3		3	
			CO4Learn about gene regulation in prokaryotes	3	3		3	
			CO5 Study the discovery of DNA as genetic material, transcription, DNA repair and translation.	3	3		3	
			CO6 Analyse coding and non-coding regions of eukaryotic genome and their importance.	3	3		3	
			CO7 Exposure with the importance of E. coli lac operon	3	3		3	
	22215SEC32	Clinical Biochemistry	CO1 To learn about the normal constituents of urine, blood and their significance in maintaining good health.	3	3		3	
			CO2 Exposure to the mechanisms of causation of diseases of liver and kidney.	3	3		3	
			CO3 Develop understanding of the current concepts related to mechanism of Cancer.	3	3		3	
			CO4 To become aware with the variations in the levels of trigycerides and lipoproteins and their relationship with various diseases.	3	3		3	
			CO5 able to describe the diagnostic laboratory, according to the main stages pre-analytical, analytical and post-analytical.	3	3		3	

			CO6 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	3	3		3	
	22215SEC33L	Clinical Biochemistry Lab	CO1 Identify the principal analytical procedures used to measure biochemical magnitudes.	3	3		3	
			CO2Interpret and integrate the analytical data from the principal biochemical and molecular genetics tests for the screening, diagnosis, prognosis and monitoring of pathologies.	3	3		3	
			CO3 Interpret experimental results and identify consistent and inconsistent elements.	3	3		3	
			CO4 To introduce them to metabolic pathways of the major biomolecules and relevance to clinical conditions.	3	3		3	
			CO5 Manage information and the organization and planning of work.	3	3		3	
			CO6 To learn qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods.	3	3		3	
	22215DSC34A	Genetics and Genetic Engineering	CO1 Comprehensive, detailed understanding of the chemical basis of heredity	3	3		3	
			CO2 Comprehensive and detailed understanding of genetic methodology and how quantification of heritable traits in families and populations provides insight into cellular and molecular mechanisms.	3	3		3	
			CO3 Comprehensive detailed understanding of cellular mechanisms of developmental stages.	3	3		3	
			CO4 Exposure to the concepts of genomics, proteomics, metabolomics and their importance in human health	3	3		3	
			CO5 Acquaintance with the merits and demerits of transgenic crops.	3	3		3	
			CO6 To produce insulin using recombinant DNA technology.	3	3		3	
	22215DSC34B	Pharmaceutical Biotechnology	CO1 Understanding the importance of Immobilized enzymes in Pharmaceutical Industries.	3	3		3	
			CO2 Genetic engineering applications in relation to production of pharmaceuticals	3	3		3	
			CO3 This course gives information on drug designing, novel techniques in drug discovery and the role of biotechnology in pharmaceutics.	3	3		3	

			CO4 Importance of Monoclonal antibodies in Industries	3	3		3	
			CO5 Appreciate the use of microorganisms in fermentation technology	3	3		3	
			CO6 Exposure with the importance of expression vectors and their importance in Biotechnology.	3	3		3	
	22215SRC35	Design/Socio technical research	CO1 Sensitization of social needs for innovation			3		
			CO2 Team work towards interdisciplinary synchronous research strategy			3		
			CO3 Development of critical thinking and synergistic research approach.			3		
SEMESTER IV	22215SEC41	Molecular Basis of diseases	CO1 Attain a thorough knowledge on the molecular mechanisms for Tuberculosis, Typhoid, Cholera					
			CO2 Understand the pathological changes during infectious diseases.					
			CO3 Provide an insight into the history of pathology covering all the basic definitions and common terms.					
			CO4 Detail on the survival mechanism in diseases, an insight into microscopic and cellular pathology.					
			CO5 Elaborate the overview of Dengue Hemorrhagic Fever, and Chlamydiae, opportunistic fungal pathogens					
			CO6 review the causes and mechanisms of Emerging and re-emerging infectious diseases and pathogens					
	22215SEC42	Environmental Biochemistry	CO1 students will be able to explain fundamentals of earth atmosphere and its interconnectivity between various components.	3	3		3	
			CO2 students will be able to describe different elements of the environments and their impact on sustaining the environment.	3	3		3	
			CO3 students will be able to interpret the fundamentals of ecology and its role in biological evolution	3	3		3	
			CO4 Gain knowledege about pollution control	3	3		3	
			CO5 understand the importance of Structure and functions of ecosystem	3	3		3	

		CO6 exposure with the importance of Value of Biodiversity	3	3		3	
22215SEC43L	Molecular and Environmental biochemistry lab	CO1 After the completion of this course, the student will be able to Learn how to isolate genomic DNA.	3	3		3	
		CO2 Track various techniques adopted for separation of DNA.	3	3		3	
		CO3 Demonstrate separation of protein by Western blotting and Animal Tissue culture.	3	3		3	
		CO4 Separate chromosomal and plasmid DNA using enzyme.	3	3		3	
		CO5 Gain the knowledege about COD and BOD	3	3		3	
		CO6 demonstrate basis of Animal tissue culture	3	3		3	
22215DSC44A	Medical Biotechnology	CO1 Explain insights about genetic diseases and also about the molecular aspects related to human disease	3	3		3	
		CO2 Gain new insights into molecular mechanisms of nucleic acid and gene therapy	3	3		3	
		CO3 Gain knowledge about therapeutic recombinant proteins and immunotherapy for the treatment of different diseases	3	3		3	
		CO4 understant then Nucleic acid based Therapy	3	3		3	
		CO5 exposure with Gene therapy	3	3		3	
		CO6 able to interpret the molecular basis of diseases	3	3		3	
22215DSC44B	Applied Microbial Biochemistry	CO1 Will be acquainted with methods of measuring microbial growth, calculating growth kinetic parameters with understanding of steady state and continuous growth.	3	3		3	
		CO2 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.	3	3		3	
		CO3 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.	3	3		3	
		CO4 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.	3	3		3	

		CO5 will have learnt Microbial products in pharmaceutical and agriculture industry	3	3		3	
		CO6 exposure with Medical microbiology and microbial metabolism	3	3		3	
22215PRW45	Project Work	CO1 exposure for safe laboratory practices by handling high end equipments and chemical reagents.	3	3			3
		CO2 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.	3	3			3
		CO3 analyze current literature research for research topic of his/her area of expertise.	3	3			3
		CO4 rationalize the research gap for new innovation and design and execute independent experimental approach	3	3			3
		CO5 able analyze the data obtained from a particular experiment and make to plot graphs, power point presentations.	3	3			3
		CO6 comprehend expertise for writing the research reports.	3	3			3

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

Program Outcomes and Course outcomes of

Department of Biotechnology

REGULATION – 2022

	LOCAL
	REGIONAL
	NATIONAL
	GLOBAL

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

DEPARTMENT OF BIOTECHNOLOGY

22UGBTGEC

REGULATION 2022

Programme offered:

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

PROGRAMME OUTCOMES	
PO1	Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life
PO2	Understanding and better knowledge of the causes, types and control methods for environmental pollution by the students
PO3	The student will be able to discuss the mechanisms associated with gene expression system in prokaryotes and eukaryotes
PO4	Developed various communication skills such as reading, listening, speaking etc.,
PO5	Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments
PO6	Ethics: Convey and practice social, environmental and biological ethics
PO7	To get knowledge about research tools and learn to do review literature. Ability to carry out independent literature survey corresponding to the specific publications type and asses basic research tool
PROGRAM SPECIFIC OUTCOME	
PSO1	Graduates will exhibit contemporary knowledge in Biotechnology and students will be eligible for doing jobs in pharmaceutical and biotechnological Industry.
PSO2	An expert in biotechnology and allied fields (medical, microbial, Agricultural, environmental, plant and animal) for utilizing the practical skill to address biotechnological challenges.
PSO3	Graduates will be able to work individually as well as in team to survive in multidisciplinary environment.
PSO4	If students will engage themselves in the process of effective learning, it will give opportunities to utilize acquired knowledge for the catering the needs of science and technology as well as for the betterment of human mankind.
PSO5	Graduates will be able to understand the potentials, and impact of biotechnological innovations on environment and their implementation for finding sustainable solution to issues pertaining to environment, health sector, agriculture, etc.
PROGRAM EDUCATIONAL OBJECTIVES	
PEO1	To obtain detailed information about the fundamentals of Biotechnology, allied subjects and life skills
PEO2	To provide information about the molecular methods which involved in cellular processes of living systems such as microbes to higher order organisms for applied aspects. To address the emerging need for skilled scientific manpower with research ethics involving organisms
PEO3	To impart the basics and current molecular tools in the areas of Molecular Diagnostics, Fermentation Technology, Plant, Animal & Environmental Biotechnology are included to train the students for man power development and also sensitize them to scope for research. The practical subjects will provide information about the careers in the industry and applied research where biological system is employed

PEO4	To make the graduates of Biotechnology to learn and to adopt in a competitive world of technology update and contribute to all forms of life
PEO5	To enable them to excute a research objective through experimentation

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

Semester	Course Code	Title of the Course	Cos
I	22110AEC11	Language-I (Tamil-I)	**CO1 -** Learn the changes that have occurred in literature since the classical period.
			CO2 - Make use of vocabulary systematically.
			CO3 - Understand how to lead one's life realizing the modernity and its environment/atmosphere.
I	22111AEC11	Advanced English-I	**CO1 -** Develop vocabulary
			CO2 - Learn to edit and do proof reading
			CO3 - Read and comprehend literature
I	22111AEC12	English-I	**CO1 -** Read and comprehend literature
			CO2 - Appreciate poetry and prose
			CO3 - Familiarize students with fiction.
I	22117AEC13	Fundamentals of Biotechnology	CO1 - The students do understand the importance of plant and animal diversity and their conservation through invitro propagation and maintenance
			CO2 - Exploited techniques in molecular biology like isolation of animal and plant genomic DNA, their separation by gel electrophoresis, and amplification of separated DNA by polymerase chain reaction.
			CO3 - To gain knowledge in Concept of Biology, Biomolecules, Genetics, DNA Technology, Bioinformatics, Nanotechnology, Genetic Manipulations etc.,
			CO4 - To understand the principles of the mechanism of some biotechnologically derived diagnostic aids/tests.
I	22117AEC15L	Fundamentals of Biotechnology Lab	CO1 - The learners will acquire knowledge on the structure and functions relationship of biological system and as well their roll in various biological process
I	22115AEC14A	Microbiology -I	CO1 - Understand the history of microbiology

			CO2 - Analyze the types of microscope
			CO3 - Understand the general characteristics of microbes
			CO4 - To study out line classification of bacteria
			CO5 - Evaluate the success of understanding the characterization and cultivation of microbes
I	22116AEC16L	Microbiology Lab-I	CO1 - The molecular orbital theory, preparation and properties of inorganic compounds
			CO2 - Theory of covalent bond, polar effects and stereochemistry of organic compounds
			CO3 - Elements of photochemistry, chemical kinetics and chromatography
I	221ACLSUHV	Universal Human Values	**CO1** - Know about universal human values and understand the importance of values in individual, social circles, career path, and national life.
			CO2 - Learn from case studies of lives of great and successful people who followed and practised human values and achieved self-actualisation.
			CO3 - Become conscious practitioners of human values.
			CO4 - Realise their potential as human beings and conduct themselves properly in the ways of the world.
I	221ACLSICN	Indian Constitution	**CO1** - Democratic values and citizenship Training and gained
			CO2 - Awareness on fundamental Rights are established
			CO3 - The functions of union Government and State Government are learnt
			CO4 - The Power and functions of the Judiciary learnt thoroughly
			CO5 - Appreciation of Democratic Parliamentary Rule is learnt
II	22110AEC21	Language-II (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.
II	22111AEC21	Advanced English-II	**CO1**- Develop technological skills.
			CO2 - Able to write in a variety of formats
			CO3 - Read biographies and develop personality
II	22111AEC22	English-II	**CO1** - Appreciate different forms of literature
			CO2 - Acquire language skills through literature
			CO3 - Broadens the horizon of knowledge
II	22117AEC23	Cell Biology and Genetics	**CO1** - 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.
II	22117AEC25L	Cell Biology and Genetics lab	**CO1** - It will provide an understanding of the unique features of plant cells and animal cell

			CO2 - Gain understanding on the interaction between cells and the environment
II	22116AEC24	Microbiology-II	**CO1 -** Students will gain rigorous foundation in various methods to cultivate the microbes and maintenance of the microorganism
II	22116AEC26L	Microbiology-II lab	**CO1** - This curse will provide to this students about the mechanics of experimentation methods of genetics
II	22117RLC27	Research LED Seminar	**CO1 -** Exposure to various research domains
			CO2 - Acquaintance with languages of research
			CO3 - Development of research aptitude
II	221ACSSBBE	Basic Behavioral Etiquette	**CO1 -** Eliminating negative thought, developing enriching habits, unlocking individual potentials and well-versed communication
II	221ACLSCOS	Communicative skills	**CO1 -** By the end of this program participants should have a clear understanding of what good communication skills are and what they can do to improve their abilities
III	22110AEC31	Language-III (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
III	22111AEC31	Advanced English-III	**CO1 -** Understand phonetics.
			CO2 - Develop writing skill
			CO3 - Able to develop creative writing
III	22111AEC32	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.
III	22115AEC34	Biochemistry-I	CO1 - The course will ensure basic understanding of physical, chemical and functional properties of macromolecules and principles of bioenergetics.
			CO2 - Understand the chemical reactions for synthesis and breakdown of carbohydrates, amino acids, purines and pyrimidine, and lipids
			CO3 - Analyze the mechanistic basis for the action of selected enzymes, the thermodynamic basis for the folding and assembly of proteins and other macromolecules
			CO4 - Describe the biochemistry of a variety of well-characterized human physiological processes
			CO5 - Grasp key concepts of production of bile pigments
III	22115AEC36L	Biochemistry Lab-I	CO1 - Understanding the principles of Electrophoresis, and their applications in biological investigations/experiments.
			CO2 - Obtain hands-on training in basic separation techniques in biochemistry
			CO3 - Gain expertise in the isolation of various cell organelles and staining of cellular biomolecules
			CO4 - Quantify various biomolecules
			CO5 - The student will be able to Separate carbohydrates by paper chromatography

III	22117AEC33	Immunology	**CO1 -** The students may understanding the immune system, its components and various techniques used in bio manipulation.
III	22117AEC35L	Immunology Lab	**CO1 -** Identify the structure, function, and characteristics of immunoglobulins.
			CO2 - Explain the principles of and perform serological tests.
			CO3 - It's a paper which accomplishes the learning of techniques involved in understanding the immunological aspects of physiology and biological samples
III	22117RMC37	Research Methodology	**CO1 -** Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computational frameworks used in mathematical researches.
III	221ACLSOAN	Office Automation	**CO1 -** After completion of the course, students would be able to documents, spreadsheets, make small presentations and would be acquainted with internet
IV	22110AEC41	Language-IV (Tamil-IV)	**CO1 -** Realize how the ancient people changed their lifestyle according to the ages
			CO2 - Learn how to change one's lifestyle according to the needs of the future
			CO3 - Accept the modern trends and its uses
IV	22111AEC41	Advanced English-IV	**CO1 -** Develop writing skill.
			CO2 - Comprehend and describe poems
			CO3 - Learn interviewing skills
IV	22111AEC42	English-IV	**CO1 -** Improve their ability to read and understand them
			CO2 - Know the genius of Shakespeare
			CO3 - Express in writing their views.
IV	22117AEC43	Animal physiology	**CO1 -** To provide advanced undergraduate and introductory graduate students with a comprehensive overview of animal physiology from molecular, cellular and whole animal systems approaches.
			CO2 - To critically evaluate clinical and research case problems relating to endocrinology and cell biology.
IV	22117AEC46L	Animal Physiology Lab	CO1 - 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
			CO2 - Understand how changes in one system may impact a different system
IV	22117AEC44	Molecular biology	CO1 - To Understand the regulation of protein and nucleic acids function
			CO2 - To know the structure-function relationships and macromolecular interactions
			CO3 - To find out newer methods to implement rDNA Technology for various organisms
			CO4 - To understand several modern molecular methods to elucidate molecular and genetic questions
IV	22117AEC47L	Molecular Biology Lab	**CO1 -** To know the isolation methods of protein and nucleic acids

			CO2 - To know the structure-function of nucleic acid and protein
			CO3 - To find out newer methods to implement rDNA Technology for various organisms
			CO4 - To understand several modern molecular methods to elucidate molecular and genetic questions
IV	221ENSTU45	Environmental Studies	CO1 - Students will gain about environmental pollutions, preventive measures
			CO2 - Student will gain information related to societal issues in concern with environment.
			CO3 - Students should have out line knowledge on natural resources and effective management of resources
IV	221ACLSLMS	Leadership and Management Skills	CO1 - Examine various leadership models and understand/assess their skills, strengths and abilities that affect their own leadership style and can create their leadership vision
			CO2 - Learn and demonstrate a set of practical skills such as time management, self management, handling conflicts, team leadership, etc.
			CO3 - Understand the basics of entrepreneurship and develop business plans
			CO4 - Apply the design thinking approach for leadership
			CO5 - Appreciate the importance of ethics and moral values for making of a balanced personality
V	22117AEC51	Food and Agricultural Biotechnology	CO1 - To study about molecular biology and enzymes and fermentation in food
			CO2 - To understand the food production and preservation techniques
			CO3 - To acquire knowledge on agricultural techniques
			CO4 - To know the knowledge about genetically modified food
			CO5 - To understand food safety and standards
V	22117SEC52	Cell and Tissue culture	**CO1 -** The students should be able to know how to use different sources of tissues
V	22117AEC53	Industrial Biotechnology	CO1 - To understand the vital role of various substrate used in fermentation
			CO2 - To Learn the different types of reactors or fermenters
			CO3 - To gain knowledge about upstream and downstream processing
			CO4 - To acquire the knowledge on different product production
V	22117AEC54L	Food and Agricultural Biotechnology, Tissue Culture Lab	**CO1** - To introduce basic processes in food technology and regulatory bodies and various factors in food shelf life evaluation
			CO2 - Discuss the basic processes of plant metabolism, transport, nutrition, growth, and reproduction
V	22117AEC56L	Industrial Biotechnolo-	CO1 - To gain knowledge on enzyme production and characteristic analysis

		gy Lab	CO2 - To know the industrial process of various product production
			CO3 - To gain the knowledge on industrial strain isolation and purification
V	22117DSC54A	Discipline Specific Elective -I rDNA Technology	**CO1 -** This paper provides the student a thorough knowledge in principles and methods in genetic engineering and their applications.
V	22117DSC54B	Discipline Specific Elective -I Bioinformatics and Bio-statistics	CO1 - Know the applications and limitations of different bioinformatics and statistical methods.
			CO2 - Be able to perform and interpret bioinformatics and statistical analyses with real molecular biology data
			CO3 - Be able to describe statistical methods and probability distributions relevant for molecular biology data
V	22117DSC54C	Discipline Specific Elective -I The Science of Stem Cell	CO1 – It will develop into the basic research that uncovers the molecular mechanisms and cell *biology of stem cell* properties and functions.
V	22117DSC54D	Discipline Specific Elective -I Patenting in Bio-technology	CO1 – They should be able to analyze the social-economic significance of the intellectual property
			CO2 – Students will learn about patenting issues in exponential technologies like Artificial intelligence, Advanced Robotics, Virtual and Augmented Reality, Biotechnology, Nano- Technology
V	22117DSC54E	Discipline Specific Elective -I Renewable Energy	CO1 – Able to understand the renewable energy sources available at present
			CO2 – Able to understand the solar energy operation and its characteristics
			CO3 – To educate the wind energy operation and its types
			CO4 – To educate the tidal and geothermal energy principles and its operation
V	22117DSC54F	Discipline Specific Elective -I Molecular Docking	CO1 – To determine the interaction of two molecules and to find the best orientation of ligand, which would form a complex with overall minimum energy
V	22117DSC54G	Discipline Specific Elective -I Medicinal science	CO1 – Understand the chemistry of drugs with respect to their pharmacological activity
V	22117DSC54H	Discipline Specific Elective -I Clinical Engineering	CO1 – Understanding Complex Hospital Equipment
			CO2 – Reducing the risk of Healthcare Technology
			CO3 – Implementing and Integrating Medical Devices
V	22117DSC54I	Discipline Specific Elective -I Clinical Research	CO1 – To understand the protocol or study design and the concept of Clinical Trials.
			CO2 – To perform database or procedure testing, data validation, SAE reconciliation and medical coding

			CO3 – To learn the Processes of Drug Development
			CO4 – To understand the Ethics & regulatory perspectives on clinical research trials activities
			CO5 – To understand how pharmacovigilance, Project Management and Medical Affairs teams function and coordinate with different stakeholders.
V	22117BRC57	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
V	221ACLSPSL	Professional Skills	CO1 - Prepare their resume in an appropriate template without grammatical and other errors and using proper syntax
			CO2 - Participate in a simulated interview
			CO3 - Actively participate in group discussions towards gainful employment
			CO4 - Capture a self - interview simulation video regarding the job role concerned
			CO5 - Enlist the common errors generally made by candidates in an interview
			CO6 - Perform appropriately and effectively in group discussions
			CO7 - Explore sources (online/offline) of career opportunities
			CO8 - Identify career opportunities in consideration of their own potential and aspirations
			CO9 - Use the necessary components required to prepare for a career in an identified occupation (as a case study).
VI	22117AEC61	Plant and Animal Biotechnology	**CO1 -** Basic concepts and procedures, pitfalls, and remedies of using machine learning
VI	22117SEC62	Applied Biotechnology	**CO1 -** Evaluate and describe systems of product research, development, and production
			CO2 - Analyze the potential for commercialization for innovations within the biotechnology industry
			CO3 - The students will gain the basic knowledge of aquaculture and Students will solve a variety of problems using creative thinking skills and analytical skills in the lab.
VI	22117SEC64L	Plant, Animal and Applied Biotechnology Lab	CO1 - Economic aspects of transgenic animals and Ethical issues of animal welfare and animal rights.
			CO2 - Determination of IAA Activity
VI	22117AEC65L	Applied Biotechnology Lab	**CO1 -** To present an overview of important environmental biotechnologies involved in treatment of pollutants and resource recovery
			CO2 - The students will be able to demonstrate the use of environmental science principle in solving various environmental problems
			CO3 - Describe the most commonly applied disinfection methods, and the steps typically involved in drinking water treatment process

VI	22117DSC63A	Discipline Specific Elective - II Environmental Biotechnology	**CO1 -** Biofuels: Advantages, Energy from biomass, Biogas, Biohydrogen, Biosafety, Toxicity Bio magnification, Threshold Dose, Factor Affecting Toxicity.
			CO2 - Students will gain about environmental pollutions, preventive measures.
			CO3 - Explain the microbial processes and growth requirements undelaying the activated sludge process, nitrification, denitrification, enhanced phosphorus removal, and anaerobic digestion
VI	22117DSC63B	Discipline Specific Elective - II Pharmaceutical Biotechnology	CO1 - Know the significance and application of biotechnology in healthcare sector
			CO2 - Appreciate relevance of microorganisms from industrial context
			CO3 - Explain and apply design and operations of various fermenters; the fundamental principles for basic methods in production technique for biobased products
			CO4 - Explain and apply of important microbial/enzymatic industrial processes
VI	22117DSC63C	Discipline Specific Elective - I Tools in Biostatistics	CO1 – It will demonstrate the specific and measurable statements that define the knowledge, skills, and attitudes learners
VI	22117DSC63D	Discipline Specific Elective - I Excremental Biotechnology	CO1 - The techniques used in the visualization of cellular components and macromolecules
VI	22117DSC63E	Discipline Specific Elective - I Genetics and Society	CO1 - Students will be taught Mendelian genetics, their principles and gene interaction
			CO2 - The student will gain a basic understanding on human genetics and hereditary
VI	22117DSC63F	Discipline Specific Elective - I System Biology and Biotechnology	CO1 - To explain genome organization in Prokaryotes and Eukaryotes
			CO2 - To describe Nucleic acids Replication, Recombination and its Repair Mechanisms
			CO3 - To know how about the Interaction of Computer and Biology
			CO4 - To understand the Knowledge about Protein and Genome Databases.
VI	22117DSC63G	Discipline Specific Elective - I Cell Culture Technique	CO1 - To understand the basic requirements for culturing human and animal cells in vitro
			CO2 - To make the students strong in theoretical and practical approaches in the cell culture techniques and its application to enhance their research career
VI	22117PRW67	Project Work	**CO1 -** Understand basic concepts of research and its methodologies
			CO2 - Identify appropriate research problem and parameters
			CO3 - Prepare a research report
VI	221ACSSIST	Interview Skills Training and Mock Test	CO1 – To provides job seekers an opportunity to practice, receive feedback and improve their skills
VI	221ACLSCET	Community Engagement	CO1 - Gain an understanding of rural life, culture and social realities
			CO2 - Develop a sense of empathy and bonds of mutuality with local community
			CO3 - Appreciate significant contributions of local communities to Indian society and economy

			CO4 - Learn to value the local knowledge and wisdom of the community
			CO5 - Identify opportunities for contributing to community's socio-economic improvements

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School of Arts and Science

Department of Biotechnology

22PGBTGEC

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Program Outcomes and Course outcomes of

M.Sc., Biotechnology

PROGRAMME OUTCOMES	
PO1	Vital Thinking: Acquire knowledgeable actions after identifying the hypothesis that frame our idea and dealings, read-through out the degree to which these hypothesis are precise and suitable, and give the impression of being at our thoughts and assessments (academic, organizational and individual) from diverse perception.
PO2	Precious communication: Study about speak, read, write and listen noticeably in person and throughout electronic media in English and in one Indian language

	and build meaning of the globe by connecting people, thoughts books, media and technology.
PO3	Effectual citizenship: Reveal empathetic social concern and fairnesscentred national progress and the capability to act with andtake part in civic life through volunteering
PO4	Ethics: Be aware of diverse value systems including the individual, under the ethical dimensions of personal choice, and believe responsibility for them.
PO5	Environment and Sustainability: Analyze the importance of microbes for environmental clean-up and sustainable development.
PO6	Self-directed and life-long learning: To gain the talent to employ in self-determining and life-long learning in the broadest circumstance socio technological transforms.
PROGRAM SPECIFIC OUTCOME	
PSO1	Upon master graduation, Microbiology majors will master a set of advanced skills, which would be useful to function effectively as professionals and to their continued development and learning within the field of Microbiology.
PSO2	Able to explain why microorganisms are ubiquitous in nature, inhabiting a multitude of habitats and occupying a wide range of ecological habitats.
PSO3	Able to cite examples of the vital role of microorganisms in biotechnology, fermentation, medicine and other industries important to human well-being.
PSO4	Able to demonstrate that microorganisms have an indispensible role in the environment, including elemental cycles, biodegradation etc
PSO5	Able to systematically collect record and analyze data, identify sources of error, interpret the result and reach logical conclusion.
PROGRAM EDUCATIONAL OBJECTIVES	
PEO1	To provide detailed knowledge of Microbiology and their application fields. To understand the beneficial and harmful role of microorganisms in the environment and in the industries.
PEO2	To understand the fundamentals of physiological reactions including metabolic pathways and biochemical reactions in microorganisms. To understand the fundamental concepts of immunology, biochemistry, biotechnology and genetics etc.
PEO3	To develop human resource and entrepreneurs in microbiology with the ability to independently start their own ventures or small biotech units in the field of biotechnology.
PEO4	Understand modern microbiology - practices and approaches with an emphasis in technology application in pharmaceutical, medical, industrial, environmental and agricultural areas.
PEO5	Gain experience with standard molecular tools and approaches utilized: manipulate genes, gene products and organisms. Become familiar with handling of Laboratory animals for the research purpose. Interpret differences in data distributions via visual displays.

Semester	Course Code	Title of the Course	COs
I	22217SEC11	General Microbiology	**CO1 -** Students can gain the idea of how to identify the microorganisms based on the modern polyphasic approach.

	22217SEC12	Molecular genetics	**CO1 -** After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.
	22217SEC13	Biochemistry	**CO1 -** 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.
	22217SEC14L	Microbiology & Molecular Genetics Lab	**CO1 -** After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.
	22217DSC15A	Discipline specific elective I Immunology	**CO1 -** This course will provide the student insights into the various aspects of Immunology such as classical immunology, clinical immunology, Immunotherapy and diagnostic immunology.
	22217DSC15B	Discipline specific elective I Biosafety and Biodiversity	CO1 - To study the diversity of plants and animal life in a particular habitat, ethical issues and potential of biotechnology for the benefit of man kind
	22217DSC15C	Discipline specific elective I Forensic Identification	CO1 - Understanding how to photograph a scene using forensic photography techniques
			CO2 - Understanding how to use chemicals and/or powders to develop and/or enhance fingerprints on a variety of surfaces.
			CO3 - Knowledge of the roles and responsibilities of the forensic identification specialist within the Major Case Management model and the roles and responsibilities of the different units of the lab.
	22217DSC15D	Discipline specific elective I Co-operative Education	CO1 - It helps to learn about cooperation, cooperative movement and its principles
			CO2 - It facilitates a comparative study of cooperation and other economic systems
	22217DSC15E	Discipline specific elective I Computer Security and Computer Forensic	CO1 - To determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation
	22217DSC15F	Discipline specific elective I Pathology and Experimental Medicine	CO1 - To acquire knowledge about Basic and general pathology like Cell injury, adaptation, degeneration, Amyloidosis, necrosis, inflammation, hemodynamic disturbances and genetic disorders
			CO2 - To be able to understand basic Immunohematology, and general principles of transfusion medicine
	22217RLS16	Research Led Seminar	CO1 - Exposure to various research domains
			CO2 - Acquaintance with languages of research
			CO3 - Development of research aptitude

]II	22217SEC21	Cell & Molecular Biology	CO1 - 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.
	22217SEC22	Biophysics & Bioinformatics	CO1 - This paper has been designed to give the students comprehensive training in the emerging and exciting upcoming filed of Systems Biology, which will help students to get career in both industry/R&D.
	23217SEC23	Industrial Biotechnology	CO1 - This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment-friendly processes such as green manufacturing technologies and sustainable development.
	22217SEC24L	Molecular Biology & Industrial Biotechnology Lab	CO1 - 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
	22217DSC25A	Discipline specific elective II Endocrinology	CO1 -To know the pathophysiological significance of the system with special reference to humans.
	22217DSC25B	Discipline specific elective II Bioethics And IPR	CO1 - To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act. Further teacher will have to demonstrate with products and ask the student to identify the different types of IPR'
	22217DSC25C	Discipline specific elective II Chemical Biotechnology	CO1 – To know about biochemical, chemical, microbiological and process engineering methods to produce organic basic and fine chemicals using optimized enzymes, cells or microorganisms
	22217DSC25D	Discipline specific elective II Food Industry Roles and Responsibilities	CO1 – To develops sampling plans and procedures for testing product quality
	22217DSC25E	Discipline specific elective II Artificial Intelligence	CO1 – Understand the informed and uninformed problem types and apply search strategies to solve them. CO2 – Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area
	22217DSC25F	Discipline specific elective II Mathematics for Life Sciences	CO1 – A mathematical understanding of biological data, including data collection, visualization/display, and analysis.

			CO2 – An understanding of discrete mathematical models of biological systems
			CO3 – An understanding of key mathematical concepts relevant to life sciences including: discrete-time dynamics, vector and matrix operations, discrete probability
	22217RMC26	Research Methodology	CO1 - To culminate this final stage, students will learn to write a comprehensive research proposal that may be conducted in the future
	22217BRC27	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
III	22217AEC31	Genomics	CO1 - Acquire the aspects of Gene Contig and Shotgun method.
			CO2 - Know the features of the Genome Mapping databases.
	22217AEC32	Proteomics	CO1 - Gain knowledge on phylogenetic profiles
			CO2 - Describe the features of Yeast two-hybrid system.
	22217SEC33L	Genomics & Proteomics - Lab	CO1 - 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.
	22217DSC34A	Discipline specific elective III Nanobiotechnology	CO1 - This course will act as a bridge between students from non-biology course at all levels
	22217DSC34B	Discipline specific elective III Environmental biotechnology	CO1 - This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also who is willing to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment-friendly processes such as green manufacturing technologies and sustainable development
	22217DSC34C	Discipline specific elective III Ecology	CO1 - The students will understand the basics of Ecology & Environmental Sciences.
	22217DSC34D	Discipline specific elective III Biochemical Pathway	CO1 - Identify and present relevant information dealing with issues of molecular biology
	22217DSC34E	Discipline specific elective III Animal Health	CO1 – It will provide students with an understanding of basic immunology, epidemiology and disease investigation in *animals*
	22217DSC34F	Discipline specific elective III Translational Biology and Molecular Medicine	CO1 – It is anticipated that students in the basic science area will receive insights into the translational and clinical aspects of science and conversely that students in clinical medicine will have the opportunity to gain new insights into molecular mechanisms, disease models and preclinical work.

	22217SRC35	Design\socio technical research	CO1 - Familiarity with cutting edge research trends
IV	22217AEC41	Food Technology	CO1 - To understand the basic food safety issues in the food market
			CO2 - To develop and evaluate quality of new food products using objective and subjective methodologies.
			CO3 - To understand the basic concepts in food chemistry and food analysis
	22217AEC42	Bio instrumentation	CO1 - Check for analytical functions and find the analytical function and study
			CO2 - Learn the measurement systems, errors of measurement
			CO3 - Demonstrate basic knowledge of Biotechniques
	22217SEC43L	Food technology and Bio instrumentation lab	CO1 - Ability to apply principles of food engineering in industry.
			CO2 - Understand, identify and analyze a problem related to food industry and ability to find an appropriate solution for the same.
	22217DSC44A	Discipline specific elective IV Gene therapy utilization pharmacology	CO1 - Understand some of the types of disease that might be treatable by gene therapy
			CO2 - Understand the basic principles of genetic manipulation
			CO3 - Understand how genetics may be used in the design of drugs
	22217DSC44B	Discipline specific elective IV Plant conservation & disaster management	CO1 - To make sustainable utilization of species and ecosystems
			CO2 - Familiarity with disaster management theory (cycle, phases) Knowledge about existing global frameworks and existing agreements (e.g. Sendai)
			CO3 - Regulatory practices, biosensors and applications in Pharmaceuticals
			CO4 - Quality Assurance and Validation
	22217DSC44C	Discipline specific elective IV Biotherapeutics	CO1 – It will find a job in the field of drug discovery and design, or the development and production of biologics, including quality, safety, and clinical trials.
	22217DSC44D	Discipline specific elective IV Live Stock Production & Management	CO1 - Student will able to understand role of livestock in agriculture economy
			CO2 - Student will able to able to learn management livestock and poultry
	22217DSC44E	Discipline specific elective IV Veterinary Medicine	CO1 - Students learned about general and systemic veterinary medicine, zoo and wild life medicine

22217PRW45	Project work	CO1 - Experience from a master's project and international literature
		CO2 - Develop ability to independently carry out a complete scientific process
		CO3 - Learn about how to write dissertations and proposals for the scientific community

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Program Outcomes and Course outcomes of
B.Sc., Mapping of COs and Pos

Semester	Course Code	Title of the Course	COs	POS						
				PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	22110AEC11	Language-I (Tamil-I)	CO1 - Learn the changes that have occurred in literature since the classical period.	3	0	2	1	2	0	2
			CO2 - Make use of vocabulary systematically.	2	1	2	0	1	2	3
			CO3 - Understand how to lead one's life realizing the modernity and its environment/atmosphere.	3	2	1	0	2	2	1
I	22111AEC11	Advanced English-I	CO1 - Develop vocabulary	1	2	2	0	3	1	2
			CO2 - Learn to edit and do proof reading	1	2	0	3	2	0	1
			CO3 - Read and comprehend literature	1	1	2	0	1	2	3
I	22111AEC12	English-I	CO1 - Read and comprehend literature	2	1	2	3	0	3	2

			CO2 - Appreciate poetry and prose	3	0	1	2	2	2	3
			CO3 - Familiarize students with fiction.	0	1	2	1	3	0	3
I	22117AEC13	Fundamentals of Biotechnology	CO1 - The students do understand the importance of plant and animal diversity and their conservation through invitro propagation and maintenance	2	0	3	1	2	0	3
			CO2 - Exploited techniques in molecular biology like isolation of animal and plant genomic DNA, their separation by gel electrophoresis, and amplification of separated DNA by polymerase chain reaction.	2	3	0	3	2	2	1
			CO3 - To gain knowledge in Concept of Biology, Biomolecules, Genetics, DNA Technology, Bioinformatics, Nanotechnology, Genetic Manipulations etc.,	3	3	2	1	0	2	3
			CO4 - To understand the principles of the mechanism of some biotechnologically derived diagnostic aids/tests.	1	1	2	0	2	2	3
I	22117AEC15L	Fundamentals of Biotechnology Lab	CO1 - The learners will acquire knowledge on the structure and functions relationship of biological system and as well their roll in various biological process	3	2	0	2	3	1	2
I	22115AEC14A	Microbiology -I	CO1 - Understand the history of microbiology	3	0	1	1	2	2	3
			CO2 - Analyze the types of microscope	1	2	3	1	2	3	3
			CO3 - Understand the general characteristics of microbes	1	1	2	0	1	2	3
			CO4 - To study out line classification of bacteria	2	0	3	2	1	0	1
			CO5 - Evaluate the success of understanding the characterization and cultivation of microbes	3	2	0	1	0	2	1
I	22116AEC16L	Microbiology Lab-I	CO1 - The molecular orbital theory, preparation and properties of inorganic compounds	1	3	0	1	0	2	2

			CO2 - Theory of covalent bond, polar effects and stereochemistry of organic compounds	3	2	1	0	2	3	1
			CO3 - Elements of photochemistry, chemical kinetics and chromatography	3	1	1	2	2	3	0
I	221ACLSUHV	Universal Human Values	CO1 - Know about universal human values and understand the importance of values in individual, social circles, career path, and national life.	2	3	2	1	2	3	3
			CO2 - Learn from case studies of lives of great and successful people who followed and practised human values and achieved self-actualisation.	2	1	0	1	2	2	3
			CO3 - Become conscious practitioners of human values.	1	2	0	2	1	2	0
			CO4 - Realise their potential as human beings and conduct themselves properly in the ways of the world.	1	1	2	0	1	2	3
I	221ACLSICN	Indian Constitution	CO1 - Democratic values and citizenship Training and gained	1	2	2	0	1	1	2
			CO2 - Awareness on fundamental Rights are established	1	3	0	2	1	1	2
			CO3 - The functions of union Government and State Government are learnt	1	2	0	2	1	1	2
			CO4 - The Power and functions of the Judiciary learnt thoroughly	1	1	2	2	0	1	2
			CO5 - Appreciation of Democratic Parliamentary Rule is learnt	1	1	1	2	0	2	3
II	22110AEC21	Language-II (Tamil-II)	CO1 - Know what devotion really is.	2	0	2	2	1	1	1
			CO2 - Know the fruitfulness obtained through devotion	1	2	3	1	0	2	1
			CO3 - Perceive the progress achieved in the society through devotion.	1	3	2	1	0	1	2
II	22111AEC21	Advanced English-II	CO1 - Develop technological skills.	1	2	2	3	0	3	2
			CO2 - Able to write in a variety of formats	1	2	2	1	2	1	2

			CO3 - Read biographies and develop personality	2	2	3	0	3	2	1
II	22111AEC22	English-II	CO1 - Appreciate different forms of literature	1	1	1	0	3	3	2
			CO2 - Acquire language skills through literature	3	2	1	0	2	2	1
			CO3 - Broadens the horizon of knowledge	2	1	2	0	3	1	1
II	22117AEC23	Cell Biology and Genetics	CO1 - 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.	2	0	2	3	3	2	1
II	22117AEC25L	Cell Biology and Genetics lab	CO1 - It will provide an understanding of the unique features of plant cells and animal cell	2	1	1	0	1	2	3
			CO2 - Gain understanding on the interaction between cells and the environment	1	2	0	2	1	3	2
II	22116AEC24	Microbiology-II	CO1 - Students will gain rigorous foundation in various methods to cultivate the microbes and maintenance of the microorganism	1	2	1	1	0	2	3
II	22116AEC26L	Microbiology-II lab	CO1 - This curse will provide to this students about the mechanics of experimentation methods of genetics	2	1	2	0	3	2	1
II	22117RLC27	Research LED Seminar	CO1 - Exposure to various research domains	3	2	1	1	2	0	2
			CO2 - Acquaintance with languages of research	2	3	2	3	0	1	2
			CO3 - Development of research aptitude	2	1	0	2	3	1	2
II	221ACSSCBBE	Basic Behavioral Etiquette	CO1 - Eliminating negative thought, developing enriching habits, unlocking individual potentials and well-versed communication	3	2	1	2	0	2	1
II	221ACLSCOS	Communicative skills	CO1 - By the end of this program participants should have a clear understanding of what good communication skills are and what they can do to improve their abilities	2	1	2	0	1	1	1
III	22110AEC31	Language-III (Tamil-III)	CO1 - Achieve one's goal by following the ancestral path	2	1	0	2	1	3	2
			CO2 - Learn to lead life of perfection by realizing the uncertainty in the life	2	0	3	2	1	2	3

			CO3 - Attain happiness through honesty	2	3	2	1	0	1	1
III	22111AEC31	Advanced English-III	CO1 - Understand phonetics.	0	1	2	1	1	1	1
			CO2 - Develop writing skill	1	2	1	3	3	2	1
			CO3 - Able to develop creative writing	1	2	1	2	3	1	2
III	22111AEC32	English-III	CO1 - Enable to appreciate different types of prose	1	2	0	3	2	1	1
			CO2 - Develop the conversational skills through one-act plays	2	3	1	2	3	0	2
			CO3 - Enhance the skill of making grammatically correct sentences.	3	3	0	2	1	2	2
III	22117AEC33	Immunology	CO1 - The students may understanding the immune system, its components and various techniques used in bio manipulation	1	2	3	2	3	3	1
III	22115AEC34	Biochemistry-I	CO1 - The course will ensure basic understanding of physical, chemical and functional properties of macromolecules and principles of bioenergetics.	2	3	1	3	0	3	3
			CO2 - Understand the chemical reactions for synthesis and breakdown of carbohydrates, amino acids, purines and pyrimidine, and lipids	1	2	0	1	1	1	2
			CO3 - Analyze the mechanistic basis for the action of selected enzymes, the thermodynamic basis for the folding and assembly of proteins and other macromolecules	0	0	0	3	0	0	0
			CO4 - Describe the biochemistry of a variety of well-characterized human physiological processes	1	2	1	1	0	1	2
			CO5 - Grasp key concepts of production of bile pigments	1	0	1	1	0	1	1
III	22117AEC35L	Immunology Lab	CO1 - Identify the structure, function, and characteristics of immunoglobulins.	1	2	0	1	1	1	0
			CO2 - Explain the principles of and perform serological tests.	1	1	0	2	2	1	1

			CO3 - It's a paper which accomplishes the learning of techniques involved in understanding the immunological aspects of physiology and biological samples	1	1	0	2	1	2	1
III	22115AEC36L	Biochemistry Lab-I	CO1 - Understanding the principles of Electrophoresis, and their applications in biological investigations/experiments.	1	0	2	1	2	2	1
			CO2 - Obtain hands-on training in basic separation techniques in biochemistry	1	2	1	1	0	1	2
			CO3 - Gain expertise in the isolation of various cell organelles and staining of cellular biomolecules	1	2	0	1	1	2	2
			CO4 - Quantify various biomolecules	2	1	0	1	1	1	1
			CO5 - The student will be able to Separate carbohydrates by paper chromatography	2	1	0	1	0	1	2
III	22117RMC37	Research Methodology	CO1 - Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computational frameworks used in mathematical researches.	1	1	2	1	2		1
III	221ACLSOAN	Office Automation	CO1 - After completion of the course, students would be able to documents, spreadsheets, make small presentations and would be acquainted with internet	1	0	2	2	0	2	0
IV	22110AEC41	Language-IV (Tamil-IV)	CO1 - Realize how the ancient people changed their lifestyle according to the ages	1	1	1	1	1	0	1
			CO2 - Learn how to change one's lifestyle according to the needs of the future	3	3	2	1	3	0	3
			CO3 - Accept the modern trends and its uses	2	1	2	3	0	2	2
IV	22111AEC41	Advanced English-IV	CO1 - Develop writing skill.	2	1	2	3	2	1	2
			CO2 - Comprehend and describe poems	1	2	2	3	3	2	1
			CO3 - Learn interviewing skills	1	2	3	2	0	1	2

IV	22111AEC42	English-IV	CO1 - Improve their ability to read and understand them	1	3	0	2	1	1	2
			CO2 - Know the genius of Shakespeare	2	1	3	2	3	1	2
			CO3 - Express in writing their views.	1	2	0	2	1	0	2
IV	22117AEC43	Animal physiology	CO1 - 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	1	1	1	0	1	2	2
			CO2 - Understand how changes in one system may impact a different system	2	2	3	2	3	1	2
IV	22117AEC46L	Animal Physiology Lab	CO1 - Have an enhanced knowledge and appreciation of mammalian physiology	1	2	0	1	2	0	1
			CO2 - Understand the functions of important physiological systems including the cardiorespiratory, renal, reproductive and metabolic systems	0	1	2	1	0	1	1
IV	22117AEC44	Molecular biology	CO1 - To Understand the regulation of protein and nucleic acids function	1	0	1	2	1	1	1
			CO2 - To know the structure-function relationships and macromolecular interactions	1	2	0	1	2	1	1
			CO3 - To find out newer methods to implement rDNA Technology for various organisms							
			CO4 - To understand several modern molecular methods to elucidate molecular and genetic questions	1	2	0	1	1	0	1
IV	22117AEC47L	Molecular Biology Lab	CO1 - To know the isolation methods of protein and nucleic acids	1	2	0	1	1	1	1
			CO2 - To know the structure-function of nucleic acid and protein	1	2	3	0	3	3	2
			CO3 - To find out newer methods to implement rDNA Technology for various organisms	1	2	2	0	1	2	3

			CO4 - To understand several modern molecular methods to elucidate molecular and genetic questions	2	1	0	3	2	1	1
IV	221ENSTU45	Environmental Studies	CO1 - Students will gain about environmental pollutions, preventive measures	3	1	1	0	1	2	1
			CO2 - Student will gain information related to societal issues in concern with environment.	1	2	2	0	1	2	3
			CO3 - Students should have out line knowledge on natural resources and effective management of resources	2	1	0	3	2	1	1
IV	221ACLSLMS	Leadership and Management Skills	CO1 - Help students to develop essential skills to influence and motivate others	1	0	3	1	1	2	2
			CO2 - Inculcate emotional and social intelligence and integrative thinking for effective leadership	1	2	3	0	3	3	2
			CO3 - Create and maintain an effective and motivated team to work for the society	1	0	2	1	2	3	2
			CO4 - Nurture a creative and entrepreneurial mindset	1	2	0	1	2	3	1
			CO5 - Make students understand the personal values and apply ethical principles in professional and social contexts	3	2	0	2	1	2	3
V	22117AEC51	Food and Agricultural Biotechnology	CO1 - To study about molecular biology and enzymes and fermentation in food	1	2	3	0	1	2	3
			CO2 - To understand the food production and preservation techniques	3	0	3	2	0	2	1
			CO3 - To acquire knowledge on agricultural techniques	3	2	1	0	2	1	3
			CO4 - To know the knowledge about genetically modified food	1	2	3	0	1	2	1

			CO5 - To understand food safety and standards	2	1	1	1	2	0	3
V	22117SEC52	Cell and Tissue culture	CO1 - The students should be able to know how to use different sources of tissues	2	3	3	2	2	0	1
V	22117AEC53	Industrial Biotechnology	CO1 - To understand the vital role of various substrate used in fermentation	1	2	3	3	2	2	3
			CO2 - To Learn the different types of reactors or fermenters	3	2	3	0	2	1	3
			CO3 - To gain knowledge about upstream and downstream processing	1	2	2	1	2	3	1
			CO4 - To acquire the knowledge on different product production	2	1	1	2	1	2	1
V	22117AEC54L	Food and Agricultural Biotechnology, Tissue Culture Lab	CO1 - To introduce basic processes in food technology and regulatory bodies and various factors in food shelf life evaluation	1	2	1	0	3	2	1
			CO2 - Discuss the basic processes of plant metabolism, transport, nutrition, growth, and reproduction	1	3	2	1	1	2	3
V	22117AEC56L	Industrial Biotechnology Lab	CO1 - To gain knowledge on enzyme production and characteristic analysis	1	3	1	0	3	2	1
			CO2 - To know the industrial process of various product production	1	1	2	1	2	0	1
			CO3 - To gain the knowledge on industrial strain isolation and purification	1	0	1	2	1	1	1
V	22117DSC54A	Discipline Specific Elective -I rDNA Technology	CO1 - This paper provides the student a thorough knowledge in principles and methods in genetic engineering and their applications.	1	2	1	1	1	0	3
V	22117DSC54B	Discipline Specific Elective -I	CO1 - Know the applications and limitations of different bioinformatics and statistical methods.	1	3	2	1	1	2	3

		Bioinformatics and Biostatistics	CO2 - Be able to perform and interpret bioinformatics and statistical analyses with real molecular biology data	1	2	3	0	2	1	1
			CO3 - Be able to describe statistical methods and probability distributions relevant for molecular biology data	1	1	2	1	0	1	1
V	22117DSC54C	Discipline Specific Elective -I The Science of Stem Cell	CO1 – It will develop into the basic research that uncovers the molecular mechanisms and cell *biology of stem cell* properties and functions.	1	2	1	1	0	2	2
V	22117DSC54D	Discipline Specific Elective -I Patenting in Biotechnology	CO1 – They should be able to analyze the social-economic significance of the intellectual property	1	1	0	1	1	0	1
			CO2 – Students will learn about patenting issues in exponential technologies like Artificial intelligence, Advanced Robotics, Virtual and Augmented Reality, Biotechnology, Nano- Technology	1	2	1	0	1	2	1
V	22117DSC54E	Discipline Specific Elective -I Renewable Energy	CO1 – Able to understand the renewable energy sources available at present	1	2	3	0	2	1	1
			CO2 – Able to understand the solar energy operation and its characteristics	1	2	3	1	1	0	2
			CO3 – To educate the wind energy operation and its types	1	0	2	3	2	1	3
			CO4 – To educate the tidal and geothermal energy principles and its operation	1	2	3	3	2	1	3
V	22117DSC54F	Discipline Specific Elective -I Molecular Docking	CO1 – To determine the interaction of two molecules and to find the best orientation of ligand, which would form a complex with overall minimum energy	3	1	1	0	2	1	2
V	22117DSC54G	Discipline Specific Elective -I Medicinal science	CO1 – Understand the chemistry of drugs with respect to their pharmacological activity	1	0	2	2	1	3	2

V	22117DSC54H	Discipline Specific Elective -I Clinical Engineering	CO1 – Understanding Complex Hospital Equipment	2	1	3	2	1	3	1
			CO2 – Reducing the risk of Healthcare Technology	2	1	3	2	1	1	2
			CO3 – Implementing and Integrating Medical Devices	1	2	1	2	3	1	2
V	22117DSC54I	Discipline Specific Elective -I Clinical Research	CO1 – To understand the protocol or study design and the concept of Clinical Trials.	3	2	0	2	1	2	1
			CO2 – To perform database or procedure testing, data validation, SAE reconciliation and medical coding	1	2	3	2	1	1	3
			CO3 – To learn the Processes of Drug Development	2	3	0	1	1	1	1
			CO4 – To understand the Ethics & regulatory perspectives on clinical research trials activities	1	2	2	3	1	2	1
			CO5 – To understand how pharmacovigilance , Project Management and Medical Affairs teams function and coordinate with different stakeholders.	1	0	2	1	2	1	1
V	22117BRC57	Participation in Bounded Research	CO1 - Hands on exposure to problem solving tools in contemporary research	2	1	1	0	1	1	2
			CO2 - Evolution of research intuitiveness and orientation	3	2	0	2	1	2	1
			CO3 - Familiarity with cutting edge research trends	1	1	0	1	2	0	3
V	221ACLSPSL	Professional Skills	CO1 - Prepare their resume in an appropriate template without grammatical and other errors and using proper syntax	2	3	0	1	1	1	1
			CO2 - Participate in a simulated interview	3	0	2	1	2	0	2
			CO3 - Actively participate in group discussions towards gainful employment	2	1	2	0	1	2	3

			CO4 - Capture a self - interview simulation video regarding the job role concerned	3	2	1	0	2	2	1
			CO5 - Enlist the common errors generally made by candidates in an interview	1	2	2	0	3	1	2
			CO6 - Perform appropriately and effectively in group discussions	1	2	0	3	2	0	1
			CO7 - Explore sources (online/offline) of career opportunities	1	1	2	0	1	2	3
			CO8 - Identify career opportunities in consideration of their own potential and aspirations	2	1	2	3	0	3	2
			CO9 - Use the necessary components required to prepare for a career in an identified occupation (as a case study).	3	0	1	2	2	2	3
VI	22117AEC61	Plant and Animal Biotechnology	CO1 - Basic concepts and procedures, pitfalls, and remedies of using machine learning	0	1	2	1	3	0	3
VI	22117SEC62	Applied Biotechnology	CO1 - Evaluate and describe systems of product research, development, and production	2	0	3	1	2	0	3
			CO2 - Analyze the potential for commercialization for innovations within the biotechnology industry	2	3	0	3	2	2	1
			CO3 - The students will gain the basic knowledge of aquaculture and Students will solve a variety of problems using creative thinking skills and analytical skills in the lab.	3	3	2	1	0	2	3
VI	22117SEC64L	Plant, Animal and Applied Biotechnology Lab	CO1 - Economic aspects of transgenic animals and Ethical issues of animal welfare and animal rights.	1	1	2	0	2	2	3
			CO2 - Determination of IAA Activity	3	2	0	2	3	1	2
VI	22117AEC65L	Applied Biotechnology Lab	CO1 - To present an overview of important environmental biotechnologies involved in treatment of pollutants and resource recovery	3	0	1	1	2	2	3
			CO2 - The students will be able to demonstrate the use of environmental science principle in solving various environmental problems	1	2	3	1	2	3	3

			CO3 - Describe the most commonly applied disinfection methods, and the steps typically involved in drinking water treatment process	1	1	2	0	1	2	3
VI	22117DSC63A	Discipline Specific Elective – II Environmental Biotechnology	CO1 - Biofuels: Advantages , Energy from biomass, Biogas, Biohydrogen, Biosafety	2	0	3	2	1	0	1
			CO2 - Toxicity – Bio magnification, Threshold Dose, Factor Affecting Toxicity , Antidotal Procedure	3	2	0	1	0	2	1
VI	22117DSC63B	Discipline Specific Elective – II Pharmaceutical Biotechnology	CO1 - Know the significance and application of biotechnology in healthcare sector	1	3	0	1	0	2	2
			CO2 - Appreciate relevance of microorganisms from industrial context	3	2	1	0	2	3	1
			CO3 - Explain and apply design and operations of various fermenters; the fundamental principles for basic methods in production technique for biobased products	3	1	1	2	2	3	0
			CO4 - Explain and apply of important microbial/enzymatic industrial processes	2	3	2	1	2	3	3
VI	22117DSC63C	Discipline Specific Elective – II Tools in Biostatistics	CO1 – It will demonstrate the specific and measurable statements that define the knowledge, skills, and attitudes learners	2	1	0	1	2	2	3
VI	22117DSC63D	Discipline Specific Elective – II Excremental Biotechnology	CO1 - The techniques used in the visualization of cellular components and macromolecules	1	2	0	2	1	2	0
VI	22117DSC63E	Discipline Specific Elective – II Genetics and Society	CO1 - Students will be taught Mendelian genetics, their principles and gene interaction	1	1	2	0	1	2	3
			CO2 - The student will gain a basic understanding on human genetics and hereditary	1	2	2	0	1	1	2

VI	22117DSC63F	Discipline Specific Elective – II System Biology and Biotechnology	CO1 - To explain genome organization in Prokaryotes and Eukaryotes	1	3	0	2	1	1	2
			CO2 - To describe Nucleic acids Replication, Recombination and its Repair Mechanisms	1	2	0	2	1	1	2
			CO3 - To know how about the Interaction of Computer and Biology	1	1	2	2	0	1	2
			CO4 - To understand the Knowledge about Protein and Genome Databases.	1	1	1	2	0	2	3
VI	22117DSC63G	Discipline Specific Elective – II Cell Culture Technique	CO1 - To understand the basic requirements for culturing human and animal cells in vitro	2	0	2	2	1	1	1
			CO2 - To make the students strong in theoretical and practical approaches in the cell culture techniques and its application to enhance their research career	1	2	3	1	0	2	1
VI	22117PRW67	Project Work	CO1 - Understand basic concepts of research and its methodologies	1	3	2	1	0	1	2
			CO2 - Identify appropriate research problem and parameters	1	2	2	3	0	3	2
			CO3 - Prepare a research report	1	2	2	1	2	1	2
VI	221ACSSIST	Interview Skills Training and Mock Test	CO1 – To provides job seekers an opportunity to practice, receive feedback and improve their skills	2	2	3	0	3	2	1
VI	221ACLSCET	Community Engagement	CO1 - Gain an understanding of rural life, culture and social realities	1	1	1	0	3	3	2
			CO2 - Develop a sense of empathy and bonds of mutuality with local community	3	2	1	0	2	2	1
			CO3 - Appreciate significant contributions of local communities to Indian society and economy	2	1	2	0	3	1	1
			CO4 - Learn to value the local knowledge and wisdom of the community	2	0	2	3	3	2	1

PRIST DEEMED TO BE UNIVERSITY
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School of Arts and Science
Department of Biotechnology
22PGBTGEC
2022 Regulation
Program Outcomes and Course outcomes of
M.Sc., Mapping of COs and Pos

Semester	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
I	22217SEC11	General Microbiology	CO1 - Students can gain the idea of how to identify the microorganisms based on the modern polyphasic approach.	3	1	0	1	2	2
	22217SEC12	Molecular genetics	CO2 - After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.	2	0	0	1	2	2
	22217SEC13	Biochemistry	CO3 - This paper in biochemistry has been designed to provide the student with a firm foundation in the biochemical aspects of cellular functions which forms a base for their future research.	3	0	0	3	2	2
	22217SEC14L	Microbiology & Molecular Genetics Lab	CO1 - After successful completion of the paper the students will get an overall view about genetic makeup of organisms and can take up a career in research.	2	2	1	0	1	2

	22217DSC15A	Discipline specific elective I Immunology	CO1 - This course will provide the student insights into the various aspects of Immunology such as classical immunology, clinical immunology, Immunotherapy and diagnostic immunology.	2	1	1	0	0	1
	22217DSC15B	Discipline specific elective I Biosafety and Biodiversity	CO1 - To study the diversity of plants and animal life in a particular habitat, ethical issues and potential of biotechnology for the benefit of man kind	3	1	1	2	2	1
	22217DSC15C	Discipline specific elective I Forensic Identification	CO1 - Understanding how to photograph a scene using forensic photography techniques	3	2	1	0	2	2
			CO2 - Understanding how to use chemicals and/or powders to develop and/or enhance fingerprints on a variety of surfaces.	3	2	2	0	0	1
			CO3 - Knowledge of the roles and responsibilities of the forensic identification specialist within the Major Case Management model and the roles and responsibilities of the different units of the lab.	2	1	1	2	2	1
	22217DSC15D	Discipline specific elective I Co-operative Education	CO1 - It helps to learn about cooperation, cooperative movement and its principles	2	1	1	1	1	1
			CO2 - It facilitates a comparative study of cooperation and other economic systems	2	1	1	2	1	1
	22217DSC15E	Discipline specific elective I Computer Security and Computer Forensic	CO1 - To determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation	2	1	0	1	1	1

	22217DSC15F	Discipline specific elective I Pathology and Experimental Medicine	CO1 - To acquire knowledge about Basic and general pathology like Cell injury, adaptation, degeneration, Amyloidosis, necrosis, inflammation, hemodynamic disturbances and genetic disorders	2	1	0	0	1	2
			CO2 - To be able to understand basic Immunohematology, and general principles of transfusion medicine	1	2	0	1	1	3
	22217RLS16	Research Led Seminar	CO1 - Exposure to various research domains	2	2	1	1	2	2
			CO2 - Acquaintance with languages of research	1	2	1	1	2	2
			CO3 - Development of research aptitude	3	1	1	0	2	1
II	22217SEC21	Cell & Molecular Biology	CO1 - 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.	3	1	1	0	2	1
	22217SEC22	Biophysics & Bioinformatics	CO2 - This paper has been designed to give the students comprehensive training in the emerging and exciting upcoming filed of Systems Biology, which will help students to get career in both industry/R&D.	3	1	1	1	2	1
	22217SEC23	Industrial Biotechnology	CO1 - This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment-friendly processes such as green manufacturing technologies and sustainable development.	3	0	0	2	1	2
	22217SEC24L	Molecular Biology & Industrial Biotechnology Lab	CO1 - 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	3	1	0	3	1	1

	22217DSC25A	Discipline specific elective II Endocrinology	CO1 -To know the pathophysiological significance of the system with special reference to humans.	2	1	0	3	1	1
	22217DSC25B	Discipline specific elective II Bioethics And IPR	CO1 - To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act. Further teacher will have to demonstrate with products and ask the student to identify the different types of IPR'	2	2	0	3	2	1
	22217DSC25C	Discipline specific elective II Chemical Biotechnology	CO1 – To know about biochemical, chemical, microbiological and process engineering methods to produce organic basic and fine chemicals using optimized enzymes, cells or microorganisms	1	1	0	1	1	1
	22217DSC25D	Discipline specific elective II Food Industry Roles and Responsibilities	CO1 – To develops sampling plans and procedures for testing product quality	1	1	1	1	1	1
	22217DSC25E	Discipline specific elective II Artificial Intelligence	CO1 – Understand the informed and uninformed problem types and apply search strategies to solve them.	2	1	1	1	1	1
			CO2 – Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area	3	0	2	2	2	1
	22217DSC25F	Discipline specific elective II Mathematics for Life Sciences	CO1 – A mathematical understanding of biological data, including data collection, visualization/display, and analysis.	2	1	1	1	2	2

			CO2 – An understanding of discrete mathematical models of biological systems	2	1	2	1	1	2
			CO3 – An understanding of key mathematical concepts relevant to life sciences including: discrete-time dynamics, vector and matrix operations, discrete probability	2	2	2	1	1	2
	22217RMC26	Research Methodology	CO1 - To culminate this final stage, students will learn to write a comprehensive research proposal that may be conducted in the future	2	0	0	1	1	2
	22217BRC27	Participation in Bounded Research	CO1 - Hands on exposure to problem solving tools in contemporary research	2	0	0	1	1	2
			CO2 - Evolution of research intuitiveness and orientation	2	1	1	1	1	2
			CO3 - Familiarity with cutting edge research trends	3	0	1	1	1	2
III	22217SEC31	Genomics	CO1 - Acquire the aspects of Gene Contig and Shotgun method.	2	1	1	1	1	1
			CO2 - Know the features of the Genome Mapping databases.	3	0	1	0	2	1
	22217SEC32	Proteomics	CO1 - Gain knowledge on phylogenetic profiles	2	1	1	0	1	1
			CO2 - Describe the features of Yeast two-hybrid system.	3	1	2	0	2	1
	22217SEC33L	Genomics & Proteomics - Lab	CO1 - 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.	2	1	0	1	2	1

	22217DSC34A	Discipline specific elective III Nanobiotechnology	CO1 - This course will act as a bridge between students from non-biology course at all levels	2	0	0	1	2	2
	22217DSC34B	Discipline specific elective III Environmental biotechnology	CO1 - This course is important in the era of industrialization leading to environmental hazards and hence will help students to take up a career in tackling industrial pollution and also who is willing to take up the research in areas like development of biological systems for remediation of contaminated environments (land, air, water), and for environment- friendly processes such as green manufacturing technologies and sustainable development	1		0	1	2	2
	22217DSC34C	Discipline specific elective III Ecology	CO1 - The students will understand the basics of Ecology & Environmental Sciences.	1	1	1	1	1	2
	22217DSC34D	Discipline specific elective III Biochemical Pathway	CO1 - Identify and present relevant information dealing with issues of molecular biology	1		0	1	1	2
	22217DSC34E	Discipline specific elective III Animal Health	CO1 – It will provide students with an understanding of basic immunology, epidemiology and disease investigation in *animals*	3	1	0	1	2	2
	22217DSC34F	Discipline specific elective III Translational Biology and Molecular Medicine	CO1 – It is anticipated that students in the basic science area will receive insights into the translational and clinical aspects of science and conversely that students in clinical medicine will have the opportunity to gain new insights into molecular mechanisms, disease models and preclinical work.	2	0	0	1	2	2
III	22217SRC35	Design\socio technical research	CO1 - Familiarity with cutting edge research trends	3	0	0	3	2	2

IV	22217SEC41	Food Technology	CO1 - To understand the basic food safety issues in the food market	2	2	1	0	1	2
			CO2 - To develop and evaluate quality of new food products using objective and subjective Methodologies	2	1	1	0	0	1
			CO3 - To understand the basic concepts in food chemistry and food analysis	3	1	1	2	2	1
	22217SEC42	Bio instrumentation	CO1 - Check for analytical functions and find the analytical function and study	3	2	1	0	2	2
			CO2 - Learn the measurement systems, errors of measurement	3	2	2	0	0	1
			CO3 - Demonstrate basic knowledge of Biotechniques	2	1	1	2	2	1
	22217SEC43L	Food technology and Bio instrumentation lab	CO1 - Ability to apply principles of food engineering in industry.	2	1	1	1	1	1
			CO2 - Understand, identify and analyze a problem related to food industry and ability to find an appropriate solution for the same.	2	1	1	2	1	1
	22217DSC44A	Discipline specific elective IV Gene therapy utilization pharmacology	CO1 - Understand some of the types of disease that might be treatable by gene therapy	2	1	0	1	1	1
			CO2 - Understand the basic principles of genetic manipulation	2	1	0	0	1	2
			CO3 - Understand how genetics may be used in the design of drugs	1	2	0	1	1	3
	22217DSC44B	Discipline specific elective IV	CO1 - To make sustainable utilization of species and ecosystems	2	2	1	1	2	2

		Plant conservation & disaster management	CO2 - Familiarity with disaster management theory (cycle, phases)Knowledge about existing global frameworks and existing agreements (e.g. Sendai)	1	2	1	1	2	2
	22217DSC44C	Discipline specific elective IV Biotherapeutics	CO1 – It will find a job in the field of drug discovery and design, or the development and production of biologics, including quality, safety, and clinical trials.	3	1	1	0	2	1
	22217DSC44D	Discipline specific elective IV Live Stock Production & Management	CO1 - Student will able to understand role of livestock in agriculture economy	3	1	1	0	2	1
			CO2 - Student will able to able to learn management livestock and poultry	3	1	1	1	2	1
	22217DSC44E	Discipline specific elective IV Veterinary Medicine	CO1 - Students learned about general and systemic veterinary medicine, zoo and wild life medicine.	3	0	0	2	1	2
	22217PRW5	Project work	CO1 - Experience from a master's project and international literature.	3	1	0	3	1	1
			CO2 - Develop ability to independently carry out a complete scientific process.	2	1	0	3	1	1
			CO3 - Learn about how to write dissertations and proposals for the scientific community.	2	2	0	3	2	1

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

***1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University* (20UGMBGE)**

Program Outcomes and Course outcomes of

Department of Microbiology

22UGMBGEC

Regulation 2022

Local Need	
Regional Need	
National Need	
Global Need	

B.Sc., MICROBIOLOGY

2022 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEO)	
PEO1	To gain and apply knowledge of microorganisms concept to solve the problems.
PEO2	To identify, analyse and understand the problems related to microbes.
PEO3	Ability to design and develop solution to environment using the microbes.
PEO4	Ability to design performs experiments, analyse, and interpret data for investigating complex problems.
PEO5	To decide and apply appropriate tools and techniques for manipulations.

PROGRAM SPECIFI COUTCOME (PSO)	
PSO1	Expose input practical skills/competencies in working through microbes for study and use in the laboratory as well as outside, with the use of good microbiological practices.
PSO2	Obtain information and understanding of the microbiology perception as appropriate to various areas such as medical, industrial, environment, genetics, agriculture, food and others.
PSO3	Proficient enough to use microbiology knowledge and skills to study problems involving microbes, clear these with peers/ team members/ other stake holders, and undertake remedial measures/ studies etc.
PSO4	Developed a broader standpoint of the regulation of Microbiology to facilitateindividual to identify challenging societal troubles and plan them professional career to build upnoveldecision for such problems.

PROGRAMME OUTCOMES (POS)	
PO1	**Vital Thinking:** Acquire knowledgeable actions after identifying the hypothesis that frame our idea and dealings, read-through out the degree to which these hypothesis are precise and suitable, and give the impression of being at our thoughts and assessments (academic, organizational and individual) from diverse perception.
PO2	**Precious communication:** Study about speak, read, write and listen noticeably in person and throughout electronic media in English and in one Indian language and build meaning of the globe by connecting people, thoughts books, media and technology.
PO3	**Effectual citizenship:** Reveal empathetic social concern and fairnesscentred

	national progress and the capability to act with andtake part in civic life through volunteering.
PO4	**Ethics:** Be aware of diverse value systems including theindividual, under the ethical dimensions of personal choice, and believe responsibility for them.
PO5	**Environment and Sustainability:** Analyze the importance of microbes for environmental clean-up and sustainable development.
PO6	**Self directed and life-long learning:** To gain the talent to employ in self-determining and life-long learning in the broadest circumstance socio technological transforms.
PO7	**Economic liberty and employability potential:** Attain the ability to be concerned in economically sustainable opening and pound entrepreneurial skill.

B. Sc., CURRICULUM MAPPING

Programme Educational Objectives vs Programme Outcome

Programme Outcome-PO Programme Educational Objectives – PEO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
PEO1	*	*	*	*	
PEO2	*		*		*
PEO3		*		*	
PEO4	*	*	*		*
PEO5	*		*	*	

Course outcomes (Cos)
B.SC - MICROBIOLOGY

S.No	Semester	Course Code/Name	Course Outcome

CO1	**I**	**Tamil I**	• நடிப்பாற்றலை வளர்க்க உதவும். • படைப்பாற்றலுக்கு வழிவகுக்கும். • உளவியல் சிந்தனைத்திறனை வளர்க்க உதவும். • தற்கால இலக்கியப் படைப்புகளை வாசிக்கும் ஆர்வத்தை உண்டாக்கும். • கட்டுரை எழுதும் திறனை ஏற்படுத்தும் • படைப்பாளர்களின் படைப்பாளுமையைத் தெரிந்துகொள்ள வாய்ப்பாக அமையும்.
CO2	**I**	**English-I**	• Read and comprehend literature • Appreciate poetry and prose • Familiarize students with fiction.
CO3	**I**	**Fundamentals of Microbiology**	• Describe the characteristics of microorganisms and classification of biological system. • Understand concepts of growth and reproduction of microbes. • Able to explain the beneficial and detrimental effects of microorganisms • Gather theoretical background of microbial cultivation
CO4	**I**	**Fundamentals of Microbiology Lab**	• Develop basic skills in aseptic techniques for microbiology practical. • Hands on experience in handling of various important instruments. • Able to perform basic experiments to grow and study microorganism in laboratory • Develop knowledge on identification of microorganisms
CO5	**I**	**Bio Chemistry I**	• Develop fundamental knowledge about various biomolecules • Understand the basic concepts related to enzymes • Know various biochemical pathway

			● Understand the concept of microbial metabolism
CO6	**I**	Bio Chemistry I Lab	● Practical knowledge about various techniques used inBiochemistry ● Exhibit the well practical knowledge about estimation of carbohydrates, protein. ● Learn the quantitative and qualitative estimation biochemical analysis.
CO7	**I**	**Indian constitution**	● Democrative values and citizenship training and gained ● Awareness on fundamental rights is established ● The functions of union government and ● state government are learning thoroughly ● The power and functions of the judiciary learn thoroughly ● Appreciation of democratic parliamentary rule is learnt
CO8	**I**	**Universal Human Values**	● Know about universal human values and understand the importance of values in individual, social circles, career path, and national life. ● Learn from case studies of lives of great and successful people who followed and practiced human values and achieved self-actualisation. ● Become conscious practitioners of human values. ● Realize their potential as human beings and conduct themselves properly in the ways of the world.

CO9	**II**	**Tamil II**	• இறையடிவர்களின் அற்புதச் செயல்வழி இறைநம்பிக்கை வேரூன்றும். • தலபுராண வரலாற்றினை அறிவதன் மூலம் வாழ்வியல் சிக்கல் தீர்க்கும் இடங்களைஅறிய முடியும். • தத்துவக் கருத்துக்களின் வழி நல்லெண்ணங்கள் மனதில் தோன்றும். • பக்தி இலக்கியங்களே சிற்றிலக்கியத் தோற்றத்திற்குக் காரணம் என உணர்ந்து கொள்ள முடியும். • சொற்பொருள் கருத்தாழங்களை அறிய முடியும். • சமயக் கொள்கைகளை கற்றுக் கொள்ளும் வாய்ப்பு கிடைக்கும். • காப்பியங்களில் பொருந்தியிருக்கும் சமயக் கருத்துக்களை கண்டறிய வழி செய்யும்.
CO10	**II**	English II	● Appreciate different forms of literature ● Acquire language skills through literature Broadens the horizon of knowledge
CO11	**II**	**Microbial Physiology**	• Determining the growth features of the microbes with various environmental factors. Analysis of essential nutrients ensuring microbial growth. • The significance of microbial surveillance like autotrophs, heterotrophs, etc… • Electron transport and metabolic pathway of living systems
CO12	**II**	**Microbial Physiology Lab**	• Understand and predict the various metabolic reactions microbial cell. • Predict the intermediate products which can be employed in industrial production. • Environmental growth kinetics of microorganism
CO13	**II**	**Bio Chemistry II**	• Developed a very good understanding of various biomolecules

			• Knowledge about lipids and fatty acids • Well knowledge about multifarious function of proteins • Gain knowledge about metabolism.
CO14	**II**	**Bio Chemistry II Lab**	To demonstrate an understanding of fundamental biochemical principles To learn the structure/function of biomolecules, metabolic pathways, and regulation. Students are able to make buffers, study enzyme kinetics.
CO15.	**II**	**Research Led Seminar**	• To examining the relationship between teaching and research • Clarify terminology and approaches to different facets of research-based teaching, in order better to explore institutional strengths and weaknesses in countries. • Explore good practices in institution- driven, strategic approaches on how to integrate research and education missions.
CO16	**II**	**Communication Skills**	• Identify common communication problems that may be holding learners back • Identify what their non-verbal messages are communicating to others • Understand role of communication in teaching-learning process • Learning to communicate through the digital media • Understand the importance of empathetic listening • Explore communication beyond language.
CO17.	**II**	**Basic Behavioral Etiquette**	• Gaining a perspective on importance of corporate etiquette • Knowing about the ABC of etiquette • Being able to form good impressions • Understanding the way of reading body language • Knowing the different etiquette in different cultures

			• Learning to be confident in social settings • Understanding to deal with etiquette dilemmas • Being able to develop proper email, telephonic and behavioural etiquette
CO18	**III**	**Tamil III**	• காப்பிய அறக்கருத்துக்கள் வாழ்க்கையைச் செம்மைப்படுத்த உதவும். • சமயக்கோட்பாடுகளை அறிந்து கொள்ள முடியும். • சிற்றிலக்கிய வகைகளை அறிந்து அவைகளைக் கற்கும் ஆர்வத்தை ஏற்படுத்தும். • காப்பியத்திற்கும் சிற்றிலக்கியத்திற்கும் இடையே உள்ள வேறுபாட்டை அறிந்து கொள்ள முடியும். • உரைநடை, செய்யுளின் மொழிநடை வேறுபாட்டை அறிந்து கொள்ள உதவும்.
CO19	**III**	**English III**	● Enable to appreciate different types of prose
CO20	**III**	**Immunology**	• Theory linked to cells and organs related to immune system. • Able to know Immune response and immune mechanism. • Understanding the mechanism of Immunological disorders. • Learn the importance and precautions of Immunodeficiency syndromes
CO21	**III**	**Immunology Lab**	• Able to know about principles and techniques Blood grouping • Understanding the immunological experiments for clinical field • Counting of RBC, WBC and platelets
CO22	**III**	**Cell Biology**	• Understand the structures and purposes of basic components of prokaryotic • and eukaryotic cells, especially macromolecules, membranes, and organelles

			• Students will understand how these cellular components are used to generate and utilize energy in cells
CO23	**III**	Cell Biology Lab	● Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles ● Students will understand how these cellular components are used to generate and utilize ● energy in cells
CO24	**III**	**Research Methodology**	• Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computational framework used in mathematical research.
CO25	**III**	**Office Automation**	• Students would be able to documents, spreadsheets, make small presentations and would be acquainted with the internet.
CO26	**IV**	**Tamil IV**	• வாழ்வியல் நெறிமுறைகளின் முக்கியத்துவத்தைப் பெற முடியும். • சமூகவியல் அணுகுமுறைக்கு வழி வகுக்கும். • உளவியல் ஆய்வுக்கு அடிகோலும். • அனுபவமுள்ளவர்களின் அறிவுரைகள் வாழ்க்கையைச் செம்மைப்படுத்த உதவும் என்பதை அறிய முடியும். • சங்க இலக்கியம் கற்கும் ஆர்வத்தை ஏற்படுத்தும். • உயர்கல்விக்குச் செல்ல வேண்டுமென்ற ஆர்வம் ஏற்படும். • சங்க இலக்கியத்தை ஆராயும் மனப்பான்மையை உருவாக்கும்.
CO26	**IV**	**English IV**	● Improve their ability to read and understand

			● Know the genius of Shakespeare ● Express one' s views in writing
CO27	**IV**	**Virology**	• Knowledge on structure of plants, animal, bacteria and viruses. • This paper also enables the student on isolation, propagation of various viruses • Despite advances in clinical laboratory testing devices
CO28	**IV**	**Virology Lab**	• Knowledge on structure of plants, animal, bacteria and viruses. • This paper also enables the student on isolation, propagation of various viruses • Despite advances in clinical laboratory testing devices
CO29	**IV**	**Biostatistics and Bioinformatics**	• Understand the importance of principal concepts about biostatistics • Know the knowledge about statistics and its relation with other science and research aspects • Knowledge on bioinformatics databases, perform text- and sequence-based searches • Use of a wide variety of internet applications, biological • Database and will be able to apply these methods to research problems.
CO30	**IV**	**Biostatistics and Bioinformatics Lab**	● Read and learn statistical measures individually. ● Analysis the data from experiments and interpretation of the results ● Study the multivariate analysis in biostatistics ● Understand the nucleotide sequence data of the given species using NCBI / EMBL / DDBJ. ● Identify the protein sequence of the species using PIR and Swissprot.

CO31	**IV**	**Environmental studies**	● Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale . ● Develop critical thinking and/or observation skills, and apply them to the ● analysis of a problem or question related to the environment ● Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues ● Understand how politics and management have ecological consequences.
CO32	**IV**	**Leadership and Management Skills**	● Help students to develop essential skills to influence and motivate others ● Inculcate emotional and social intelligence, and integrative thinking for effective leadership ● Create and maintain an effective and motivated team to work for the society ● Nurture a creative and entrepreneurial mindset ● Make students understand the personal values and apply ethical principles in professional and social contexts.
CO33	**IV**	**General Aptitude and Quantitative Ability**	● Understand and practice quantitative aptitude ● Understand and practice

			● Logical reasoning ● Understand and practice verbal reasoning ● Understand different placement practice techniques
CO34	**V**	**Food and Dairy Microbiology**	• Better understanding of cause of microbes in food spoilage. • Get information regarding food preservation. • Enable them to work food fermentation industries.
CO35	**V**	**Molecular Biology**	➢ It will elaborate the central dogma of the cell i.e., gene expression viz. transcription and translation in both prokaryotes and eukaryotes.
CO36	**V**	**Agricultural and Environmental Microbiology**	• Students acquire the information about microbes. • Know about microbes and its role in environment. • Able to understand about microbes in agriculture and environmental practice.
CO37	**V**	**Food and Dairy Microbiology and Molecular Biology Lab** ➢	● Analyze the microbes in food and dairy industry products ● Production of Food and dairy products using microbes ● Knowledge about Molecular Genome analysis and quantification ● Isolation of DNA and amplification using PCR technique. ● Protein and DNA separation technique
CO38	**V**	**Agricultural and Environmental Microbiology Lab**	● Students acquire the information about microbes role in agriculture ● Know about microbes and its role in environment

CO39	**V**	**Discipline Specific Elective -I A Proteomics**	• Students acquire huge knowledge in protein functional and expressions, Gel based and Non gel based proteomics.
CO40	**V**	**Discipline Specific Elective -I B Bioinoculants**	• Students acquire knowledge in microbial preparates, enzymes, and secondary metabolites in agricultural practices.
CO41	**V**	**Participation in bounded research**	● Hands on exposure to problem olving tools in contemporary research Evolution of research intuitiveness and orientation ● Familiarity with cutting edge research trends
CO42	**V**	**Professional Skills**	• Prepare their resume in an appropriate template without grammatical and other errors and using proper syntax • Participate in a simulated interview Actively participate in group discussions towards gainful employment • Capture a self - interview simulation video regarding the job role concerned • Enlist the common errors generally made by candidates in an interview • Perform appropriately and effectively in group discussions • Explore sources (online/offline) of career opportunities • Identify career opportunities in consideration of their own potential and aspirations • Use the necessary components required to prepare for a career in an identified occupation
CO43	**VI**	**Industrial Microbiology**	• Students acquire hands-on training on various microbes of industrial importance.
CO44	**VI**	**Clinical Microbiology**	• Get information about various mechanisms of infection • Knowledge on clinical lab techniques • Acquire knowledge on control measures of diseases

CO45	**VI**	**Industrial Microbiology Lab**	• Students acquire hands on training various microbes of industrial importance
	VI	**Clinical Microbiology Lab**	• Get practical knowledge in specimen collection and processing • Become technically expert which will helpful to work in clinical laboratory • Able to identify clinical pathogens
CO46	**VI**	**Dicipline Specific Elective – Recombinant DNA Technology A** ➢	• Students acquire knowledge in gene cloning, plasmid and target DNA isolation, genomic and cDNA library
CO47	**VI**	**Bioethics B**	• Students will identify ethical issues in a research proposal and suggest appropriate methods to ensure ethical conduct of biomedical research
CO48	**VI**	**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
CO49		**Interview Skills Training and Mock**	● Use the STAR Method to describe relevant experiences in away that reflects ● knowledge of the job/internship position description and employer. ● Identify appropriate verbal and non-verbal communication skills/techniques for an interview (e.g. eye contact, use of filler words, hand gestures, and verbal pace).

			● Demonstrate professional behavior(s) including preparedness, professional attire, and respectful presentation. ● Develop confidence in relationship to their interviewing skills.
CO50		**Community Engagement**	● Gain an understanding of rural life, culture and social realities ● Develop a sense of empathy and the bonds of mutuality with the local community ● Appreciate significant contributions of local communities to Indian society and economy ● Learn to value the local knowledge and wisdom of the community ● Identify opportunities for contributing to community's socio-economic improvements ● Identify opportunities for contributing to the community's socio-economic improvements
CO51		**Open Elective Course - Tamil Ilakkiya Varalaru**	• தமிழ இலக்கிய வரலாறு - மு.வரதராசன சாகித்திய அகாடமி வெளியீடு. • தமிழ இலக்கிய வரலாறு - ச.சுபாஷ் சந்திரபோஸ், இயல் பதிப்பகம். • தமிழ இலக்கிய வரலாறு - முனைவர் பாக்யமேரி, NCBH சென்னை. • தமிழஇலக்கியவரலாறு - முனைவர் சு.ஆனந்தன், NCBH சென்னை
CO52		**Open Elective Course - Journalism**	Become a journalist
CO53		**Open Elective Course - 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.
CO54		**Open Elective Course - 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.
CO55		**Open Elective Course - Food and Adulteration**	● The students will have knowledge about different processing and preservation methods and principles involved.
CO56		**Open Elective Course - Web Technology**	● xplore markup languages features and create interactive web pages using them ● Learn and design Client side validation using scripting languages
CO57		**Open Elective Course - E-Learning**	● Develop e - learning application on their own. ● Ability to develop contents for e-learning. ● To perform course management using tools.

CO58		**Open Elective Course - Banking service**	● To help to gather knowledge on banking and financial system in India ● To provide knowledge about commercial banks and its products ● To create awareness about modern banking services like e-banking-banking and internet banking, ATM System ● To introduce recent trends in banking system ● To make the student understand the basic concept of banking and financial institutions and expose various types of risk based by banks

M.Sc - MICROBIOLOGY

22PGMBGEC

Curriculum-Regulation 2022-2023

PROGRAM EDUCATIONAL OBJECTIVES (PEO)	
PEO1	To provide detailed knowledge of Microbiology and their application fields. To understand the beneficial and harmful role of microorganisms in the environment and in the industries.

PEO2	To understand the fundamentals of physiological reactions including metabolic pathways and biochemical reactions in microorganisms. To understand the fundamental concepts of immunology, biochemistry, biotechnology and genetics etc.
PEO3	To develop human resource and entrepreneurs in microbiology with the ability to independently start their own ventures or small biotech units in the field of biotechnology.
PEO4	Understand modern microbiology - practices and approaches with an emphasis in technology application in pharmaceutical, medical, industrial, environmental and agricultural areas.
PEO5	Gain experience with standard molecular tools and approaches utilized: manipulate genes, gene products and organisms. Become familiar with handling of Laboratory animals for the research purpose. Interpret differences in data distributions via visual displays.

PROGRAM SPECIFI COUTCOME (PSo)	
PSO1	Upon master graduation, Microbiology majors will master a set of advanced skills, which would be useful to function effectively as professionals and to their continued development and learning within the field of Microbiology.
PSO2	Able to explain why microorganisms are ubiquitous in nature, inhabiting a multitude of habitats and occupying a wide range of ecological habitats.
PSO3	Able to cite examples of the vital role of microorganisms in biotechnology, fermentation, medicine and other industries important to human well-being.
PSO4	Able to demonstrate that microorganisms have an indispensable role in the environment, including elemental cycles, biodegradation etc
PSO5	Able to systematically collect, record and analyse data, identify sources of error, interpret the result and reach logical conclusion.

PROGRAMME OUTCOMES (POS)	
PO1	**Vital Thinking:** Acquire knowledgeable actions after identifying the hypothesis that frame our idea and dealings, read-through out the degree to which these hypothesis are precise and suitable, and give the impression of being at our thoughts and assessments (academic, organizational and individual) from diverse perception.
PO2	**Precious communication:** Study about speak, read, write and listen noticeably in person and throughout electronic media in English and in one Indian language and build meaning of the globe by connecting people, thoughts books, media and technology.
PO3	**Effectual citizenship:** Reveal empathetic social concern and fairness centred national

	progress and the capability to act with and take part in civic life through volunteering
PO4	**Ethics:** Be aware of diverse value systems including the individual, under the ethical dimensions of personal choice, and believe responsibility for them.
PO5	**Environment and Sustainability:** Analyse the importance of microbes for environmental clean-up and sustainable development.
PO6	**Self-directed and life-long learning:** To gain the talent to employ in self-determining and life-long learning in the broadest circumstance socio technological transforms.

Programme Educational Objectives vs Programme Outcome

Programme Outcome-PO Programme Educational Objectives PEO	PO1	PO2	PO3	PO4	PO5
PEO1	*	*	*	*	
PEO2	*		*		*
PEO3		*		*	
PEO4	*	*	*		*
PEO5	*		*	*	

Course outcomes (Cos)
M.Sc Microbiology

S.No	Semester	Course Code/Name	Course Outcome
CO1	**I**	**Prokaryotic Microbiology**	● Scope and historical importance of microbiology ● Understanding the features and classification of prokaryotes. ● Study about isolation and identification of microbes

			● Economic value of beneficial bacteria
CO2		**Eukaryotic Microbiology**	● General Features and taxonomy of eukaryotes ● Knowledge about advanced research in mycology, phycology. ● Scope of Algae used as a food ● Economic importance of Lichens and algae
CO3		**Microbial Physiology**	● Understand the factors influencing the growth of microbes in ecosystem ● Learn about Bioluminescence and their advantages. ● Learn about microorganism to assimilate the nutrients for growth. ● Study about metabolic pathway
CO4.		**Fundamentals of Microbiology Lab**	● Practical knowledge about the isolation and purification of microbes from various sources. ● Training about staining experiments ● Handling on light and compound microscope. ● Learn essential biochemical analysis
CO5		**Discipline Specific Elective-I A Immunotechnology**	● Learn scope and history of immunology. ● Study about immune system and lymphatic organs. ● Learn tumour immunology

			● Gain knowledge about various immunological techniques.
		Discipline Specific Elective-I B Bioremediation and Waste Management	● Understanding on the management of solid and liquid wastes ● Learn the principles of remedial measures of recycling, reuse and recover from the wastes. ● Understand the mechanism and role of microbes in the degradation of various pollutants
CO6		**Research Led 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.
CO7	**II**	**Industrial Microbiology**	● Students will get knowledge on strain improvement. ● Enable them to work in fermentation industry. ● Students will get idea on upstream and downstream fermentation process ● Economic importance of Bio products.

CO8		**Environmental and Agricultural Microbiology**	● Huge Insights into these precious areas of Environmental microbiology. ● Students able to know detailed idea about biofertilizer production and plantdisease. ● Role of Microbes in marine and fresh water environment ● Scope of Recycling of Liquid and Solid wastes
CO9		**Clinical Microbiology**	● Learn normal flora of human body ● Get information about various sources of infection and transmission ● Epidemiology, pathogenesis and treatment of bacterial, fungal and viral diseases ● Learn Strategy of antimicrobial therapy.
CO10		**Industrial, Clinical and Environmental and Agricultural Microbiology Lab**	● Get practical knowledge in specimen collection and processing ● Become technically expert which will helpful to work in clinical laboratory ● Learn practical understanding of diagnosis of pathogens. ● Acquire knowledge on fermentation process ● Learn bio fertilizer and inoculants production

CO11		Discipline Specific Elective-II A Biomolecules	● They acquire knowledge in the quantitative and qualitative estimation of biomolecules ● They study the influence and role of structure in reactivity of biomolecules ● Students have a thorough understanding on the role of biomolecules and their functions.
		Discipline Specific Elective-II B Genomics and Proteomics	● Students gain the knowledge about the interactions between the proteins ● Get the information to predict cell behaviour or develop drug targets. ● Rapidly evolving scientific area into *genomes*, proteomes and databases ● Learn to store various data NCBI, DDBJ and EMBL
CO12		**Research Methodology**	● Understanding research questions and tools ● Experience in scientific writings ● Practice in various aspects of scientific publications ● Inculcation of research ethics

CO13		**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 ● Learn the measurement & scaling techniques as well as the quantitative data analysis
CO14	**III**	**Microbial Genetics**	● Understood genome organization of model organisms. ● Learn molecular mechanisms that underlie mutations. ● Study about transformation, transduction and conjugation. ● Are able to describe the nature of the transposable elements
CO15		**Microbial Biotechnology**	● Developed an understanding in recombinant DNA technology. ● Candidate to recollect the basics of Molecular Genetics and apply cognitive thinking. ● Possibilities ranging from the treatment of human diseases to develop novel medicines
CO16		**Microbial Genetics and Biotechnology Lab**	● Separation of DNA and Protein by gel electrophoresis. ● Students can perform isolation of DNA, amplification of any gene by

			PCR ● Hands on experience on Molecular genome isolation and identification techniques
CO17		**Discipline Specific Elective-II A Plant Tissue Culture**	● To inculcate the basics of plant tissue culture ● To impart the knowledge about the various aspects of tissue culture and their applications ● Learn the role of micro and macro-nutrients in tissue culture plantation.
		Discipline Specific Elective-II B Nanotechnology	● Describe the basic science behind the properties of materials at the nanometre scale ● Advanced experimental and computational techniques for studying nanomaterials. ● Learn clearly and effectively using conventional scientific and mathematical notation. ● Systematically solve scientific problems related specifically to nanotechnological materials.
CO18		**Participation in Scaffold Research (Design/Societal Project)**	● Explain the process of analysis using the Example Research Paper Scaffold. ● Formulate a clear thesis that conveys a perspective on the subject of their research. ● Practice research skills, including evaluation of sources and citation

			• Logically group and sequence ideas in expository writing.
CO19	**IV**	Pharmaceutical Microbiology	● Acquired detailed knowledge of antimicrobial agents, their mechanism of action. ● Developed understanding of different types of disinfectants/antiseptics bactericidal and bacteriostatic actions ● Regulatory practices, biosensors and applications in Pharmaceuticals. ● Quality Assurance and Validation.
CO20		Biostatistics and Bioinformatics	● Learn about probability/variable analysis and collection, classification of data ● Basic ideas of significance test (T-test, ANOVA) ● Understanding about the information on the search engines and various software tools ● Scope of Biological databases related software used in the bioinformatics
CO21		Pharmaceutical Microbiology Lab	● Aseptic condition relevance to healthcare and the pharmaceutical industry. ● Knowledge and understanding of the practical aspects of pharmaceutical microbiology. ● Perform practicals on antimicrobial activity

			● Learn the production of antibiotics from microbes.
CO22		Discipline Specific Elective-IV A Bioethics and IPR	• Students will gain awareness about Intellectual Property Rights (IPRs) • To take measure for the protecting their ideas • Able to develop business strategies by taking account of IPRs ● Able to assists in technology up gradation and enhancing competitiveness.
		Discipline Specific Elective-IV B Molecular Immunology	• Able to identify the cellular and molecular basis of immune responsiveness. • Learn about Biosensor assays for assessing ligand receptor interaction. • Rationale for vaccine design about new generation antibodies • Multi-gene organization of immunoglobulin gene
CO23		**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.
CO24		**OPEN ELECTIVE** **Writing for the Media**	● Understand the intricacies of mass media
		Applicable Mathematical Techniques	● Students using OR techniques in business tools for decision making ● Sstudents develop Assignment problem and Replacement problems Understand the concept of decision analysis and game theory ● Students gets the knowledge about interpolation
		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
		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 antiobiotics.
		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.

School of Arts and Science
Department of Microbiology
22UGMBGEC
2022 Regulation
Program Outcomes and Course outcomes of
B.Sc., Mapping of COs and POs

Semester	Course Code	Title of the Course	Cos	POS						
				PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	22110AEC11	Language-I (Tamil-I)	CO1- Learn the changes that have occurred in literature since the classical period.	*	*	*		*	*	*
			CO2- Make use of vocabulary systematically.	*	*	*	*	*	*	*
			CO3- Understand how to lead one's life realizing the modernity and its environment/atmosphere.	*	*	*		*	*	*
I	22111AEC11	Advanced English-I	CO1- Develop vocabulary	*	*		*	*	*	*
			CO2- Learn to edit and do proof reading	*	*	*	*		*	*
			CO3- Read and comprehend literature	*	*			*		
I	22111AEC12	English-I	CO1- Read and comprehend literature	*	*	*	*		*	*
			CO2- Appreciate poetry and prose	*	*		*	*		

			CO3- Familiarize students with fiction.	*	*	*	*	*	*	*
I	22111AEC13	Fundamentals of Microbiology	CO1 – Describe the characteristics of microorganisms and classification of biological system	*	*	*				*
			CO2 – Understand concepts of growth and reproduction of microbes	*			*		*	
			CO3 – Able to explain the beneficial and detrimental effects of microorganisms	*	*	*		*		*
			CO4 -- Gather theoretical background of microbial cultivation	*	*		*	*		*
I	22116AEC14L	Fundamentals of Microbiology Lab	CO1 – Develop basic skills in aseptic techniques for microbiology practical.	*	*	*	*	*	*	*
			CO2 – Hands on experience in handling various important instruments.	*		*	*		*	*
			CO3 - Able to perform basic experiments to grow and study microorganism in laboratory	*	*	*	*	*	*	*
			CO4 - Develop knowledge on identification of microorganisms	*		*	*	*	*	*
I	22115AEC15	Bio Chemistry I	CO1 – Develop fundamental knowledge about various biomolecules	*	*	*	*	*		*
			CO2 - Understand the basic concepts related to enzymes	*		*	*	*		*
			CO3 - Know various biochemical pathway	*	*	*	*	*		*

			CO4 - Understand the concept of microbial metabolism	*		*		*		*
I	22115AEC16L	Bio Chemistry I Lab	CO1 - Practical knowledge about various techniques used in Biochemistry		*	*	*	*	*	*
			CO2 - Exhibit the well practical knowledge about estimation of carbohydrates, protein.			*			*	*
			CO3 – Learn the quantitative and qualitative estimation biochemical analysis	*	*	*	*	*		*
II	22110AEC21	Language-II (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.	*	*	*	*		*	*
II	22111AEC21	Advanced English-II	CO1- Develop technological skills.	*	*		*	*	*	*
			CO2- Able to write in a variety of formats		*		*		*	
			CO3- Read biographies and develop personality	*	*	*	*	*	*	*
II	22110AEC22	English-II	CO1- Appreciate different forms of literature	*	*	*	*		*	*
			CO2- Acquire language skills through literature	*	*			*	*	
			CO3- Broadens the horizon of knowledge	*	*				*	
II	22116AEC23	Microbial Physiology	CO1- Determining the growth features of the microbes with various environmental factors.	*				*	*	*
			CO2 – Analysis of essential nutrients ensuring microbial growth.	*		*	*	*	*	

			CO3 -The significance of microbial surveillance like autotrophs, heterotrophs, etc…	*	*	*	*	*	*	*
			CO4- Electron transport and metabolic pathway of living systems	*	*		*	*		*
II	22116AEC24L	Microbial Physiology Lab	CO1- Understand and predict the various metabolic reactions in microbial cell.		*	*	*	*	*	*
			CO2-Predict the intermediate products which can be employed in industrial production.	*	*	*	*	*	*	*
			CO3- Environmental growth kinetics of microorganism	*			*	*	*	*
II	22115AEC25	Bio Chemistry II	CO1- Developed a very good understanding of various biomolecules	*		*			*	*
			CO2 - knowledge about lipids and fatty acids	*			*	*	*	*
			CO3- Well knowledge about multifarious function of proteins	*	*	*		*	*	*
			CO4- Gain knowledge about metabolism.	*	*	*	*	*	*	*
II	22115AEC26L	Bio Chemistry II Lab	CO1- To demonstrate an understanding of fundamental biochemical principles	*	*	*	*	*	*	*
			CO2- To learn the structure/function of biomolecules, metabolic pathways, and regulation	*		*	*	*	*	*
			CO3- Students are able to make buffers, study enzyme kinetics	*		*		*	*	*

II	22116RLC27	Research LED Seminar	CO1- Exposure to various research domains	*		*	*			*
			CO2- Acquaintance with languages of research	*	*	*	*	*	*	*
			CO3- Development of research aptitude	*	*				*	*
III	22110AEC31	Language-III (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	*	*	*		*	*	*
III	22111AEC31	Advanced English-III	CO1- Understand phonetics.	*	*		*	*	*	*
			CO2- Develop writing skill							
			CO3- Able to develop creative writing	*	*	*	*	*	*	*
III	22111AEC32	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.	*	*				*	
III	22116AEC33	Immunology	CO1- Theory linked to cells and organs related to the immune system.	*		*	*	*	*	*
			CO2- Able to know Immune response and immune mechanism.	*		*	*	*	*	*

			CO3- Understanding the mechanism of Immunological disorders.	*	*	*	*	*	*	*
			CO4- Learn the importance and precautions of Immunodeficiency syndromes	*		*	*	*	*	*
	22116AEC34	Cell Biology	CO1-To grasp the significance of cell and its components in living systems	*	*			*	*	*
			CO2-To understand the and describe the structures and basic components of prokaryotic and eukaryotic cells	*	*	*		*	*	*
III			CO3-To understand the cyclical events of cell division and types of cell division	*		*	*	*	*	*
			CO4-To acquire the knowledge of cell biology for understanding various physiological process							
			C05-To understand the synthesis of cellular compounds and cell signaling							
	22112AEC35L	Immunology Lab	CO1- Able to know about principles and techniques Blood grouping	*	*	*	*	*	*	*
			CO2- Understanding the immunological experiments for clinical field	*	*	*		*	*	*
III			CO3- Counting of RBC, WBC and platelets	*	*			*	*	*
III	22112AEC36L	Cell Biology Lab	C01- To grasp the significance of cell and its components in living systems							

			CO2-To understand the and describe the structures and basic components of prokaryotic and eukaryotic cells							
			CO3-To understand the cyclical events of cell division and types of cell division							
III	20116RMC37	Research Methodology	CO1- Understanding research questions and tools	*	*	*		*	*	*
			CO2- Experience in scientific writings	*	*	*	*	*	*	*
			CO3-Practice in various aspects of scientific publications	*	*	*	*	*	*	*
			CO4-Inculcation of research ethics	*	*		*	*	*	*
IV	22110AEC41	Language-IV (Tamil-IV)	CO1- Realize how the ancient people changed their lifestyle according to the ages	*	*	*		*	*	*
			CO2- Learn how to change one's lifestyle according to the needs of the future	*	*			*	*	*
			CO3- Accept the modern trends and its uses	*	*	*		*	*	*
IV	22111AEC41	Advanced English-IV	CO1- Develop writing skill.	*	*			*	*	*
			CO2- Comprehend and describe poems	*		*		*	*	*
			CO3- Learn interviewing skills		*				*	
IV	22111AEC42	English-IV	CO1- Improve their ability to read and understand them	*	*		*	*	*	*
			CO2- Know the genius of Shakespeare		*				*	
			CO3- Express in writing their views.	*	*			*	*	

IV	22116AEC43	Virology	CO1- Understanding the characteristic features of viruses.	*	*	*	*	*	*	*
			CO2 – Gain the knowledge about the biology of bacteriophages.	*	*		*	*	*	*
			CO3 – Learn the range of plant viruses and animal viruses.	*	*	*	*		*	*
			CO4 - To know the role of viruses in causing of cancer	*		*	*		*	*
IV	22116AEC46L	Virology Lab	CO1- Knowledge on structure of plants, animal, bacteria and viruses.	*	*	*		*	*	*
			CO2- This paper also enables the student on isolation, propagation of various viruses	*	*	*		*	*	*
			CO3- Despite advances in clinical laboratory testing devices	*					*	*
IV	22116AEC45	Biostatistics and Bioinformatics	CO1- Developed skills to use computers for analysis of biological data.	*	*	*		*	*	*
			CO2 – Gained the biological databases and compares the data of the biological macromolecules.	*	*	*	*	*	*	*
			CO3 – Analysis of data retrieval, representation, analysis and interpretation	*	*	*	*	*	*	*
IV	22116AEC47L	Biostatistics and Bioinformatics Lab	CO1 - Investigate the literature data of the given protein using PubMed.	*	*	*	*		*	*
			CO2 - Explore the nucleotide sequence data of the given species using NCBI / EMBL / DDBJ.	*	*		*		*	*

			CO3 - Investigate the protein sequence of the species using PIR and Swissprot / UniProt	*	*		*	*	*	*
IV	221ENSTU45	Environmental Studies	CO1- Understand eco-system	*	*	*		*	*	*
			CO2- Know social issues and the environment	*	*	*	*	*	*	*
			CO3- Learn keep the environment eco-friendly	*	*	*	*	*	*	*
V	22116AEC51	Food and Dairy Microbiology	CO1 – Illustrate the role of microorganisms in the production of food	*		*		*	*	*
			CO2 – Investigation of milk and foods quality test for detecting microorganisms	*	*	*		*	*	*
			CO3 – Gain the knowledge regarding food preservation	*	*		*	*	*	*
V	22116AEC52	Molecular Biology	CO1 - Concept of central dogma of the cell and gene regulation.	*	*	*		*	*	*
			CO2 - Principles and applications of various molecular techniques.	*	*	*		*	*	*
			CO3 - Concept, methods and application of r-DNA technology.	*	*	*	*	*	*	*
			CO4 - Gene library and gene mapping	*	*	*	*	*	*	*
V	22116AEC53	Agricultural and Environmental Microbiology	CO1 - Students acquire the information about microbes	*	*			*	*	*
			CO2 - Know about microbes and its role in the environment.	*	*			*	*	*

			CO3 - Able to understand about microbes in agriculture and environmental practice	*	*			*	*	*
V	22116AEC55L	Food and Dairy Microbiology and Molecular Biology Lab	CO1 - Analyze the microbes in food and dairy industry products	*		*		*	*	*
			CO2 - Production of Food and dairy products using microbes	*		*	*	*	*	*
			CO3 - Knowledge about Molecular Genome analysis and quantification	*		*	*	*	*	*
			CO4 - Isolation of DNA and amplification using PCR technique.	*	*	*	*	*	*	*
			CO5 - Protein and DNA separation technique	*	*	*		*	*	*
V	22116AEC56L	Agricultural and Environmental Microbiology Lab	CO1 - Students acquire the information about microbes role in agriculture	*	*	*	*	*	*	*
			CO2 - Learn about Biofertilizer production	*	*	*	*	*	*	*
			CO3 - Know about microbes and its role in environment	*		*	*	*	*	*
V	22116DSC54A	Discipline Specific Elective -I Proteomics	CO1- Students acquire knowledge in protein functional and expressions.	*			*			*
			CO2- Knowledge about 3-D structural prediction of proteins	*	*	*	*	*	*	*

			CO3- Study the protein purification with various chromatographic techniques.	*	*	*		*	*	*
			CO4- Knowledge about MALDI-TOF (Matrix assisted laser Desorption and Ionization)	*	*	*		*	*	*
V	22116DSC54B	Bioinoculants	CO1- Students acquire knowledge in microbial products	*	*	*	*	*	*	*
			CO2-Separation of primary and secondary metabolites	*	*	*	*	*	*	*
			CO3- Applications of value added products	*	*		*	*	*	*
			CO4- Scope of microbial inoculants in agricultural practices	*				*	*	*
V	22116DSC54C	Molecular Immunology	CO1- Theory linked to cells and organs related to the immune system.							
			CO2- Able to know Immune response and immune mechanism.							
			CO3 - Concept of central dogma of the cell and gene regulation.	*		*		*	*	*
			CO4 - Principles and applications of various molecular techniques.	*	*	*	*	*	*	*
V	22116DSC54 D	Algae Biotechnology	CO1- Developed an understanding in recombinant DNA technology.	*	*	*	*	*	*	*
			CO2- candidate to recollect the basics of Molecular Genetics and apply cognitive thinking.	*	*				*	*

			CO3-Possibilities ranging from the treatment of human diseases to develop novel medicines	*	*				*	*
VI	22116AEC61	Industrial Microbiology	CO1- Learning of different types of reactors or fermenters functions	*		*		*	*	*
			CO2-. Capable of understanding the vital role of various substrates used in fermentation.	*		*	*	*	*	*
			CO3 – Learn about Industrial Product production	*		*	*	*	*	*
			CO4- knowledge about upstream and downstream processing	*	*		*	*	*	*
VI	22116SEC62	Clinical Microbiology	CO1- Understood the basic and general concepts of Normal flora of the human body	*	*	*	*	*	*	*
			CO2 –Understand the sources of infectious diseases and transmission	*	*	*	*	*	*	*
			CO3 - Study the pathogenicity of bacterial, fungal, protozoa and viral diseases	*		*	*	*	*	*
			CO4- Understand the preventive measures of Hospital acquired infections.	*			*	*	*	*
VI	22116DSC63A	Discipline Specific Elective - II Recominant DNA Technnology	CO1- Students have acquired knowledge in desired DNA and protein separation.	*	*			*	*	*
			CO2- Learn the gene and operon concept	*	*	*		*	*	*
			CO3- Knowledge about gene cloning and cDNA library	*	*	*	*	*	*	*

			CO4- Learn the blotting techniques	*	*	*	*	*	*	*
VI	22116DSC63B	Bioethics	CO1- Students will identify ethical issues in a research proposal	*	*		*	*	*	*
			CO2- Understand the Intellectual property Rights (IPR) and patent filing.	*	*			*	*	*
			CO3- Knowledge about to ensure ethical conduct of biomedical research	*				*	*	*
			CO4- Describe the basic concepts of legal, ethical, economic, and regulatory measurements	*		*		*	*	*
VI	22116DSC63C	Microbiome	CO1-Introduction to the Human Microbiome	*	*	*	*	*	*	*
			CO2-How the Microbiome is Studied	*	*	*	*	*	*	*
			CO3- The Human Gut Microbes	*			*	*	*	*
			CO4-Modification of the Microbiome	*			*	*	*	*
VI	22116DSC63D	Tissue Culture	CO1-To know the basic technique of tissue cultures	*	*	*	*	*	*	*
			CO2-To produce new plants through this tissue culture	*	*	*	*	*	*	*
			CO3-To gain the knowledge about tissue culture in crop improvements	*	*	*	*	*	*	*
			CO4-To know the applications of tissue culture in various fields.	*	*		*	*	*	*

VI	22116DSC63E	Nanotechnology	CO1-To understand the basic principles and method of Nanotechnology	*	*			*		*
			CO2-To know the applications of Nanotechnology	*				*	*	*
			CO3-To understand the groundbreaking innovations in medicine and medical implants, environment and other field	*		*	*			*
VI	22116AEC64L	Industrial Microbiology Lab	CO1- Students acquire hands on training various microbes for industrial practices	*	*	*	*	*	*	
			CO2- Screening of desired microbes	*	*	*		*	*	*
			CO3- Learn the optimization process for scale up process	*	*	*		*	*	*
			CO4- Well technical knowledge on upstream and downstream processing	*	*	*		*	*	*
VI	22116SEC65L	Clinical Microbiology Lab	CO1- Get practical knowledge in specimen collection and processing	*	*	*		*	*	*
			CO2- Knowledge about cyst and protozoa identification.	*	*			*	*	*
			CO3- Technical practice on diagnosis of pathogenic infection	*	*		*	*	*	*
			CO4- Determine antimicrobial activity of microorganisms	*	*				*	*
VI	22116PRW66	Project Work	CO1 - Understand basic concepts of research and its methodologies	*	*	*		*	*	*

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
I	22216SEC11	Prokaryotic Microbiology	CO1- Scope and historical importance of microbiology	3	1	0	1	2	2
			CO2- Understanding the features and classification of prokaryotes.	2	0	0	1	2	2
			CO3- study about isolation and identification of microbes	3	0	0	3	2	2
			CO4- Economic value of beneficial bacteria	2	2	1	0	1	2
	22216SEC12	Eukaryotic Microbiology	CO1- General Features and taxonomy of eukaryotes	2	1	1	0	0	1
			CO2- Knowledge about advanced research in mycology, phycology.	3	1	1	2	2	1
			CO3- Scope of Algae used as a food	3	2	1	0	2	2
			CO4- Economic importance of Lichens and algae	3	2	2	0	0	1
	22216SEC13	Microbial Physiology	CO1- Understand the factors influencing the growth of microbes in ecosystem	2	1	1	2	2	1
			CO2- Learn about Bioluminescence and their advantages.	2	1	1	1	1	1
			CO3- Learn about microorganisms to assimilate the nutrients for growth.	2	1	1	2	1	1

			CO4- Study about metabolic pathway	2	1	0	1	1	1
	22216SEC14L	Fundamentals of Microbiology Lab	CO1- practical knowledge about isolation and purification of microbes from various sources.	2	1	0	0	1	2
			CO2- Training about staining experiments	1	2	0	1	1	3
			CO3- Handling on light and compound microscope.	2	2	1	1	2	2
			CO4- Learn essential biochemical analysis	1	2	1	1	2	2
	22216DSC15A	Immunotechnology	CO1- Learn scope and history of immunology.	3	1	1	0	2	1
			CO2- Study about the immune system and lymphatic organs.	3	1	1	0	2	1
			CO3- Learn tumor immunology	3	1	1	1	2	1
			CO4- gain knowledge about various immunological techniques (RIA, ELISA, etc…)	3	0	0	2	1	2
	22216DSC15B	Aquatic Microbiology	CO1- Understanding on the management of solid and liquid wastes	3	1	0	3	1	1
			CO2- Learn the principles of remedial measures of recycling, reuse and recover from the wastes.	2	1	0	3	1	1
			CO3- Understand the mechanism and role of microbes in the degradation of various pollutants	2	2	0	3	2	1

	22216DSC15C	Food Technology	CO1 – Illustrate the role of microorganisms in the production of food	2	2	0	1	1	2
			CO2 – Investigation of milk and foods quality test for detecting microorganisms	2	2	1	0	1	2
			CO3 – Gain the knowledge regarding food preservation	2	2	0	1	0	2
	22216DSC15D	Modern Industrial Biotechnology	CO1- Learning of different types of reactors or fermenters functions	2	3	0	0	1	2
			CO2-. Capable of understanding the vital role of various substrates used in fermentation.	3	1	1	0	2	1
			CO3 – Learn about Industrial Product production	2	1	2	1	2	1
			CO4- knowledge about upstream and downstream processing	2	1	2	1	2	2
	22216RLC16	Research LED Seminar	CO1- Exposure to various research domains	1	1	0	1	1	1
			CO2- Acquaintance with languages of research	1	1	1	1	1	1
			CO3- Development of research aptitude	2	1	1	1	1	1
II	22216SEC21	Industrial Microbiology	CO1- Students will get knowledge on strain improvement.	3	0	2	2	2	1
			CO2- Enable them to work in the fermentation industry.	2	1	1	1	2	2
			CO3- Students will get idea on upstream and downstream fermentation process	2	1	2	1	1	2

			CO4- Economic importance of Bio products	2	2	2	1	1	2
	22216SEC22	Environmental and Agricultural Microbiology	CO1- Huge Insights into these precious areas of Environmental microbiology.	2	0	0	1	1	2
			CO2- Students able to know detailed ideas about biofertilizer production and plant disease.	2	0	0	1	1	2
			CO3- Role ofMicrobes in marine and freshwater environment	2	1	1	1	1	2
			CO4- Scope of Recycling of Liquid and Solid wastes	3	0	1	1	1	2
	22216SEC23	Clinical Microbiology	CO1- Learn normal flora of human body	2	1	1	1	1	1
			CO2- Get information about various sources of infection and transmission	3	0	1	0	2	1
			CO3- Epidemiology, pathogenesis and treatment of bacterial, fungal and viral diseases	2	1	1	0	1	1
			CO4- Learn Strategy of antimicrobial therapy	3	1	2	0	2	1
	22216SEC24L	Industrial, Clinical, Environmental and Agricultural Microbiology Lab	CO1- Get practical knowledge in specimen collection and processing	2	1	0	1	2	1
			CO2- Become technically expert which will helpful to work in clinical laboratory	2	0	0	1	2	2
			CO3- Learn practical understanding of diagnosis of pathogens.	1		0	1	2	2

			CO4- Acquire knowledge on fermentation process	1	1	1	1	1	2
			CO5- Learn bio fertilizer and inoculants production	1		0	1	1	2
	22216DSC25A	Clinical research and development	CO1- Understood the basic and general concepts of Normal flora of the human body	2	0	0	1	2	1
			CO2 –Understand the sources of infectious diseases and transmission	2	1	1	3	1	1
			CO3 - Study the pathogenicity of bacterial, fungal, protozoa and viral diseases	2	2	1	1	1	1
	22216 DSC25B	Soil and waste engineering	CO1- Students gain the knowledge about the interactions between the proteins	3	1		1	1	2
			CO2- Get the information to predict cell behavior or develop drug targets.	1	0	2	0	1	1
			CO3- Rapidly evolving scientific area into genomes, proteomes and databases	3	0	2	0	1	3
			CO4- Learn to store various data NCBI, DDBJ and EMBL	3	0	2	1	2	3
	22216 DSC25C	Fungal immunology	CO1- Understood the basic and general concepts of Normal flora of the human body	3	1		1	1	2
			CO2 –Understand the sources of infectious diseases and transmission	1	0	2	0	1	1

			CO3 - Study the pathogenicity of bacterial, fungal, protozoa and viral diseases	3	0	2	0	1	3
			CO4- Understand the preventive measures of Hospital acquired infections.	3	0	2	1	2	3
	22216 DSC2D	Pollution research	CO1- Students will identify ethical issues in a research proposal	3	1		1	1	2
			CO2- Understand the Intellectual property Rights (IPR) and patent filing.	1	0	2	0	1	1
			CO3- Knowledge about to ensure ethical conduct of biomedical research	3	0	2	0	1	3
			CO4- Describe the basic concepts of legal, ethical, economic, and regulatory measurements	3	0	2	1	2	3
	22216RMC26	Research Methodology	CO1- Understanding research questions and tools	3	1		1	1	2
			CO2- Experience in scientific writings	1	0	2	0	1	1
			CO3-Practice in various aspects of scientific publications	3	0	2	0	1	3
			CO4-Inculcation of research ethics	3	0	2	1	2	3
	22216BRC27	Participation in Bounded Research	CO1-Hands on exposure to problem solving tools in contemporary research	2	0	0	0	1	2
			CO2- Evolution of research intuitiveness and orientation	2	0	0	0	1	2

			CO3- Familiarity with cutting edge research trends.	2	0	0	2	1	2
III	22216SEC31	Microbial Genetics	CO1- Understood genome organization of model organisms.	2	1	1	1	1	2
			CO2 - Learn molecular mechanisms that underlie mutations.	2	1	1	1	1	2
			CO3- Study about transformation, transduction and conjugation.	3	1	1	1	1	1
			CO4- Are able to describe the nature of the transposable elements	2	1	1	2	2	2
III	22216SEC32	Microbial Biotechnology	CO1- Developed an understanding in recombinant DNA technology.	2	2	3	2	2	1
			CO2- candidate to recollect the basics of Molecular Genetics and apply a cognitive thinking.	2	1	1	2	1	1
			CO3-Possibilities ranging from the treatment of human diseases to develop novel medicines	2	2	3	1	2	1
III	22216SEC33L	Microbial Genetics and Biotechnology Lab	CO1- Has acquired a fairly good knowledge of the tools and the methods for genetic engineering	2	0	1	1	2	2
			CO2- Separation of DNA and Protein by gel electrophoresis.	1	0	1	1	2	2
			CO3- Students can perform isolation of DNA, amplification of any gene by PCR	2	0	1	1	1	2

			CO4- Hands on experience on Molecular genome isolation and identification techniques	2	1	1	1	1	2
III	22216DSC34A	Plant Tissue Culture	CO1- To inculcate the basics of plant tissue culture	3	1	0	2	2	2
			CO2- To impart the knowledge about the various aspects of tissue culture and their applications	3	2	3	2	2	2
			CO3- Learn the role of micro and macro- nutrients in tissue culture plantation	2	2	0	1	1	2
III	22216DSC34D	Nano-technology	CO1- Describe the basic science behind the properties of materials at the nanometre scale	2	0	0	1	1	2
			CO2- Advanced experimental and computational techniques for studying nanomaterials.	2	0	2	1	2	2
			CO3- Learn clearly and effectively using conventional scientific and mathematical notation.	2	0	0	1	1	2
III	22216SRC37	Partcipation in Scaffold Research (Design/Societial projects)	CO1- Sensitization of social needs for innovation	3	2	1	3	3	2
			CO2- Team work towards interdisciplinary synchronous research strategy.	3	2	1	3	2	1
			CO3- Development of critical thinking and synergistic research approach.	3	2	1	2	1	1
IV	22216SEC41	Pharmaceutical Microbiology	CO1- Acquired detailed knowledge of antimicrobial agents, their mechanism of action	1	1	2	2	2	1

			CO2- Developed understanding of different types of disinfectants/antiseptics bactericidal and bacteriostatic actions	1	1	2	2	1	1
			CO3- Regulatory practices, biosensors and applications in Pharmaceuticals	1	1	1	1	1	2
			CO4- Quality Assurance and Validation	2	2	1	1	2	1
IV	22216SEC42	Biostatistics and Bioinformatics	CO1- Learn about probability/variable analysis and collection, classification of data	1	2	0	2	1	2
			CO2- Basic ideas of significance test (T-test, ANOVA)	2	0	0	2	2	2
			CO3- Understanding about the information on the search engines and various software tools	2	1	0	2	2	2
			CO4- Scope of Biological databases related software used in the bioinformatics	0	0	1	1	1	2
IV	22216SEC43L	Pharmaceutical Microbiology Lab	CO1 - Aseptic condition relevance to healthcare and the pharmaceutical industry.	1	0	1	2	1	2
			CO2 - Knowledge and understanding of the practical aspects of pharmaceutical microbiology.	1	1	1	2	2	3
			CO3 - Perform practicals on antimicrobial activity	1	1	0	1	1	3
			CO4- Learn the production of antibiotics from microbes.	1	1	0	2		2

IV	22216DSC44A	Bioethics and IPR	CO1- Students will gain awareness about Intellectual Property Rights (IPRs)	1	2	0	1	2	3
			CO2- To take measure for the protecting their ideas	1	2	2	1	1	1
			CO3- Able to develop business strategies by taking account of IPRs	1	3	3	1	2	1
			CO4- Able to assists in technology up gradation and enhancing competitiveness	2	1	1	1	2	1
IV	22216DSC44B	Molecular Immunology	CO1 - Able to identify the cellular and molecular basis of immune responsiveness.	2	0	0	2	1	1
			CO2- Learn about Biosensor assays for assessing ligand – receptor interaction.	2	0	1	2	1	2
			CO3- Rationale for vaccine design about new generation antibodies	1	0	0	1	1	2
			CO4- Multi-gene organization of immunoglobulin gene	2	1	2	1	1	2
	22216PRW45	Project work	CO1- Experience from a master's project and international literature.	2	1	0	1	2	1
			CO2- Develop ability to independently carry out a complete scientific process.	2	1	1	1	2	1
			CO3- Learn about how to write dissertation and proposal for the scientific community	1	0	0	1	1	1

			CO4- Scope of Biological databases related software used in the bioinformatics	3	0	0	1	1	2

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

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

DEPARTMENT OF COMPUTER SCIENCE

2022 REGULATION

Local need	
Regional need	
National need	
Global need	

DEPARTMENT OF COMPUTER SCIENCE

Program Outcomes and Course outcomes

2022

Programme offered:

S.No	Programme Name	PO and CO
1.	B.Sc. Computer Science	Yes
2.	M.Sc. Computer Science	Yes
3.	M.Phil. Computer Science	Yes
4.	BCA	Yes
5.	MCA	Yes

B.Sc. Computer Science

PROGRAMME OUTCOMES	
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.
PROGRAM SPECIFIC OUTCOME	
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
PROGRAM EDUCATIONAL OBJECTIVES	
PEO1	To study about I/O management, storage management
PEO2	To know the methods of connecting them to the peripheral devices.
PEO3	To learn Software design and Implementation
PEO4	To learn the basic principles of database and database design
PEO5	To understand computational development of graphics with mathematics

Course outcomes

(Cos) B.Sc.

Computer Science

S.No	Semester	Course Code/Name	Course Outcome
CO1	I	**Tamil- I / 22110AEC11**	➢ Learn the changes occurred in literature since classical period. ➢ Make use of vocabulary systematically. ➢ Obtaining More information about one's culture and tradition; ➢ Encourage creative writing and developing self-confidence. ➢ Aiming at enriching human excellence; ➢ Increasing the level of comprehension and exercising communal harmony.
CO2	I	**Hindi-I/ 22111AEC11**	➢ Enables other state students to continue their learning phase without any disruptions. ➢ Through this language they can learn spirituality. ➢ Students can learn social discrimination.D18. ➢ Students can learn grammar techniques. ➢ Enables them to enhance their language skills. ➢ Enables them to develop creative writing.
CO3	I	**Advanced English-I/ 22132AEC11**	➢ Academic skills in preparation for tertiary study. ➢ Presentation and participation skills. ➢ Learning strategies and research skills. ➢ Academic essay and report writing skills. ➢ Social and Cultural skills. ➢ Reading speed, skimming, scanning and Assessment procedures
CO4	I	**French-I/ 22135AEC11**	➢ Focus on all four modalities of the language: speaking, listening, reading and writing. ➢ As well as knowledge of Francophone cultures and the skills of collaboration and critical thinking. ➢ Students can compare and contrast cultural practices as they relate to French and American culture.

			➢ Students are able to generalize about the importance of understanding cultural differences. ➢ Students can demonstrate critical thinking ➢ Collaborative problem-solving through advanced task-based language activities.
CO5	I	**English-I /22111AEC12**	➢ Read and comprehend literature ➢ Understand how to lead one's life realizing the modernity and its environment/atmosphere. ➢ Read and comprehend literature ➢ Improves their proficiency in English language. ➢ Develops the habit of effective reading. ➢ Develops effective writing skills. ➢ Develops functional communicative aspect of language through a series of real life tasks.
CO6	I	**PROBLEM SOLVING USING PYTHON/ 221220EC13**	➢ To understand the principles of Python and acquire skills in programming in python ➢ To develop the emerging applications of relevant field using Python ➢ Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. ➢ Able to develop simple turtle graphics programs in Python
CO7	I	**Classical Algebra/ 22112AEC14B**	➢ Understand the theory of, and be able to solve problems in Cayley Hamilton Theorem, and finding the Eigen values & Eigen vectors ➢ be able to manipulate relation between root and coefficients, symmetric functions of the roots in terms of the coefficients and transformation of equation . ➢ be able to calculate summation related to Binomial, Exponential and Logarithmic series

CO8	I	**Numerical And Statistical Methods/ 22112AEC15B**	➢ Apply numerical methods to find the solution of algebraic equations using different methods and numerical solution of system of algebraic equations. ➢ Compute the error estimates for the numerical methods. ➢ Apply various interpolation methods and finite difference concepts. ➢ Work out numerical differentiation and integration whenever and wherever routine methods are not applicable. ➢ Solve a differential equation using an appropriate numerical method.
CO9	I	**PROBLEM SOLVING USING PYTHON LAB/ 2210SEC16L**	➢ To implement the python programming features in practical applications. ➢ 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, turtles, Files and modules.

CO10	I	**Indian Constitution/ 221LSCIC**	➢ To make the students understand about the Democratic Rule and Parliamentarian administration. ➢ To appreciate the salient features of the Indian Constitution. ➢ To know the fundamental Rights and Constitutional Remedies. ➢ To make familiar with powers and positions of the Union Executive, Union Parliament and the Supreme Court. ➢ To exercise the adult franchise of voting and appreciate the Electoral system of Indian Democracy.

CO11	I	**Universal Human Values/ 221LSCUV**	➢ Know about universal human values and understand the importance of values in individual, social circles, career path, and national life. ➢ Learn from case studies of lives of great and successful people who followed and practiced human values and achieved self-actualization. ➢ Become conscious practitioners of human values. ➢ Realize their potential as human beings and conduct themselves properly in the ways of the world.
CO12	II	**Tamil – II/22110AEC21**	➢ Know what devotion really is. ➢ Know the fruitfulness obtained through devotion. ➢ Perceive the progress achieved in the society through devotion. ➢ Obtaining More information about one's culture and tradition; ➢ Encourage creative writing and developing self-confidence. ➢ Aiming at enriching human excellence;
CO13	II	**Hindi-II/ 22111AEC21**	➢ Enables other state students to continue their learning phase without any disruptions. ➢ Through this language they can learn spirituality. ➢ Students can learn social discrimination.D18. ➢ Students can learn grammar techniques. ➢ Enables them to enhance their language skills. ➢ Enables them to develop creative writing.

CO14	II	**Advanced English-II/ 22132AEC21**	➢ Communicate effectively in most daily practical and social situations at both concrete and abstract levels. ➢ Participate in formal and informal conversations involving problem solving and decision making. ➢ Speak on familiar concrete topics at a descriptive level and present a detailed analysis or comparison. ➢ Participate in conversations with confidence. ➢ Demonstrate an increased ability to respond appropriately to the formality level of a social interaction. ➢ Understand more complex indirect questions about personal experience, familiar topics
CO15	II	**French-II/ 22135AEC21**	➢ Focus on all four modalities of the language: speaking, listening, reading and writing. ➢ As well as knowledge of Francophone cultures and the skills of collaboration and critical thinking. ➢ Students can compare and contrast cultural practices as they relate to French and American culture. ➢ Students are able to generalize about the importance of understanding cultural differences. ➢ Students can demonstrate critical thinking and ➢ Collaborative problem-solving through Advanced task-based language activities.
CO16	II	**English-II/ 22111AEC22**	➢ Read and appreciate literature. ➢ Know more about Mahatma Gandhi, Mother Teresa, and Martin Luther King. ➢ Describe Daffodils, beauty of Byron‘s Maid, Painful account of apple- pickers. ➢ Apply the concept of the stories to the present cult. ➢ Understand the basic Grammar, and Spoken English. Ability to write composition, letter and vocabulary. ➢ Gain vocabulary through reading. Acquire fluency in English language.

CO17	II	**Internet and Java Programming/ 22120SEC23**	➢ To understand the core principles of the Java Language ➢ To study about Graphics programming using java Language ➢ To learn visual tools to produce well designed, effective applications and applets. ➢ Write, compile, and execute Java programs using arrays and recursion. ➢ Write a final project that may be selected from among the following applets for inclusion ➢
CO18	II	**Discrete Mathematics/ 22112AEC24B**	➢ 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 conditional.

CO19	II	**Operations Research/ 22112AEC25B**	➢ Identify and develop operational research models from the verbal description of the real system. ➢ Understand the mathematical tools that are needed to solve optimization problems. ➢ Use mathematical software to solve the proposed models. ➢ Develop a report that describes the model And the solving technique, analyses 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
CO20	II	**Internet and Java Programming Lab/ 22120SEC26L**	➢ learn the Internet Programming, using Java Applets ➢ create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings ➢ apply event handling on AWT and Swing components ➢ learn to access database through Java programs, using Java Data Base Connectivity (JDBC) ➢ create dynamic web pages, using Servlets and JSP ➢ make a reusable software component, using Java Bean
CO21	II	**Communication Skills/ 201LSCCS**	➢ Learning to communicate through the digital media ➢ Understand the importance of empathetic listening ➢ Explore communication beyond language. ➢ By the end of this program participants should have a clear understanding of what good communication skills are and what they can do to improve their abilities. ➢ Understand role of communication in teaching-learning process

CO22	III	**Tamil-III/ 22110AEC31**	➢ 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. ➢ Obtaining More information about one's culture and tradition; ➢ Encourage creative writing and developing self-confidence. ➢ Aiming at enriching human excellence;
CO23	III	**Hindi-III/ 22132AEC31**	➢ Enables other state students to continue their learning phase without any disruptions. ➢ Through this language they can learn spirituality. ➢ Students can learn social discrimination.D18. ➢ Students can learn grammar techniques. ➢ Enables them to enhance their language skills. ➢ Enables them to develop creative writing.
CO24	III	**Advanced English-III/ 22111AEC31**	➢ Follow main ideas, key words, and important details in an authentic 2-3 page text on a familiar and partially predictable topic. ➢ Read in English for information, to learn the language and to develop reading skills. ➢ Also begin to read very simple adult fiction. ➢ Write coherent paragraphs on familiar topics with clear main ideas and some supporting details. Develop a sense of audience. ➢ Demonstrate mostly satisfactory control over complex structures, spelling, and mechanics. ➢ Use and understand an expanded inventory Of concrete and common idiomatic language.

CO25	III	**French-III/ 22135AEC31**	➢ Focus on all four modalities of the language: speaking, listening, reading and writing. ➢ As well as knowledge of Francophone cultures and the skills of collaboration and critical thinking. ➢ Students can compare and contrast cultural practices as they relate to French and American culture. ➢ Students are able to generalize about the importance of understanding cultural differences. ➢ Students can demonstrate critical thinking and Collaborative problem-solving through advanced task-based language activities.
CO26	III	**Visual Programming/ 22120SEC33**	➢ Students list the visual programming concepts. ➢ Explain basic concepts and definitions. ➢ Express constants and arithmetic operations. ➢ Distinguish variable and data types. ➢ Students code visual programs by using Visual Basic work environment. ➢ Distinguish and compose events and methods. ➢ Recognize and arrange control structures. ➢ Design a complete program using visual programming concepts. ➢ Students prepare various projects by helping visual programming.
CO27	III	**Applied physics –I/ 22113AEC34A**	➢ 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.
CO28	III	**Visual Programming Lab/ 22120SEC35L**	➢ To understand arithmetic operations ➢ To understand string and matrix operations ➢ To understand form applications ➢ To understand web application

CO29	III	**Applied physics Lab-I/ 22113AEC36AL**	➢ An ability to apply knowledge of mathematics, science, and engineering. Graduates should transform knowledge of mathematics, Physics, chemistry, Engineering Mechanics, probability and statistics, and engineering drawing in solving a wide range of civil engineering problems. ➢ An ability to design, implement, evaluate a system and conduct experiments, as well as to analyze and interpret data. Graduates should show that they can make decisions regarding type, and number of data points to be collected, duration of the experiment to obtain intended results, and demonstrate an understanding of accuracy and precision of data ➢ An ability to design, implement and evaluate a system, or process to meet desired needs Graduates should be able to: identify the project goal;
CO30	III	**Research Methodology/** 2**2120RMC37**	➢ Students who complete this course will be able to understand and comprehend the basics in research methodology and applying them in research/ project work. ➢ This course will help them to select an appropriate research design. ➢ With the help of this course, students will be able to take up and implement a research project/ study. ➢ The course will also enable them to collect the data, edit it properly and analyses it accordingly. Thus, it will facilitate students' prosperity in higher education.
CO31	III	**OFFICE AUTOMATION/221ACLOSAN**	➢ 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 Windows, Word, Excel, Power point, and the Internet in the workplace and in future coursework. ➢ Students will be able to communicate effectively

CO32	IV	**Tamil-IV/ 22110AEC41**	➢ 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. ➢ Obtaining More information about one's culture and tradition; ➢ Encourage creative writing and developing self-confidence. ➢ Aiming at enriching human excellence;
CO33	IV	**Hindi-IV/ 22111AEC41**	➢ Enables other state students to continue their learning phase without any disruptions. ➢ Through this language they can learn spirituality. ➢ Students can learn social discrimination.D18.

CO34	IV	**Advanced English-IV/ 22132AEC41**	➢ Make oral presentations effectively for academic purposes by using appropriate discourse markers, transitions and conjunctions. ➢ Respond to spoken discourse in their content courses and academic presentations. ➢ Follow oral instructions, identify details, and evaluate the speakers' viewpoints and attitudes. ➢ Evaluate information in discourse, criticize academic and non-academic texts in English. ➢ Recognize the grammatical structures in the text, make inferences by analyzing cause and effect relations. ➢ Interpret figurative language, make critical Judgments, distinguish between significant and insignificant information.

CO35	IV	**French-IV/ 19135AEC41**	➢ Focus on all four modalities of the language: speaking, listening, reading and writing. ➢ As well as knowledge of Francophone cultures and the skills of collaboration and critical thinking. ➢ Students can compare and contrast cultural practices as they relate to French and American culture. ➢ Students are able to generalize about the importance of understanding cultural differences. ➢ Students can demonstrate critical thinking and ➢ Collaborative problem-solving through advanced task-based language activities.
CO36	IV	**English-IV/ 22111AEC42**	➢ Know about genius of Shakespeare, Martin Luther King, Mahatma Gandhi, and Mother Teresa. ➢ Describe Daffodils, beauty of Byron‘s Maid, Painful account of apple- pickers. ➢ Apply the concept of the stories to the present cult. ➢ Understand the basic Grammar, and Spoken English. Ability to write composition, letter and vocabulary. ➢ Ability to write composition, letter and vocabulary. Gain vocabulary through reading. Acquire fluency in English language.

CO37	IV	**Active Server Programming / 22120SEC43**	➢ Learners will be able to design web applications using ASP.NET ➢ Learners will be able to use ASP.NET controls in web applications ➢ Learners will be able to create database driven ASP.NET web applications and web services ➢ demonstrate advanced knowledge of programming for network communications ➢ have a detailed knowledge of the TCP/UDP Sockets ➢ create applications using techniques such as multiplexing, forking, multithreading ➢ make use of different types of I/O such as non-blocking I/O and event driven I/O

CO38	IV	**Applied physics II/ 22113AEC44A**	➢ Effectively use and critically evaluate current technical/scientific research literature, online information, as well as information related to scientific issues in the mass media. ➢ Integrate and relate scientific knowledge learned from classroom with real life situations. ➢ Communicate in written and oral forms with interested citizens and professionals on key concepts in physics and general scientific issues. ➢ Work cooperatively as part of a research team. ➢ Maintain life-long learning in the sciences and incorporate new information into the existing body of knowledge. ➢ Outline the applications of physics in industry and the role of physicists as entrepreneurs.

CO39	IV	**Environmental Studies/ 221ENSTU45**	➢ Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes. ➢ Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world. ➢ Demonstrate proficiency in quantitative methods, qualitative analysis, critical thinking, and written and oral communication needed to conduct high- level work as interdisciplinary scholars and/or practitioners. ➢ Understand the utility of environmental sources. ➢ Analyze the ecosystem and able to understand the different types of pollutions in country. Learn about environmental pollution. ➢ Familiarize with the social issues and the environment

CO40	IV	**Active Server Page Lab/ 221201SEC46L**	➢ Learners will be able to design web applications using ASP.NET ➢ Learners will be able to use ASP.NET controls in web applications ➢ Learners will be able to create database driven ASP.NET web applications and web services ➢ demonstrate advanced knowledge of programming for network communications ➢ have a detailed knowledge of the TCP/UDP Sockets ➢ create applications using techniques such as multiplexing, forking, multithreading ➢ make use of different types of I/O such as non-blocking I/O and event driven I/O
CO41	IV	**Applied physics lab II/** 2**2113AEC47AL**	➢ Effectively use and critically evaluate current technical/scientific research literature, online information, as well as information related to scientific issues in the mass media. ➢ Integrate and relate scientific knowledge learned from classroom with real life situations. ➢ Communicate in written and oral forms with interested citizens and professionals on key concepts in physics and general scientific issues. ➢ Work cooperatively as part of a research team. ➢ Maintain life-long learning in the sciences and incorporate new information into the existing body of knowledge. ➢ Outline the applications of physics in industry and the role of physicists as entrepreneurs.
CO42	IV	**Leadership and Management Skills/ 221LSCLS**	➢ Help students to develop essential skills to influence and motivate others ➢ Inculcate emotional and social intelligence and integrative thinking for effective leadership ➢ Create and maintain an effective and motivated team to work for the society ➢ Nurture a creative and entrepreneurial mindset ➢ Make students understand the personal values and apply ethical principles in professional And social contexts.

CO43	**V**	**Data Communication and Networking/ 22120SEC51**	➢ 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. ➢ Another node. Identify the components required to build different types of networks
CO44	**V**	**Operating System/ 22120SEC52**	➢ 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.
CO45	**V**	**Microprocessor and its Applications/ 22120SEC53**	➢ Design and implement programs on 8086 microprocessor. ➢ Design I/O circuits. ➢ Design Memory Interfacing circuits. ➢ Design and implement 8051 microcontroller based systems ➢ Understand the design of DMA
CO46	**V**	**Cloud Computing/ 22120DSC56A**	➢ 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
CO47	**V**	**Middleware Technology/ 22120DSC56B**	➢ Understand Distributed systems design and implementation ➢ Understand existing Distributed Technologies ➢ Use Middleware to Build Distributed Applications ➢ Understand Middleware Interoperability ➢ Understand Web services architectures

CO48	**V**	**Enterprise resource planning/ 22120DSC56C**	➢ Make basic use of Enterprise software, and its role in integrating business functions ➢ Analyze the strategic options for ERP identification and adoption. ➢ Design the ERP implementation strategies. ➢ Create reengineered business processes for successful ERP implementation.
CO49	**V**	**Microprocessor Lab/ 22120SEC55LC**	➢ Design and implement programs on 8085 microprocessor. ➢ Design and implement programs on 8086 microprocessor. ➢ Design interfacing circuits with 8085 ➢ Design interfacing circuits with 8086. ➢ Design and implement 8051 microcontroller based systems ➢ To Understand the concepts related to I/O and memory interfacing
CO50	**V**	**Operating System Lab/ 22120SEC56L**	➢ Execute the Unix Shell programming on the given system configuration. ➢ Learn the various services provided by the system calls. ➢ Simulate the process scheduling, process synchronization, deadlock avoidance and detection algorithms. ➢ Simulate memory management techniques and file handling
CO51	**V**	**Professional Skills/ 22120BRC57**	➢ Prepare their resume in an appropriate template without grammatical and other errors and ➢ using proper syntax ➢ Participate in a simulated interview ➢ Actively participate in group discussions towards gainful employment ➢ Capture a self - interview simulation video regarding the job role concerned ➢ Enlist the common errors generally made by candidates in an interview ➢ Perform appropriately and effectively in group discussions

CO52	VI	**.NET Programming/ 22120SEC61**	➢ 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. ➢ Understand the key protocols which support The internet. ➢ Demonstrate advanced knowledge of ➢ Programming for network communications.
CO53	VI	**Relational Data Base Management System/ 22120SEC62**	➢ Demonstrate the basic elements of a relational database management system. ➢ Identify the data models for relevant problems. ➢ Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data ➢ Characterize and discriminate data ➢ summarization forms and determine data mining functionalities ➢ Discover and measure interesting patterns ➢ From different kinds of databases. ➢ Design and implement of a data-mining application using sample, realistic data sets and modern tools.
CO54	VI	**Data Mining/** 2**2120DSC65A**	➢ Assess raw input data, and process it to provide suitable input for a range of data mining algorithms. ➢ Evaluate and implement a wide range of emerging and newly-adopted methodologies and technologies to facilitate the knowledge discovery. ➢ Characterize and discriminate data ➢ Summarization forms and determine data mining functionalities. ➢ Evaluate and select appropriate data-mining algorithms and apply, and interpret and ➢ Report the output appropriately.

CO55	VI	**NET Programming Lab/ 22120SEC64L**	➢ Contrast and compare major elements of the ➢ .NET Framework and explain how C# fits into the .NET platform. ➢ Analyze the basic structure of a C# application and be able to document, debug, compile, and run a simple application. ➢ Create, name, and assign values to variables. ➢ Use common statements to implement flow control, looping, and exception handling. ➢ Create methods (functions and subroutines) that can return values and take parameters. ➢ Create, initialize, and use arrays.
CO56	VI	**Oracle Lab/ 22120SEC65L**	➢ Brief knowledge about SQL Fundamentals ➢ Unary and Binary table Operations. ➢ Able to handle with different database ➢ Languages. ➢ Table view, Log and Triggers. ➢ Handling online Transactions] ➢ Characterize and discriminate data ➢ Summarization forms and determine data mining functionalities.

CO57	VI	**Artificial Intelligence and Expert Systems/ 22120DSC65B**	➢ Develop mathematical thinking and problem solving skills associated with research and writing proofs. ➢ Get exposure to a wide variety of mathematical concepts used in computer science discipline like probability. ➢ Use Graph Theory for solving problems. ➢ Acquire basic knowledge of sampling and estimation. ➢ Understand basic concepts of hypothesis. ➢ Understand the mathematical fundamentals that are prerequisites for a variety of courses like Data Mining, Network protocols, analysis of Web traffic, Computer security, Bioinformatics and Machine Learning.
CO58	VI	**Ethical hacking/ 22120DSC65C**	➢ To understand and analyses Information security threats & countermeasures ➢ To perform security auditing & testing ➢ To understand issues relating to ethical hacking ➢ To study & employ network defense measures ➢ To understand penetration and security testing issues
CO59	VI	**Journalism/22120DSC66C**	➢ Classifying newspaper as a recorder of news and events, as an organ of public opinion, instrument of social service, and promoter of democracy. ➢ Defining News and understanding its elements, news sources and different types of news. ➢ Understanding the role of the news editor and its functions, duties and responsibilities. ➢ Analyzing the duties and qualities of Chief

CO60	VI	**Development Of Mathematical Skills/ 221MAOEC**	➢ 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. ➢ Write and understand basic proofs. ➢ Develop and maintain problem-solving skills. ➢ Use mathematical ideas to model real-world problems
CO61	VI	**Instrumentation/ 221PHOEC**	➢ Touse the techniques and skills for electrical projects. ➢ Design a system, component or process to meet desired needs in electrical engineering. ➢ Measurement of R,L,C ,Voltage, Current, Power factor , Power, Energy ➢ Ability to balance Bridges to find unknown values. ➢ Ability to measure frequency, phase with Oscilloscope ➢ Ability to use Digital voltmeters ➢ Ability to measure strain, displacement, Velocity, Angular Velocity, temperature, Pressure, Vacuum, and Flow.
CO62	VI	**Food and Adulteration/ 221CHOE**	➢ 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.
CO63	VI	**Wild Life Conservation/ 221MBOEC**	➢ Maintenance of rare species in protected areas such as national parks, sentries etc., ➢ Establishment of specific biosphere reserves for endangered plants and animals. ➢ Protection of wild life through legislation such as banning hunting etc., ➢ Imposing specific restrictions on export of endangered plants and animals or their products. ➢

CO64	VI	**Web Technology/ 221CSOEC**	➢ 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.
CO65	VI	**BANKING SERVICES/ 221CMOEC**	➢ To help to gather knowledge on banking and Financial system in India. ➢ To provide knowledge about commercial banks And its products. ➢ To create awareness about modern bank ➢ services like e-banking-banking and internet ➢ Banking, ATM System. ➢ To introduce recent trends in banking system ➢ To make the student understand the basic concept of banking and financial institutions and expose ➢ various types of risk based by banks

CO66	VI	**Project Work/ 22120PRW66**	➢ Learn to create animated graphics and sound and interactivity. ➢ Can develop Website ➢ CD based presentations ➢ Manage website content. ➢ Use the Timeline. ➢ Add and Manage Tweens. ➢ Create Slideshows.
CO67	VI	**Communicative Engagement/ 221LSCCE**	➢ Increases confidence in their ability to read comprehends organize and retain written information. ➢ Increases Vocabulary through the study of word parts, use of context clues and Practice with a dictionary. ➢ Uses standard Grammar, punctuation and spelling, be clear and concise in formal technical writing. ➢ Learns to analyze unfamiliar words by understanding the structure of the English language. ➢ Improves comprehension and retention. ➢ Improves their ability to read and spell Words through an analysis of structure of the English language.

PRIST
DEEMED TO BE
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THANJAVUR – 613 403 - TAMIL NADU

SCHOOL OF ARTS AND SCIENCE
DEPARTMENT OF COMPUTER SCIENCE

Bachelor of Computer Application (B.C.A)

PROGRAMME OUTCOMES	
PO1	Able to design and develop reliable software applications for social needs and Excel in IT enabled services.
PO2	Able to analyze and identify the customer requirements in multidisciplinary domains, create high level design and implement robust software applications using latest technological skills.
PO3	Proficient in successfully designing innovative solutions for solving real life business problems and addressing business development issues with a passion for quality, competency and holistic approach
PO4	Perform professionally with social, cultural and ethical responsibility as an individual as well as in multifaceted teams with positive attitude
PO5	Capable of adapting to new technologies and constantly upgrade their skills with An attitude towards independent and lifelong learning.
PO6	Develop various real time applications using latest technologies and programming languages
PROGRAM SPECIFIC OUTCOME	
PSO1	Professional Skills: Attain the ability to design and develop computer applications, evaluate and recognize potential risks and provide innovative solutions.
PSO2	Successful Career and Entrepreneurship: Explore technical knowledge in diverse areas of Computer Applications and experience an environment conducive in Cultivating skills for successful career, entrepreneurship and higher studies.
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.
PROGRAM EDUCATIONAL OBJECTIVES	
PEO1	Evolve as globally competent computer professionals possessing leadership skills

	For developing innovative solutions in multidisciplinary domains.
PEO2	Excel as socially committed individual having high ethical values and empathy for The needs of society.
PEO3	Become an entrepreneur who can provide solutions and develop software products For Enterprise needs.
PEO4	Involve in lifelong learning to adapt the technological advancements in the Emerging areas of computer applications.

Course outcomes (Cos)

Bachelor of Computer Application (B.C.A)

S.No	Semester	Course Code/Name	Course Outcome
CO1	I	**Tamil- I/ 22110AEC11**	➢ Learn the changes occurred in literature since classical period. ➢ Make use of vocabulary systematically. ➢ Obtaining More information about one's culture and tradition; ➢ Encourage creative writing and developing self- confidence. ➢ Aiming at enriching human excellence; ➢ Increasing the level of comprehension and exercising communal harmony.
CO2	I	**Hindi-I/** 22111AEC11	➢ Enables other state students to continue their learning phase without any disruptions. ➢ Through this language they can learn spirituality. ➢ Students can learn social discrimination.D18. ➢ Students can learn grammar techniques. ➢ Enables them to enhance their language skills. ➢ Enables them to develop creative writing.
CO3	I	**Advanced English/-I 22132AEC11**	➢ Academic skills in preparation for tertiary study. ➢ Presentation and participation skills. ➢ Learning strategies and research skills. ➢ Academic essay and report writing skills.

			➢ Social and Cultural skills. ➢ Reading speed, skimming, scanning and Assessment procedures
CO4	I	**French-I/ 22135AEC11**	➢ Focus on all four modalities of the language: speaking, listening, reading and writing. ➢ As well as knowledge of Francophone cultures and the skills of collaboration and critical thinking. ➢ Students can compare and contrast cultural practices as they relate to French and American culture. ➢ Students are able to generalize about the importance of understanding cultural differences. ➢ Students can demonstrate critical thinking ➢ Collaborative problem-solving through advanced task-based language activities.
CO5	I	**English-I/ 22111AEC12**	➢ Read and comprehend literature ➢ Understand how to lead one's life realizing the modernity and its environment/atmosphere. ➢ Read and comprehend literature ➢ Improves their proficiency in English language. ➢ Develops the habit of effective reading. ➢ Develops effective writing skills. ➢ Develops functional communicative aspect of language through a series of real life tasks.
CO6	I	**PROBLEM SOLVING USING PYTHON/ 22122SEC13**	➢ To understand the principles of Python and acquire skills in programming in python ➢ To develop the emerging applications of relevant field using Python ➢ Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. ➢ Able to develop simple turtle graphics programs in Python

CO7	I	**Classical Algebra/ 22112AEC14B**	➢ Understand the theory of, and be able to solve problems in Cayley Hamilton Theorem, and finding the Eigen values & Eigen vectors ➢ Be able to manipulate relation between root and coefficients, symmetric functions of the roots in terms of the coefficients and transformation of equation . ➢ Be able to calculate summation related to Binomial, Exponential and Logarithmic series. Learn about various kinds of series. ➢ Develop skills for solving equations. ➢ Implement different methods to find complex roots.

CO8	I	**Numerical And Statistical Methods/ 22112AEC15B**	➢ Solutions of simultaneous equations, be able to calculate the area of the given curve Understood the concept of correlation and regression ➢ A knowledge of test of significance based on parametric and non – parametric test. Understands the concepts of finite differences. ➢ Gains knowledge about to interpolation for equal intervals. ➢ Study the concepts of interpolation for unequal intervals.
CO9	I	**PROBLEM SOLVING USING PYTHON LAB/ 22122SEC16L**	➢ To implement the python programming features in practical applications. ➢ 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, turtles, Files and modules. ➢
CO10	I	**Indian Constitution/ 221LSCIC**	➢ 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. ➢ Understand and Evaluate the Indian Political scenario amidst the emerging challenges.

CO11	I	**Universal Human Values 221LSCUV**	➢ Know about universal human values and understand the importance of values in individual, social circles, career path, and national life. ➢ Learn from case studies of lives of great and successful people who followed and practiced human values and achieved self-actualization. ➢ Become conscious practitioners of human values. ➢ Realize their potential as human beings and conduct themselves properly in the ways of the world.

CO12	II	**Tamil – II** **22110AEC2**	➢ Know what devotion really is. ➢ Know the fruitfulness obtained through devotion. ➢ Perceive the progress achieved in the society through devotion. ➢ Obtaining More information about one's culture and tradition; ➢ Encourage creative writing and developing self-confidence. ➢ Aiming at enriching human excellence;
CO13	II	**Hindi-II** **22111AEC21**	➢ Enables other state students to continue their learning phase without any disruptions. ➢ Through this language they can learn spirituality. ➢ Students can learn social discrimination.D18. ➢ Students can learn grammar techniques. ➢ Enables them to enhance their language skills. ➢ Enables them to develop creative writing.
CO14	II	**Advanced English-II** **22132AEC21**	➢ Communicate effectively in most daily practical and social situations at both concrete and abstract levels. ➢ Participate in formal and informal conversations involving problem solving and decision making. ➢ Speak on familiar concrete topics at a descriptive level and present a detailed analysis or comparison. ➢ Participate in conversations with confidence. ➢ Demonstrate an increased ability to respond appropriately to the formality level of a social interaction. ➢ Understand more complex indirect questions about personal experience, familiar topics, and general knowledge.

CO15	II	**French-II** **22135AEC21**	➢ Focus on all four modalities of the language: ➢ Speaking, listening, reading and writing. ➢ As well as knowledge of Francophone cultures and the skills of collaboration and critical thinking. ➢ Students can compare and contrast cultural practices as they relate to French and American culture. ➢ Students are able to generalize about the importance of understanding cultural differences. ➢ Students can demonstrate critical thinking and ➢ Collaborative problem-solving through advanced task-based language activities.

CO16	II	**English-II 22111AEC22**	➢ Read and appreciate literature. ➢ Know more about Mahatma Gandhi, Mother Teresa, and Martin Luther King. ➢ Describe Daffodils, beauty of Byron‘s Maid, painful account of apple- pickers. ➢ Apply the concept of the stories to the present cult. ➢ Understand the basic Grammar, and Spoken English. Ability to write composition, letter and vocabulary. ➢ Gain vocabulary through reading. Acquire fluency in English language.
CO17	II	**Data Structure and Algorithms 22122SEC23**	➢ Use the control structures of C appropriately for problems. ➢ Apply the different linear data structures to problem solutions. Implement basic data structures such as arrays and linked list. To learn how to apply ➢ Algorithms of data structures on data. ➢ Appreciate the needed for optimized algorithm. ➢ To gain knowledge of various methods used in data structures such as brute force, divide and conquer,greedy,etc
CO18	II	**Data Structure and Algorithms Lab/ 22122SEC26L**	➢ Implement basic data structures such as arrays and linked list. ➢ Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph Traversals and Shortest Paths. ➢ Implement various searching and sorting algorithms. To develop application using data structure algorithms. ➢ Implement the concept of data structures through ADT including List, Stack, and Queues. ➢ Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.

CO19	II	**Discrete Mathematics/ 22112AEC24B**	➢ Understood the concept of Algebraic structures like Groups, costs, different types of morphemes of group's fundamental theorem of homomorphism. ➢ To identify and apply basic concepts of set theory, arithmetic, logic, proof techniques, binary relations, graphs and trees. ➢ Understand the concepts of Mathematical logic such as Connections, Concepts of Tautology etc.. Study the concepts of Relations and Functions. ➢ Gains knowledge in Formal languages and Automata. Classify the concept of Lattices and Boolean Algebra ➢ Create structural designs using patterns of graphs in graph theory.
CO20	II	**Operations Research/ 22112AEC25B**	➢ 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. ➢ Extend knowledge to Non Linear Programming Problems. Investigate the concept of Dynamic Programming Problem.
CO21	II	**Research Led Seminar/ 22122RLC27**	➢ 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.
CO22	II	**Basic Behavioral Etiquette/ 221SSCBE**	➢ 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.

CO23	II	**Communicative English Lab-II**	➢ Understand grammar ➢ Develop speaking and writing skills ➢ Improves comprehension and retention. ➢ Improves their ability to read and spell words through an analysis of structure of the English language. ➢ Develops ideas with coherence and cohesion. ➢ Builds confidence in handling English language.
CO24	III	**Tamil-III 22110AEC31**	➢ 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. ➢ Obtaining More information about one's culture and tradition; ➢ Encourage creative writing and developing self-confidence. ➢ Aiming at enriching human excellence;
CO25	III	**Hindi-III 22132AEC31**	➢ Enables other state students to continue their learning phase without any disruptions. ➢ Through this language they can learn spirituality. ➢ Students can learn social discrimination.D18. ➢ Students can learn grammar techniques. ➢ Enables them to enhance their language skills. ➢ Enables them to develop creative writing.
CO26	III	**Advanced English-III 22111AEC31**	➢ Follow main ideas, key words, and important details in an authentic 2-3 page text on a familiar and partially predictable topic. ➢ Read in English for information, to learn the language and to develop reading skills. ➢ Also begin to read very simple adult fiction. ➢ Write coherent paragraphs on familiar topics with clear main ideas and some supporting details. Develop a sense of audience. ➢ Demonstrate mostly satisfactory control over complex structures, spelling, and mechanics. ➢ Use and understand an expanded inventory of concrete and common idiomatic language.
CO27	III	**French-III 22135AEC31**	➢ Focus on all four modalities of the language: speaking, listening, reading and writing. ➢ As well as knowledge of Francophone cultures and

			The skills of collaboration and critical thinking. ➢ Students can compare and contrast cultural practices as they relate to French and American culture. ➢ Students are able to generalize about the importance of understanding cultural differences. ➢ Students can demonstrate critical thinking and Collaborative problem-solving through advanced task-based language activities.
CO28	III	**English-III 22111AEC32**	➢ Read and appreciate literature. ➢ Know more about Mahatma Gandhi, Mother Teresa, and Martin Luther King. Describe Daffodils, beauty of Byron‘s Maid, painful account of apple- pickers. Apply the concept of the stories to the present cult. ➢ Understand the basic Grammar, and Spoken English. Ability to write composition, letter and vocabulary. ➢ Gain vocabulary through reading. Acquire fluency in English language.
CO29	III	**Internet and Java Programming 22122SEC33**	➢ 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. ➢ Develop Graphical User Interface applications and Web based applications in Java by importing applet, AWT.
CO30	III	**Internet and Java Programming Lab 22122SEC36L**	➢ To solve computational problems using basic constructs like if-else, control structures, array and strings. ➢ To implement relational ships between classes. ➢ To evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements. ➢ To develop software applications using java programming language. Write modular, Multithreading and event driven programming. ➢ Implement interfaces, inheritance, polymorphism, exception handling, file IO and multithreading as Programming techniques for application development.
CO31	III	**Financial Accounting 22161SEC34**	➢ Students are now familiarizes with the accounting principles and practices and the ascertainment of the

			Profitability and the financial position of the business. ➢ Identify events that need to be recorded in the accounting records. ➢ Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP. ➢ Describe the role of accounting information and its limitations. ➢ Equip with the knowledge of accounting process and preparation of final accounts of sole trader. Identify and analyze the reasons for the difference between cash book and pass book balances.
CO32	III	**Allied Physics –I 22113AEC35A**	➢ Learn how to develop and employ circuit models for elementary electronic components, e.g., resistors, sources, inductors, capacitors, diodes and transistors; ➢ Become adept at using various methods of circuit analysis, including simplified methods such as series-parallel reductions, voltage and current dividers, and the node method; ➢ Based on physics, system understanding that can predict the progress of climate changes, development of new material and technology. ➢ The motion of the particles, liquid & the propagation of heat &sound waves was regarded by students. ➢ The unit of solar physics they studied about the solar material as working and their principles. For electricity and magnetism students get knowledge about, how the electric circuit works and the magnetic field was created.
CO33	III	**Research Methodology 22122RMC37**	➢ Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools. ➢ 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.

CO34	III	**Office Automation 221ACLSOAN**	➢ Increases confidence in their ability to read comprehends organize and retain written information. Increases Vocabulary through the study of word parts, use of context clues and Practice with a dictionary. ➢ Uses standard Grammar, punctuation and spelling, be clear and concise in formal technical writing. ➢ Learns to analyze unfamiliar words by understanding the structure of the English language. Improves comprehension and retention. ➢ Improves their ability to read and spell words through an analysis of structure of the English language.
CO35	IV	**Tamil-IV 22110AEC41**	➢ 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. ➢ Obtaining more information about one's culture and tradition; Encourage creative writing and developing self-confidence. ➢ Aiming at enriching human excellence;
CO36	IV	**Hindi-IV 22111AEC41**	➢ Enables other state students to continue their learning phase without any disruptions. Through this language they can learn spirituality. ➢ Students can learn social discrimination.D18. Students can learn grammar techniques. ➢ Enables them to enhance their language skills. Enables them to develop creative writing.
CO37	IV	**Advanced English-IV 22132AEC41**	➢ Make oral presentations effectively for academic purposes by using appropriate discourse markers, transitions and conjunctions. ➢ Respond to spoken discourse in their content courses and academic presentations. Follow oral instructions, identify details, evaluate the speakers' viewpoints and attitudes. Evaluate information in discourse, criticize academic and non-academic texts in English. ➢ Recognize the grammatical structures in the text, make inferences by analyzing cause and effect

CO38	IV	**French-IV/ 19135AEC41**	➢ Focus on all four modalities of the language: speaking, listening, reading and writing. ➢ As well as knowledge of Francophone cultures and the skills of collaboration and critical thinking. ➢ Students can compare and contrast cultural practices as they relate to French and American culture. ➢ Students are able to generalize about the importance of understanding cultural differences. ➢ Students can demonstrate critical thinking and Collaborative problem-solving through advanced task-based language activities.
CO39	IV	**English-IV 22111AEC42**	➢ Read and appreciate literature. ➢ Know more about Mahatma Gandhi, Mother Teresa, and Martin Luther King. Describe Daffodils, beauty of Byron‘s Maid, painful account of apple- pickers. Apply the concept of the stories to the present cult. ➢ Understand the basic Grammar, and Spoken English. Ability to write composition, letter and vocabulary. ➢ Gain vocabulary through reading. Acquire fluency in English language.
CO40	IV	**Visual Programming 22122SEC43**	➢ 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. Design and implement Applications using an object-oriented methodology.
CO41	IV	**Visual Programming Lab 22122SEC45L**	➢ Design, create, build and debug visual basic applications. Apply arithmetic operations for displaying numeric output. Apply decision structures for determining different operations. Write windows applications using forms, controls and events. ➢ Write Visual Basic programs using object-oriented

CO42	IV	**Allied Physics –II 22113AEC44A**	➢ Express positive integers in different number systems (binary, octal, decimal hexadecimal) Codify data elements or information (signal values) by binary variables (signals) using standard codes for positive integers (binary, BCD, Gray) and characters (ASCII code). ➢ Codify signed integers (positive and negative) using the two's-complement system ➢ Perform basic arithmetic operations (addition, subtraction, multiplication) of signed integers by means of the 2's complement system ➢ List a set of simulation tools for digital electronics.
CO43	IV	**Environmental Studies/ 221EVNSTU**	➢ Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world. ➢ Demonstrate proficiency in quantitative methods, qualitative analysis, critical thinking, and written and oral communication needed to conduct high-level work as interdisciplinary scholars and/or practitioners. ➢ Understand the utility of environmental sources. ➢ Analyze the ecosystem and able to understand the different types of pollutions in country. ➢ Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
CO44	IV	**Allied Physics Lab –I 22113AEC46AL**	➢ Uses standard Grammar, punctuation and spelling, be clear and concise in formal technical writing. ➢ Learns to analyze unfamiliar words by understanding the structure of the English language. Improves comprehension and retention. ➢ Improves their ability to read and spell words through an analysis of structure of the English language. ➢ Develops ideas with coherence and cohesion. Builds confidence in handling English language.

CO45	IV	**Leadership and Management Skills 221LSCLS**	➢ Communication and negotiation techniques for complex workplace discussions ➢ Exposure to real business documentation, legislation and policy ➢ The ability to lead and manage effective workplace relationships ➢ Confidence to guide colleagues and staff to reach their goals ➢ A strong pathway to continue your study and enhance your career opportunities
CO46	IV	**General Aptitude and Quantitative Ability 221SSCAQ**	➢ Uses standard Grammar, punctuation and spelling, be clear and concise in formal technical writing. ➢ Learns to analyze unfamiliar words by understanding the structure of the English language. Improves comprehension and retention. ➢ Improves their ability to read and spell words through an analysis of structure of the English language. ➢ Develops ideas with coherence and cohesion. Builds confidence in handling English language

CO47	**V**	**Relational Database Management Systems/ 22122SEC51**	➢ Design Databases for applications. ➢ Use the Relational model, ER diagrams. ➢ Design the Query Processor and Transaction Processor. ➢ To analyze Database design Methodology. ➢ Acquire knowledge in fundamentals of Database Management System. ➢ Able to handle with different Database Languages.
CO48	V	**NET Programming/22122SEC 52**	➢ 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. Understand the Key protocols which support the internet. ➢ Demonstrate advanced knowledge of programming for network communications. Utilize game-related graphic displays and audio.

CO49	V	**Designing and supporting Computer Networks/22122SEC53**	➢ Identify the components required to build different types of networks Choose the required functionality at each layer for given application Identify solution for each functionality at each layer ➢ Trace the flow of information from one node to another node in the network. ➢ Describe, analyze and evaluate a number of data link, network, and transport layer protocols. Design, analyze, and evaluate networks and services for homes, data centers, IoT/IoE LANs and WANs.

CO50	V	**Oracle Lab/22122SEC55L**	➢ Brief knowledge about SQL Fundamentals Unary and Binary table Operations. ➢ Able to handle with different database languages. Table view, Log and Triggers. ➢ Handling online Transactions.
CO51	V	**NET Programming Lab/22122SEC56L**	➢ Contrast and compare major elements of the .NET Framework and explain how C# fits into the ➢ Analyze the basic structure of a C# application and be able to document, debug, compile, and run a simple application. ➢ Use common statements to implement flow control, looping, and exception handling. Create methods (functions and subroutines) that can return values and take parameters. Create, initialize, and use arrays.
CO52	V	**Computer Organization and Architecture/22122DSC54A**	➢ Design arithmetic and logic unit. ➢ Design and analyze pipelined control units ➢ Evaluate performance of memory systems ➢ Distinguish the organization of various parts of a System memory hierarchy. Basic concept of Parallel Computing.

CO53	**V**	**E-learning/22122DSC54B**	➢ Develop e – learning application on their own. Ability to develop contents for e-learning. ➢ To represent the learning goals by starting with an acting verb. To indicate the kind of performance expected. ➢ It can be understood within the context of the discipline.
CO54	V	**Enterprise Resource Planning/22121DSC54C**	➢ Make basic use of Enterprise software, and its role in integrating business functions ➢ Analyze the strategic options for ERP identification and adoption. ➢ Design the ERP implementation strategies. ➢ Create reengineered business processes for successful ERP implementation.

CO55	**V**	**Participation in Bounded Research/22122BRC57**	➢ To understood a 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 educational; research study and the components that comprise such an introduction. ➢ Know the types of descriptive statistics typically reported in educational research studies. Able to identify a research problem stated in a study. ➢ Have basic awareness of data analysis-and hypothesis testing procedures
CO56	V	**Professional /Skills221ACLSPSL**	➢ 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
CO57	VI	**Advanced Web Technology/22122SEC 61**	➢ 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 Acquire knowledge about PHP. ➢ Familiar with client server architecture and able to develop a web application using java technologies.

CO58	VI	**Operating System/22122SEC62**	➢ 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. ➢ Perform administrative tasks on Linux Servers.
CO59	VI	**Advanced Web Technology Lab/22122SEC64L**	➢ Understand analyze and apply the role of languages like HTML ,DHTML ,CSS, XML ,JavaScript VBScript ASP PHP and protocols in the workings of the web and web applications. ➢ Analyze a web page and identify its elements and Attributes. ➢ Create a web pages using HTML, DHTML and Cascading styles Sheets. Create interactive web Applications using ASP.NET. ➢ Build and consume web services. ➢ Students will be able to write a server side java application called JSP to catch form data sent from Client and store it on data base.
CO60	VI	**Operating System Lab/22122SEC65L**	➢ Install a Linux operating system with a custom partitioning scheme and log into and out of a UNIX/Linux computer system using graphical and command line environments. ➢ Use UNIX/Linux command line (shell) commands to navigate and manage the UNIX/Linux file system, customize the user shell environment, ➢ Use archiving and compression to back up files. ➢ Use file name globing and regular expressions to find files and text in the system. To manage user and group accounts and permissions. ➢ To manage processes and jobs.

CO61	VI	**Software Project Management/22122DSC63A**	➢ Identify the different project contexts and suggest an appropriate management strategy. Practice the role of professional ethics in successful software Development. ➢ Identify and describe the key phases of project Management. ➢ Determine an appropriate project management approach through an evaluation of the business Context and scope of the project. ➢ Plan and manage projects at each stage of the software development life cycle (SDLC). Create project plans that address real-world management challenges.
CO62	VI	**Object Oriented Analysis and Design/22122DSC63B**	➢ Design and implement projects using OO concepts. Use the UML analysis and design patterns. ➢ Compare and contrast various testing techniques.
CO63	VI	**Ethical Hacking/22122DSC63C**	➢ Plan a vulnerability assessment and penetration test for a network. ➢ Execute a penetration test using standard hacking tools in an ethical manner. ➢ Report on the strengths and vulnerabilities of the tested network. ➢ Identify legal and ethical issues related to vulnerability and penetration testing.

CO64	VI	**Tamil IlakkiyaVaralaru/ 221TNOEC**	➢ They can know the growth of classical literature and also middle period literature. They can know the oldness, the specialty and the uniqueness of Tamil literature. They can know the spiritual linguistic characters and life style. ➢ They can know the trends and traditions, cultures and customs of classical people. They can get the creativity and talents to produce new style of literature. ➢ They can know the relationship between literature and the history of politics.

CO65	VI	**Journalism/221ENOEC**	➢ Classifying newspaper as a recorder of news and events, as an organ of public opinion, instrument of social service, and promoter of democracy. ➢ Defining News and understanding its elements, news sources and different types of news. Understanding the role of the news editor and its functions, duties and responsibilities. ➢ Analyzing the duties and qualities of Chief Sub editor and Sub editors. Understanding news writing and different structures of news writing. Analyzing crime And legal reporting, science and financial reporting.
CO66	VI	**Development of Mathematical Skills/221MAOEC**	➢ Demonstrate an understanding of the foundations and history of mathematics. Perform computations in higher mathematics. ➢ Read and understand middle-level proofs. Write and understand basic proofs. ➢ Develop and maintain problem-solving skills. ➢ Use mathematical ideas to model real-world problems.
CO67	VI	**Instrumentation/221PHOEC**	➢ Recognize the evolution and history of units and standards in Measurements. ➢ Identify the various parameters that are measurable in electronic instrumentation. Employ appropriate instruments to measure given sets of parameters. ➢ Practice the construction of testing and measuring set up for electronic systems. ➢ To have a deep understanding about instrumentation concepts which can be applied to Control Systems.
			➢ Relate the usage of various instrumentation standards.
CO68	VI	**Food and Adulteration/221CEOEC**	➢ Understand various areas of Food Safety & Quality Assurance. Grasp knowledge of the quality assessments of food products. Comprehend food quality management systems. ➢ Apprehend the Indian and International food laws. Conceive the concept of adulteration in food products. ➢ Apprehend the quality assessment of food products using various instruments.

CO69	VI	**Wildlife Conservation/221MBOEC**	➢ Wildlife habitat studies will enable students to solve problems of conservation. Describe habitat management. ➢ Understanding of Conservation will help protection of wildlife. Explain wildlife trade that may enhance the economy. ➢ Wildlife legislation will systematically organize the understanding of wildlife conservation, trade and management.
CO70	VI	**Mushroom Technology/221BTOEC**	➢ Understand prospects of cultivation of ➢ Different types of edible mushroom. ➢ CO2: Identify climatic requirements, composting ➢ requirements and methods of harvesting of ➢ Mushroom cultivation. ➢ CO3: Prepare value-added products. ➢ Out of mushroom to generate self-employment. ➢ CO4: Demonstrate knowledge about the ➢ significance of morphology, anatomy and ➢ Propagation of mushrooms.
CO71	VI	**E-Learning/ 221CSOEC**	➢ Develop e – learning application on their own. Ability to develop contents for e-learning. ➢ To represent the learning goals by starting with an acting verb. To indicate the kind of performance expected. ➢ It can be understood within the context of the discipline.
CO72	VI	**Banking Service 221CMOEC**	➢ To disseminate knowledge among the students inculcate with theoretical structures about banking and insurance. ➢ To train and equip the students with the skills of modern banking and insurance is run. Students will be taken for trainings to banks and insurance companies. ➢ To develop and inculcate the traits of professionalism among the students. Communications skills and professional discipline will be inculcated. ➢ To enable the student to know the process of credit and risk management.

CO73	VI	**Project Work 22122PRW66**	➢ To identify and describethe political, religious, economic, and social uses of art in Italy during the renaissance. ➢ Identify a range of works of art and artists. ➢ Analyze the role of art and of the artist in Italy at this time. Analyze the art of the period according to objective methods. ➢ Link different materials and types of art to the attitudes and values of the period. Evaluate and defend their response to a range of art historical issues.

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

SCHOOL OF ARTS & SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

M.Sc., (Computer Science)

PROGRAMME OUTCOMES	
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, analyses, 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 OUTCOME	
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 (Cos)

M.Sc Computer Science

S.No	Semester	Course Code/Name	Course Outcome
CO1	I	**J2EE programming/22220SEC11**	➢ 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	I	**Relational Data Base Management System/2220SEC12**	➢ 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	I	**Discrete Mathematics/22212SEC13**	➢ 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

CO4	I	**J2EE programming Lab/22220SEC14L**	➢ 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	I	**RDBMS Lab/22220SEC15L**	➢ 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.
CO6	I	**WAP & XML/22220DSC16A**	➢ 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	I	**Computer**	➢ Analyze processor Performance

		Architecture/22220DSC16B	➢ 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	I	**Research Led Seminar/22220RLC17**	➢ Able to determine the methods to create and manipulate **Python** programs. ➢ Can Identify the commonly used operations involving file systems and regular expressions
CO9	II	**Python Programming/22220SEC21**	➢ Building subject-matter expertise ➢ Learning new concepts from industry experts ➢ Gaining a foundational understanding of Python ➢ Developing job-relevant skills with hands-on projects
CO9	II	**Cryptography & Network Security/22220SEC22**	➢ Develop basic skills of secure network architecture and explain the theory behind the security of different Cryptographic algorithms. ➢ Describe common network vulnerabilities and attacks, defense mechanisms against network attacks, and cryptographic protection Mechanisms. ➢ Compare various Cryptographic Techniques Design Secure applications ➢ Inject secure coding in the developed applications

CO10	II	**Software Engineering/22220SEC23**	➢ 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.

CO11	II	**Python Programming Lab/22220SEC24L**	➢ Able to determine the methods to create and manipulate Python programs. By utilizing the data structures like lists, dictionaries, tupelos 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(Numbly for ➢ Numerical calculations, Pandas for data analytics etc.).
CO11	II	**UNIX Lab/22220SEC25L**	➢ 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 seed concepts. ➢ To learn file management and permission advance commands. To learn awk, grap, perl scripts.

CO12	II	**Operating System/22220DSC26B**	➢ 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
CO13	II	**Artificial Intelligence/22220DSC26A**	➢ 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.
CO14	II	**Research Methodology/22220 RMC27**	➢ 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

CO15	II	**Participation in Bounded Research/22220BRC28**	➢ To understand the general definition of research design. ➢ To be able to identify the overall process of designing a research study from its inspect on 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.
CO16	III	**Open Source programming /22220SEC31**	➢ 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
CO17	III	**.Net Programming/22220SEC32**	➢ 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.

CO18	III	**.Net Programming Lab/22220SEC34L**	➢ 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:
CO19		**Open Source programming Lab/22220SEC33L**	➢ These students able to develop efficient open source programmers for rapidly ➢ developing network world ➢ Reliability and auditability. ➢ Integrated management.
CO20	III	**Real time Operating Systems/20220DSC35A**	➢ Be able to explain real-time concepts such as preemptive multitasking, task priorities, priority inversions, mutual exclusion, context switching, and synchronization, interrupt latency and response time, and semaphores. ➢ Able describe how a real-time operating system kernel is implemented. ➢ Able explain how tasks are managed. ➢ Explain how the real-time operating system implements time management. ➢ Discuss how tasks can communicate using semaphores, mailboxes, and queues.
CO21	III	**Wireless Communication Network/22220DSC35B**	➢ After successfully completing the course student will be able to ➢ Keep himself updated on latest wireless technologies and trends in the communication field

			➢ Understand the transmission of voice and data through various networks
CO23	III	**Writing for the Media/ 222ENOEC**	➢ Write with confidence ➢ Use Correct Grammar, Punctuation and Appropriate Style ➢ Differentiate between various types of media writing ➢ Gather and synthesize information from authentic sources ➢ Use digital resources for media writing
CO24	III	**222MAOEC-Applicable Mathematics Techniques**	➢ Be able to explain the core ideas and the techniques of mathematics at the college level. ➢ Be able to recognize the power of abstraction and generalization, and to carry out investigative mathematical work with independent judgment. ➢ Be able to setup mathematical models of real world problems and obtain solutions in structured and analytical approaches with independent judgment. ➢ Be able to carry out objective analysis and prediction of quantitative information with independent judgment.
CO25	III	**222PHOEC-Bio-medical Instrumentation**	➢ To identify the characteristics of the bio signals and their importance in diagnosis ➢ To outline the simple measurement and monitoring techniques to analyze bio signals for obtaining specific diagnostic information. ➢ To select appropriate imaging techniques for acquiring physiological parameters. ➢ To differentiate the suitability of a specific device for simple therapeutic and prosthetic applications.

			➢ To conceive an idea about the safety measures of biomedical instruments for their better utility.
CO26	III	**222CHOEC-Green Chemistry**	➢ Understand the importance of Green chemistry and Green synthesis. ➢ Engage in Microwave assisted organic synthesis. ➢ Demonstrate skills using the alternative green solvents in synthesis. ➢ Demonstrate and explain enzymatic catalysis. ➢ Analyze alternative sources of energy and carry out green synthesis.
CO27	III	**222BCOEC-Herbal Medicines**	➢ To Understand the raw material as source of herbal drugs from cultivation to herbal drug product ➢ To Understand the Nutraceuticals and Herbal-Drug and Herb Food Interactions ➢ To Understand the Herbal Cosmetics, Herbal Excipients, Herbal formulations ➢ To Understand the Patenting and Regulatory requirements of natural products
CO28	III	**222CMOEC- Financial Service**	➢ To impart knowledge regarding the components of Indian Financial System. ➢ To provide in depth understanding of different avenues of financial system viz. capital markets, banking, insurance, mutual funds & other related services. ➢ To enable the students to understand the role & functioning of regulatory bodies in financial sector ➢ To equip the students with skills required to operate in competitive environment in the service sector

CO29	III	**Societal project (Mini Project)/ 22220SRC37**	➢ 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

CO30	IV	**Software Testing/22220SEC41**	➢ 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 cyclamate 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.
CO31	IV	**Human Computer Interaction/22220 SEC42**	➢ 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-

CO32	IV	**Multimedia And Its Application/22220DSC 43A**	➢ 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
CO33	IV	**Middleware technology/ 22220DSC4 3B**	➢ 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.
CO34	IV	**Project work/22220PRW44**	➢ 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 deliverable hand over E ➢ Estimate and cost the human and physical resources required, and make plans to obtain the necessary resources.

CO35	IV	**Program Exit Examination/22220PEE**	➢ 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.

SCHOOL OF ARTS AND SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
Master of Computer Application (MCA)

PROGRAMME OUTCOMES	
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
PROGRAM SPECIFIC OUTCOME	
PSO1	Ability to pursue careers in IT industry/ consultancy/ research and development, teaching and allied areas related to computer science.
PSO2	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.
PSO3	Understand, analyze and develop computer programs in the areas related to algorithms, Process and solutions for specific application development using appropriate data modeling concepts.
PSO4	Apply standard Software Engineering practices and strategies in software project development using open-source programming environment to deliver a quality product for business success.
PSO5	Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.
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

Course outcomes (Cos)

Master of Computer Application (MCA)

S.No	Semester	Course Code/Name	Course Outcome
CO1	I	**ADVANCED DATA SCIENCE/22222SEC11**	➢ 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.
CO2	I	**ADVANCE DATABASE MANAGEMENT SYSTEM/22222SEC12**	➢ 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.
CO3	I	**Routing and Switching in LAN/22222SEC13**	➢ 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

CO4	I	**Discrete Mathematics/22212SEC14**	➢ some fundamental mathematical concepts and terminology; ➢ how to use and analyses recursive definitions; ➢ how to count some different types of discrete structures; ➢ Techniques for constructing mathematical proofs, illustrated by discrete mathematics examples. ➢ 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 Rap Shon method
CO5	I	**ADVANCED DATA SCIENCE LAB/22222SEC15L**	➢ Develop mathematical thinking and problem solving skills associated with research and writing proofs ➢ Get exposure to a wide variety of mathematical concepts used in computer science discipline like probability ➢ Use Graph Theory for solving problem ➢ Acquire basic knowledge of sampling and estimation. ➢ Understand basic concepts of hypothesis
CO6	I	**ADVANCE DATABASE MANAGEMENT SYSTEM LAB/22222SEC16L**	➢ The course is designed to develop skills to design and analyze simple linear and nonlinear 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.
CO7	I	**Mobile Computing 22222DSC17A**	➢ Able to think and develop new mobile application. ➢ Able to debate on any new technical issue related to this new paradigm and come up with a solution(s) ➢ Able to develop new ad hoc network applications and/or algorithms/protocols. ➢ Able to explain & develop any existing or new protocol related to mobile environment
CO8	I	**-Knowledge based decision support system/ 22222DSC17B**	➢ 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++.
CO9	II	**Python Programming/ 22222SEC21**	➢ Able to understand the Design and analyses small signal amplifier circuit ➢ Ability to understand Postulates of Boolean algebra and to minimize combinational functions ➢ Ability to understand Design and analyze combinational and sequential circuits ➢ Ability to understand logic families and realization of logic gates.

CO10	II	**Cryptography Network security/22222SEC22**	➢ 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.
CO11	II	**Open Source programming/22222SEC23**	➢ 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.
CO12	II	**Web Service/22222SEC24**	➢ Students learn to understand the principles of SOAP ➢ Students identify and select the appropriate framework components in the creation of web service solution ➢ Students analyze and efficiently use market leading environment tools to create and consume web services

CO13	II	**Python Programming Lab/22222SEC25L**	➢ Demonstrate competencies in fundamentals of computing, computing specialization, mathematics, and domain knowledge suitable for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements. ➢ Identify, formulate, and analyze complex real-life problems in order to arrive at computationally viable conclusions using fundamentals of mathematics, computer sciences, management and relevant domain disciplines

CO14	**II**	**Open Source programming Lab/22222SEC26L**	➢ Analyze the complexities of recursive and Non recursive algorithms. ➢ Apply ADT concepts such as arrays, stacks and queues for solving infix to post fix, postfix evaluation, priority queues. ➢ Apply the concepts of dynamic memory allocation for reducing the time and space complexity of algorithms. ➢ Implement linear, binary, interpolation, hashing searching techniques and sorting techniques namely bubble, insertion, selection, quick, merge sort

CO15	II	**Game Programming/ 22222DSC27A**	➢ Solve complex logic problems using the tools and techniques found in computer science, software engineering, and game programming. ➢ Write clear and efficient code in the programming languages relevant to professional game development, following appropriate coding standards and industry practices.
CO16	II	**Multimedia and Graphics/ 22222DSC27B**	➢ 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.
CO17	II	**Middleware Technology/22222 DSC27C**	➢ 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.
CO18	II	**Research Methodology/22222RMC28**	➢ Demonstrate the ability to choose methods appropriate to research aims and objectives ➢ Understand the limitations of particular research methods ➢ Develop skills in qualitative and quantitative data analysis and presentation ➢ Develop advanced critical thinking skills ➢ Demonstrate enhanced writing skills

CO19	IIII	**Data mining and warehousing/22222SEC31**	➢ 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.

CO20	IIII	**Grid and Cloud Computing/ 22222SEC32**	➢ Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. ➢ 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. ➢ Design/development of solutions: Design solutions for complex engineering problems and design system components or processes
CO21	III	**.NET Programming/22 222SEC33**	➢ 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.

CO22	III	**Object Oriented System Design/22222SEC34**	➢ 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. ➢ Design and carry out an empirical evaluation of different algorithms on a problem Formalization, and state the ➢ conclusions that the evaluation supports
CO23	III	**NET Programming Lab/22222SEC35L**	➢ At the end of this Lab course students will be able to: ➢ Create user interactive web pages using ASP.Net. ➢ Create simple data binding applications using ADO.Net connectivity. ➢ Performing Database operations for Windows Form and web application
CO24	III	**Information Security /22222DSC 36A**	➢ 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

CO25	III	**Internet of Things/ 22222DSC36B**	➢ 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 conman type of cryptography algorithms.
CO26	III	**M-Marketing/ 22222DSC36C**	➢ 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.

CO27	III	**Societal project (Mini Project)/ 22222SRC37**	➢ To write programs for a wide variety problem in mathematics, science, and games. ➢ Open source and community development.
CO28	IV	**Human Computer Interaction/ 22222SEC41**	➢ Design user interfaces and experiences grounded in known principles of usability and human-computer interaction. ➢ Iteratively prototype, evaluate, and improve user-centered designs with user feedback. ➢ Apply those skills to open or new areas of development in human-computer interaction.

CO29	IV	**Software Project Management/22222SEC42**	➢ 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

CO30	IV	**Big Data/22222SEC43**	➢ 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.
CO31	IV	**Project work/22222PRW44**	➢ 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

CO32	IV	**Program Exit Examination/22222PEE**	➢ Formulate research hypotheses. ➢ Review, compare and contrast research outcomes. ➢ 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 ➢ The exam is supposed to measures the knowledge of mathematics and computing fundamentals to various real life applications for any given requirement

D Comp. Sc M.C.A **School: Arts & Science** **Programme:** M.C.A

Mapping of courses to Employability/Entrepreneurship and Skill Development

Sem	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
I	22222SEC11	ADVANCED DATA SCIENCE	Understand the format and use of	3	1	3	1	3	0
			Understand basic input/output	2	0	3	2	1	0
			Understand object inheritance and	1	2	3	3	3	1
			Design C Programs for problems	2	1	3	2	1	0
			Understand the use of various	2	0	3	1	2	0
	22222SEC12	ADVANCE DATABASE MANAG	Understand the basic concepts of	2	1	3	1	2	0
			Design a database using ER	2	3	1	1	3	0
			Acquire the knowledge of query	1	1	1	3	1	0
			Develop a simple database	2	1	3	2	3	0
			Explain the basic concepts	3	2	3	2	1	3
	22222SEC13	Routing and Switching in LAN	Systematic approach to hierarchical	3	1	2	1	2	0
			Idea on VLAN, VTP, STP and Inter-	2	3	1	2	1	1
			Components of a wireless LAN and	1	2	3	1	2	1
			You will also learn how to	2	1	2	1	3	0
			small business router in order to	1	2	1	1	2	3
	22212SEC14	Discrete Mathematics	Students completing this course will	3	2	1	1	2	2
			Students completing this course	1	2	3	1	2	1
			Students completing this course	2	0	1	3	1	1
			Students completing this course	2	3	2	2	3	1
			Use the basic ideas of discrete	3	0	3	3	2	3
			Complete and use truth tables for	2	1	2	3	1	3
	22222SEC15L	ADVANCED DATA SCIENCE LAB	In depth manual testing teaching	3	2	1	1	1	0
			programmer training by creating	2	0	1	1	2	0
			Identify advance concepts of java pr	2	1	1	3	3	0
			Design and develop platform	1	1	3	2	3	1
			Able to implement the concepts of	2	0	3	2	1	0
	22222SEC16L	ADBMS LAB	Sharing of data and data integrity.	2	1	3	1	2	0
			Reducing Data Redundancy.	2	3	1	1	3	1
			The file based data management	2	1	1	3	1	0
			Be able to write SQL commands to	1	2	2	2	3	0
			Foundation knowledge in database c	3	2	1	1	1	3
	22222DSC17A	Mobile Co	Enhanced Productivity	2	1	3	1	1	0
			Location Flexibility.	1	1	1	3	1	2
			Streamlining of Business Processes.	1	3	2	2	3	0
			Understand fundamentals of wireless	1	2	3	3	2	3
			Analyze security, energy efficiency,	3	2	1	1	1	0
			Identify problems that are amenable	3	1	2	1	1	1

	22222DS	Knowledg	Identify appropriate AI methods to	2	1	3	1	1	0
			Formalise a given problem in the	2	0	1	1	3	0
			Implement basic AI algorithms.	2	0	1	1	1	3
			Design and carry out an empirical	2	1	3	1	2	0
			Formalisation, and state the	3	1	1	2	2	1
	22222R LC18	Research Led Seminar	Learn about contemporary research	3	2	2	3	3	2
			Learn the methodology for	2	3	2	1	1	3
			Identifying strengths and	1	2	2	3		3
			This course provides an experience	1		2	1	3	3
			It also gives an overview and	3	2	1	1	1	1
	22222S EC21	Python Programming	Presence of Third Party Modules.	1	1	1	3	1	0
			Extensive Support Libraries.	1	2	1	2	3	0
			Open Source and Community	1	1	3	1	2	1
			Express proficiency in the handling	2	1	1	3	2	0
			Identify the commonly used operatio	2	1	3	2	1	0
	22222S EC22	Cryptography Network security	Compare various Cryptographic	3	3	1	2	2	0
			Design Secure applications	1	2	3	3	3	1
			Inject secure coding in the	2	0	2	2	3	3
			Its help to develop the technical	2	1	1	2	1	2
			Understanding the most comman	2	1	3	2	1	2
	22222S EC23	Open Source programming	Understand process of executing a	3	2	1	2	1	1
			Be able to develop a form	2	1	3	1	3	0
			Understand basic PHP syntax for	2	1	1	3	1	0
			Understand the paradigm for	1	2	1	2	3	1
			To understand the role and future	3	2	3	2	1	1
	22222S EC24	Web Service	Get an idea on Processing XML.	2	3	1	1	1	0
			Understand the concepts of SOAP,	2	1	3	2	1	1
			Understand the concepts of Web	2	0	1	2	3	0
			Efficiently use market leading	2	1	2	3	1	3
			Indentify and select the appropriate	2	1	2	3	1	1
	22222S EC25L	Python Programming Lab	Duck typing and huge standard	2	1	1	3		1
			Presence of third-party modules.	1	2	2	2	3	0
			Express proficiency in the handling	2	2	3	2	2	0
			Extensive support libraries(NumPy	1	1	1	3		0
			Open source and community		1	3	2	2	0
			To write programs for a wide	3	1	2	2	1	0
	22222S EC26L	Open Source programming Lab	Reliability and auditability.	3	2	1	1	1	0
			Integrated management.	2	2	3		3	1
			Simple license management	1	1	1	3	1	1
II			To understand the role and future	2	0	1	2	3	2
			Knowledge about the latest	3	0	3	1	1	0
	22222D SC27A	Game Prog	Illustrate an understanding of the	3	1	1	1	1	0
			Implement game programming	2	1	3	1	2	0
			Construct a basic game engine	2	1	2	3		2
			Develop and maintain software	2	1	3	3	2	1
			Test, debug, and optimize	2	0	2	3	1	1
		Multimed	Gain proficiency in 3D computer	2	1	3	1	1	0
			Enhance the perspective of modern	2	0	1	3	1	1

	22222DS	ia and Graphics	Able to understand different	2	1	2	2	3	1
			Able to develop interactive	2	1	1	1	2	3
			Gain the knowledge of different	3	2	1	1	2	1
	22222DS	Middlewa	In business, it helps streamline	3	2	1	1	2	1
			It facilitates communication between	2	3	1	1	1	0
			It is able to maintain the integrity of	2	1	2	3	1	0
			Understand Middleware Interoperabi	2	1	3	2	3	0
			Understand Web services architectur	2	1	2	2	2	3
	22222R MC28	Research Methodol ogy	Formulate research hypotheses.	3	1	3	2	2	2
			Review, compare and contrast	2	0	3	2	3	3
			Discriminate between different	2	1	2	3	3	2
			Examine statistical methods to condu	2	1	1	3	1	2
			Select computational techniques	2	1	1	1	3	1
			Associate different types of research	2	2	3	2	2	3
			Recommend research management te	3	1	2	3	2	3
	22222B RC29	Participat ion in Bounded Research	To understood a general definition	3	1	3	3	3	3
			To be able to identify the overall	3	2	3	3	2	3
			Familiar with how to write a good	2	2	3	2	3	3
			Know the types of descriptive	3	2	3	2	3	3
			Able to identify a research problem	3	2	2	2	3	3
	22222S EC31	Data mining and warehous ing	Apply data mining techniques and	2	3	1	2	1	3
			Use data mining tools	2	1	3	1	2	0
			Compare and contrast the various	1	1	2	2	3	0
			Compare different approaches of	2	1	1	2	2	3
			x`x`x`	3	0	2	3	2	
	22222S EC32	Grid and Cloud Computin g.	Use the grid and cloud tool kits.	1	2	2	2	1	3
			Design and implement applications	2	0	3	2	2	2
			Compare the strengths and	2	1	3	2	1	3
			Identify the architecture,	2	1	1	2	3	2
			Design Cloud Services and Set a	2	1	3	2	2	2
	22222S EC33	.NET Program ming	Create web-based distributed	3	1	2	1	1	0
			Utilize DirectX libraries in the	1	2	3	1	1	0
			develop menu based program for	2	0	3	2	2	0
			Understand ADO .NET and	2	3	1	2	1	1
			Utilize the .NET environment to	2	1	2	3	2	0
	22222S EC34	Object Oriented System Design	Understand the basic concepts to	1	2	1	2	3	0
			Able to learn the various object	2	1	2	2	3	3
			Understand the concept of analysis,	2	1	3	3	2	1
			Able to implement analysis, design	2	1	1	3	3	0
			Able to understand the testing	1	2	3	1	3	0
III	22222S EC35L	.NET Program ming Lab	It provides re-usability.	3	1	3	2	1	0
			Create web-based distributed	2	1	3	2	1	1
			develop menu based program for	2	1	3	2	2	0
			Utilize the .NET environment to	2	3	1	3	2	0
			Less Coding and Increased Reuse	2	0	1	3	1	0
	22222DS	Informatio	Securing confidential information.	3	1	2	3	2	1
			Protection from malicious attacks	2	3	1	1	2	2
			Develop an understanding of	1	2	3	2	1	1

			Deletion and/or guaranteeing	2	1	3	2	1	2
			Prevents users from unauthorized	2	1	2	1	2	3
	22222DS	Internet of	Upon completion of the course, the	2	1	1	2	2	1
			Analyze various protocols for IoT	2	1	3	3	2	2
			Develop web services to access/cont	2	3	3	2	2	1
			Design a portable IoT using	3	1	3	3	2	2
			Deploy an IoT application and	2	1	3	3	2	3
			Analyze applications of IoT in real	2	1	1	2	3	1
	22222DS	M-Market	Upon Completion of the course, the	2	0	1	1	1	0
			Analyze various mobile marketing	1	3	1	1	1	1
			To introduce marketing as a	1	2	3	3	2	1
			Market Mobile based Applications.	1	2	3	1	1	0
			Apply various tools in mobile	2	2	1	3	1	0
	22222S RC37	Societal project (Mini Project)	It supports students to show their	3	0	3	3	2	3
			To strengthen the understanding of	3	3	1	2	1	3
			They also support students to show	2	2	3	1	2	3
			Improve your chances of achieving	2	2	1	3		3
			Gain a fresh perspective on your	2	2	1	2	3	3
IV	22222S EC41	Human Computer Interactio n.	Design effective dialog for HCI.	3	2	1	2	2	1
			Design effective HCI for	3	2	3	1	2	2
			Assess the importance of user	2	2	1	3	2	1
			Apply theories and concepts	1	2	1	3	1	1
			Explain the HCI implications for	1	1	3	2	1	0
	22222S EC42	Software Project Managem ent	Apply project management concepts	3	1	1	2	1	1
			Identify issues that could lead to IT p	2	3	3	2	1	0
			Explain project management in terms	2	2	2	3	1	0
			Explain the quality management & d	3	1	2	2	2	0
			Describe the responsibilities of IT pr	2	1	3	1	1	1
	22222S EC43	Big Data	Work with big data platform and	3	3	2	2	1	1
			Analyze the big data analytic	2	3	2	1	1	0
			Design efficient algorithms for	2	2	3	2	2	1
			Analyze the HADOOP and Map	3	3	2	3	3	3
			Explore the applications of Big	2	2	1	2	2	1
	22222P RW44	Project work	It supports students to show their	3	2	3	2	1	3
			To strengthen the understanding of	2	3	2	3	3	3
			They also support students to show	3	2	3	3	3	3
			Improve your chances of achieving	3	1	2	3	3	3
			Each student will develop and	3	1	2	3	3	3
	22222P EE	Program Exit Examinat ion	The exam is supposed to measure	3	2	2	3	3	3
			The primary purpose of the exit	3	2	3	3	3	3
			It help the student on latest	3	2	3	3	3	3
			The exam is supposed to measures	3	3	3	2	3	3
			The exam is supposed to measures	3	2	3	3	3	3
D(	**Comp. Sci.**		**School: Arts & Science**	**Programme: BCA**					
	22110A EC11	Tamil-I	Learn the changes occurred in	2	1	3	2	1	1
			Make use of vocabulary	2	3	2	1	2	1
			Obtaining More information about	3	2	1	2	1	0
			Encourage creative writing and	1	2	2	1	3	2

			Aiming at enriching human	2	1	1	2	1	3
			Increasing the level of	1	2	1	3	2	2
	22132AEC11	Hindi-I	Enables other state students to	1	3	2	1	2	1
			Through this language they can	1	2	2	3	1	2
			Students can learn social	0	1	3	2	2	1
			Students can learn grammar	2	2	1	2	1	3
			Enables them to enhance their	3	1	2	1	2	1
			Enables them to develop creative	2	1	1	2	3	2
	22111AEC11	Advanced English-I	Academic skills in preparation for	3	2	1	1	1	2
			Presentation and participation skills	2	2	3	2	1	1
			Learning strategies and research	1	3	2	1	0	2
			Academic essay and report writing	2	1	2	3	2	1
			Social and Cultural skills	1	2	1	1	3	2
			Reading speed, skimming, scanning	1	1	2	2	2	3
	22135AEC11	French-I	Focus on all four modalities of the	1	2	1	2	3	2
			As well as knowledge of	3	1	1	2	2	1
			Students can compare and contrast	2	2	0	3	1	2
			Students are able to generalize	2	1	2	1	2	1
			Students can demonstrate critical	1	2	3	2	1	2
			Collaborative problem-solving	2	3	2	1	1	3
	22111AEC12	English-I	Understand how to lead one's life	2	1	3	2	1	1
			Read and comprehend literature	2	3	2	1	2	1
			Improves their proficiency in	3	2	1	2	1	0
			Develops the habit of effective	1	2	2	1	3	2
			Develops effective writing skills.	2	1	1	2	1	3
			Develops functional communicative	1	2	1	3	2	2
	22122SE	Programming in C with C++	Be exposed to the syntax of C	1	3	2	1	2	1
			Be familiar with programming in C.	1	2	2	3	1	2
			Learn to use arrays, strings,	0	1	3	2	2	1
			To learn how C++ supports Object	2	2	1	2	1	3
			To understand and apply the	3	1	2	1	2	1
			Design and implement reliable and	2	1	1	2	3	2
I	22122SEC14L	Programming in C with C++ Lab	Read understand and trace the	3	2	1	1	1	2
			Write the C code for a given	2	2	3	2	1	1
			Implement programs with pointers	1	3	2	1	0	2
			Write programs that perform	2	1	2	3	2	1
			Illustrate flowchart and algorithm to	1	2	1	1	3	2
			Understand basic Structure of the C-	1	1	2	2	2	3
	22112AEC15B	Classical algebra	Understand the theory of, and be	1	2	1	2	3	2
			Be able to manipulate relation	3	1	1	2	2	1
			Be able to calculate summation	2	2	0	3	1	2
			Learn about various kinds of series	2	1	2	1	2	1
			Develop skills for solving equations	1	2	3	2	1	2
			Implement different methods to find	2	3	2	1	1	3
	22112AEC16B	Numerical and statistical	Solutions of simultaneous	2	1	3	2	1	1
			Understood the concept of	2	3	2	1	2	1
			A knowledge of test of significance	3	2	1	2	1	0
			Understands the concepts of finite	1	2	2	1	3	2

	methods	Gains knowledge about to	2	1	1	2	1	3
		Study the concepts of interpolation	1	2	1	3	2	2
22120SE	Skill Based Elective - I	Create a new document	1	3	2	1	2	1
		Select and work with text in a	1	2	2	3	1	2
		Cut and Copy information within	0	1	3	2	2	1
		To work effectively with features	2	2	1	2	1	3
		Create and modify tables, insert and	3	1	2	1	2	1
		To use the Mail Merge Wizard to	2	1	1	2	3	2
22111SEC01L	Communicative English Lab-I	Increases confidence in their ability	3	2	1	1	1	2
		Increases Vocabulary through the	2	2	3	2	1	1
		Uses standard Grammar,	1	3	2	1	0	2
		Learns to analyze unfamiliar words	2	1	2	3	2	1
		Improves comprehension and	1	2	1	1	3	2
		Improves their ability to read and	1	1	2	2	2	3
221INDCONS	Indian Constitution	Democratic values and citizenship	1	2	1	2	3	2
		Awareness on Fundamental Rights	3	1	1	2	2	1
		Learn the functions of union and	2	2	0	3	1	2
		Learn the power and functions of	2	1	2	1	2	1
		Appreciate of Democratic	1	2	3	2	1	2
		Understand and Evaluate the Indian	2	3	2	1	1	3
22110AEC21	Tamil-II	Know what devotion really is.	2	1	3	2	1	1
		Know the fruitfulness obtained	2	3	2	1	2	1
		Perceive the progress achieved in	3	2	1	2	1	0
		Obtaining More information about	1	2	2	1	3	2
		Encourage creative writing and	2	1	1	2	1	3
		Aiming at enriching human	1	2	1	3	2	2
22132AEC21	Hindi-II	Enables other state students to	1	3	2	1	2	1
		Through this language they can	1	2	2	3	1	2
		Students can learn social	0	1	3	2	2	1
		Students can learn grammar	2	2	1	2	1	3
		Enables them to enhance their	3	1	2	1	2	1
		Enables them to develop creative	2	1	1	2	3	2
22111AEC21	Advanced English-II	Communicate effectively in most	3	2	1	1	1	2
		Participate in formal and informal	2	2	3	2	1	1
		Speak on familiar concrete topics at	1	3	2	1	0	2
		Participate in conversations with	2	1	2	3	2	1
		Demonstrate an increased ability to	1	2	1	1	3	2
		Understand more complex indirect	1	1	2	2	2	3
22135AEC21	French-II	Focus on all four modalities of the	1	2	1	2	3	2
		As well as knowledge of	3	1	1	2	2	1
		Students can compare and contrast	2	2	0	3	1	2
		Students are able to generalize	2	1	2	1	2	1
		Students can demonstrate critical	1	2	3	2	1	2
		Collaborative problem-solving	2	3	2	1	1	3
22111AEC22	English-II	Read and appreciate literature	2	1	3	2	1	1
		Know more about Mahatma	2	3	2	1	2	1
		Describe Daffodils, beauty of	3	2	1	2	1	0
		Apply the concept of the stories to	1	2	2	1	3	2

			Understand the basic Grammar, and	2	1	1	2	1	3
			Gain vocabulary through reading.	1	2	1	3	2	2
	22122SEC23	Data Structure and Algorithms	Use the control structures of C	1	3	2	1	2	1
			Apply the different linear data	1	2	2	3	1	2
			Implement basic data structures	0	1	3	2	2	1
			To learn how to apply algorithms of	2	2	1	2	1	3
			Appreciate the needed for	3	1	2	1	2	1
II			To gain knowledge of various	2	1	1	2	3	2
	22122SEC24L	Data Structure and Algorithms Lab	Implement basic data structures	3	2	1	1	1	2
			Programs to demonstrate	2	2	3	2	1	1
			Implement various searching and	1	3	2	1	0	2
			To develop application using data	2	1	2	3	2	1
			Implement the concept of data	1	2	1	1	3	2
			Apply Algorithm for solving	1	1	2	2	2	3
	22112AEC25B	Discrete Mathematics	Understood the concept of	1	2	1	2	3	2
			To identify and apply basic	3	1	1	2	2	1
			Understand the concepts of	2	2	0	3	1	2
			Gains knowledge in Formal	2	1	2	1	2	1
			Classify the concept of Lattices and	1	2	3	2	1	2
			Create structural designs using	2	3	2	1	1	3
	22112AEC26B	Operations Research	Students using OR techniques in	2	1	3	2	1	1
			Students develop PERT and CPM	2	3	2	1	2	1
			Understand the concept of	3	2	1	2	1	0
			Students gets the knowledge about	1	2	2	1	3	2
			Extend knowledge to Non Linear	2	1	1	2	1	3
			Investigate the concept of Dynamic	1	2	1	3	2	2
	22122RLC27	Research Led Seminar	Learn about contemporary research	1	3	2	1	2	1
			Learn the methodology for	1	2	2	3	1	2
			Identifying strengths and	0	1	3	2	2	1
			This course provides an experience	2	2	1	2	1	3
			It also gives an overview and	3	1	2	1	2	1
			Application of research in various	2	1	1	2	3	2
	22120SEC02A	Skill Based Elective-II	Indicate the names and functions of	3	2	1	1	1	2
			Enter and edit data.	2	2	3	2	1	1
			Format data and cells.	1	3	2	1	0	2
			Construct formulas, including the	2	1	2	3	2	1
			Create and modify charts.	1	2	1	1	3	2
			Preview and print worksheets.	1	1	2	2	2	3
	22111SEC02L	Communicative English Lab-II	Understand grammar	1	2	1	2	3	2
			Develop speaking and writing skills	3	1	1	2	2	1
			Improves comprehension and	2	2	0	3	1	2
			Improves their ability to read and	2	1	2	1	2	1
			Develops ideas with coherence and	1	2	3	2	1	2
			Builds confidence in handling	2	3	2	1	1	3
	22110AEC31	Tamil-III	Achieve one's goal by following	2	1	3	2	1	1
			Learn to lead life of perfection by	2	3	2	1	2	1
			Attain happiness through honesty.	3	2	1	2	1	0
			Obtaining More information about	1	2	2	1	3	2

			Encourage creative writing and	2	1	1	2	1	3
			Aiming at enriching human	1	2	1	3	2	2
	22132AEC31	Hindi-III	Enables other state students to	1	3	2	1	2	1
			Through this language they can	1	2	2	3	1	2
			Students can learn social	0	1	3	2	2	1
			Students can learn grammar	2	2	1	2	1	3
			Enables them to enhance their	3	1	2	1	2	1
			Enables them to develop creative	2	1	1	2	3	2
	22111AEC31	Advanced English-III	Follow main ideas, key words, and	3	2	1	1	1	2
			Read in English for information, to	2	2	3	2	1	1
			Also begin to read very simple adult	1	3	2	1	0	2
			Write coherent paragraphs on	2	1	2	3	2	1
			Demonstrate mostly satisfactory	1	2	1	1	3	2
			Use and understand an expanded	1	1	2	2	2	3
	22135AEC31	French-III	Focus on all four modalities of the	1	2	1	2	3	2
			As well as knowledge of	3	1	1	2	2	1
			Students can compare and contrast	2	2	0	3	1	2
			Students are able to generalize	2	1	2	1	2	1
			Students can demonstrate critical	1	2	3	2	1	2
			Collaborative problem-solving	2	3	2	1	1	3
	22111AEC32	English-III	Read and comprehend literature.	2	1	3	2	1	1
			Know more about Mahatma	2	3	2	1	2	1
			Describe Daffodils, beauty of	3	2	1	2	1	0
			Apply the concept of the stories to	1	2	2	1	3	2
			Understand the basic Grammar, and	2	1	1	2	1	3
			Gain vocabulary through reading.	1	2	1	3	2	2
	22122SEC33	Internet and Java Programming	Understand the format and use of	1	3	2	1	2	1
			Understand basic input/output	1	2	2	3	1	2
			Understand object inheritance and	0	1	3	2	2	1
			Understand development of JAVA	2	2	1	2	1	3
			Understand the use of various	3	1	2	1	2	1
III			Develop Graphical User Interface	2	1	1	2	3	2
	22122SEC34L	Internet and Java Programming Lab	To solve computational problems	3	2	1	1	1	2
			To implement relationalships	2	2	3	2	1	1
			To evaluate user requirements for	1	3	2	1	0	2
			To develop software applications	2	1	2	3	2	1
			Write modular, multithreading and	1	2	1	1	3	2
			Implement interfaces, inheritance,	1	1	2	2	2	3
	22161SEC35	Financial Accounting	Students are now familiarizes with	1	2	1	2	3	2
			Identify events that need to be	3	1	1	2	2	1
			Develop the skill of recording	2	2	0	3	1	2
			Describe the role of accounting	2	1	2	1	2	1
			Equip with the knowledge of	1	2	3	2	1	2
			Identify and analyze the reasons for	2	3	2	1	1	3
	22113AEC36C	Allied Physics – I Electricit	Learn how to develop and employ	2	1	3	2	1	1
			Become adept at using various	2	3	2	1	2	1
			Based on physics, system	3	2	1	2	1	0
			The motion of the particles, liquid	1	2	2	1	3	2

	y &	The unit of solar physics they	2	1	1	2	1	3
	Electroni	For electricity and magnetism	1	2	1	3	2	2
22122RMC37	Research Methodology	Able to carry out independent	1	3	2	1	2	1
		Formulate research hypotheses.	1	2	2	3	1	2
		Review, compare and contrast	0	1	3	2	2	1
		Discriminate between different	2	2	1	2	1	3
		Examine statistical methods to	3	1	2	1	2	1
		Select computational techniques	2	1	1	2	3	2
22120SEC03A	Skill Based Elective –III	Identify the names and functions of	3	2	1	1	1	2
		Create, edit, save, and print	2	2	3	2	1	1
		Format presentations.	1	3	2	1	0	2
		Add a graphic to a presentation.	2	1	2	3	2	1
		Create and manipulate simple slide	1	2	1	1	3	2
		Create slide presentations that	1	1	2	2	2	3
22111SEC03L	Communicative English Lab-III	Increases confidence in their ability	1	2	1	2	3	2
		Increases Vocabulary through the	3	1	1	2	2	1
		Uses standard Grammar,	2	2	0	3	1	2
		Learns to analyze unfamiliar words	2	1	2	1	2	1
		Improves comprehension and	1	2	3	2	1	2
		Improves their ability to read and	2	3	2	1	1	3
22110AEC41	Tamil-IV	Realize how the ancient people	2	1	3	2	1	1
		Learn how to change one's lifestyle	2	3	2	1	2	1
		Accept the modern trend and its	3	2	1	2	1	0
		Obtaining More information about	1	2	2	1	3	2
		Encourage creative writing and	2	1	1	2	1	3
		Aiming at enriching human	1	2	1	3	2	2
22132AEC41	Hindi-IV	Enables other state students to	1	3	2	1	2	1
		Through this language they can	1	2	2	3	1	2
		Students can learn social	0	1	3	2	2	1
		Students can learn grammar	2	2	1	2	1	3
		Enables them to enhance their	3	1	2	1	2	1
		Enables them to develop creative	2	1	1	2	3	2
22111AEC41	Advanced English-IV	Make oral presentations effectively	3	2	1	1	1	2
		Respond to spoken discourse in	2	2	3	2	1	1
		Follow oral instructions, identify	1	3	2	1	0	2
		Evaluate information in discourse,	2	1	2	3	2	1
		Recognize the grammatical	1	2	1	1	3	2
		Interpret figurative language, make	1	1	2	2	2	3
22135AEC41	French-IV	Focus on all four modalities of the	1	2	1	2	3	2
		As well as knowledge of	3	1	1	2	2	1
		Students can compare and contrast	2	2	0	3	1	2
		Students are able to generalize	2	1	2	1	2	1
		Students can demonstrate critical	1	2	3	2	1	2
		Collaborative problem-solving	2	3	2	1	1	3
22111AEC42	English-IV	Know about genius of Shakespeare,	2	1	3	2	1	1
		Describe Daffodils, beauty of	2	3	2	1	2	1
		Apply the concept of the stories to	3	2	1	2	1	0
		Understand the basic Grammar, and	1	2	2	1	3	2

			Ability to write composition, letter	2	1	1	2	1	3
			Gain vocabulary through reading.	1	2	1	3	2	2
	22122SEC43	Visual Programming	Design, create, build, and debug	1	3	2	1	2	1
			Explore Visual Basic's Integrated	1	2	2	3	1	2
			Implement syntax rules in Visual	0	1	3	2	2	1
			Write Windows applications using	2	2	1	2	1	3
			Write and apply decision structures	3	1	2	1	2	1
IV			Design and implement applications	2	1	1	2	3	2
	22122SEC44L	Visual Programming Lab	Design,create,build and debug	3	2	1	1	1	2
			Apply arithmetic operations for	2	2	3	2	1	1
			Apply decision structures for	1	3	2	1	0	2
			Write windows applications using	2	1	2	3	2	1
			Create one and two dimensional	1	2	1	1	3	2
			Write Visual Basic programs using	1	1	2	2	2	3
	22113AEC45C	Allied Physics –II Digital Electronics	Express positive integers in	1	2	1	2	3	2
			Codify data elements or information	3	1	1	2	2	1
			standard codes for positive	2	2	0	3	1	2
			Codify signed integers (positive and	2	1	2	1	2	1
			Perform basic arithmetic	1	2	3	2	1	2
			List a set of simulation tools for	2	3	2	1	1	3
	22113AEC46CL	Allied Physics Lab – I Digital Electronics Lab	Learn the basics of gates.	2	1	3	2	1	1
			Construct basic combinational	2	3	2	1	2	1
			Apply the design procedures to	3	2	1	2	1	0
			Learn about counters.	1	2	2	1	3	2
			Learn about Shift Registers.	2	1	1	2	1	3
			To understand the basic digital	1	2	1	3	2	2
	22120SEC04A	Skill Based Elective-IV	Examine database concepts and	1	3	2	1	2	1
			Design a simple database.	1	2	2	3	1	2
			Build a new database with related	0	1	3	2	2	1
			Manage the data in a table.	2	2	1	2	1	3
			Query a database using different	3	1	2	1	2	1
			Design a form.	2	1	1	2	3	2
	22111SEC04L	Communicative English Lab-IV	Uses standard Grammar,	3	2	1	1	1	2
			Learns to analyze unfamiliar words	2	2	3	2	1	1
			Improves comprehension and	1	3	2	1	0	2
			Improves their ability to read and	2	1	2	3	2	1
			Develops ideas with coherence and	1	2	1	1	3	2
			Builds confidence in handling	1	1	2	2	2	3
	221ENVTSTU	Environmental Studies	Apply systems concepts and	1	2	1	2	3	2
			Reflect critically about their roles	3	1	1	2	2	1
			Demonstrate proficiency in	2	2	0	3	1	2
			Understand the utility of	2	1	2	1	2	1
			Analyze the ecosystem and able to	1	2	3	2	1	2
			Understand the transnational	2	3	2	1	1	3
	22122SEC51	Relational Database Managem	Design Databases for applications.	2	1	3	2	1	1
			Use the Relational model, ER	2	3	2	1	2	1
			Design the Query Processor and	3	2	1	2	1	0
			To analyze DataBase design	1	2	2	1	3	2

	ent Systems	Acquire knowledge in fundamentals	2	1	1	2	1	3
		Able to handle with different	1	2	1	3	2	2
22122SEC52	.NET Programming	Create web-based distributed	1	3	2	1	2	1
		Utilize DirectX libraries in the	1	2	2	3	1	2
		Utilize the .NET environment to	0	1	3	2	2	1
		Understand the key protocols which	2	2	1	2	1	3
		Demonstrate advanced knowledge	3	1	2	1	2	1
		Utilize game-related graphic	2	1	1	2	3	2
22122SEC53	Designing and supporting Computer Networks	Identify the components required to	3	2	1	1	1	2
		Choose the required functionality at	2	2	3	2	1	1
		Identify solution for each	1	3	2	1	0	2
		Trace the flow of information from	2	1	2	3	2	1
		Describe, analyze and evaluate a	1	2	1	1	3	2
		Design, analyze, and evaluate	1	1	2	2	2	3
22122SEC54L	Oracle Lab	Brief knowledge about SQL	1	2	1	2	3	2
		Unary and Binary table Operations.	3	1	1	2	2	1
		Able to handle with different	2	2	0	3	1	2
		Table view,Log and Triggers.	2	1	2	1	2	1
		Handling online Transactions.	1	2	3	2	1	2
		Database Connectivity with front-	2	3	2	1	1	3
22122SEC55L	.NET Programming Lab	Contrast and compare major	2	1	3	2	1	1
		Analyze the basic structure of a C#	2	3	2	1	2	1
		Create, name, and assign values to	3	2	1	2	1	0
		Use common statements to	1	2	2	1	3	2
		Create methods (functions and	2	1	1	2	1	3
		Create, initialize, and use arrays.	1	2	1	3	2	2
22122DSC56A	Computer Organization and Architecture	Design arithmetic and logic unit.	1	3	2	1	2	1
		Design and anlayse pipelined	1	2	2	3	1	2
		Evaluate performance of memory	0	1	3	2	2	1
		Distinguish the organization of	2	2	1	2	1	3
		Basic concept of Parallel	3	1	2	1	2	1
		Design and analyze solutions in the	2	1	1	2	3	2
22122DSC56B	E-learning	Develop e – learning application on	3	2	1	1	1	2
		Ability to develop contents for e-	2	2	3	2	1	1
		To perform course management	1	3	2	1	0	2
		To represent the learning goals by	2	1	2	3	2	1
		To indicate the kind of performance	1	2	1	1	3	2
		It can be understood within the	1	1	2	2	2	3
22122BRC57	Participation in Bounded Research	To understood a general definition	1	2	1	2	3	2
		To be able to identify the overall	3	1	1	2	2	1
		Familiar with how to write a good	2	2	0	3	1	2
		Know the types of descriptive	2	1	2	1	2	1
		Able to identify a research problem	1	2	3	2	1	2
		Have basic awareness of data	2	3	2	1	1	3
22120SEC05A	Skill Based Elective-	work with the Photoshop workspace	2	1	3	2	1	1
		navigate images	2	3	2	1	2	1
		resize and crop images	3	2	1	2	1	0
		make and work with selections	1	2	2	1	3	2

V

	V	create new layers and perform other	2	1	1	2	1	3
		transform images	1	2	1	3	2	2
22111SEC05L	Communicative English Lab-V	Increases confidence in their ability	1	3	2	1	2	1
		Increases Vocabulary through the	1	2	2	3	1	2
		Uses standard Grammar,	0	1	3	2	2	1
		Learns to analyze unfamiliar words	2	2	1	2	1	3
		Improves comprehension and	3	1	2	1	2	1
		Improves their ability to read and	2	1	1	2	3	2
22122SEC61	Advanced Web Technology	Acquire knowledge about	3	2	1	1	1	2
		Explore markup languages features	2	2	3	2	1	1
		Learn and design Client side	1	3	2	1	0	2
		Acquire knowledge about Open	2	1	2	3	2	1
		Acquire knowledge about PHP	1	2	1	1	3	2
		Familiar with client server	1	1	2	2	2	3
22122SE	Operating System	Design various Scheduling	1	2	1	2	3	2
		Apply the principles of	3	1	1	2	2	1
		Design deadlock, prevention and	2	2	0	3	1	2
		Compare and contrast various	2	1	2	1	2	1
		Design and Implement a prototype	1	2	3	2	1	2
		Perform administrative tasks on	2	3	2	1	1	3
22122SE	Advanced Web Technology Lab	Understand analyze and apply the	2	1	3	2	1	1
		Analyze a web page and identify its	2	3	2	1	2	1
		Create a web pages using	3	2	1	2	1	0
		Create interactive web applications	1	2	2	1	3	2
		Build and consume web services.	2	1	1	2	1	3
		Students will be able to write a	1	2	1	3	2	2
22122SEC64L	Operating System Lab	Install a Linux operating system	1	3	2	1	2	1
		Use UNIX/Linux command line	1	2	2	3	1	2
		Use archiving and compression to	0	1	3	2	2	1
		Use file name globing and regular	2	2	1	2	1	3
		To Manage user and group accounts	3	1	2	1	2	1
		To Manage processes and jobs.	2	1	1	2	3	2
22122DSC65A	Software Project Management	Identify the different project	3	2	1	1	1	2
		Practice the role of professional	2	2	3	2	1	1
		Identify and describe the key phases	1	3	2	1	0	2
		Determine an appropriate project	2	1	2	3	2	1
		Plan and manage projects at each	1	2	1	1	3	2
		Create project plans that address	1	1	2	2	2	3
22122DSC65B	Object Oriented Analysis and Design	Design and implement projects	1	2	1	2	3	2
		Use the UML analysis and design	3	1	1	2	2	1
		Apply the UML analysis and design	2	2	0	3	1	2
		Create code from design.	2	1	2	1	2	1
		Compare and contrast various	1	2	3	2	1	2
		Develop a working understanding	2	3	2	1	1	3
22110OEC	Tamil Ilakkiya Varalaru	Able to distinguish between hackers	2	1	3	2	1	1
		To apply the principles of computer	2	3	2	1	2	1
		To implement the data recovery	3	2	1	2	1	0
		To manage threats and the tactics.	1	2	2	1	3	2

		Varalaru	Evaluate and implement new and	2	1	1	2	1	3
			Evaluate best practices in security	1	2	1	3	2	2
	22111OEC	Journalism	Classifying newspaper as a recorder	1	3	2	1	2	1
			Defining News and understanding	1	2	2	3	1	2
			Understanding the role of the news	0	1	3	2	2	1
			Analyzing the duties and qualities	2	2	1	2	1	3
			Understanding news writing and	3	1	2	1	2	1
			Analyzing crime and legal	2	1	1	2	3	2
	22112OEC	Development of Mathematical Skills	Demonstrate an understanding of	3	2	1	1	1	2
			Perform computations in higher	2	2	3	2	1	1
			Read and understand middle-level	1	3	2	1	0	2
			Write and understand basic proofs.	2	1	2	3	2	1
			Develop and maintain problem-	1	2	1	1	3	2
			Use mathematical ideas to model	1	1	2	2	2	3
VI	22113OEC	Instrumentation	Recognize the evolution and history	1	2	1	2	3	2
			Identify the various parameters that	3	1	1	2	2	1
			Employ appropriate instruments to	2	2	0	3	1	2
			Practice the construction of testing	2	1	2	1	2	1
			To have a deep understanding about	1	2	3	2	1	2
			Relate the usage of various	2	3	2	1	1	3
	22114OEC	Food and Adulteration	Understand various areas of Food	2	1	3	2	1	1
			Grasp knowledge of the quality	2	3	2	1	2	1
			Comprehend food quality	3	2	1	2	1	0
			Apprehend the Indian and	1	2	2	1	3	2
			Conceive the concept of	2	1	1	2	1	3
			Apprehend the quality assessment	1	2	1	3	2	2
	220116OEC	Wildlife Conservation	Wildlife habitat studies will enable	1	3	2	1	2	1
			Describe habitat management.	1	2	2	3	1	2
			Understanding of Conservation will	0	1	3	2	2	1
			Explain wildlife trade that may	2	2	1	2	1	3
			Wildlife legislation will	3	1	2	1	2	1
			Evaluate current events and public	2	1	1	2	3	2
	22120OEC	E-Learning	Develop e – learning application on	3	2	1	1	1	2
			Ability to develop contents for e-	2	2	3	2	1	1
			To perform course management	1	3	2	1	0	2
			To represent the learning goals by	2	1	2	3	2	1
			To indicate the kind of performance	1	2	1	1	3	2
			It can be understood within the	1	1	2	2	2	3
	22161OEC	Banking Service	To disseminate knowledge among	1	2	1	2	3	2
			To train and equip the students with	3	1	1	2	2	1
			Students will be taken for trainings	2	2	0	3	1	2
			To develop and inculcate the traits	2	1	2	1	2	1
			Communications skills and	1	2	3	2	1	2
			To enable the student to know the	2	3	2	1	1	3
	22120SEC06A	Skill Based Elective	Learn to create animated graphics	2	1	3	2	1	1
			Can develop Website	2	3	2	1	2	1
			CD based presentations	3	2	1	2	1	0
			Learn a new software tool through	1	2	2	1	3	2

	–VI	You will be able to apply Flash	2	1	1	2	1	3
		You will be able to create a simple	1	2	1	3	2	2
22111SEC06L	Communicative English Lab-VI	Increases confidence in their ability	1	3	2	1	2	1
		Increases Vocabulary through the	1	2	2	3	1	2
		Uses standard Grammar,	0	1	3	2	2	1
		Learns to analyze unfamiliar words	2	2	1	2	1	3
		Improves comprehension and	3	1	2	1	2	1
		Improves their ability to read and	2	1	1	2	3	2
22122EXACT	Extension Activities	To identify and describe the	3	2	1	1	1	2
		Identify a range of works of art and	2	2	3	2	1	1
		Analyze the role of art and of the	1	3	2	1	0	2
		Analyze the art of the period	2	1	2	3	2	1
		Link different materials and types	1	2	1	1	3	2
		Evaluate and defend their response	1	1	2	2	2	3
22122PEE	Program Exit Examination	Preparation of exit exam questions	1	2	1	2	3	2
		Supervising the conduction of the	3	1	1	2	2	1
		Analyze the results of the exit exam	2	2	0	3	1	2
		Preparation of an improvement plan	2	1	2	1	2	1
		Follow-up the implementation of	1	2	3	2	1	2
		An exit examination tests students	2	3	2	1	1	3
221LSCIC	Indian Constitution	Concept of various organizations,	1	2	1	2	3	2
		Ability to understand basic	1	2	3	2	1	2
		Applying this knowledge in	2	3	2	1	1	3
		Ability to analyze the concept of	2	2	3	2	1	1
		Develop competency in	1	3	2	1	0	2
221LSCU	Universal Human Values	Understand the significance of	2	1	2	3	2	1
		Distinguish between values and	1	2	1	1	3	2
		Understand the value of harmonious	1	1	2	2	2	3
		Understand the role of a human	2	3	2	1	1	3
		Distinguish between ethical and	2	3	2	1	2	1
221LSCC	Communication Skills	Develop knowledge, skills, and	3	2	1	2	1	0
		Understand and practice different	1	2	2	1	3	2
		Practice and adhere to the 7Cs of	2	1	1	2	1	3
		Familiarize with different types of						
		Understand and practice Interview	2	1	1	2	1	3
221SSCE	Basic Behavior	Network effectively, including	1	2	1	3	2	2
		Develop an extra edge to	1	3	2	1	2	1
221LSCO	Office Aut	To perform documentation	1	2	2	3	1	2
		To perform accounting operations	1	1	3	2	2	1
		To perform presentation skills	2	1	3	2	1	1
221LSCI	Leadership and Management Skills	Identify different leadership styles;	2	3	2	1	2	1
		Select the leadership style that best	3	2	1	2	1	0
		Communicate effectively by saying	1	2	2	1	3	2
		Improve their social skills and	2	1	1	2	1	3
		Mediate conflicts in their work	1	2	1	3	2	2
221SSCAQ	General Aptitude and	It will improve verbal ability skill	1	3	2	1	2	1
		Students will communicate	1	2	2	3	1	2
		It will enhance students problem	2	3	2	1	2	1

	Quantitat	Students will be able to prepare for	3	2	1	2	1	0
221LSCPS	Professional Skills	Identify Common Errors and	1	2	2	1	3	2
		Develop and Expand Writing Skills	2	1	2	3	2	1
		To Develop Coherence, Cohesion	1	2	1	1	3	2
221LSCC	Community Engagem	Demonstrate an ability to engage res	1	1	2	2	2	3
		Convey a message effectively.	1	2	1	2	3	2
		Demonstrate an ability to engage	1	1	2	2	2	3
221SSCIM	Interview Skills Training	understand the various ways of	1	2	1	2	3	2
		understand how to decide between	1	2	2	1	3	2
		develop the skills needed for	2	1	2	3	2	1
D	**CS**	**B.Sc**	**School: Arts & Science**						
	22110AE	Tamil- I	Learn the changes occurred in literat	2	3	2	1	2	1
			Make use of vocabulary systematical	1	2	3	0	1	2
			Obtaining more information about or	1	3	2	1	2	1
			Encourage creative writing and deve	2	1	3	0	1	2
			Aiming at enriching human excellen	3	2	1	1	2	0
			Increasing the level of comprehensio	1	2	3	2	1	1
	22132AEC11	Hindi-I	Enables other state students to contir	2	3	2	1	2	1
			Through this language they can learn	1	2	1	3	1	2
			Students can learn social discriminat	1	2	1	2	3	1
			Students can learn grammar techniqu	2	3	2	1	2	1
			Enables them to enhance their langua	1	2	3	1	1	2
			Enables them to develop creative wr	3	2	1	2	3	1
	22111AEC11	Advanced English-I	Academic skills in preparation for te	1	2	1	3	2	1
			Presentation and participation skills.	2	3	2	3	1	2
			Learning strategies and research skil	2	1	3	2	1	2
			Academic essay and report writing s	3	1	2	3	2	1
			Social and Cultural skills.	2	3	1	2	2	1
			Reading speed, skimming, scanning	1	2	3	1	1	1
	22135AEC11	French-I	Focus on all four modalities of the la	1	3	2	2	1	1
			As well as knowledge of Francophor	2	1	2	3	2	2
			Students can compare and contrast c	2	3	1	2	1	1
			Students are able to generalize about	1	2	3	1	1	1
			Students can demonstrate critical thi	3	2	1	2	1	1
			Collaborative problem-solving throu	2	1	2	3	2	2
	22111AEC12	English-I	Read and comprehend literature	1	3	1	2	2	1
			Understand how to lead one's life re	1	2	3	2	1	1
			Read and comprehend literature	3	1	2	3	2	2
			Improves their proficiency in Englis	1	2	1	2	2	1
			Develops the habit of effective readi	2	1	2	2	3	2
			Develops effective writing skills.	3	2	1	3	1	2
			Develops functional communicative	2	3	2	1	2	1
I	22120SEC13	Programming in C with C++	Design C Programs for problems.	2	1	2	3	2	1
			Write and execute C programs for si	1	3	1	2	1	0
			Able to understand and design the so	2	1	3	1	2	1
			Able to demonstrate the use of virtua	2	3	1	2	1	2
			Understand functions and parameter	1	2	2	3	1	1
			Be able to do numeric (algebraic) an	3	1	2	1	2	0

		Understand object-oriented design ar	3	2	1	2	1	2
22120SEC16L	Programming in C with C++ Lab	Read understand and trace the execu	2	1	3	1	2	1
		Write the C code for a given algorith	3	2	1	2	1	2
		Implement programs with pointers ar	2	1	3	1	2	1
		Write programs that perform operati	2	3	1	2	1	2
		Be able to do numeric (algebraic) an	2	1	2	3	2	1
		Illustrate flowchart and algorithm to	2	2	3	1	2	1
22112AEC14B	Classical Algebra	Apply mathematical methods involvi	1	2	1	2	2	1
		Represent mathematical information	2	1	2	2	3	2
		Interpret and analyze numerical data	3	2	1	3	1	2
		Prepare students for pursuing researc	2	3	2	1	2	1
		Continue to acquire relevant knowle	2	1	2	3	2	1
		Inculcate critical thinking to carry ou	1	3	1	2	1	2
22112AEC15B	Numerical And Statistical Methods	Recognize the error in the number ge	2	1	3	1	2	1
		Compute solution of algebraic and tr	2	3	1	2	1	2
		Apply method of interpolation and e	1	2	2	3	1	1
		Recognize elements and variable in	3	1	2	1	2	1
		Calculate mean, median and mode f	3	2	1	2	1	2
		Outline properties of correlation and	2	1	3	1	2	1
221LSCIC	Indian Constitution	Understand how Constitutions embo	3	2	1	2	1	2
		Understand the difference between n	2	1	3	1	2	1
		Learn why there is a need for limits	1	2	1	2	2	1
		Explain about making of Indian Con	2	1	2	2	3	2
		Describe the importance of Preamble	3	2	1	3	1	2
221LSCUV	Universal Human Values	To create awareness, conviction & c	2	3	2	1	2	1
		To facilitate the development of a ho	2	1	2	3	2	0
		To give students a clear	1	3	1	2	1	2
		Demonstrate that challenges have be	2	1	3	1	2	1
		To enable atomically clean surfaces	2	3	1	2	1	2
22110AEC21	Tamil – II	Know what devotion really is.	1	2	2	3	1	1
		Know the fruitfulness obtained throu	3	1	2	1	2	1
		Perceive the progress achieved in the	3	2	1	2	1	2
		Obtaining More information about o	2	1	3	1	2	1
		Encourage creative writing and deve	3	2	1	2	1	0
		Aiming at enriching human excellen	2	1	3	1	2	1
22132AEC21	Hindi-II	Enables other state students to contir	1	2	1	2	2	1
		Through this language they can learn	2	1	2	2	3	2
		Students can learn social discriminat	3	2	1	3	1	2
		Students can learn grammar techniqu	2	3	2	1	2	0
		Enables them to enhance their langua	2	1	2	3	2	1
		Enables them to develop creative wri	1	3	1	2	1	2
22111AEC21	Advanced English-II	Communicate effectively in most dai	2	1	3	1	2	1
		Participate in formal and informal co	2	3	1	2	1	2
		Speak on familiar concrete topics at	1	2	2	3	1	1
		Participate in conversations with con	3	1	2	1	2	1
		Demonstrate an increased ability to r	3	2	1	2	1	2
		Understand more complex indirect q	2	1	3	1	2	1
		Focus on all four modalities of the la	3	2	1	2	1	2

II	22135AEC21	French-II	As well as knowledge of Francophor	2	1	3	1	2	1
			Students can compare and contrast c	1	2	1	2	2	1
			Students are able to generalize about	2	1	2	2	3	2
			Students can demonstrate critical thi	3	2	1	3	1	2
			Collaborative problem-solving throu	2	3	2	1	2	1
	22111AEC22	English-II	Read and appreciate literature.	2	1	2	3	2	1
			Know more about Mahatma Gandhi,	1	3	1	2	1	2
			Describe Daffodils, beauty of Byron	2	1	3	1	2	0
			Apply the concept of the stories to th	2	3	1	2	1	2
			Understand the basic Grammar, and	1	2	2	3	1	1
			Gain vocabulary through reading. A	3	1	2	1	2	1
	22120SEC23	Internet and Java Programming	Understand the format and use of ob	3	2	1	2	1	2
			Understand basic input/output metho	2	1	3	1	2	1
			Understand object inheritance and its	3	2	1	2	1	2
			Understand development of JAVA a	2	1	3	1	2	1
			Understand the use of various systen	1	2	1	2	2	1
	22120SEC26L	Internet and Java Programming Lab	To solve computational problems usi	2	1	2	2	3	2
			To implement relationships between	3	2	1	3	1	0
			To evaluate user requirements for so	2	3	2	1	2	1
			To develop software applications usi	2	1	2	3	2	1
			Write modular, multithreading and e	1	3	1	2	1	2
			Implement interfaces, inheritance, po	2	1	3	1	2	0
	22112AEC24B	Discrete Mathematics	Students completing this course will	2	3	1	2	1	2
			Students completing this course will	1	2	2	3	1	1
			Students completing this course will	3	1	2	1	2	1
			Students completing this course will	3	2	1	2	1	2
			Use the basic ideas of discrete proba	2	1	3	1	2	1
			Complete and use truth tables for exp	3	2	1	2	1	2
	22112AEC25B	Operations Research	Identify and develop operational rese	2	1	3	1	2	1
			Understand the mathematical tools th	1	2	1	2	2	1
			Use mathematical software to solve t	2	1	2	2	3	2
			Develop a report that describes the m	3	2	1	3	1	2
			Understand variety of problems such	2	3	2	1	2	1
			Solve the mathematical model manua	2	1	2	3	2	1
	22120RLC27	Research Led Seminar	Learn about contemporary research t	1	3	1	2	1	2
			Learn the methodology for scientific	2	1	3	1	2	1
			Identifying strengths and weaknesses	2	3	1	2	1	2
			This course provides an experience i	1	2	2	3	1	1
			It also gives an overview and insight	3	1	2	1	2	1
	221LSCCS	Communication Skills	Understand grammar	3	2	1	2	1	2
			Develop speaking and writing skills	2	1	3	1	2	1
			Improves comprehension and retenti	3	2	1	2	1	2
			Improves their ability to read and spe	2	1	3	1	2	0
			Develops ideas with coherence and c	1	2	1	2	2	1
			Builds confidence in handling Englis	2	1	2	2	3	2
	221SSCBE	Basic Behavioral	Etiquette helps us to be thoughtful ab	3	2	1	3	1	2
			It helps us to be aware of the feelings	2	3	2	1	2	1
			Business etiquette training, a key par	2	1	2	3	2	0

		Etiquette	It emphasises on a set of practices us	1	3	1	2	1	2
III	22110AEC31	Tamil-III	Achieve one's goal by following the	2	1	3	1	2	1
			Learn to lead life of perfection by re	2	3	1	2	1	2
			Attain happiness through honesty.	1	2	2	3	1	1
			Obtaining More information about o	3	1	2	1	2	1
			Encourage creative writing and deve	3	2	1	2	1	2
			Aiming at enriching human excellen	2	1	3	1	2	1
	22132AEC31	Hindi-III	Enables other state students to contir	3	2	1	2	1	2
			Through this language they can learn	2	1	3	1	2	0
			Students can learn social discriminat	1	2	1	2	2	1
			Students can learn grammar techniqu	2	1	2	2	3	2
			Enables them to enhance their langua	3	2	1	3	1	2
			Enables them to develop creative wr	2	3	2	1	2	1
	22111AEC31	Advanced English-III	Follow main ideas, key words, and ir	2	1	2	3	2	1
			Read in English for information, to l	1	3	1	2	1	2
			Also begin to read very simple adult	2	1	3	1	2	1
			Write coherent paragraphs on familia	2	3	1	2	1	2
			Demonstrate mostly satisfactory con	1	2	2	3	1	1
			Use and understand an expanded inv	3	1	2	1	2	0
	22135AEC31	French-III	Focus on all four modalities of the la	3	2	1	2	1	2
			As well as knowledge of Francophor	2	1	3	1	2	1
			Students can compare and contrast c	3	2	1	2	1	2
			Students are able to generalize about	2	1	3	1	2	1
			Students can demonstrate critical thi	1	2	1	2	2	1
			Collaborative problem-solving throu	2	1	2	2	3	2
	22111AEC32	English III	Read and appreciate literature.	3	2	1	3	1	2
			Know more about Mahatma Gandhi,	2	3	2	1	2	0
			Describe Daffodils, beauty of Byron	2	1	2	3	2	1
			Apply the concept of the stories to th	1	3	1	2	1	2
			Understand the basic Grammar, and	2	1	3	1	2	1
			Gain vocabulary through reading. A	2	3	1	2	1	2
	22120SEC33	Visual Programming	Design, create, build, and debug Visu	1	2	2	3	1	1
			Explore Visual Basic's Integrated De	3	1	2	1	2	1
			Implement syntax rules in Visual Ba	3	2	1	2	1	2
			Write Windows applications using fo	2	1	3	1	2	1
			Write and apply decision structures f	3	2	1	2	1	2
			Write and apply loop structures to pe	2	1	3	1	2	0
	22120SEC35L	Visual Programming Lab	Design,create,build and debug visual	1	2	1	2	2	1
			Apply arithmetic operations for displ	2	1	2	2	3	2
			Apply decision structures for determ	3	2	1	3	1	2
			Write windows applications using fo	2	3	2	1	2	1
			Create one and two dimensional arra	2	1	2	3	2	1
			Write Visual Basic programs using o	1	3	1	2	1	2
	22113AEC34A	Applied physics –I	Cognitive abilities and skills relating	2	1	3	1	2	1
			Practical skills relating to the conduc	2	3	1	2	1	2
			General skills relating to non-subject	1	2	2	3	1	0
			Demonstrate a working knowledge o	3	1	2	1	2	1
			Formulate hypotheses and devise and	3	2	1	2	1	2

			Effectively apply current technology	2	1	3	1	2	1
	22113AEC36AL	Applied physics Lab –I	Practical skills relating to the conduc	3	2	1	2	1	2
			General skills relating to non-subject	2	1	3	1	2	1
			Demonstrate a working knowledge o	1	2	1	2	2	1
			Formulate hypotheses and devise and	2	1	2	2	3	2
			Effectively apply current technology	3	2	1	3	1	2
			Cognitive abilities and skills relating	2	3	2	1	2	1
	22120RMC37	Research Methodology	Ability to carry out independent liter	2	1	2	3	2	0
			Able to carry out independent literatu	1	3	1	2	1	2
			Formulate research hypotheses.	2	1	3	1	2	1
			Review, compare and contrast resear	2	3	1	2	1	2
			Discriminate between different degre	1	2	2	3	1	1
			Examine statistical methods to condu	3	1	2	1	2	0
			Select computational techniques fron	3	2	1	2	1	2
	221LSC(	Office Automation	Office automation eases organization	2	1	3	1	2	1
			To provide an in-depth training in us	3	2	1	2	1	2
			The course also helps the candidates	2	1	3	1	2	1
			After completion of the course, stude	1	2	1	2	2	1
			This course helps students to learn va	2	1	2	2	3	2
	22110AE	Tamil-IV	Realize how the ancient people chan	3	2	1	3	1	2
			Learn how to change one's lifestyle a	2	3	2	1	2	1
			Accept the modern trend and its uses	2	1	2	3	2	1
			Obtaining More information about o	1	3	1	2	1	2
			Encourage creative writing and deve	2	1	3	1	2	1
			Aiming at enriching human excellen	2	3	1	2	1	2
	22132AE	Hindi-IV	Enables other state students to contir	1	2	2	3	1	1
			Through this language they can learn	3	1	2	1	2	0
			Students can learn social discriminat	3	2	1	2	1	2
			Students can learn grammar techniqu	2	1	3	1	2	1
			Enables them to enhance their langua	3	2	1	2	1	2
			Enables them to develop creative wri	2	1	3	1	2	1
	22111AE	Advanced English-IV	Make oral presentations effectively f	2	1	2	2	3	2
			Respond to spoken discourse in their	3	2	1	3	1	2
			Follow oral instructions, identify det	2	3	2	1	2	1
			Evaluate information in discourse, cr	2	1	2	3	2	0
			Recognize the grammatical structure	1	3	1	2	1	2
			Interpret figurative language, make c	2	1	3	1	2	1
	19135AE	French-IV	Focus on all four modalities of the la	2	3	1	2	1	2
			As well as knowledge of Francophon	1	2	2	3	1	1
			Students can compare and contrast c	2	3	2	1	2	1
			Students are able to generalize about	1	2	3	0	1	2
			Students can demonstrate critical thi	1	3	2	1	2	1
			Collaborative problem-solving throu	2	1	3	0	1	2
	22111AE	English-IV	Know about genius of Shakespeare,	3	2	1	1	2	0
			Describe Daffodils, beauty of Byron	1	2	3	2	1	1
			Apply the concept of the stories to th	2	3	2	1	2	1
			Understand the basic Grammar, and	1	2	1	3	1	2
			Ability to write composition, letter a	1	2	1	2	3	1

			Gain vocabulary through reading. A	2	3	2	1	2	1
IV	22120SE	Active Server Programming	Create web-based distributed applica	1	2	3	1	1	2
			Utilize DirectX libraries in the .NET	3	2	1	2	3	1
			Utilize the .NET environment to crea	1	2	1	3	2	1
			Understand the key protocols which	2	3	2	3	1	2
			Demonstrate advanced knowledge of	2	1	3	2	1	2
			Utilize game-related graphic displays	3	1	2	3	2	1
	22120SE	Active Server Page Lab	Contrast and compare major element	2	3	1	2	2	1
			Analyze the basic structure of a C# a	1	2	3	1	1	1
			Create, name, and assign values to va	1	3	2	2	1	1
			Use common statements to implemer	2	1	2	3	2	2
			Create methods (functions and subro	2	3	1	2	1	1
			Create, initialize, and use arrays.	1	2	3	1	1	1
	22113AE	Applied physics –II	The Applied Physics program will pr	3	2	1	2	1	1
			Demonstrate a working knowledge o	2	1	2	3	2	2
			Formulate hypotheses and devise and	1	3	1	2	2	1
			Effectively apply current technology	1	2	3	2	1	1
			Effectively use and critically evaluat	3	1	2	3	2	2
	22113AE	Applied physics Lab–II	Effectively use and critically evaluat	1	2	1	2	2	1
			Integrate and relate scientific knowle	2	1	2	2	3	2
			Communicate in written and oral for	3	2	1	3	1	2
			Work cooperatively as part of a resea	2	3	2	1	2	1
			Maintain life-long learning in the sci	2	1	2	3	2	1
			Outline the applications of physics in	1	3	1	2	1	0
	221AC LSLMS	Leadership and Management Skills	Successful leaders are able to transfo	2	1	3	1	2	1
			Through leadership skills training, m	2	3	1	2	1	2
			Enhanced their strategic thinking and	1	2	2	3	1	1
			Utilised techniques that can create hi	3	1	2	1	2	0
			Communicate effectively by saying r	3	2	1	2	1	2
			It is believed that good leaders lead c	2	1	3	1	2	1
	221ACS SAQA	General Aptitude and Quantitative Ability	The student will be able to • Use ther	3	2	1	2	1	2
			Solve questions related to Time and	2	1	3	1	2	1
			The main aim of introducing “Quant	2	3	1	2	1	2
			Effort has been made to accommoda	2	1	2	3	2	1
			Effort has been made to accommoda	2	2	3	1	2	1
			This course consists of practice exer	1	2	1	2	2	1
	22120SE	Data Communication and Networking	Identify the components required to b	2	1	2	2	3	2
			Identify solution for each functionali	3	2	1	3	1	2
			Trace the flow of data from one node	2	3	2	1	2	1
			Choose the required functionality at	2	1	2	3	2	1
			Identify solution for each functionali	1	3	1	2	1	2
			Use data communication vocabulary	2	1	3	1	2	1
			Trace the flow of information from c	2	3	1	2	1	2
	22120SE	Operating System	Design various Scheduling algorithm	1	2	2	3	1	1
			Apply the principles of concurrency.	3	1	2	1	2	1
			Design deadlock, prevention and avo	3	2	1	2	1	2
			Compare and contrast various memo	2	1	3	1	2	1
			Design and Implement a prototype fi	3	2	1	2	1	2

			Perform administrative tasks on Linu	2	1	3	1	2	1
	22120SE	Microprocessor and its Applications	Design and implement programs on 8	1	2	1	2	2	1
			Design I/O circuits.	2	1	2	2	3	2
			Design Memory Interfacing circuits.	3	2	1	3	1	2
			Design and implement 8051 microco	2	3	2	1	2	1
			Understand the design of DMA.	2	1	2	3	2	0
			Understand theimplementation of Bu	1	3	1	2	1	2
	22120SE	Microprocessor lab	Identify relevant information to supp	2	1	3	1	2	1
			Set up programming strategies and s	2	3	1	2	1	2
			Practice different types of programm	1	2	2	3	1	1
			Develop testing and experimental pr	3	1	2	1	2	1
			Prepare professional quality textual a	3	2	1	2	1	2
	22120SE	Operating System Lab	Install a Linux operating system with	2	1	3	1	2	1
			Use UNIX/Linux command line (she	3	2	1	2	1	0
			Use archiving and compression to ba	2	1	3	1	2	1
			Use file name globing and regular ex	1	2	1	2	2	1
			To Manage user and group accounts	2	1	2	2	3	2
V			To Manage processes and jobs.	3	2	1	3	1	2
	22120DS	Cloud Computing	Compare the strengths and limitation	2	3	2	1	2	0
			Identify the architecture, infrastructu	2	1	2	3	2	1
			Apply suitable virtualization concept	1	3	1	2	1	2
			Choose the appropriate cloud player	2	1	3	1	2	1
			Address the core issues of cloud com	2	3	1	2	1	2
			Design Cloud Services and Set a priv	1	2	2	3	1	1
	22120DS	Middleware Technology	To understand how middleware facil	3	1	2	1	2	1
			To study how it helps to incorporate	3	2	1	2	1	2
			Understand Distributed systems desi	2	1	3	1	2	1
			Understand existing Distributed Tech	3	2	1	2	1	2
			Understand Web services architectur	2	1	3	1	2	1
	22120DS	Enterprise Resource Planning	Make basic use of Enterprise	1	2	1	2	2	1
			Analyze the strategic options for ER	2	1	2	2	3	2
			Design the ERP implementation stra	3	2	1	3	1	2
			Create reengineered business proces	2	3	2	1	2	1
			To aim at preparing the students	2	1	2	3	2	1
	22120BR	Participation in Bounded Research	To understood a general definition o	1	3	1	2	1	2
			To be able to identify the overall pro	2	1	3	1	2	0
			Familiar with how to write a good in	2	3	1	2	1	2
			Know the types of descriptive statist	1	2	2	3	1	1
			Able to identify a research problem s	3	1	2	1	2	1
			Have basic awareness of data analys	3	2	1	2	1	2
	221ACL	Professional Skills	specific and measurable statements t	2	1	3	1	2	1
			Learning Outcomes are written with	3	2	1	2	1	2
			By the end of the soft skills training	2	1	3	1	2	1
			Develop effective presentation	1	2	1	2	2	1
			Develop all-round personalities	2	1	2	2	3	2
			Become self-confident individuals	3	2	1	3	1	0
		.NET	Create web-based distributed applica	2	3	2	1	2	1
			Utilize DirectX libraries in the .NET	2	1	2	3	2	1

22120SE	.NET Programming	Utilize the .NET environment to crea	1	3	1	2	1	2
		Understand the key protocols which	2	1	3	1	2	0
		Demonstrate advanced knowledge of	2	3	1	2	1	2
		Utilize game-related graphic displays	1	2	2	3	1	1
22120SE	Relational Data Base Management System	Design Databases for applications.	3	1	2	1	2	1
		Use the Relational model, ER diagra	3	2	1	2	1	2
		Apply concurrency control and recov	2	1	3	1	2	1
		Design the Query Processor and Tran	3	2	1	2	1	2
		Apply security concepts to databases	2	1	3	1	2	1
		Understand basic concepts of Relati	1	2	1	2	2	1
22120SE	NET Programming Lab	Contrast and compare major element	2	1	2	2	3	2
		Analyze the basic structure of a C# a	3	2	1	3	1	2
		Create, name, and assign values to va	2	3	2	1	2	1
		Use common statements to implemen	2	1	2	3	2	1
		Create methods (functions and subro	1	3	1	2	1	2
		Create, initialize, and use arrays	2	1	3	1	2	1
22120SE	Oracle Lab	Brief knowledge about SQL Fundam	2	3	1	2	1	2
		Unary and Binary table Operations.	1	2	2	3	1	1
		Able to handle with different databas	3	1	2	1	2	1
		Table view, Log and Triggers.	3	2	1	2	1	2
		Handling online Transactions.	2	1	3	1	2	1
		Database Connectivity with front-en	3	2	1	2	1	2
22120DS	Data Mining	Evaluate and implement a wide rang	2	1	3	1	2	0
		Assess raw input data, and process it	1	2	1	2	2	1
		Discover and measure interesting pat	2	1	2	2	3	2
		Characterize and discriminate data su	3	2	1	3	1	2
		Evaluate and select appropriate data-	2	3	2	1	2	1
		Design and implement of a data-min	2	1	2	3	2	0
22120DS	Artificial Intelligence and Expert Systems	Demonstrate fundamental understand	1	3	1	2	1	2
		Apply basic principles of aim solutio	2	1	3	1	2	1
		Demonstrate knowledge of the build	2	3	1	2	1	2
		Develop intelligent algorithms for co	1	2	2	3	1	1
		Formalize a given problem in the lan	3	1	2	1	2	1
		Implement basic AI algorithms.	3	2	1	2	1	2
22120DS	Ethical Hacking	Plan a vulnerability assessment and p	2	1	3	1	2	1
		Execute a penetration test using stan	3	2	1	2	1	2
		Report on the strengths and vulnerab	2	1	3	1	2	0
		Identify legal and ethical issues relat	1	2	1	2	2	1
		Use of standard hacking tools in an e	2	1	2	2	3	2
		Evaluation of the penetration test res	3	2	1	3	1	2
221TAC	Tamil IlakkiyaVaralaru	Realize how the ancient people chan	2	3	2	1	2	1
		Learn how to change one's lifestyle a	2	1	2	3	2	1
		Accept the modern trend and its uses	1	3	1	2	1	2
		Obtaining More information about o	2	1	3	1	2	1
		Encourage creative writing and deve	2	3	1	2	1	2
221TAC	Development of	Aiming at enriching human excellen	1	2	2	3	1	1
		use appropriate mathematical concep	3	1	2	1	2	0
		Select and apply general rules correc	3	2	1	2	1	2

	221TA	Mathematical Skills	Write and understand basic proofs.	2	1	3	1	2	1
			Develop and maintain problem-solvi	3	2	1	2	1	2
VI			Use mathematical ideas to model rea	2	1	3	1	2	1
	221PHO	Instrumentation	To use the techniques and skills for e	1	2	1	2	2	1
			Design a system, component or proc	2	1	2	2	3	2
			Measurement of R,L,C ,Voltage, Cu	3	2	1	3	1	2
			Ability to balance Bridges to find un	2	3	2	1	2	0
			Ability to measure frequency, phase	2	1	2	3	2	1
			Ability to use Digital voltmeters	1	3	1	2	1	2
			Ability to measure strain, displaceme	2	1	3	1	2	1
	221CHO	Food and Adulteration	Ability to apply principles of food er	2	3	1	2	1	2
			Understand, identify and analyze a p	1	2	2	3	1	1
			Design, implement and evaluate a re	3	1	2	1	2	1
			Use appropriate techniques, skills, a	3	2	1	2	1	2
			Understanding of professional, ethic	2	1	3	1	2	1
	221MBC	Wildlife Conservation	understand the factors affecting the r	3	2	1	2	1	2
			competent in basic forest manageme	2	1	3	1	2	0
			understand how the environment infl	1	2	1	2	2	1
			understand how soil fertility is deter	2	1	2	2	3	2
			understand the general principles of	3	2	1	3	1	2
			understand how to propagate, plant,	2	3	2	1	2	1
	221CSO	Web Technology	Students are able to develop a	2	1	2	3	2	1
			Students will be able to write a well	1	3	1	2	1	2
			Students will be able to connect a	2	1	3	1	2	1
			Students will be able to write a	2	3	1	2	1	2
			Students will be able to write a	1	2	2	3	1	0
	221CMC	Banking Service	Develop and understand the nature	3	1	2	1	2	1
			Analyze the ability to use a basic	3	2	1	2	1	2
			Create the ability to use the	2	1	3	1	2	1
			Understand the ability to use	3	2	1	2	1	2
			Apply the ability to use accounting	2	1	3	1	2	1
			Analyze business transactions using	1	2	1	2	2	1
			Manually prepare journal entries	2	1	2	2	3	2
	22120PR	Project Work	In a specialization domain of his /	3	2	1	3	1	2
			For a selected research topic,	2	3	2	1	2	1
			For a selected research topic,	2	1	2	3	2	0
			For a selected research topic,	1	3	1	2	1	2
			Based on the analysis and	2	3	2	1	2	1
	22120PR	Program Exit Examination	Preparation of exit exam questions b	1	2	3	0	1	2
			Supervising the conduction of the tes	1	3	2	1	2	1
			Analyze the results of the exit exam	2	1	3	0	1	2
			Preparation of an improvement plan	3	2	1	1	2	0
			Follow-up the implementation of aca	1	2	3	2	1	1
			An exit examination tests students at	2	3	2	1	2	1
	221SSCI	Interview Skills Training and Mock	Help candidates reduce their stress a	1	2	1	3	1	2
			Help you boost your confidence.	1	2	1	2	3	1
			Provide you with useful feedback in	2	3	2	1	2	1
			Help you prepare for behavioral-base	1	2	3	1	1	2

		and Mock Test	Interviewing Skills Training focuses	3	2	1	2	3	1
			This will allow a hiring manager or i	1	2	1	3	2	1
	221LSC(	Communi ty Engagem ent	Develop and expand their understan	2	3	2	3	1	2
			Experience the personal benefits of f	2	1	3	2	1	2
			Establishing long standing, effective	3	1	2	3	2	1
			Community outcomes are a high-leve	2	3	1	2	2	1
			These outcomes seek to improve the	1	2	3	1	1	1
			Being Healthy so that they are physi	1	3	2	2	1	1
D(	**CS**	**M.SC(**	**School: Arts & Science**						
	22220SEC1	EE programmi	Understand the format and use of objects.	3	0	1	3	2	0
			their use.	3	3	2	1	3	0
			Understand object inheritance and its use.	3	1	2	3	3	3
			JAVA applications.	3	3	1	3	3	2
			Understand the use of various system libraries.	3	3	0	3		3
	2220SEC12	Relational Data Base Management System	do if they master the material.	3	2	1	3	3	3
			and data models.	3	2	3	1	3	0
			ER into Relations and normalize the reltions.	3	2	3	1	3	0
			monitor the performance of the DBMS.	3	3	1	1	3	0
			normalization.	2	3	1	3	3	1
	22212SEC13	Discrete Mathematics	many disciplines.	3	1	2	1	2	0
			many disciplines.	1	1	3	3	2	3
			advising is relatively easy	2	1	1	1	2	3
			are countable or otherwise distinct and	1	3	2	1	1	0
			combinations, graphs, and logical statements.	1	1	3	2	1	1
				3	1	2	1	3	0
	22220SEC 14L	J2EE programming Lab	applications using Abstract Windowing Toolkit	3	2	1	2	2	0
			Swing and Event Handling	1	1	2	3	1	0
			Web applications and Designing	1	2	3	1	3	0
			Enterprise based applications for business logic	1	1	3	2	1	0
I			studies.	3	0	2	1	1	0
			reusable modular components and by enabling	3	2	3	1	1	0
	22220SEC 15L	RDBMS Lab	Normalize a database	2	1	3	3	2	3
			a database using a state-of-the-art.	3	0	3	3	2	3
			Procedures.	2	1	2	3	1	3
			Sharing of data and data integrity.	2	1	3	2	1	3
			Reducing Data Redundancy.	2	2	1	1	1	3
	22220DSC 16A	WAP and XMI	for mobile devices such as mobile phones that	3	2	1	3	2	0
			mobile devices.	3	3	2	3	3	0
			ActiveX Controls, Shockwave, movie clips,	3	1	1	3	3	3
			wireless access) and low delay	3	3	1	3	3	
	22220DSC 16B	Advanced Computer Architecture	using instruction level parallelism.	3	3	1	3	1	3
			hierarchy.	3	0	1	1	3	0
			computer.	3	2	1	1	1	0
			processor or other components that satisfy	1	2	2	2	1	0
			assembly language programming	2	1	3		3	0
	22220RLC 17	Research Led Seminar	on the link between *research* and teaching is	1	2	3	2	1	0
			complex analysis.	3	1	3	2	1	0
			procedural and theoretical learning *outcomes* at	2	3	1	2	1	1

			approaches to learning.	1	1	2	3	2	
			consequence of exposure to expert subject	2	1	1		3	1
II	22220SEC 21	Python Programming	Presence of Third Party Modules.	2	2	1	1	1	1
			Extensive Support Libraries.	2	1	3	1	1	1
			Open Source and Community Development	1	0	2	3	1	0
			manipulate **Python** programs.	1	2	1	1	3	0
			involving file systems and regular expressions	1	1	3	1	2	3
	22220SEC 22	Cryptography & Network Security	architecture and explain the theory	2	1	2	1	1	2
			attacks, defence mechanisms against **network**	2	3	2	3	1	0
			Compare various Cryptographic Techniques	3	1	2	1	1	0
			Design Secure applications	2	0	2	1	3	3
			applications	1	2	3	1	1	0
	22220SEC 23	Software Engineering	demonstrate the problem	2	1	1	2	3	1
			complex *engineering* problems by applying	2	1	3	2	1	0
			visualizing and analyzing software requirements.	1	3	3	2	3	0
			software design and user-centric approach and	1	2	1	3		1
			To Understand the nature of software life cycle.	1	1	2	1	3	1
	22220SEC 24L	Python Programming Lab	manipulate Python programs.	3	2	1	1	1	3
			dictionaries, tupelos and sets.	2	1	3	2	1	2
			file systems and regular expressions	2	2	1	3		2
			Duck typing and huge standard library	1	1	3	2	3	1
			Presence of third-party modules.	2	1	2	3	1	3
	22220SEC 25L	UNIX Lab	Commands	2	1	2	3	1	3
			To learn network Unix commands.	3	2	1	1	1	1
			environment.	2	3	3	2	1	0
			To learn shell script and sed concepts.	2	1	2	3	1	1
			advance commands.	2	1	2	1	3	0
			To learn awk, grap, perl scripts.	2	1	1	2	1	1
	22220DSC 26A	Artificial Intelligence	difficult real life problems in a state space	2	3	1	2	3	1
			planning, Bayes networks,	3	2	1	2	1	0
			space, graph, design heuristics and select	1	2	1	1	3	3
			satisfaction problems and also design intelligent	2	1	3	2	2	0
			problem domains using logic based techniques	1	2	2	2	3	0
			information using Bayesian approaches.	3	1	3	1	3	0
	22220DSC 26B	Distributed Operating System	their functions.	2	0	3	2	1	0
			scheduling.	1	2	3	3	3	1
			Communication (IPC) and the role of OS in IPC.	2	1	3	2	1	0
			Memory management policies and virtual	2	0	3	1	2	0
	22220RMC2	Research Methodology	**research** processes (reading, evaluating, and	2	1	3	1	2	0
			key elements of a **research** proposal/report.	2	3	1	1	3	0
			qualitative **research** paradigms	1	1	1	3	1	0
			various research strategies	2	1	3	2	3	0
			manual scripts	3	2	3	2	1	3
	22220BRC2	~~Participation in Bounded Researcb~~	design.	3	1	2	1	2	0
			designing a research study from its inspecti on to	2	3	1	2	1	1
			to an education , research study and the	1	2	3	1	2	1
			ty[ically reported in educational research studies.	2	1	2	1	3	0
			astudy.	1	2	1	1	2	3

III	22220SEC31	Open Source programming	which are normally free to download, although it	3	2	1	1	2	2
			still tend to be far cheaper than closed **source**	1	2	3	1	2	1
			script on a webserver.	2	0	1	3	1	1
			fields and be able to process the data	2	3	2	2	3	1
			and standard language constructs, such as	3	0	3	3	2	3
	22220SEC32	.Net Programming	networking understands the key protocols which	2	1	2	3	1	3
			interfaces for **network** communication.	3	2	1	1	1	0
			ASP.NET, SQL Server and ADO.NET	2	0	1	1	2	0
			environment to implement 2D and 3D	2	1	1	3	3	0
			Service-based applications and components.	1	1	3	2	3	1
	22220SEC33L	Open Source programming Lab	source programmes for rapidly developing	2	0	3	2	1	0
			Reliability and auditability.	2	1	3	1	2	0
			Integrated management.	2	3	1	1	3	1
			Simple license management	2	1	1	3	1	0
	22220SEC34L	.Net Programming Lab	using *C#* based on object oriented concepts	1	2	2	2	3	0
			EFFICIENT *programs* by using *c#* code and	3	2	1	1	1	3
			development.	2	1	3	1	1	0
			It provides re-usability.	1	1	1	3	1	2
			Less Coding and Increased Reuse of Code:	1	3	2	2	3	0
	20220DSC35A	Real time Operating Systems	system characteristic into account in a	1	2	3	3	2	3
			and knowing the existing middleware	3	2	1	1	1	0
			different applications.	3	1	2	1	1	1
			software laboratory work with socket and RMI	2	1	3	1	1	0
			behind validity of algorithms solving the	2	0	1	1	3	0
			atomicity and timing issues are not handled in a	2	0	1	1	1	3
	22220DSC35B	Wireless Communication Network	wireless communication and its infrastructure.	2	1	3	1	2	0
			communication networks	3	1	1	2	2	1
			networks.	3	2	2	3	3	2
			technologies.	2	3	2	1	1	3
			networks.	1	2	2	3		3
			technologies and standards	1		2	1	3	3
	22220SRC37	Societal project (Mini Project)	These students will learn to real	3	2	1	1	1	1
			Group discussion.	1	1	1	3	1	0
			Cost effective development	1	2	1	2	3	0
			Breaking problem	1	1	3	1	2	1
			Reassembling problem	2	1	1	3	2	0
	22220SEC41	Software Testing	Apply modern **software testing**	2	1	3	2	1	0
			Create **test** strategies and plans,	3	3	1	2	2	0
			To develop, implement black box	1	2	3	3	3	1
			To understand use of Flow graphs	2	0	2	2	3	3
			To understand and implement	2	1	1	2	1	2
			To develop, implement, and	2	1	3	2	1	2
	22220SEC42	Human Computer Interaction	Design effective dialog for HCI.	3	2	1	2	1	1
			Design effective HCI for	2	1	3	1	3	0
			Assess the importance of user	2	1	1	3	1	0
			Explain the HCI implications for	1	2	1	2	3	1
	22220D	Multimedia and its	To customize the specific parts of	3	2	3	2	1	1
			To prepare visuals by making	2	3	1	1	1	0

IV	22220DSC43A	ia and its application	An understanding of multimedia	2	1	3	2	1	1
			An understanding of the content of	2	0	1	2	3	0
			To work with learners to plan and	2	1	2	3	1	3
	22220DSC43B	Middleware Technology	In Business it helps streamline	2	1	2	3	1	1
			It facilitates communication	2	1	1	3		1
			It is able to maintain the integrity of	1	2	2	2	3	0
			Understand middleware	2	2	3	2	2	0
			Can able to develop middleware	1	1	1	3		0
	22220PRW44	Project work	Can be able to develop plans with		1	3	2	2	0
			Break **work** down into tasks and	3	1	2	2	1	0
			Identify links and dependencies,	3	2	1	1	1	0
			Estimate and cost the human and	2	2	3		3	1
			It supports students to show their	1	1	1	3	1	1
	22220PEE	Programme Exit Examinat	The exam is supposed to measure	2	0	1	2	3	2
			The primary purpose of the exit	3	0	3	1	1	0
			The exam is supposed to measures	3	1	1	1	1	0

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SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
B.TECH - PART TIME (UG - 2022)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
22148S11P	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.
22153C12P	CONTROL SYSTEM	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.
22153C13P	**CIRCUIT THEORY**	Ability analyse electrical circuits
		Ability to apply circuit theorems
		Ability to analyse AC and DC Circuits
22153C14P	ELECTRONIC CIRCUITS	Upon Completion of the course, the students will be 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
22153C15P	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
22148S21P	**NUMERICAL METHODS**	Understand the basic concepts and techniques of solving algebraic 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.
22153C22P	OPTIMISATION TECHNIQUES	To understand ethical issues, environmental impact and acquire management skills.
22153C23P	ELECTRICAL MACHINES-II	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.
22153C24P	DIGITAL ELECTRONICS	Ability to design combinational and sequential Circuits.
		Ability to simulate using software package.
		Ability to study various number systems and simplify the logical expressions using
		Boolean functions
		Ability to design various synchronous and asynchronous circuits.

		Ability to introduce asynchronous sequential circuits and PLDs
		Ability to introduce digital simulation for development of application oriented logic circuits.
22153C25P	TRANSMISSION AND DISTRIBUTION	To understand the concepts of Lines and Insulators.
		To acquire knowledge on the performance of Transmission lines.
		To acquire knowledge on Underground Cabilitys
22148S31CP	PROBABILITY AND STATISTICS	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.
22153C32P	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	Ability to understand and analyse, linear and digital electronic circuits.
22153C33P	POWER ELECTRONICS	Ability to analyse AC-AC and DC-DC and DC-AC converters.
		Ability to choose the converters for real time applications.

22153C34P	MEASUREMENTS AND 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.
22153L35P	DC AND AC ELECTRICAL MACHINES LABORATORY	Ability to conduct performance tests on DC and AC machines
		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

22153C41P	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.
22153C42P	HIGH VOLTAGE DC TRANSMISSION	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
22153C43P	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
22153E44DP	MODELING AND SIMULATION OF SOLAR ENERGY SYSTEMS	Basic knowledge in Power system planning, operation and modeling of large scale power systems.
		Ability to understand the various faults occurring in power system and to solve load flow problems using numerical methods.
		Ability to analyze the power system transients and faults and select the rating for protective devices.
22153L45P	**CONTROL AND INSTRUMENTATION LABORATORY**	Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.
22153C51P	**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
22153C52P	POWER QUALITY	Ability to understand and analyze power system operation, stability, control and protection.

		The students able to understand the over voltage protection & analysis tools used for analyzing the transients.
		They are fully trained in designing and evaluating the devices of harmonic distortion
22153C53P	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.
22153E54AP	**ENVIRONMENTAL SCIENCE AND ENGINEERING**	Play a important role in transferring a healthy environment for future generations
		Analyze the impact of engineering solutions in a global and societal context
		Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems
22153L55P	**POWER ELECTRONICS AND DRIVES LAB**	Ability to practice and understand converter and inverter circuits and apply software for engineering problems.
		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
22153C61P	UTILIZATION OF ELECTRICAL ENERGY	To understand the main aspects of 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.
22153C62P	SOLID STATE RELAYS	Ability to suggest suitability circuit breaker.
		Ability to find the causes of abnormal operating conditions of the apparatus and system
22153C63P	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 reactive power-voltage interaction.

22153E64AP	PRINCIPLES OF MANAGEMENT	Basic Knowledge on management, business, organization culture, environment and planning process.
		Ability to organize business activities, motivational techniques and effective communication.
		Ability to understand the management control and budgetary techniques.
22153L65P	POWER SYSTEMS LAB	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
22160S71P	TOTAL QUALITY MANAGEMENT	ability to have clear understanding of managerial
		basic knowledge on international aspect of management
22153C72P	ELECTRICAL MACHINE DESIGN	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.
22153C73P	POWER PLANT ENGINEERING	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.
22153E74BP	EHV AC and DC Transmission systems	Basic knowledge of HVDC Transmission, its components, types and applications
		Ability to analyze and design the Converter circuits, System Control Techniques
		Ability to design filters for harmonic control and perform power flow analysis using Per unit system for DC Quantities.
22153P75P	PROJECT WORK	○ The students will be able to appreciate the importance of optimization, commercialization, and innovation as the desired features of the designed system

MTECH PS – FULL TIME(2022)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
22248S11D	APPLIED MATHEMATICS FOR POWER SYSTEM ENGINEERING	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems
		Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations
		Illustrate Laplace transform and its application in different fields
		Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations
		Use Z-transform and its applications to solve difference equations
22272C12	**SYSTEM THEORY**	Basics of linear theory/linear algebra
		State-space models, Transition matrix properties, Minimal realization, Controllability, Observability.
		Internal Stability, Lyapunov Stability theorems for linear systems, Linear Feedback and Observers, Separation Principle.
22272C13	**ADVANCED POWER SYSTEM ANALYSIS**	Ability to apply the concepts of sparse matrix for large scale power system analysis

		Ability to analyze power system studies that needed for the transmission system planning
22272C14	**ECONOMIC OPERATIONS OF POWER SYSTEMS**	This course also introduces optimization methods and their application in practical power system operation problems.
		This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.
		The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.
22272C15	**HVDC AND FACTS**	Learners will be able to refresh on basics of power transmission networks and need for FACTS controllers
		Learners will understand the significance about different voltage source converter based FACTS controllers
		Learners will understand the significance of HVDC converters and HVDC system control
		Learners will attain knowledge on AC/DC power flow analysis
22272E16 A	ANALYSIS OF INVERTERS	Analyze various single phase and three phase power converters

		Select and design dc-dc converter topologies for a broad range of power conversion applications.
		Develop improved power converters for any stringent application requirements.
		Design ac-ac converters for variable frequency applications.
22272L17	POWER SYSTEM SIMULATION LABORATORY	Upon Completion of the course, the students will be able to:
		Analyze the power flow using Newton-Raphson method and Fast decoupled method.
		Perform contingency analysis & economic dispatch
		Set Digital Over Current Relay and Coordinate Relay
22272C21	EHV POWER TRANSMISSION	Students would be introduced to the issues in designing power transmission lines operating at EHV/UHV voltages especially about insulation design, corona losses, audible noise , insulation co-ordination, electric field under the lines, issues due to mechanical vibrations of overhead power transmission lines and their mitigation etc.
22272C22	POWER SYSTEM CONTROL	Formation of Y bus, Z bus, line parameters and modeling of transmission lines.
		Power flow analysis: Gauss – Seidel Method.

22272C23	ADVANCED POWER SYSTEM PROTECTION	Learners will be able to understand the various schemes available in Transformer protection
		Learners will have knowledge on Overcurrent protection.
		Learners will attain knowledge about Distance and Carrier protection in transmission lines.
		Learners will understand the concepts of Generator protection.
		Learners will attain basic knowledge on substation automation.
22272E24C	POWER SYSTEM RELIABILITY	Students will develop the ability to learn about load forecasting.
		Students will learn about reliability analysis of ISO and interconnected systems.
		Students will understand the concepts ot Contingency analysis and Probabilistic Load flow Analysis
		Students will be able to understand the concepts of Expansion planning
		Students will have knowledge on the fundamental concepts of the Distribution system planning
22272E25A	**WIND ENERGY CONVERSION SYSTEMS**	Explain the basics of solar energy conversion systems.
		Design a standalone PV system.

		Describe different wind energy conversion systems.
22272L26	**ADVANCED POWER SYSTEM SIMULATION LABORATORY**	To analyze the effect of FACTS controllers by performing steady state analysis.
		To have hands on experience on different wind energy conversion technologies
22272C31	**ELECTRICAL TRANSIENTS IN POWER SYSTEMS**	A quantitative foundation of the mechanism of lighting strokes and the production of lighting surges to understand how the various types of Transients in the system produced.
		Obtain the theoretic basis of the propagation, reflection and refraction of travelling waves for modeling of transmission line travelling waves
		Grasp the concepts of the impact of voltage transients caused by circuit breaker action, switching on integrated power system.
		Design of Insulations under the presence of transients and protection of power system against transient over voltages.
22272E32D	**ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY**	Recognize the sources of Conducted and radiated EMI in Power Electronic Converters and consumer appliances and suggest remedial measures to mitigate the problems

		Assess the insertion loss and design EMI filters to reduce the loss
		Design EMI filters, common-mode chokes and RC-snubber circuits measures to keep the interference within tolerable limits
22272E33A	**POWER CONDITIONING**	Reliably identify the sources of various power quality problems.
		Explain about causes of harmonic and its distortion effect.
		Estimate the impact of various power quality problems on appliances.
		Educate the harmful effects of poor power quality and harmonics.
		Decide the compensators and filters to keep the power quality indices within the standards.
22272E34A	**SOFTWARE FOR CONTROL SYSTEM DESIGN**	Used for problem-solving and control system design
		Used for modeling plant dynamics, designing control algorithms, and running closed-loop simulations
22272P35	**PROJECT WORK PHASE-I**	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

22272P41	**PROJECT WORK PHASE-II**	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

MTECH PS- PART TIME 2022

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
22248S11DP	APPLIED MATHEMATICS FOR POWER SYSTEM ENGINEERING	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems
		Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations
		Illustrate Laplace transform and its application in different fields
		Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations
		Use Z-transform and its applications to solve difference equations
	SYSTEM THEORY	Basics of linear theory/linear algebra

22272C12P		State-space models, Transition matrix properties, Minimal realization, Controllability, Observability.
		Internal Stability, Lyapunov Stability theorems for linear systems, Linear Feedback and Observers, Separation Principle.
22272C13P	**ADVANCED POWER SYSTEM ANALYSIS**	Ability to apply the concepts of sparse matrix for large scale power system analysis
		Ability to analyze power system studies that needed for the transmission system planning
22272L14P	POWER SYSTEM SIMULATION LABORATORY	Upon Completion of the course, the students will be able to:
		Analyze the power flow using Newton-Raphson method and Fast decoupled method.
		Perform contingency analysis & economic dispatch
		Set Digital Over Current Relay and Coordinate Relay
22272C21P	EHV POWER TRANSMISSION	Students would be introduced to the issues in designing power transmission lines operating at EHV/UHV voltages especially about insulation design, corona losses, audible noise , insulation co-ordination, electric field under the lines, issues due to mechanical vibrations of overhead power transmission lines and their mitigation etc.

22272C22P	ADVANCED POWER SYSTEM PROTECTION	Learners will be able to understand the various schemes available in Transformer protection
		Learners will have knowledge on Overcurrent protection.
		Learners will attain knowledge about Distance and Carrier protection in transmission lines.
		Learners will understand the concepts of Generator protection.
		Learners will attain basic knowledge on substation automation.
22272E23AP	ANALYSIS AND DESIGN OF POWER CONVERTERS	Analyze various single phase and three phase power converters
		Select and design dc-dc converter topologies for a broad range of power conversion
		Develop improved power converters for any stringent application requirements.
		Design ac-ac converters for variable frequency applications.
22272C31P	**ECONOMIC OPERATIONS OF POWER SYSTEMS**	This course also introduces optimization methods and their application in practical power system operation problems.

		This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.
		The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.
22272C32P	**HVDC AND FACTS**	Learners will be able to refresh on basics of power transmission networks and need for FACTS controllers
		Learners will understand the significance about different voltage source converter based FACTS controllers
		Learners will understand the significance of HVDC converters and HVDC system control
		Learners will attain knowledge on AC/DC power flow analysis
22272E33CP	POWER SYSTEM RELIABILITY	Students will develop the ability to learn about load forecasting.
		Students will learn about reliability analysis of ISO and interconnected systems.
		Students will understand the concepts ot Contingency analysis and Probabilistic Load flow Analysis

		Students will be able to understand the concepts of Expansion planning
		Students will have knowledge on the fundamental concepts of the Distribution system planning
22272L34P	**ADVANCED POWER SYSTEM SIMULATION LABORATORY**	To analyze the effect of FACTS controllers by performing steady state analysis.
		To have hands on experience on different wind energy conversion technologies
22272C41P	POWER SYSTEM CONTROL	Formation of Y bus, Z bus, line parameters and modeling of transmission lines.
		Power flow analysis: Gauss – Seidel Method.
22272C42P	**ELECTRICAL TRANSIENTS IN POWER SYSTEMS**	A quantitative foundation of the mechanism of lighting strokes and the production of lighting surges to understand how the various types of Transients in the system produced.
		Obtain the theoretic basis of the propagation, reflection and refraction of travelling waves for modeling of transmission line travelling waves
		Grasp the concepts of the impact of voltage transients caused by circuit breaker action, switching on integrated power system.
		Design of Insulations under the presence of transients and protection of power system against transient over voltages.

22272E33CP	POWER SYSTEM RELIABILITY	Students will develop the ability to learn about load forecasting.
		Students will learn about reliability analysis of ISO and interconnected systems.
		Students will understand the concepts ot Contingency analysis and Probabilistic Load flow Analysis
		Students will be able to understand the concepts of Expansion planning
		Students will have knowledge on the fundamental concepts of the Distribution system planning
22272P44P	**PROJECT WORK PHASE-I**	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.
22272E43AP	**WIND ENERGY CONVERSION SYSTEMS**	Explain the basics of solar energy conversion systems.
		Design a standalone PV system.
		Describe different wind energy conversion systems.
22272E51DP	**ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY**	Recognize the sources of Conducted and radiated EMI in Power Electronic Converters and consumer appliances and suggest remedial measures to mitigate the problems
		Assess the insertion loss and design EMI filters to reduce the loss

		Design EMI filters, common-mode chokes and RC-snubber circuits measures to keep the interference within tolerable limits
22275E52AP	**POWER CONDITIONING**	Reliably identify the sources of various power quality problems.
		Explain about causes of harmonic and its distortion effect.
		Estimate the impact of various power quality problems on appliances.
		Educate the harmful effects of poor power quality and harmonics.
		Decide the compensators and filters to keep the power quality indices within the standards.
22272E53AP	**SOFTWARE FOR CONTROL SYSTEM DESIGN**	Used for problem-solving and control system design
		Used for modeling plant dynamics, designing control algorithms, and running closed-loop simulations
22272P61P	**PROJECT WORK PHASE-II**	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

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THANJAVUR – 613 403 - TAMIL NADU

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH - FULL TIME (UG - 2022)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012
22148S11P	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	CO1	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	✓											
		CO2	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									✓			
		CO3	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.								✓				

22153C12P	CONTROL SYSTEM	CO1	Ability to develop various representations of system based on the knowledge of					✓							
		CO2	Mathematics, Science and Engineering fundamentals.			✓									
		CO3	Ability to do time domain and frequency domain analysis of various models of linear system.			✓									
		CO4	Ability to interpret characteristics of the system to develop mathematical model.				✓								
		CO5	Ability to design appropriate compensator for the given specifications.							✓					
		C06	Ability to come out with solution for complex control problem.									✓			
		C07	Ability to understand use of PID controller in closed loop system.											✓	
22153C13P	**CIRCUIT THEORY**	CO1	Ability analyse electrical circuits		✓										
		CO2	Ability to apply circuit theorems				✓								
		CO3	Ability to analyse AC and DC Circuits			✓									
22153C14P	ELECTRONIC CIRCUITS	CO1	Upon Completion of the course, the students will be ability to:								✓				
		CO2	Explain the structure and working operation of basic electronic devices.							✓					
		CO3	Able to identify and differentiate both active and passive elements						✓						

		CO4	Analyze the characteristics of different electronic devices such as diodes and transistors	✓										
		CO5	Choose and adapt the required components to construct an amplifier circuit. Employ the acquired knowledge in design and analysis of oscillators										✓	
22153C15P	ELECTRICAL MACHINES – I	CO1	Ability to analyze the magnetic-circuits.											✓
		CO2	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.										✓	
		CO3	Ability to acquire the knowledge in working principles of DC Motor									✓		
		CO4	Ability to acquire the knowledge in various losses taking place in D.C. Machines								✓			
22148S21P	**NUMERICAL METHODS**	CO1	Understand the basic concepts and techniques of solving algebraic equations.							✓				
		CO2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.		✓									
		CO3	Apply the numerical techniques of differentiation and integration for engineering problems.						✓					

		CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.			✓										
22153C22P	OPTIMISATION TECHNIQUES	CO1	To understand ethical issues, environmental impact and acquire management skills.						✓							
22153C23P	ELECTRICAL MACHINES-II	CO1	Ability to understand MMF curves and armature windings.						✓							
		CO2	Ability to acquire knowledge on Synchronous motor.						✓							
		CO3	Ability to understand the construction and working principle of Three phase Induction Motor									✓				
		CO4	Ability to understand the construction and working principle of Special Machines								✓					
		CO5	Ability to predetermine the performance characteristics of Synchronous Machines.										✓			
22153C24P	DIGITAL ELECTRONICS	CO1	Ability to design combinational and sequential Circuits.									✓				
		CO2	Ability to simulate using software package.			✓										
		CO3	Ability to study various number systems and simplify the logical expressions using		✓											
		CO4	Boolean functions								✓					
		CO5	Ability to design various synchronous and asynchronous circuits.					✓								
		C06	Ability to introduce asynchronous sequential circuits and PLDs											✓		

		C07	Ability to introduce digital simulation for development of application oriented logic circuits.													✓
22153C25P	TRANSMISSION AND DISTRIBUTION	CO1	To understand the concepts of Lines and Insulators.			✓										
		CO2	To acquire knowledge on the performance of Transmission lines.								✓					
		CO3	To acquire knowledge on Underground Cabilitys	✓												
22148S31CP	PROBABILITY AND STATISTICS	CO1	Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.									✓				
		CO2	Gradient, divergence and curl of a vector point function and related identities.								✓					
		CO3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.					✓								
22153C32P	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	CO1	Ability to understand and analyse, linear and digital electronic circuits.			✓										
22153C33P	POWER ELECTRONICS	CO1	Ability to analyse AC-AC and DC-DC and DC-AC converters.			✓										
		CO2	Ability to choose the converters for real time applications.				✓									

22153C34P	MEASUREMENTS AND INSTRUMENTATION	CO1	To understand the concepts of Fundamentals of electrical and electronic instruments							✓						
		CO2	Ability to compare between various measurement techniques									✓				
		CO3	To acquire knowledge on Various storage and display devices												✓	
		CO4	To understand the concepts Various transducers and the data acquisition systems		✓											
		CO5	Ability to model and analyze electrical and electronic Instruments and understand the operational features of display Devices and Data Acquisition System.				✓									
22153L35P	DC AND AC ELECTRICAL MACHINES LABORATORY	CO1	Ability to conduct performance tests on DC and AC machines			✓										
		CO2	Ability to understand and analyze EMF and MMF methods								✓					
		CO3	Ability to analyze the characteristics of V and Inverted V curves							✓						
		CO4	Ability to understand the importance of Synchronous machines						✓							
		CO5	Ability to understand the importance of Induction Machines	✓												

22153C41P	PROTECTION AND SWITCHGEAR	CO1	Ability to understand and analyze Electromagnetic and Static Relays.											✓	
		CO2	Ability to suggest suitability circuit breaker.												✓
		CO3	Ability to find the causes of abnormal operating conditions of the apparatus and system.											✓	
		CO4	Ability to analyze the characteristics and functions of relays and protection schemes. Ability to study about the apparatus protection, static and numerical relays.										✓		
		CO5	Ability to acquire knowledge on functioning of circuit breaker.								✓				
22153C42P	HIGH VOLTAGE DC TRANSMISSION	CO1	Ability to understand Generation and measurement of high voltage.							✓					
		CO2	Ability to understand High voltage testing.		✓										
		CO3	Ability to understand various types of over voltages in power system. Ability to measure over voltages.						✓						
		CO4	Ability to test power apparatus and insulation coordination			✓									
22153C43P	SOLID STATE DRIVES	CO1	Ability to understand and suggest a converter for solid state drive.						✓						
		CO2	Ability to select suitability drive for the given application.						✓						

		CO3	Ability to study about the steady state operation and transient dynamics of a motor load system. Ability to analyze the operation of the converter/chopper fed dc drive.						✓							
		CO4	Ability to analyze the operation and performance of AC motor drives.									✓				
		CO5	Ability to analyze and design the current and speed controllers for a closed loop solid								✓					
22153E44DP	MODELING AND SIMULATION OF SOLAR ENERGY SYSTEMS	CO1	Basic knowledge in Power system planning, operation and modeling of large scale power systems.	✓												
		CO2	Ability to understand the various faults occurring in power system and to solve load flow problems using numerical methods.									✓				
		CO3	Ability to analyze the power system transients and faults and select the rating for protective devices.								✓					
22153L45P	**CONTROL AND INSTRUMENTATION LABORATORY**	CO1	Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.					✓								

22153C51P	**POWER SYSTEM ANALYSIS**	CO1	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			✓									
		CO2	Ability to model and analyze stability problems in power system			✓									
22153C52P	POWER QUALITY	CO1	Ability to understand and analyze power system operation, stability, control and protection.				✓								
		CO2	The students able to understand the over voltage protection & analysis tools used for analyzing the transients.							✓					
		CO3	They are fully trained in designing and evaluating the devices of harmonic distortion									✓			
22153C53P	SPECIAL ELECTRICAL MACHINES	CO1	Ability to analyze and design controllers for special Electrical Machines.											✓	
		CO2	Ability to acquire the knowledge on construction and operation of stepper motor.		✓										
		CO3	Ability to acquire the knowledge on construction and operation of stepper switched reluctance motors.				✓								
		CO4	Ability to construction, principle of operation, switched reluctance motors.			✓									

22153E54AP	**ENVIRONMENTAL SCIENCE AND ENGINEERING**	CO1	Play a important role in transferring a healthy environment for future generations								✓				
		CO2	Analyze the impact of engineering solutions in a global and societal context							✓					
		CO3	Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems						✓						
22153L55P	**POWER ELECTRONICS AND DRIVES LAB**	CO1	Ability to practice and understand converter and inverter circuits and apply software for engineering problems.	✓											
		CO2	Ability to analyze about AC to DC converter circuits.											✓	
		CO3	Ability to analyze about DC to AC circuits.												✓
		CO4	Ability to acquire knowledge on AC to AC converters											✓	
		CO5	Ability to acquire knowledge on simulation software										✓		
22153C61P	UTILIZATION OF ELECTRICAL ENERGY	CO1	To understand the main aspects of generation, utilization and conservation.								✓				
		CO2	To identify an appropriate method of heating for any particular industrial application.							✓					
		CO3	To evaluate domestic wiring connection and debug any faults occurred.		✓										

		CO4	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.						✓							
22153C62P	SOLID STATE RELAYS	CO1	Ability to suggest suitability circuit breaker.			✓										
		CO2	Ability to find the causes of abnormal operating conditions of the apparatus and system						✓							
22153C63P	POWER SYSTEM OPERATION AND CONTROL	CO1	Ability to understand the day-to-day operation of electric power system.						✓							
		CO2	Ability to analyze the control actions to be implemented on the system to meet the minute- to-minute variation of system demand.						✓							
		CO3	Ability to understand the reactive power-voltage interaction.									✓				
22153E64AP	PRINCIPLES OF MANAGEMENT	CO1	Basic Knowledge on management, business, organization culture, environment and planning process.								✓					
		CO2	Ability to organize business activities, motivational techniques and effective communication.	✓												
		CO3	Ability to understand the management control and budgetary techniques.									✓				
22153L65P	POWER SYSTEMS LAB	CO1	Ability to understand power system planning and operational studies.								✓					

		CO2	Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks.					✓							
		CO3				✓									
		CO4	Ability to analyze the power flow using GS and NR method			✓									
		CO5	Ability to find Symmetric and Unsymmetrical fault				✓								
22160S71P	TOTAL QUALITY MANAGEMENT	CO1	ability to have clear understanding of managerial							✓					
		CO2	basic knowledge on international aspect of management									✓			
22153C72P	ELECTRICAL MACHINE DESIGN	CO1	Ability to understand basics of design considerations for rotating and static electrical machines											✓	
		CO2	Ability to design of field system for its application.		✓										
		CO3	Ability to design sing and three phase transformer.				✓								
		CO4	Ability to design armature and field of DC machines.			✓									
22153C73P	POWER PLANT ENGINEERING	CO1	Ability to create awareness about renewable Energy Sources and technologies.								✓				
		CO2	Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.							✓					
		CO3	Ability to recognize current and possible future role of renewable energy sources.						✓						

		CO1	Basic knowledge of HVDC Transmission, its components, types and applications	✓										
		CO2	Ability to analyze and design the Converter circuits, System Control Techniques										✓	
	EHV AC and DC Transmission	CO3	Ability to design filters for harmonic control and perform power flow analysis using Per unit system for DC Quantities.											✓
22153E74BP	systems	CO4											✓	
22153P75P	PROJECT WORK	CO1	o The students will be able to appreciate the importance of optimization, commercialization, and innovation as the desired features of the designed system									✓		

MTECH PS -FULL TIME 2022

COURSE CODE	**COURSE TITLE**	**CO**	**COURSE OUTCOMES**						✓					
22248S11D	APPLIED MATHEMATICS FOR POWER SYSTEM ENGINEERING	**CO1**	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems			✓								
		CO2	Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations						✓					
		CO3	Illustrate Laplace transform and its application in different fields						✓					

		CO4	Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations						✓							
		CO5	Use Z-transform and its applications to solve difference equations									✓				
22272C12	**SYSTEM THEORY**	**CO1**	Basics of linear theory/linear algebra								✓					
		CO2	State-space models, Transition matrix properties, Minimal realization, Controllability, Observability.	✓												
		CO3	Internal Stability, Lyapunov Stability theorems for linear systems, Linear Feedback and Observers, Separation Principle.									✓				
22272C13	**ADVANCED POWER SYSTEM ANALYSIS**	**CO1**	Ability to apply the concepts of sparse matrix for large scale power system analysis								✓					
		CO2	Ability to analyze power system studies that needed for the transmission system planning					✓								
22272C14	**ECONOMIC OPERATIONS OF POWER SYSTEMS**	**CO1**	This course also introduces optimization methods and their application in practical power system operation problems.			✓										
		CO2	This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.			✓										

		CO3	The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.				✓								
22272C15	**HVDC AND FACTS**	**CO1**	Learners will be able to refresh on basics of power transmission networks and need for FACTS controllers							✓					
		CO2	Learners will understand the significance about different voltage source converter based FACTS controllers									✓			
		CO3	Learners will understand the significance of HVDC converters and HVDC system control											✓	
		CO4	Learners will attain knowledge on AC/DC power flow analysis		✓										
22272E16 A	ANALYSIS OF INVERTERS	**CO1**	Analyze various single phase and three phase power converters				✓								
		CO2	Select and design dc-dc converter topologies for a broad range of power conversion applications.			✓									
		CO3	Develop improved power converters for any stringent application requirements.								✓				
		CO4	Design ac-ac converters for variable frequency applications.							✓					

22272L17	POWER SYSTEM SIMULATION LABORATORY	**CO1**	Upon Completion of the course, the students will be able to:						✓						
		CO2	Analyze the power flow using Newton-Raphson method and Fast decoupled method.	✓											
		CO3	Perform contingency analysis & economic dispatch											✓	
		CO4	Set Digital Over Current Relay and Coordinate Relay												✓
22272C21	EHV POWER TRANSMISSION	**CO1**	Students would be introduced to the issues in designing power transmission lines operating at EHV/UHV voltages especially about insulation design, corona losses, audible noise , insulation co-ordination, electric field under the lines, issues due to mechanical vibrations of overhead power transmission lines and their mitigation etc.											✓	
22272C22	POWER SYSTEM CONTROL	**CO1**	Formation of Y bus, Z bus, line parameters and modeling of transmission lines.										✓		
		CO2	Power flow analysis: Gauss – Seidel Method.								✓				
22272C23	ADVANCED POWER SYSTEM PROTECTION	**CO1**	Learners will be able to understand the various schemes available in Transformer							✓					
		CO2	protection		✓										
		CO3	Learners will have knowledge on Overcurrent protection.						✓						

		CO4	Learners will attain knowledge about Distance and Carrier protection in transmission lines.			✓									
		CO5	Learners will understand the concepts of Generator protection.						✓						
		CO6	Learners will attain basic knowledge on substation automation.						✓						
22272E24 C	POWER SYSTEM RELIABILITY	**CO1**	Students will develop the ability to learn about load forecasting.						✓						
		CO2	Students will learn about reliability analysis of ISO and interconnected systems.									✓			
		CO3	Students will understand the concepts ot Contingency analysis and Probabilistic Load flow Analysis								✓				
		CO4	Students will be able to understand the concepts of Expansion planning	✓											
		CO5	Students will have knowledge on the fundamental concepts of the Distribution system planning									✓			
22272E25 A	**WIND ENERGY CONVERSION SYSTEMS**	**CO1**	Explain the basics of solar energy conversion systems.								✓				
		CO2	Design a standalone PV system.					✓							
		CO3	Describe different wind energy conversion systems.			✓									

22272L26	**ADVANCED POWER SYSTEM SIMULATION LABORATORY**	**CO1**	To analyze the effect of FACTS controllers by performing steady state analysis.			✓									
		CO2	To have hands on experience on different wind energy conversion technologies				✓								
22272C31	**ELECTRICAL TRANSIENTS IN POWER SYSTEMS**	**CO1**	A quantitative foundation of the mechanism of lighting strokes and the production of lighting surges to understand how the various types of Transients in the system produced.							✓					
		CO2	Obtain the theoretic basis of the propagation, reflection and refraction of travelling waves for modeling of transmission line travelling waves									✓			
		CO3	Grasp the concepts of the impact of voltage transients caused by circuit breaker action, switching on integrated power system.											✓	
		CO4	Design of Insulations under the presence of transients and protection of power system against transient over voltages.		✓										
22272E32D	**ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY**	**CO1**	Recognize the sources of Conducted and radiated EMI in Power Electronic Converters and consumer appliances and suggest remedial measures to mitigate the problems				✓								
		CO2	Assess the insertion loss and design EMI filters to reduce the loss			✓									

		CO3	Design EMI filters, common-mode chokes and RC-snubber circuits measures to keep the interference within tolerable limits								✓				
22272E33A	**POWER CONDITIONING**	**CO1**	Reliably identify the sources of various power quality problems.							✓					
		CO2	Explain about causes of harmonic and its distortion effect.						✓						
		CO3	Estimate the impact of various power quality problems on appliances.	✓											
		CO4	Educate the harmful effects of poor power quality and harmonics.											✓	
		CO5	Decide the compensators and filters to keep the power quality indices within the standards.												✓
22272E34A	**SOFTWARE FOR CONTROL SYSTEM DESIGN**	**CO1**	Used for problem-solving and control system design											✓	
		CO2	Used for modeling plant dynamics, designing control algorithms, and running closed-loop simulations										✓		
22272P35	**PROJECT WORK PHASE-I**	**CO1**	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.								✓				
22272P41	**PROJECT WORK PHASE-II**	**CO1**	On Completion of the project work students will be in a position to take up any challenging practical problems and find							✓					

			solution by formulating proper methodology.													

MTECH PS- PART TIME 2022

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES						✓						
22248S11DP	APPLIED MATHEMATICS FOR POWER SYSTEM ENGINEERING	**CO1**	Understand Finite differences, interpolation techniques, Numerical differentiation and Integration and apply it to various practical problems						✓						
		CO2	Apply Numerical methods to solve first order ordinary differential equations and Algebraic and Transcendental equations									✓			
		CO3	Illustrate Laplace transform and its application in different fields								✓				
		CO4	Apply Fourier transforms and its applications to solve Ordinary and Partial differential equations	✓											
		CO5	Use Z-transform and its applications to solve difference equations									✓			
22272C12P	**SYSTEM THEORY**	**CO1**	Basics of linear theory/linear algebra								✓				
		CO2	State-space models, Transition matrix properties, Minimal realization, Controllability, Observability.					✓							

		CO3	Internal Stability, Lyapunov Stability theorems for linear systems, Linear Feedback and Observers, Separation Principle.			✓									
22272C13P	**ADVANCED POWER SYSTEM ANALYSIS**	**CO1**	Ability to apply the concepts of sparse matrix for large scale power system analysis			✓									
		CO2	Ability to analyze power system studies that needed for the transmission system planning				✓								
22272L14P	POWER SYSTEM SIMULATION LABORATORY	**CO1**	Upon Completion of the course, the students will be able to:							✓					
		CO2	Analyze the power flow using Newton-Raphson method and Fast decoupled method.									✓			
		CO3	Perform contingency analysis & economic dispatch											✓	
		CO4	Set Digital Over Current Relay and Coordinate Relay		✓										
22272C21 P	EHV POWER TRANSMISSION	**CO1**	Students would be introduced to the issues in designing power transmission lines operating at EHV/UHV voltages especially about insulation design, corona losses, audible noise , insulation co-ordination, electric field under the lines, issues due to mechanical vibrations of overhead power transmission lines and their mitigation etc.				✓								
22272C22P		**CO1**	Learners will be able to understand the various schemes available in Transformer			✓									

	ADVANCED POWER SYSTEM PROTECTION	**CO2**	protection								✓				
		CO3	Learners will have knowledge on Overcurrent protection.							✓					
		CO4	Learners will attain knowledge about Distance and Carrier protection in transmission lines.						✓						
		CO5	Learners will understand the concepts of Generator protection.	✓											
		CO6	Learners will attain basic knowledge on substation automation.											✓	
22272E23AP	ANALYSIS AND DESIGN OF POWER CONVERTERS	**CO1**	Analyze various single phase and three phase power converters												✓
		CO2	Select and design dc-dc converter topologies for a broad range of power conversion											✓	
		CO3	Develop improved power converters for any stringent application requirements.										✓		
		CO4	Design ac-ac converters for variable frequency applications.								✓				
		CO5								✓					
22272C31P	**ECONOMIC OPERATIONS OF POWER SYSTEMS**	**CO1**	This course also introduces optimization methods and their application in practical power system operation problems.		✓										
		CO2	This course provides application of modern numerical techniques and analytical methods for dealing with and solving operation-related problems in electric power systems.						✓						

		CO3	The primary objective of this course is to analyze efficient and optimum operation of electric power generation system and to provide an overview about the control techniques adopted to ensure the economic operation of a power system.			✓										
22272C32P	**HVDC AND FACTS**	**CO1**	Learners will be able to refresh on basics of power transmission networks and need for FACTS controllers						✓							
		CO2	Learners will understand the significance about different voltage source converter based FACTS controllers						✓							
		CO3	Learners will understand the significance of HVDC converters and HVDC system control						✓							
		CO4	Learners will attain knowledge on AC/DC power flow analysis									✓				
22272E33CP	POWER SYSTEM RELIABILITY	**CO1**	Students will develop the ability to learn about load forecasting.								✓					
		CO2	Students will learn about reliability analysis of ISO and interconnected systems.	✓												
		CO3	Students will understand the concepts ot Contingency analysis and Probabilistic Load flow Analysis									✓				
		CO4	Students will be able to understand the concepts of Expansion planning								✓					

		CO5	Students will have knowledge on the fundamental concepts of the Distribution system planning					✓							
22272L34P	**ADVANCED POWER SYSTEM SIMULATION LABORATORY**	**CO1**	To analyze the effect of FACTS controllers by performing steady state analysis.			✓									
		CO2	To have hands on experience on different wind energy conversion technologies			✓									
22272C41P	POWER SYSTEM CONTROL	**CO1**	Formation of Y bus, Z bus, line parameters and modeling of transmission lines.				✓								
		CO2	Power flow analysis: Gauss – Seidel Method.							✓					
22272C42P	**ELECTRICAL TRANSIENTS IN POWER SYSTEMS**	**CO1**	A quantitative foundation of the mechanism of lighting strokes and the production of lighting surges to understand how the various types of Transients in the system produced.									✓			
		CO2	Obtain the theoretic basis of the propagation, reflection and refraction of travelling waves for modeling of transmission line travelling waves											✓	
		CO3	Grasp the concepts of the impact of voltage transients caused by circuit breaker action, switching on integrated power system.		✓										
		CO4	Design of Insulations under the presence of transients and protection of power system against transient over voltages.				✓								

22272E33CP	POWER SYSTEM RELIABILITY	**CO1**	Students will develop the ability to learn about load forecasting.			✓									
		CO2	Students will learn about reliability analysis of ISO and interconnected systems.								✓				
		CO3	Students will understand the concepts ot Contingency analysis and Probabilistic Load flow Analysis							✓					
		CO4	Students will be able to understand the concepts of Expansion planning						✓						
		CO5	Students will have knowledge on the fundamental concepts of the Distribution system planning	✓											
22272P44P	**PROJECT WORK PHASE-I**	**CO1**	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.											✓	
22272E43AP	**WIND ENERGY CONVERSION SYSTEMS**	**CO1**	Explain the basics of solar energy conversion systems.												✓
		CO2	Design a standalone PV system.											✓	
		CO3	Describe different wind energy conversion systems.										✓		
22272E51DP	**ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY**	**CO1**	Recognize the sources of Conducted and radiated EMI in Power Electronic Converters and consumer appliances and suggest remedial measures to mitigate the problems								✓				
		CO2	Assess the insertion loss and design EMI filters to reduce the loss							✓					

		CO3	Design EMI filters, common-mode chokes and RC-snubber circuits measures to keep the interference within tolerable limits		✓											
22275E52AP	**POWER CONDITIONING**	**CO1**	Reliably identify the sources of various power quality problems.						✓							
		CO2	Explain about causes of harmonic and its distortion effect.			✓										
		CO3	Estimate the impact of various power quality problems on appliances.						✓							
		CO4	Educate the harmful effects of poor power quality and harmonics.						✓							
		CO5	Decide the compensators and filters to keep the power quality indices within the standards.						✓							
22272E53AP	**SOFTWARE FOR CONTROL SYSTEM DESIGN**	**CO1**	Used for problem-solving and control system design									✓				
		CO2	Used for modeling plant dynamics, designing control algorithms, and running closed-loop simulations								✓					
22272P61P	**PROJECT WORK PHASE-II**	**CO1**	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	✓												

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

B.TECH (F.T)- 2022R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
SEM 1	22148S11P	Transforms & Partial Differential Equations	Understand how to solve the given standard partial differential equations.			✓							
			Solve differential equations using Fourier series analysis which plays a vital role in engineering			✓				✓			
			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.			✓							
	22155C12P	Strength of Materials I	Understand the concepts of stress and strain, principal stresses and principal planes.	✓									✓
			Determine Shear force and bending moment in beams and understand concept of theory of simple bending.	✓									
			Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.	✓									
			Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.	✓									
			Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure	✓									

	22155C13P	Fluid Mechanics I	Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.	✓			✓	✓					
			Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.	✓									
			Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.		✓								
			Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.	✓									
			Explain the concept of boundary layer and its application to find the drag force excreted by the fluid on the flat solid surface.			✓	✓						✓
	22155C14P	Plane and Geodetic Surveying	Introduce the rudiments of various surveying and its principles.	✓			✓	✓	✓				
			Imparts knowledge in computation of levels of terrain and ground features										
			Imparts concepts of Theodolite Surveying for complex surveying operations										
			Understand the procedure for establishing horizontal and vertical control										
			Imparts the knowledge on modern surveying instruments					✓					✓
	22155C15P	Irrigation Engineering	Explain the concept of flood, drought and reservoirs	✓	✓		✓	✓	✓		✓	✓	
			to understand and explain the hydraulic structures.	✓									
			Draw the components of irrigation canal network to design the canal and to familiarize	✓									
			Apply the concepts of groundwater for water resources management	✓									
			explain the concepts of irrigation water management from the bottom-up approach.	✓									
SEM 2	22148S21P	Numerical Methods	demonstrate the understandings of common numerical methods for nonlinear equations,system of linear equations and eigenvalue problems;			✓				✓			
			understand the interpolation theory			✓							
			understand the concepts of numerical methods for ordinary differential equations			✓							✓
			demonstrate the understandings of common numerical methods for elliptic equations										

			understand the concepts of numerical methods for time dependent partial differential equations							✓			
	22155C22P	Strength of Materials II	Understand the concepts of stress and strain, principal stresses and principal planes	✓	✓								
			Determine Shear force and bending moment in beams		✓								✓
			understand concept of theory of simple bending	✓	✓								
			Calculate the deflection of beams by different methods	✓	✓								
			Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements	✓	✓								
	22155C23P	Fluid Mechanics II	Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application	✓	✓	✓	✓	✓					
			Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles grades	✓									
			Derive the relationship among the sequent depths of steady rapidly varied flow		✓								
			Design turbines and explain the working principle			✓							
			Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps	✓				✓					
	22155C24P	Concrete Technology	Understand the requirements of cement, aggregates and water for concrete	✓									
			Select suitable admixtures for enhancing the properties of concrete										
			Design concrete mixes as per IS method of mix design										
			Determine the properties of concrete at fresh and hardened state.										
			Know the importance of special concretes for specific requirements	✓									
	22155C25P	Soil Mechanics	Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems						✓		✓		

			Show the basic understanding of flow through soil medium and its impact of engineering solution	✓									✓
			Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation						✓		✓		
			Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear soils strength of soils.										
			Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications	✓					✓				✓
SEM 3	22148S31P	Probability & Statistics	To introduce the basic concepts of two dimensional random variables.	✓									
			To introduce the basic concepts of two dimensional random variables.	✓									
			To acquaint the knowledge of testing of hypothesis for small and large samples which play an important role in real life problems.	✓									
			To introduce the basic concepts of classification of design of esperiments which plays vwery important roles in the field of agriculture and statistical quality control.	✓									
	22155C32P	Design of Reinforced Concrete Structures-I	Know the various design concepts and design RC rectangular beams by working stress and limit state methods	✓	✓		✓		✓			✓	
			Understand the design of flanged beams, design for shear and torsion, and anchorage and development length	✓									
			Design a RC slabs and staircase and draw the reinforcement detailing	✓									
			Design short columns for axial, uni-axial and bi-axial eccentric loadings										✓
			Design wall footings, isolated footings and combined rectangular footing	✓									
	22155C33P	Structural Analysis I	Analyze the pin-jointed plane and space frames	✓			✓		✓			✓	
			Analyse the continuous beams and rigid frames by slope defection method				✓		✓			✓	
			Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway	✓	✓								✓
			Analyse 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	✓									
	22155C34P	Construction Materials And Practice	Identify the good quality brick, stone and blocks for construction	✓	✓	✓	✓					✓	
			Recognize the market forms of timber, steel, aluminum and applications of various composite materials		✓	✓							
			Identify the best construction and service practices such as thermal insulations and air conditioning of the building	✓			✓					✓	
			Select various equipments for construction works conditioning of building	✓									
			Understand the construction planning and scheduling techniques	✓									
	22155L35P	Soil Mechanics laboratory	Conduct tests to determine the index properties of soils	✓		✓			✓			✓	
			Determine the insitu density and compaction characteristics.			✓							
			Conduct tests to determine the compressibility, permeability and shear strength of soils	✓					✓			✓	
			Understand the various tests on Geosynthetics										
SEM 4	22155C41P	Design of Reinforced Concrete Structures-II	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	✓									
	22155C42P	Structural Analysis II	Draw influence lines for statically determinate structures and calculate critical stress resultants	✓			✓		✓		✓	✓	
			Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams										
			Analyse three hinged, two hinged and fixed arches				✓		✓		✓	✓	
			Analyse the suspension bridges with stiffening girders	✓									
			AnalysHYDe rigid frames by approximate methods for gravity and horizontal loads						✓		✓		
	22155C43P	Environmental Engineering	An ability to estimate sewage generation and design sewer system including sewage pumping stations	✓	✓	✓	✓	✓					✓

			The required understanding on the characteristics and composition of sewage, self-purification of streams	✓	✓	✓							
			An ability to perform basic design of the unit operations and processes that are used in sewage treatment	✓	✓								
			Understand the standard methods for disposal of sewage.				✓	✓					
	22155E44BP	Water Resource Engineering	The students gain the knowledge needed on hydrologic cycle, hydrometeorology and formation of precipitation	✓	✓		✓			✓	✓	✓	✓
			The students are able to apply the various methods of field measurements and empirical formulae for estimating the various losses of precipitation, stream flow							✓	✓		
			The students will know the basics of groundwater and hydraulics of subsurface flows	✓	✓								
	22155L45P	Environmental Engineering Lab	Quantify the pollutant concentration in water and wastewater	✓	✓		✓			✓	✓	✓	✓
			Suggest the type of treatment required and amount of dosage required for the treatment				✓						✓
			Examine the conditions for the growth of micro-organisms	✓	✓					✓	✓		
SEM 5	22155C51P	Design of Steel Structures	Recognize the design philosophy of steel structures and identify the different failure modes of bolted and welded connections, and determine their design strengths	✓	✓	✓	✓	✓					✓
			Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria		✓	✓							✓
			Apply the principles, procedures and current code requirements to the analysis and design of steel tension members, columns, column bases and beams	✓	✓								
			Identify and compute the design loads on Industrial structures, and gantry girder				✓	✓					
			Find out ultimate load of steel beams and portal frames using plastic analysis	✓		✓							
	22155C52P	Foundation Engineering	Graduate will demonstrate an ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation	✓	✓	✓	✓	✓				✓	✓
			Graduate will demonstrate an ability to design shallow foundations, its component or process as per the needs and specifications	✓		✓	✓						

			Graduate will demonstrate an ability to design combined footings and raft foundations, its component or process as per the needs and specifications				✓					✓	✓
			Graduate will demonstrate an ability to design deep foundations, its component or process as per the needs and specifications.	✓	✓								
			Graduate will demonstrate an ability to design retaining walls, its component or process as per the needs and specifications.		✓	✓						✓	✓
	22155C53P	Waste Water Engineering	Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission			✓	✓	✓	✓			✓	
			Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations					✓					
			Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and treatment process biological treatment process	✓					✓				
			Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods						✓			✓	
			Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage			✓	✓					✓	
	22155E54BP	Transportation Engineering	Understand the fundamentals of ITS and its benefits	✓		✓							
			Gain knowledge on data collection using sensors and its applications		✓								
			Acquainted with the knowledge of ITS in Traffic Management	✓									
			Application of ITS in Transportation Planning										
			Able to gain knowledge on application of ITS in Logistics	✓									
	22155L55P	Computer Aided Building Drawing Laboratory	Draft the plan, elevation and sectional view of the load bearing and framed buildings	✓									
			Draw the structural detailing of RCC elements										
			Draw the structural detailing of RCC water tanks, footings and retaining walls	✓									
			Draw the structural detailing of steel	✓				✓					

			structures										
			Draft the structural detailing of Industrial structures					✓					
SEM 6	22155C61P	Estimation & Cost Evaluation	Gain knowledge on types of contracts	✓	✓	✓	✓	✓					✓
			Understand types of specifications, principles for report preparation, tender notices types			✓	✓						
			Rate Analysis for all Building works, canals, and Roads and Cost Estimate		✓								✓
			Estimate the quantities for buildings										✓
			Evaluate valuation for building and land	✓									
	22155C62P	Ground Water Hydrology	Define and list out the key drivers of hydrological processes and their integrated behaviour in catchments	✓	✓	✓	✓	✓				✓	✓
			Apply the knowledge of hydrological processes to address basin characteristics, runoff and hydrograph			✓	✓					✓	
	2155C63P	Construction Project Management	To understand the overall and detailed planning of formwork	✓	✓		✓						
			To impart knowledge on formwork materials, accessories, pressures and labour requirement				✓						
			To develop the conceptual understanding of design, construction and erection of formwork	✓	✓								
			To impart the knowledge about different types of form work used for special structures										
			To understand the errors in design and judge the formwork failures through case studies				✓						
	22155E64CP	Airport & Harbours	Gain an insight on the planning and site selection of Airport Planning and design		✓	✓	✓	✓			✓		
			Knowledge on Design of various Airport components				✓						
			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					✓					
			Knowledge on various Environmental Regulations and Acts		✓	✓							
	22155L65P	Concrete &Transportation Engineering Laboratory	Characterize Pavement Aggregate through relevant test	✓	✓		✓						
			Ascertain the Quality of Bitumen				✓						
			Determine the Optimum Binder Content Using Marshall Method	✓	✓								
			Evaluate the Consistency and Properties of Bitumen										

			Determine the Bitumen Content in the Bituminous Mixes				✓							
SEM 7	22155S71P	Total Quality Management	Ability to apply TQM concepts in a selected enterprise	✓	✓				✓	✓			
			Ability to apply TQM principles in a selected enterprise										
			Ability to understand Six Sigma and apply Traditional tools, New tools, Benchmarking and FMEA	✓	✓								
			Ability to understand Taguchi's Quality Loss Function, Performance Measures and apply QFD, TPM, COQ and BPR						✓	✓			
			Ability to apply QMS and EMS in any organization										
	22155C72P	Housing, Planning & Management	To get maximum benefit from building and its services in terms of quality, timely completion and cost-effectiveness		✓		✓			✓		✓	
			To compile different aspects of Building Construction, Planning and Drawing of residential buildings & Public Building		✓					✓		✓	
	22155C73P	Repair And Rehabilitation of Structures	the importance of maintenance and assessment method of distressed structures.	✓	✓	✓	✓		✓				
			The strength and durability properties ,their effects due to climate and temperature.			✓	✓						
			recent development in concrete	✓	✓								
			The techniques for repair rand protection methods	✓		✓							
			Repair, rehabilitation and retrofitting of structures and demolition methods.						✓				
	22155E74DP	Prestressed Concrete Structures	Understand the behaviour of prestressed concrete members and able to analyze the prestressed concrete beams.										
			Design the prestressed concrete members for flexure and shear as per the relevant design code (IS 1343).										
			Analyze for deflection of prestressed concrete members and design the anchorage zone.										
			Analyze and design of composite beams and continuous beams.	✓	✓	✓	✓		✓				
			Design of prestressed concrete structures - sleepers, Tanks, pipes and poles.			✓	✓						
	22155P75P	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.	✓	✓		✓						

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DEPARTMENT OF CIVIL ENGINEERING
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M.TECH (F.T)- 2020R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
SEM 1	22248S11E	Advanced Engineering Mathematics	Application of Laplace and Fourier transforms to the initial value, initial–boundary value and boundary value problems in Partial Differential Equations			✓							
			Maximizing and minimizing the functions that occur in various branches of Engineering Disciplines.			✓				✓			
			Competently use tensor analysis as a tool in the field of applied sciences and related fields.			✓							
	22255C12	Quality Control &Assurance in Construction	To study the various aspects of quality control and asurance aspects of pharamaceutical	✓									✓
			Understanding of important parameters such as cgmp.qc tests,documentation,quality certifications,GLP and regulatory	✓									
			Scope of quality certifications applicable to pharamaceutical industries	✓									
			Responsible of QA & QC	✓									
	22255C13	Theory of Plasticity and Elasticity	Derive and write the fundamental equations of elasticity describing the linear behavior of elements and develop constitutive models based on material behavior	✓			✓	✓					
			Demonstrate the application of plane stress and plane strain in a given situation in both cartesian and polar coordinate systems	✓									

			Solve torsion problems in circular and non-circular cross-sections		✓								
			Analyse beams resting on elastic foundations	✓									
			Solve analytically the simple boundary value problems with elasto-plastic and strain hardening properties			✓	✓						✓
	22255C14	Structural Dynamics	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems	✓			✓	✓	✓				
			Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration										
			Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration										
			Explain the causes and effects of an earthquake										
			Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice					✓					✓
	22255C15	Experimental Techniques	Do the mix proportion using IS and ACI codal provisions	✓	✓		✓	✓	✓		✓	✓	
			Test the concrete in a non-destructive manner using rebound hammer	✓									
			Know the permeability characteristics of concrete	✓									
			Observe the effect of mineral and chemical admixture in concrete	✓									
			Study the flow characteristics of self-compacting concrete	✓									
	22255E16 A	Prestressed Concrete Design	Identify the various methods of prestressing and estimate the loss	✓			✓	✓	✓				
			Design the beams for flexure, shear, bond and torsion	✓									
			Design the continuous beams and composite beams	✓									✓
			Design the water tank, piles and masts	✓									
			Analyze and design the prestressed concrete bridge	✓									

	22255L17	Core Practical (Computer Programming Lab)	Read, understand and trace the execution of programs written in C language	✓			✓	✓	✓				
			Write the C code for a given algorithm	✓									
			Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor	✓									
SEM 2	22255C21	Management Information System	Relate the basic concepts and technologies used in the field of management information systems			✓				✓			
			Compare the processes of developing and implementing information systems			✓							
			Outline the role of the ethical, social, and security issues of information systems			✓							✓
			Translate the role of information systems in organizations, the strategic management processes with the implications for the management										
			Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization							✓			
	22255C22	Finite Element Analysis	Formulate a finite element problem using basic mathematical principles	✓	✓								
			Explain the various types of elements and select the appropriate element for modelling		✓								✓
			Analyse a frame using truss element	✓	✓								
			Formulate and analyse the two- and three-dimensional solid finite element problems	✓	✓								
			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM	✓	✓								
	22255C23	Advanced Concrete Structural Design	Explain the structural behaviour of flexural members and columns	✓	✓	✓	✓	✓					
			Design the compression members and construct interaction diagrams	✓									
			Design the special elements like corbels, deep beams and grid floors		✓								

			Design flat slab and spandrel beams			✓							
			Predict the moment curvature behavior and design and detail concrete elements based on ductility	✓				✓					
	22255E24 B	Advanced Concrete Technology	Develop knowledge on various materials needed for concrete manufacture	✓									
			Apply the rules to do mix designs for concrete by various methods	✓									
	22255E25 C	Elements of Earthquake Engineering	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems						✓		✓		
			Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration	✓									✓
			Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration free and forced vibration						✓		✓		
			Explain the causes and effects of an earthquake	✓					✓				✓
	22255L26	Core practical(Software Lab – Finite Element Analysis-ANSYS)	Formulate a finite element problem using basic mathematical principles	✓	✓		✓	✓	✓		✓		
			Analyse a frame using truss element		✓								
			Formulate and analyse the two- and three-dimensional solid finite element problems	✓				✓					
			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM				✓				✓	✓	
			Explain the various types of elements and select the appropriate element for	✓									
	222TECW R	Technical writing / Seminars	To effectively communicate by making an oral presentation						✓				
			To study research papers for understanding of anew field, in the absence of a text book, to summarize and review them.	✓		✓							

SEM 3	22255C31	Advanced Steel Structures	Design the steel members such as purlins, gable wind girders subjected to combined	✓									
			Explain and design different types of steel connections such as welded and bolted flexible as well as moment resisting connections	✓									
			Analyze and design industrial structures such as trusses and portal frames subjected to wind and seismic forces	✓									
			Explain the effect of axial force and shear force on steel structures and analyse continuous beams and frames using plastic theory	✓									
			Evaluate the behaviour and design of compression and flexural Cold-formed Steel members	✓									
	22255E32C	A seismic Design of Structures	Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration	✓	✓		✓		✓			✓	
			Explain the causes and effects of an earthquake										✓
			Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice	✓									
	22255E33 A	Prefabricated Structures	commendations of IS codes of practice	✓			✓		✓			✓	
			Detail the different types of connection				✓		✓			✓	
			Design for stripping forces during manufacture	✓	✓								✓
			Determine the forces in shear walls	✓									
			Identify the different roof trusses used in industrial buildings	✓									
	22255E34 A	Offshore Structures	Develop the concept of wave theories	✓	✓	✓	✓					✓	
			Apply the knowledge of wave forces and offshore structures		✓	✓							
			Explain the modeling for offshore structure and its foundation	✓			✓					✓	

			Analyse offshore structures by means of static and dynamic methods	✓									
			Design of jacket towers, mooring cables and pipelines	✓									
	22255P35	Project Work Phase-I	Apply the knowledge gained from theoretical and practical courses in solving	✓		✓			✓			✓	
			Recognize the importance of literature review			✓							
			Develop a clear outline and methodology for the project	✓					✓			✓	
			Identify the potential research gap and list parameters to work with										
			Report and present the findings of the work conducted										
SEM 4	22255P41	Project Work Phase-II	Discover potential research areas in the field of Structural Engineering.	✓									
			Apply the knowledge gained from theoretical and practical courses to be creative	✓									
			Represent data acquired in graphical and reader-friendly formats	✓									
			Derive detailed conclusions from work carried out	✓									
			Report and present the findings of the work conducted	✓									

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SEM 1	22248S11EP	Advanced Engineering Mathematics	Application of Laplace and Fourier transforms to the initial value, initial–boundary value and boundary value problems in Partial Differential Equations			✓							
			Maximizing and minimizing the functions that occur in various branches of Engineering Disciplines.			✓				✓			
			Competently use tensor analysis as a tool in the field of applied sciences and related fields.			✓							
	22255C12P	Quality Control &Assurance in Construction	To study the various aspects of quality control and asurance aspects of pharamaceutical	✓									✓
			Understanding of important parameters such as cgmp.qc tests,documentation,quality certifications,GLP and regulatory	✓									
			Scope of quality certifications applicable to pharamaceutical industries	✓									
			Responsible of QA & QC	✓									
	22255C13P	Theory of Plasticity and Elasticity	Derive and write the fundamental equations of elasticity describing the linear behavior of elements and develop constitutive models based on material behavior	✓			✓	✓					
			Demonstrate the application of plane stress and plane strain in a given situation in both cartesian and polar coordinate systems	✓									
			Solve torsion problems in circular and non-circular cross-sections		✓								

			Analyse beams resting on elastic foundations	✓									
			Solve analytically the simple boundary value problems with elasto-plastic and strain hardening properties			✓	✓						✓
	22255L14P	Computer Programming Lab	Read, understand and trace the execution of programs written in C language	✓			✓	✓	✓				
			Write the C code for a given algorithm										
			Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor										
SEM 2	22255C21P	Management Information System	Relate the basic concepts and technologies used in the field of management information systems			✓				✓			
			Compare the processes of developing and implementing information systems			✓							
			Outline the role of the ethical, social, and security issues of information systems			✓							✓
			Translate the role of information systems in organizations, the strategic management processes with the implications for the management										
			Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization							✓			
	22255C22P	Finite Element Analysis	Formulate a finite element problem using basic mathematical principles	✓	✓								
			Explain the various types of elements and select the appropriate element for modelling		✓								✓
			Analyse a frame using truss element	✓	✓								
			Formulate and analyse the two- and three-dimensional solid finite element problems	✓	✓								
			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM	✓	✓								

	22255E23BP	Advanced Concrete Technology	Explain the structural behaviour of flexural members and columns	✓	✓	✓	✓	✓					
			Design the compression members and construct interaction diagrams	✓									
			Design the special elements like corbels, deep beams and grid floors		✓								
			Design flat slab and spandrel beams			✓							
			Predict the moment curvature behavior and design and detail concrete elements based on ductility	✓				✓					
	22255L24P	Software Lab – ANSYS	Formulate a finite element problem using basic mathematical principles	✓									
			Analyse a frame using truss element										
			Formulate and analyse the two- and three-dimensional solid finite element problems										
			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM										
			Explain the various types of elements and select the appropriate element for	✓									
	222TECWRP	Technical Writing / Seminars	To effectively communicate by making an oral presentation						✓		✓		
			To study research papers for understanding of anew field, in the absence of a text book, to summarize and review them.	✓									✓
SEM 3	22255C31P	Structural Dynamics	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems	✓									
			Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration	✓									
			Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration	✓									
			Explain the causes and effects of an earthquake	✓									

			Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice	✓									
	22255C32P	Maintenance and Rehabilitation of Structures	To learn various distress and damages to concrete and masonry structures	✓	✓		✓		✓			✓	
			To understand the importance of maintenance of structures	✓									
			To study the various types and properties of repair materials	✓									
			To asses the damage to structures using various tests										✓
			To learn the importance and methods of substrate preparation	✓									
	22255E33AP	Prestressed Concrete Design	Identify the various methods of prestressing and estimate the loss	✓			✓		✓			✓	
			Design the beams for flexure, shear, bond and torsion				✓		✓			✓	
			Design the continuous beams and composite beams	✓	✓								✓
			Design the water tank, piles and masts	✓									
			Analyze and design the prestressed concrete bridge	✓									
SEM 4	22255C41P	Advanced Concrete Structural design	Explain the structural behaviour of flexural members and columns	✓									
			Design the compression members and construct interaction diagrams	✓									
			Design the special elements like corbels, deep beams and grid floors	✓									
			Design flat slab and spandrel beams	✓									
			Predict the moment curvature behavior and design and detail concrete elements based on ductility	✓									
	22255C42P	Advanced Steel Structures	Design the steel members such as purlins, gable wind girders subjected to combined	✓			✓		✓		✓	✓	
			Explain and design different types of steel connections such as welded and bolted flexible as well as moment resisting connections										
			Analyze and design industrial structures such as trusses and portal frames subjected to wind and seismic forces				✓		✓		✓	✓	

			Explain the effect of axial force and shear force on steel structures and analyse continuous beams and frames using plastic theory	✓									
			Evaluate the behaviour and design of compression and flexural Cold-formed Steel members						✓		✓		
	22255E43CP	Elements Of Earthquake Engineering	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems	✓	✓	✓	✓	✓					✓
			Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration	✓	✓	✓							
			Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration free and forced vibration	✓	✓								
			Explain the causes and effects of an earthquake				✓	✓					
													✓
	22255P44P	Project Work Phase I	Apply the knowledge gained from theoretical and practical courses in solving	✓	✓		✓			✓	✓	✓	✓
			Recognize the importance of literature review							✓	✓		
			Develop a clear outline and methodology for the project	✓	✓								
			Identify the potential research gap and list parameters to work with				✓					✓	✓
			Report and present the findings of the work conducted	✓	✓								
SEM 5	22255E51AP	Experimental Stress Analysis	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.	✓		✓							

			commendations of IS codes of practice	✓	✓	✓	✓	✓				✓	✓
	22255E52AP	Prefabricated Structures	Detail the different types of connection	✓		✓	✓						
			Design for stripping forces during manufacture				✓					✓	✓
			Determine the forces in shear walls	✓	✓								
			Identify the different roof trusses used in industrial buildings		✓	✓						✓	✓
	22255E53AP	Offshore Structures	Develop the concept of wave theories			✓	✓	✓	✓			✓	
			Apply the knowledge of wave forces and offshore structures					✓					
			Explain the modeling for offshore structure and its foundation	✓					✓				
			Analyse offshore structures by means of static and dynamic methods						✓			✓	
			Design of jacket towers, mooring cables and pipelines			✓	✓					✓	
SEM 6	22255P61P	Project Work Phase II	Discover potential research areas in the field of Structural Engineering.	✓	✓	✓	✓	✓					✓
			Apply the knowledge gained from theoretical and practical courses to be creative			✓	✓						
			Represent data acquired in graphical and reader-friendly formats		✓								✓
			Derive detailed conclusions from work carried out										✓
			Report and present the findings of the work conducted	✓									

PRIST
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UNIVERSITY
NAAC ACCREDITED
THANJAVUR – 613403 - TAMILNADU

DEPARTMENT OF CIVIL ENGINEERING

COURSEOBJECTIVE

B.TECH (P.T)-2022R

SEM	Course Code	Title of the Course	COs
1	22148S11P	Transforms & Partial Differential Equations	• Understand how to solve the given standard partial differential equations.
			• Solve differential equations using Fourier series analysis which plays a vital role in engineering.
			• 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.
	22155C12P	Strength of Materials	• 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.
			• Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
			• Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure.

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	22155C13P	Fluid Mechanics I	• Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions. • Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics. • Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies. • Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. • Explain the concept of boundary layer and its application to find the drag force excreted by the fluid on the flat solid surface.techniques.
	22155C14P	Plane and Geodetic Surveying	• Introduce the rudiments of various surveying and its principles. • Imparts knowledge in computation of levels of terrain and ground features Imparts concepts of Theodolite Surveying for complex surveying operations Understand the procedure for establishing horizontal and vertical control Imparts the knowledge on modern surveying instruments
	22155C15P	Irrigation Engineering	• Explain the concept of flood, drought and reservoirs • to understand and explain the hydraulic structures. • Draw the components of irrigation canal network to design the canal and to familiarize • Apply the concepts of groundwater for water resources management • explain the concepts of irrigation water management from the bottom-up approach.
II	22148S21P	Numerical Methods	• Demonstrate the understandings of common numerical methods for nonlinear equations,system of linear equations and eigenvalue problems;

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			• Understand the interpolation theory
			• Understand the concepts of numerical methods for ordinary differential equations
			• Demonstrate the understandings of common numerical methods for elliptic equations.
			• Understand the concepts of numerical methods for time dependent partial differential equations
	22155C22P	Strength of Materials II	• Understand the concepts of stress and strain, principal stresses and principal planes
			• Determine Shear force and bending moment in beams
			• Understand concept of theory of simple bending
			• Calculate the deflection of beams by different methods
			• Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements
	22155C23P	Fluid Mechanics II	• Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application
			• Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles grades
			• Gradient, divergence and curl of a vector point function and related identities.
			• Design turbines and explain the working principle
			• Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps
	22155C24P	Concrete Technology	• Understand the requirements of cement, aggregates and water for concrete

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			• Select suitable admixtures for enhancing the properties of concrete
			• Design concrete mixes as per IS method of mix design
			• Determine the properties of concrete at fresh and hardened state.
			• Know the importance of special concretes for specific requirements
	22155C25P	Soil Mechanics	• Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems
			• Show the basic understanding of flow through soil medium and its impact of engineering solution
			• Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation
			• Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear soils strength of soils.
			• Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications
III	22148S31P	Probability & Statistics	• To introduce the basic concepts of two dimensional random variables.
			• To introduce the basic concepts of two dimensional random variables.
			• To acquaint the knowledge of testing of hypothesis for small and large samples which play an important role in real life problems.
			• To introduce the basic concepts of classification of design of esperiments which plays vwery important roles in the field of agriculture and statistical quality control.
	22155C32P	Design of Reinforced Concrete Structures-I	• Understand the design of flanged beams, design for shear and torsion, and anchorage and development length
			• Design a RC slabs and staircase and draw the reinforcement detailing

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			• Design short columns for axial, uni-axial and bi-axial eccentric loadings
			• Design wall footings, isolated footings and combined rectangular footing
	22155C33P	Structural Analysis I	• Analyze the pin-jointed plane and space frames
			• Analyse the continuous beams and rigid frames by slope defection method
			• Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway
			• Analyse 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
	22155C34P	Construction Materials And Practice	• Identify the good quality brick, stone and blocks for construction
			• Public awareness of environmental is at inRecognize the market forms of timber, steel, aluminum and applications of various composite materialsfant stage.
			• Identify the best construction and service practices such as thermal insulations and air conditioning of the building
			• Select various equipments for construction works conditioning of building
			• Understand the construction planning and scheduling techniques
	22155L35P	Soil Mechanics laboratory	• Conduct tests to determine the index properties of soils
			• Determine the insitu density and compaction characteristics.
			• Conduct tests to determine the compressibility, permeability and shear strength of soils
			• Understand the various tests on Geosynthetics
IV	22155C41P	Design of Reinforced	• Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls

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		Concrete Structures-II	• 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
	22155C42P	Structural Analysis II	• Draw influence lines for statically determinate structures and calculate critical stress resultants
			• Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams
			• Analyse three hinged, two hinged and fixed arches
			• Analyse the suspension bridges with stiffening girders
			• AnalysHYDe rigid frames by approximate methods for gravity and horizontal loads
	22155C43P	Environmental Engineering	• An ability to estimate sewage generation and design sewer system including sewage pumping stations
			• The required understanding on the characteristics and composition of sewage, self-purification of streams
			• An ability to perform basic design of the unit operations and processes that are used in sewage treatment
			• Understand the standard methods for disposal of sewage.
	22155E44BP	Water Resource Engineering	• The students gain the knowledge needed on hydrologic cycle, hydrometeorology and formation of precipitation
			• The students are able to apply the various methods of field measurements and empirical formulae for estimating the various losses of precipitation, stream flow
			• The students will know the basics of groundwater and hydraulics of subsurface flows

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	22155L45P	Environmental Engineering Lab	• Quantify the pollutant concentration in water and wastewater • Suggest the type of treatment required and amount of dosage required for the treatment • Examine the conditions for the growth of micro-organisms
V	22155C51P	Design of Steel Structures	• Recognize the design philosophy of steel structures and identify the different failure modes of bolted and welded connections, and determine their design strengths • Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria • Apply the principles, procedures and current code requirements to the analysis and design of steel tension members, columns, column bases and beams • Identify and compute the design loads on Industrial structures, and gantry girder • Find out ultimate load of steel beams and portal frames using plastic analysis
	22155C52P	Foundation Engineering	• Graduate will demonstrate an ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation • Graduate will demonstrate an ability to design shallow foundations, its component or process as per the needs and specifications • Graduate will demonstrate an ability to design combined footings and raft foundations, its component or process as per the needs and specifications • Graduate will demonstrate an ability to design deep foundations, its component or process as per the needs and specifications. • Graduate will demonstrate an ability to design retaining walls, its component or process as per the needs and specifications.
	22155C53P	Waste Water Engineering	• Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission

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			• Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations
			• Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and treatment process biological treatment process
			• Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods
			• Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage
	22155E54BP	Transportation Engineering	• Understand the fundamentals of ITS and its benefits
			• Gain knowledge on data collection using sensors and its applications
			• Acquainted with the knowledge of ITS in Traffic Management
			• Application of ITS in Transportation Planning
			• Able to gain knowledge on application of ITS in Logistics
	22155L55P	Computer Aided Building Drawing Laboratory	• Draft the plan, elevation and sectional view of the load bearing and framed buildings
			• Draw the structural detailing of RCC elements
			• Draw the structural detailing of RCC water tanks, footings and retaining walls
			• Draw the structural detailing of steel structures
			• Draft the structural detailing of Industrial structures
VI	22155C61P	Estimation & Cost Evaluation	• Gain knowledge on types of contracts

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			• Understand types of specifications, principles for report preparation, tender notices types
			• Rate Analysis for all Building works, canals, and Roads and Cost Estimate
			• Estimate the quantities for buildings
			• Evaluate valuation for building and land
	22155C62P	Ground Water Hydrology	• Define and list out the key drivers of hydrological processes and their integrated behaviour in catchments
			• Apply the knowledge of hydrological processes to address basin characteristics, runoff and hydrograph
	2155C63P	Construction Project Management	• To understand the overall and detailed planning of formwork
			• To impart knowledge on formwork materials, accessories, pressures and labour requirement
			• To develop the conceptual understanding of design, construction and erection of formwork
			• To impart the knowledge about different types of form work used for special structures
			• To understand the errors in design and judge the formwork failures through case studies
	22155E64CP	Airport & Harbours	• Gain an insight on the planning and site selection of Airport Planning and design
			• Knowledge on Design of various Airport components
			• 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
			• Knowledge on various Environmental Regulations and Acts

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	22155L65P	Concrete &Transportation Engineering Laboratory	• Characterize Pavement Aggregate through relevant test
			• Ascertain the Quality of Bitumen
			• Determine the Optimum Binder Content Using Marshall Method
			• Evaluate the Consistency and Properties of Bitumen
			• Determine the Bitumen Content in the Bituminous Mixes
VII	22155S71P	Total Quality Management	• Ability to apply TQM concepts in a selected enterprise
			• Ability to apply TQM principles in a selected enterprise
			• Ability to understand Six Sigma and apply Traditional tools, New tools, Benchmarking and FMEA
			• Ability to understand Taguchi's Quality Loss Function, Performance Measures and apply QFD, TPM, COQ and BPR
			• Ability to apply QMS and EMS in any organization
	22155C72P	Housing, Planning & Management	• To get maximum benefit from building and its services in terms of quality, timely completion and cost-effectiveness
			• To compile different aspects of Building Construction, Planning and Drawing of residential buildings & Public Building
	22155C73P	Repair And Rehabilitation of Structures	• the importance of maintenance and assessment method of distressed structures.
			• The strength and durability properties ,their effects due to climate and temperature.
			• recent development in concrete
			• The techniques for repair rand protection methods
			• Repair, rehabilitation and retrofitting of structures and demolition methods.
	22155E74DP	Prestressed Concrete Structures	• Understand the behaviour of prestressed concrete members and able to analyze the prestressed concrete beams.
			• Design the prestressed concrete members for flexure and shear as per the relevant design code (IS 1343).

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			• Analyze for deflection of prestressed concrete members and design the anchorage zone.
			• Analyze and design of composite beams and continuous beams.
			• Design of prestressed concrete structures - sleepers, Tanks, pipes and poles.
	22155P75P	Project Work	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

DEPARTMENT OF CIVIL ENGINEERING
COURSE OBJECTIVES
M.TECH-2022R (F.T)

SEM	Course Code	Title of the Course	COs
1	22248S11E	Advanced Engineering Mathematics	Application of Laplace and Fourier transforms to the initial value, initial–boundary value and boundary value problems in Partial Differential Equations
			Maximizing and minimizing the functions that occur in various branches of Engineering Disciplines.
			Competently use tensor analysis as a tool in the field of applied sciences and related fields.
	22255C12	Quality Control &Assurance in Construction	To study the various aspects of quality control and asurance aspects of pharamaceutical
			Understanding of important parameters such as cgmp.qc tests,documentation,quality certifications,GLP and regulatory
			Scope of quality certifications applicable to pharamaceutical industries
			Responsible of QA & QC
	22255C13	Theory of Plasticity and Elasticity	Derive and write the fundamental equations of elasticity describing the linear behavior of elements and develop

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		constitutive models based on material behavior
		Demonstrate the application of plane stress and plane strain in a given situation in both cartesian and polar coordinate systems
		Solve torsion problems in circular and non-circular cross-sections
		Analyse beams resting on elastic foundations
		Solve analytically the simple boundary value problems with elasto-plastic and strain hardening properties
22255C14	Structural Dynamics	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems
		Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration
		Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration
		Explain the causes and effects of an earthquake
		Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice
22255C15	Experimental Techniques	Do the mix proportion using IS and ACI codal provisions
		Test the concrete in a non-destructive manner using rebound hammer
		Know the permeability characteristics of concrete
		Observe the effect of mineral and chemical admixture in concrete
		Study the flow characteristics of self-compacting concrete
22255E16A	Prestressed Concrete Design	Identify the various methods of prestressing and estimate the loss

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			Design the beams for flexure, shear, bond and torsion
			Design the continuous beams and composite beams
			Design the water tank, piles and masts
			Analyze and design the prestressed concrete bridge
	22255L17	Core Practical (Computer Programming Lab)	Read, understand and trace the execution of programs written in C language
			Write the C code for a given algorithm
			Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor
II	22255C21	Management Information System	Relate the basic concepts and technologies used in the field of management information systems
			Compare the processes of developing and implementing information systems
			Outline the role of the ethical, social, and security issues of information systems
			Translate the role of information systems in organizations, the strategic management processes with the implications for the management
			Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization
	22255C22	Finite Element Analysis	Formulate a finite element problem using basic mathematical principles
			Explain the various types of elements and select the appropriate element for modelling
			Analyse a frame using truss element
			Formulate and analyse the two- and three-dimensional solid finite element problems

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		Analyse shells, thick and thin plates and explain the dynamic analysis using FEM
22255C23	Advanced Concrete Structural Design	Explain the structural behaviour of flexural members and columns
		Design the compression members and construct interaction diagrams
		Design the special elements like corbels, deep beams and grid floors
		Design flat slab and spandrel beams
		Predict the moment curvature behavior and design and detail concrete elements based on ductility
22255E24 B	Advanced Concrete Technology	Develop knowledge on various materials needed for concrete manufacture
		Apply the rules to do mix designs for concrete by various methods
22255E25 C	Elements of Earthquake Engineering	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems
		Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration
		Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration free and forced vibration
		Explain the causes and effects of an earthquake
22255L26	Core practical(Software Lab – Finite Element Analysis- ANSYS)	Formulate a finite element problem using basic mathematical principles
		Analyse a frame using truss element
		Formulate and analyse the two- and three-dimensional solid finite element problems
		Analyse shells, thick and thin plates and explain the dynamic analysis using FEM

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			Explain the various types of elements and select the appropriate element for
	222TECWR	Technical writing / Seminars	To effectively communicate by making an oral presentation
			To study research papers for understanding of anew field, in the absence of a text book, to summarize and review them.
III	22255C31	Advanced Steel Structures	Design the steel members such as purlins, gable wind girders subjected to combined
			Explain and design different types of steel connections such as welded and bolted flexible as well as moment resisting connections
			Analyze and design industrial structures such as trusses and portal frames subjected to wind and seismic forces
			Explain the effect of axial force and shear force on steel structures and analyse continuous beams and frames using plastic theory
			Evaluate the behaviour and design of compression and flexural Cold-formed Steel members
	22255E32C	A seismic Design of Structures	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.
			Explain the causes and effects of an earthquake
			Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice
	22255E33A	Prefabricated Structures	commendations of IS codes of practice
			Detail the different types of connection
			Design for stripping forces during manufacture
			Determine the forces in shear walls
			Identify the different roof trusses used in industrial buildings

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	22255E34A	Offshore Structures	Develop the concept of wave theories
			Apply the knowledge of wave forces and offshore structures
			Explain the modeling for offshore structure and its foundation
			Analyse offshore structures by means of static and dynamic methods
			Design of jacket towers, mooring cables and pipelines
	22255P35	Project Work Phase-I	Apply the knowledge gained from theoretical and practical courses in solving
IV	22255P41	Project Work Phase-II	Discover potential research areas in the field of Structural Engineering.
			Apply the knowledge gained from theoretical and practical courses to be creative
			Represent data acquired in graphical and reader-friendly formats
			Derive detailed conclusions from work carried outconducted
			Report and present the findings of the work conducted

LOCAL NEEDS REGIONALNEEDS NATIONALNEEDS GLOBALNEEDS

DEPARTMENT OF CIVIL ENGINEERING
COURSE OBJECTIVES
M.TECH-2022R(P.T)

SEM	Course Code	Title of the Course	COs
I	22248S11EP	Advanced Engineering Mathematics	Application of Laplace and Fourier transforms to the initial value, initial–boundary value and boundary value problems in Partial Differential Equations
			Maximizing and minimizing the functions that occur in various branches of Engineering Disciplines.
			Competently use tensor analysis as a tool in the field of applied sciences and related fields.
	22255C12P	Quality Control &Assurance in Construction	To study the various aspects of quality control and asurance aspects of pharamaceutical
			Understanding of important parameters such as cgmp.qc tests,documentation,quality certifications,GLP and regulatory
			Scope of quality certifications applicable to pharamaceutical industries
			Responsible of QA & QC
	22255C13P	Theory of Plasticity and Elasticity	Derive and write the fundamental equations of elasticity describing the linear behavior of elements and develop constitutive models based on material behavior
			Demonstrate the application of plane stress and plane strain in a given situation in both cartesian and polar coordinate systems
			Solve torsion problems in circular and non-circular cross-sections

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			Analyse beams resting on elastic foundations
			Solve analytically the simple boundary value problems with elasto-plastic and strain hardening properties
	22255L14P	Computer Programming Lab	Read, understand and trace the execution of programs written in C language
			Write the C code for a given algorithm
			Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor
			Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice
II	22255C21P	Management Information System	Relate the basic concepts and technologies used in the field of management information systems
			Compare the processes of developing and implementing information systems
			Outline the role of the ethical, social, and security issues of information systems
			Translate the role of information systems in organizations, the strategic management processes with the implications for the management
			Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization
	22255C22P	Finite Element Analysis	Formulate a finite element problem using basic mathematical principles
			Explain the various types of elements and select the appropriate element for modelling
			Analyse a frame using truss element
			Formulate and analyse the two- and three-dimensional solid finite element problems

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			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM
	22255E23BP	Advanced Concrete Technology	Explain the structural behaviour of flexural members and columnss
			Design the compression members and construct interaction diagrams
			Design the special elements like corbels, deep beams and grid floors
			Design flat slab and spandrel beams
			Predict the moment curvature behavior and design and detail concrete elements based on ductility
	22255L24P	Software Lab – ANSYS	Formulate a finite element problem using basic mathematical principles
			EAnalyse a frame using truss element
			Formulate and analyse the two- and three-dimensional solid finite element problems
			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM
			Explain the various types of elements and select the appropriate element
	222TECWRP	Technical Writing / Seminars	To effectively communicate by making an oral presentation
			To study research papers for understanding of anew field, in the absence of a text book, to summarize and review them.
III	22255C31P	Structural Dynamics	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems
			Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration
			Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration
			Explain the causes and effects of an earthquake
			Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice

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			Apply the rules to do mix designs for concrete by various methods
	22255C32P	Maintenance and Rehabilitation of Structures	To learn various distress and damages to concrete and masonry structures
			To understand the importance of maintenance of structures
			To study the various types and properties of repair materials
			To asses the damage to structures using various tests
			To learn the importance and methods of substrate preparation
	22255E33AP	Prestressed Concrete Design	Explain the structural behaviour of flexural members and columns
			Design the compression members and construct interaction diagrams
			Design the special elements like corbels, deep beams and grid floors
			Design flat slab and spandrel beams
			Predict the moment curvature behavior and design and detail concrete elements based on ductility
IV	22255C42P	Advanced Steel Structures	Design the steel members such as purlins, gable wind girders subjected to combined
			Explain and design different types of steel connections such as welded and bolted flexible as well as moment resisting connections
			Analyze and design industrial structures such as trusses and portal frames subjected to wind and seismic forces
			Explain the effect of axial force and shear force on steel structures and analyse continuous beams and frames using plastic theory
			Evaluate the behaviour and design of compression and flexural Cold-formed Steel members

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	22255E43CP	Elements Of Earthquake Engineering	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems
			Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration
			Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration free and forced vibration
			Explain the causes and effects of an earthquake
	22255P44P	Project Work Phase I	Apply the knowledge gained from theoretical and practical courses in solving
			Recognize the importance of literature review
			Develop a clear outline and methodology for the project
			Identify the potential research gap and list parameters to work
			Report and present the findings of the work conducted
V	22255E51AP	Experimental Stress Analysis	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.
	22255E52AP	Prefabricated Structures	commendations of IS codes of practice
			Detail the different types of connection
			Design for stripping forces during manufacture
			Determine the forces in shear walls
			Identify the different roof trusses used in industrial

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			buildings
	22255E53AP	Offshore Structures	Develop the concept of wave theories
			Apply the knowledge of wave forces and offshore structures
			Explain the modeling for offshore structure and its foundation
			Analyse offshore structures by means of static and dynamic methods
			Design of jacket towers, mooring cables and pipelines
VI	22255P61P	Project Work Phase-II	Discover potential research areas in the field of Structural Engineering.
			Apply the knowledge gained from theoretical and practical courses to be creative
			Represent data acquired in graphical and reader-friendly formats
			Derive detailed conclusions from work carried outconducted
			Report and present the findings of the work conducted

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