



**PERIYAR
MANIAMMAI**
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University)
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think • innovate • transform

Criterion 1 – Curricular Aspects

Key Indicator	1.1	Curriculum Design and Development
Metric	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

ADDITIONAL DOCUMENTS

1. Programme Outcomes and Course Outcomes of all programmes
2. Implementation of curricula with Relevance to the local, national, regional and global developmental needs.
3. Flow chart of curriculum design process for a programme

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**Program Outcomes and Course Outcomes of
DEPARTMENT OF ARCHITECTURE**

Programmes offered:

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

1. B.ARCH

PROGRAM OUTCOMES	
PO 1	Ability to effectively use basic architectural theories and principles in design process.
PO 2	Ability to understand and frame the design requirements considering the diverse points of view to reach well-reasoned conclusions based on the relevant criteria and standard.
PO 3	Ability to diagnostic survey record and analyze, interpret, apply, and develop a proposal at the individual building and urban level.
PO 4	Ability to prepare technically clear drawings, writes outline estimation and specifications, and prepares models illustrating and clarifying the assembly of materials, systems, and components appropriate for a building design.
PO 5	Ability to use traditional and digital media representational skills to analyze and convey essential design idea at each stage of the design process.
PO 6	Understanding of the architect's responsibility to work in the public interest, to respect historic resources, and to improve the quality of life for local and global neighbours.
PO 7	Work collaboratively with teams of architects and various interdisciplinary design teams involved in the building industry, incorporating the financial implications, negotiating contracts, selecting service consultants.
PO 8	Ability to design a sustainable built environment to provide healthful environments and reduce the environmental impacts.
PO 9	Sensitive enough to strictly adhere to the code of conduct prescribed by the competent authority to practice the profession in the country with respect to building codes and regulations, safety aspects and upheld the value of the profession at its highest.
PO 10	Ability to upgrade required skills in the domain of construction technology, design process methods using software's to meet the changing scenario.
PROGRAM SPECIFIC OUTCOME	
PSO1	Understand the concept of energy in buildings and the impact of energy crisis in building industry and ability to design energy efficient buildings.
PSO2	Understand the planning aspects from the macro to micro level and ability to develop a planning, urban design proposal.

GRADUATE ATTRIBUTES

1. Knowledge base on architecture: Possess knowledge on fundamental architectural theories and sciences.
2. Design analysis and solution: Identify, formulate, analyze and provide architectural design solution.
3. Investigation skills: Conduct investigation of complex issues, skills to conduct investigation, interpret the observed the data to provide appropriate solution.
4. Architectural communication Skills: Convey design ideas through drawings and reports by manual and digital tools.
5. Modern tool usage: Skills to operate and work with the data manipulation, analytical tools.
6. Architect and society: Sensitive towards the culture, heritage and betterment of the society while planning and executing the project.
7. Project & Finance Management: Manage the diverse range of projects considering the available resources, technology and time frame.
8. Environment and sustainability: Possess knowledge on sustainable development principles and sensitive enough to safeguard the environment.
9. Professional Practice & Ethics: Upheld ethical values, standards while working as individual and group in the professional practice.
10. Lifelong learning: Update the required technical skills to upgrade the competency level in the fast pacing challenging environment.

Course outcomes (Cos)

S. NO	SEMESTER	COURSE CODE & NAME	COURSE OUTCOMES (COS)
1	I	XAR101 – HISTORY OF ARCHITECTURE – I	<ol style="list-style-type: none"> 1. Understand the origin of various civilization and Architecture in India at different points of time. 2. Understanding the architectural responses with respect to materials, technology, style and character in the Buddhist, Hindu and Dravidian Architecture 3. Gain Knowledge on the history related to design thinking, cultural aspiration, social needs, and the evolution of the built environment.
		XAR102 – THEORY OF ARCHITECTURE – I	<ol style="list-style-type: none"> 1. To know the need for architecture and the services of architecture. 2. Understand form, space, their relationship and evolution of new form. 3. Understand elements and fundamentals of defining space. 4. Understand the principles of architecture
		XAR 103 – ARCHITECTURAL MATHEMATICS	<ol style="list-style-type: none"> 1. Find area and volumes of simple, complex and irregular geometries using various rules. 2. Apply Trigonometry on architectural elements 3. Demonstrate the appropriate role of the mathematical concepts learnt. 4. Analyze Tally charts, Tables and graphs and statistical diagrams using for various types of data. 5. Explain about various architectural proportioning systems and calculating the same
		XAR 104 - ARCHITECTURAL GRAPHICS – I	<ol style="list-style-type: none"> 1. Understand the concepts of architectural drawings 2. Ability to represent complex geometrical forms in two and three dimensional drawings of varied scales. 3. Draw Orthographic projections, Axonometric and Isometric views of three-dimensional objects in varied scales.
		XAR105 - COMMUNICATION SKILLS	<ol style="list-style-type: none"> 1. Knowledge on the techniques and strategies of communication. 2. Enhance their reading skills specifically journals, books. 3. Develop the speaking skills specifically conversing with peers, presenting their works. 4. Learn to apply different strategies in writing a paper or proposal
		XAR106 – VISUAL ARTS	<ol style="list-style-type: none"> 1. Express the knowledge on appreciation of paintings and other art forms.

			<ol style="list-style-type: none"> 2. Draw the basic geometrical shapes, components of scenes. 3. Demonstrate the knowledge on components of visual composition. 4. Develop and compose the natural scenes. 5. Design and develop scaled sketches
		XAR107 - BASIC DESIGN	<ol style="list-style-type: none"> 1. Understand the basic design elements and principles 2. Identify common design principles applicable to architecture 3. Develop the skills of art appreciation and sense of aesthetics by studying, correlating the basic design principles and works of master architects. 4. Involve in practical exercises to apply the learnt design principles. 5. Develop the skills of expressing the ideas visually through observation, analysis, abstractions, interpretation through models and drawings using different media.
II	II	XAR201 – HISTORY OF ARCHITECTURE – II	<ol style="list-style-type: none"> 1. Understand the evolution of Mughal Architecture in India at different points of time. 2. Understanding the architectural responses with respect to materials, technology, style and character. 3. Gain Knowledge on the history related to design thinking, cultural aspiration, social needs, and the evolution of the built environment
		XAR202 – THEORY OF ARCHITECTURE – II	<ol style="list-style-type: none"> 1. Understand the factors that determine the size and shape of architectural spaces. 2. Understand the role played by climate and site conditions in modifying the form of the architectural spaces. 3. Understand the role played by the materials and structural system in architectural design. 4. Understand the role played by socio psychological aspects in architectural design
		XAR 203 -MECHANICS OF STRUCTURES - I	<ol style="list-style-type: none"> 1. Apply the concepts of action of forces on a body and equilibrium concepts. 2. Analyze any type of determinate trusses with different end conditions. 3. Solve the sectional properties for any geometrical shapes. 4. Understand the concepts of stress, strain and elastic consonants
		XAR 204 – ARCHITECTURAL GRAPHICS – II	<ol style="list-style-type: none"> 1. Measure and prepare scaled measured drawings of various objects and existing buildings/ structures. 2. Prepare One-point & Two-point perspective

			<p>views of objects, interior and exterior of buildings from given plans and elevations.</p> <ol style="list-style-type: none"> 3. Draw the shade and shadows of basic geometric shapes, forms and buildings. 4. To apply graphic principles in preparing construction drawings for complicated buildings.
		XAR205 - MATERIALS AND CONSTRUCTION - I	<ol style="list-style-type: none"> 1. Understand the basics of structures, their type and draw the section of wall showing the various building components and list their functions. 2. Know the origin, properties, process of manufacturing, treatment, preservation methods and types of various building materials like soil, stone and lime and understand their importance and uses in building construction. 3. Draw the various types of foundation, wall, roof trusses, flooring and plastering for rural and modern structures using various materials like brick, stone.
		XAR206 – MODEL MAKING & VISUAL ARTS – II	<ol style="list-style-type: none"> 1. Express the knowledge on appreciation of paintings and other art forms. 2. Draw the basic geometrical shapes, components of scenes. 3. Demonstrate the knowledge on components of visual composition. 4. Develop and compose the natural scenes. 5. Design and develop scaled sketches
		XAR207 – ARCHITECTURAL DESIGN – I	<ol style="list-style-type: none"> 1. Demonstrate the knowledge on arriving spatial requirements for various human activities 2. Demonstrate the knowledge on anthropometry and ergonomics in architectural design. 3. Interpret the case study examples to develop knowledge on architectural design. 4. Design of single spaces with the understanding of structural, utility, aesthetics and material considerations. 5. Develop a neat presentation drawings, scale models using various medium
III	III	XAR301 – HISTORY OF ARCHITECTURE – III	<ol style="list-style-type: none"> 1. Understand the construction techniques used by Egyptian, Babylonian, Mesopotamian, Greek, Rome and Byzantine builders. 2. Know the importance of the history, relate to design thinking, cultural aspiration, social needs, and the evolution of the built environment 3. Interpret the characteristics of designing of temples and tombs by Egyptian, Babylonian, and Mesopotamian, Greek, Rome and Byzantine builders.

		XAR302 –SITE SURVEYING AND PLANNING	<ol style="list-style-type: none"> 1. Understand the contextual importance of site analysis based on the various site factor with respect to the study area 2. Understand the various scientific and analytic site analysis techniques 3. Able to read site drawings for Landscape Architecture, master plan and Urban design.
		XAR 303- MECHANICS OF STRCUTURES - II	<ol style="list-style-type: none"> 1. Identify various types of loading and support conditions that act on structural systems and Understand the basic principles used in the analysis of structural members. 2. Apply the concepts for finding the shear forces and moments for various structural members. 3. Apply the concepts for finding the shear forces and moments for various structural members. 4. Analyze the long and short columns and determine the design loads. 5. Analyze indeterminate beams like continuous beams and fixed beams 6. Analyze and solve the problems in practical installations of the structural members
		XAR304 – BUILDING SERVICES – I	<ol style="list-style-type: none"> 1. Outline the sources, treatment of water, water supply and drainage systems 2. Assess the water supply requirements, storage and sewage generated. 3. Select the pumps, water supply and drainage pipes. 4. Design the water supply and drainage layout of residential buildings. 5. Illustrate the solid waste management concepts and systems.
		XAR305 – MATERIALS AND CONSTRUCTION – II	<ol style="list-style-type: none"> 1. Produce 2D technical drawings of building components and structural elements for varying conditions using bricks and clay products. 2. Select the timber and suggest suitable treatment process/preservation of timber. 3. Produce drawings showing the details of timber applications in construction. 4. Understand the cost effective technologies and produce develop building components and drawings of the same.
		XAR 306 – COMPUTER APPLICATIONS IN ARCHITECTURE - I	<ol style="list-style-type: none"> 1. Toapply software's in the field of Architecture to represent design ideas. 2. Produce 2D technical drawings using AutoCAD 3. Develop the 3D model of buildings & objects using AutoCAD and Sketch Up 4. Recreate realistic image of objects and buildings by using presentation software.

IV	IV		5. Sheet set organization and plot/print drawing to the scale.
		XAR 307 – ARCHITECTURAL DESIGN - II	<ol style="list-style-type: none"> 1. Understand the characteristics of site and the importance of site planning which includes built form and open space. 2. Determinespatial arrangements, circulation of buildings and the response of user group through case studies. 3. Learn the process of design 4. Able to Design of spaces with functional, aesthetics and material considerations by applying the knowledge gained in case studies. 5. Enable to present the concepts as drawings using various media and making scale models
		XAR - 401 - HISTORY OF ARCHITECTURE - IV	<ol style="list-style-type: none"> 1. Analyze the continuity between each style – the factors that connect each style 2. Explain the architectural characters of Medieval Europe through selected examples. 3. Analyze the trend or the pattern of development of architectural styles. 4. Understand the contemporary architectural style and its development leading to new styles.
		XAR 402 - CLIMATE AND ARCHITECTURE	<ol style="list-style-type: none"> 1. Understand climatic types and design approaches 2. Analyzethe movement of sun and wind and design various types of shading devices 3. Understand thermal performance of various building materials 4. Able to design of climatic conscious buildings
		XAR403 – DESIGN OF STRUCTURES - I	<ol style="list-style-type: none"> 1. Understand and Apply relevant IS Code provisions to ensure safety and serviceability of structural elements 2. Identify and compute the main mechanical properties of concrete and steel and structural behavior of RCC members 3. Design different types of foundations for axially short and long columns 4. Design reinforced concrete slabs and beams by WSM and LSM for flexure
		XAR404 – DESIGN OF SERVICES - I	<ol style="list-style-type: none"> 1. Explain on the basics of electrical, lighting and the components 2. Illustrate the fundamentals of lighting and prepare lighting design 3. Outline energy efficient lighting design solutions 4. Understand the basic principles of Acoustics 5. Analyze the acoustical criteria of various spaces and Solve simple Acoustical problems
		XAR405 – MATERIALS	<ol style="list-style-type: none"> 1. Identify the appropriate Ferrous and Non-

		AND CONSTRUCTION – III	<p>Ferrous materials in construction.</p> <ol style="list-style-type: none"> Identify appropriate construction techniques using Ferrous and Non-Ferrous materials in construction Ability to design and detail drawings of structural and non structural building components using Ferrous and Non Ferrous and Glass Ability to use metals and glass innovatively in buildings.
		XAR406 – OPEN ELECTIVE	
		XAR407 – ARCHITECTURAL DESIGN – III	<ol style="list-style-type: none"> Understand the space and furniture's required for various human activities and their influences in arriving with the circulation patterns Design of medium scale public buildings with structural, utility, aesthetics and material considerations by applying the knowledge gained in case studies. Ability to Study & Analyze the existing rural settlements and identify the need and demand and give solutions. Ability to represent design ideologies as 2 and 3 dimensional drawings, views and models in appropriate scale.
V	V	XAR - 501 - CONTEMPORARY ARCHITECTURE	<ol style="list-style-type: none"> Differentiate the chronological development of architectural style in relation with the material development and cultural change. Interpret the spatial configuration and three dimensional articulation of master architects works. Examine the contextual design solution, Spatial organization and spatial qualities of different typologies of buildings. Develop the knowledge towards logical design development.
		XAR - 502– ENVIRONMENTAL SCIENCES	<ol style="list-style-type: none"> Understand the environment and its interrelationship with the living organisms. Understand the importance of human activity, built environment and its impact on environment Know about the scientific, technical, economic and political solutions to environment
		XAR - 503– DESIGN OF STRUCTURES - II	<ol style="list-style-type: none"> Understand the principles, methods and materials for Pre stressed members Understand the design concepts of Shells and folded plates Analyze the behavior of steel and R.C.C structural members

			4. Ability to design the steel and R.C.C structural members
		XAR504 – BUILDING SERVICES - III	<ol style="list-style-type: none"> 1. Illustrate the basics of Refrigeration, components and installations and prepare electrical layout. 2. Compare the various systems of HVAC and their applications. 3. Classify the various vertical circulation components and design them. 4. Understand the fire safety requirements of buildings 5. Identify fire detection and fire fighting systems for buildings and prepare fire escape plans.
		XAR 505 – MATERIALS AND CONSTRUCTION - IV	<ol style="list-style-type: none"> 1. Explain the composition, properties, and tests for cement 2. Summarize the ingredients, properties ,quality control of concrete and its construction process 3. Ability to provide specific details of components in concrete wherever its application is possible in buildings 4. Create detailed drawings of footing, lintels, beams and slabs 5. Ability to use concrete at different applications
		XAR 506 – COMPUTER APPLICATIONS IN ARCHTECTURE - II	<ol style="list-style-type: none"> 1. Ability to use 3d modeling in representing the ideas of design 2. Ability to produce 3d animated videos/walkthroughs of buildings 3. Recreate realistic image of objects and buildings by using presentation software.
V I	VI	XAR 507 – ARCHTECTURAL DESIGN– IV	<ol style="list-style-type: none"> 1. Understand the impact of social-cultural & economy in the built environment. 2. Analyze the impact of spatial configuration at building level and at site level on passive design. 3. Analyze and interpret different case buildings. 4. Develop working drawings and model
		XAR 601-VERNACULAR ARCHITECTURE	<ol style="list-style-type: none"> 1. Understand various approaches and concepts of vernacular architecture 2. Understand the impact of colonial rule on vernacular architecture in India 3. Exposure to various vernacular architectural forms in various regions
		XAR 603– ESTIMATION, COSTING AND VALUATION	<ol style="list-style-type: none"> 1. Understand the unit measurement of materials. 2. Understand the techniques of estimating and costing related to building construction. 3. Apply and understand the various methods of quantity surveying, rate analysis of building and valuation for different materials used.

			<p>Calculate material cost of given component/product.</p> <p>4. Know about Specification for basic building material and apply the same for another example</p> <p>5. Understand and apply the concepts of project planning and basics of financial management</p>
		XAR 605– MATERIALS AND CONSTRUCTION - V	<p>1. Understand the activities carried out by research organizations.</p> <p>2. Understand the various methods and types of deep foundation.</p> <p>3. Exposed to the vertical movement equipment in buildings.</p> <p>4. Understand the types and working principle of Escalator and Elevator.</p> <p>5. Gain Knowledge of the various advanced building structure.</p>
		XAR 606– ARCHITECTURAL WORKING DRAWING AND SPECIFICATIONS	<p>1. Demonstrate an understanding of construction drawings of allied disciplines.</p> <p>2. Demonstrate an understanding of the relation of working drawing with specifications and Bill of quantities.</p> <p>3. Apply the standard conventions in a working drawing.</p> <p>4. Develop a set of Working drawing for a project.</p>
		XAR 607– ARCHITECTURAL DESIGN - V	<p>1. Understand issues in buildings with respect to density, services and energy consumption as well as make the right choices in design situations involving these issues.</p> <p>2. Understand Green Building concepts and basic principles of sustainable built environment.</p> <p>3. Integrating the services in the design</p> <p>4. Produce computer aided presentation drawings and making scale models</p>
VII	VII	XAR 701–HUMAN SETTLEMENT AND PLANNING	<p>1. Understand the origin, evolution and growth of settlements.</p> <p>2. Learn about planning theories by prominent planners.</p> <p>3. Understand about the dynamics of Urban Form and various Human Settlements pattern</p> <p>4. Understand Planning process and techniques adopted at various levels.</p> <p>5. Study the planning concepts in planned cities.</p>
		XAR 702–PROFESSIONAL PRACTICE AND ETHICS	<p>1. Knowledge of the Role of professional and statutory bodies</p> <p>2. Understanding of the Architects services, scale of fee, and competition in Architects Act 1972</p> <p>3. Understanding of code of conduct</p> <p>4. Understanding on role of Architects in project execution</p>

		XAR 704–LANDSCAPE DESIGN	<ol style="list-style-type: none"> 1. Demonstrate the knowledge on Landscape and scope of landscape architecture. 2. Understand the landscape elements 3. Develop a landscape proposal for small and medium scale projects. 4. Develop a detailed drawing and use digital tools to present landscape proposal 5. Take part. In a team with the Landscape professionals in a project
		XAR705MATERIALS AND CONSTRUCTION - VI	<ol style="list-style-type: none"> 1. Identify the various water proofing materials, thermal insulation and their application 2. Explain the properties and types of acoustic insulation 3. Select the floor, wall covering and decorative coats based on their applications
		XAR 706–ARCHITECTURAL DESIGN -VI	<ol style="list-style-type: none"> 1. Understand the concept of energy efficient design & green building technologies. 2. Understand the impact of spatial configuration at building level and at site level on energy consumption 3. Analyze and interpret different case buildings. 4. Design and development energy efficient buildings. 5. Develop working drawings and model displaying energy efficient and green building technologies.
VIII	VIII	XAR 801 - PRACTICAL TRAINING	<ol style="list-style-type: none"> 1. Demonstrate an understanding of the design philosophy, or vision of the architectural office and its implementation in the project/s 2. Interpret the architectural design process evolves when structural and service issues are integrated to create the final product. 3. Demonstrate the Knowledge on how the Drawings are used at site and an insight into the relationship between the site and drawing. 4. Develop a office and run the office successfully
		XAR901– URBAN DESIGN	<ol style="list-style-type: none"> 1. Demonstrate the knowledge of Urban design as a discipline, and its role in understanding and interpreting a city 2. Illustrate the role of imageability in urban areas. 3. Analyze the Contemporary Issues related to Urban Area 4. Prepare the sketches and design based on the above study 5. Ability to study about contemporary issues and design the buildings
		XAR 902–PROJECT MANAGEMENT	<ol style="list-style-type: none"> 1. Demonstrate the knowledge of traditional and contemporary project management techniques 2. Demonstrate the understanding of the

			<p>management system for accomplishing the task efficiently in terms of time and cost.</p> <ol style="list-style-type: none"> 3. Apply the techniques of project management in solving the constructional problems efficiently 4. Work with interdisciplinary design team in accordance with the project management schedule 5. Use the related software for project management
		XAR 903–HOUSING	<ol style="list-style-type: none"> 1. Knowledge of various issues concerning housing & housing development in Indian & global context covering a cross section of income groups. 2. Ability to appreciate socio-economic aspects in housing 3. Understanding of housing standards, site planning principles, housing concepts and types. 4. Understanding of key issues in housing today.
		XAR 905–DISSERTATION	<ol style="list-style-type: none"> 1. Undertake the research systematically in a chosen topic. 2. Illustrate the various methods available for the collection of information. 3. Analyses and interpret the information obtained from the study. 4. Organize the collected information graphically 5. Develop a report of the analyzed information with the logical reasoning and conclusion.
		XAR906 – ARCHITECTURAL DESIGN – VII	<ol style="list-style-type: none"> 1. Undertake a study to identify existing issues related urban design in built environment. 2. Identify various factors that are responsible urban conditions. 3. Gather, correlate and interpret the data that are required for design proposal at historic cities. 4. Develop an urban renewal proposal for a city. 5. Develop a design proposal for the urban issues relating to the built environment
X	X	XAR 1001 –THESIS	<ol style="list-style-type: none"> 1. Formulate design project independently by identifying the issues at individual building level and urban level. 2. Determine the requirements and other relevant information for chosen projects. 3. Plan Undertake a study, analyze and identify the issues in chosen area of interest 4. Demonstrate design skills and expertise through imaginative approach in designing built environment 5. Effectively communicate design ideas through set of detail technical drawings, models and oral presentations
ELECTIVES			

PROFESSIONAL ELECTIVES-I			
XI		XAR602 – CULTURE AND ARCHITECTURE	<ol style="list-style-type: none"> 1. Understand the significance of Anthropology in Architecture. 2. Assess the role of different components of culture in deciding and shaping the architecture of a particular region. 3. Analyze the stages of evolution of built forms in different regions as a continuous process 4. Outline the factors that influence architecture of a particular region during different periods till today. 5. Identify the impact of Culture on Architecture as a whole.
		XAR 602B –DIGITAL PROCESSES IN ARCHITECTURE	<ol style="list-style-type: none"> 1. Understand the digital design process and theories and their relation to computation. 2. Understand the specific aspects of contemporary processes appropriate to a design situation.
		XAR 602C– ARCHITECTURE AND STRUCTURE	<ol style="list-style-type: none"> 1. Understand and get acquainted with the concepts of structural design and its influence on the functional and aesthetic domains of architectural design relating to historic and contemporary periods 2. Familiar with the architectural expression, its relation between form and structure through relevant case studies.
		XAR602D –Architecture of South East Asia	<ol style="list-style-type: none"> 1. Understand the evolution of South East Asian countries 2. Understand the architecture style, technology, Character of china and japan 3. Understand the architecture style, technology, Character of Indonesia & Malaysia. 4. Understand the architecture style, technology, Character of Thailand and Cambodia 5. Understand the architecture style, technology, Character of Burma & Sri Lanka
		XAR 604A –GLASS IN ARCHITECTURE	<ol style="list-style-type: none"> 1. Understand glass and its potential application in contemporary Architecture 2. Outline the appropriate usage of glass. 3. Assess the role of glass in green architecture 4. Understanding of tools and software currently in practice with respect to the use of glass in buildings. 5. Summarize the various technological advancements, current trends in Glass
		XAR604C – ADVANCED BUILDING	<ol style="list-style-type: none"> 1. Expose to the latest construction materials and global trends in construction methods 2. Identify a suitable construction methods

		TECHNOLOGY	<ol style="list-style-type: none"> 3. Identify the suitable construction techniques to be employed for a given situation 4. Understand various aspects involved in demolition of buildings and safety aspects.
		XAR 604D –BUILDING AUTOMATION AND MANAGEMENT	<ol style="list-style-type: none"> 1. Learn the basics of building management systems, scope of BMS and its importance. 2. Understand the basics of BIM and Controllers. 3. Understand all the aspects of BMS and its application in buildings. 4. Identify the components of BMS and its application in buildings with respect to energy conservation and safety 5. Enable the students explore the various technological advancements, current trends in BMS
		XAR 903A–DISASTER RESISTANCE ARCHITECTURE	<ol style="list-style-type: none"> 1. Identify the natural and manmade disaster. 2. Understand and apply the disaster resistant design 3. Understand and apply the Earthquake resistant design 4. Understand the formation and causes of Earthquakes and factors to be considered in the Design of buildings and services to resist Earthquakes 5. Apply the knowledge gained in an architectural design assignment
		XAR 903 C – BEHAVIORAL STUDIES IN BUILT ENVIRONMENT	<ol style="list-style-type: none"> 1. Identify concepts and concerns of perception. 2. Identify and develop the sensitivity to the needs of users and clients 3. Understanding the designing and planning for urban quality 4. Identify and apply the micro and macro built environment and behavioral aspects 5. Analyze the relationship between built - environment and perception
		XAR 903 D – STEEL INARCHITECTURE	<ol style="list-style-type: none"> 1. Understand the history of development of steel in Architecture. 2. Understand the potential usage of steel in contemporary Architecture. 3. Knowledge on technical details of AEES 4. Knowledge on technical details of steel in curtain walls and advanced framing systems 5. Outline the fabrication and erection of steel members
		XAR 904A – ARCHITECTURAL CONSERVATION	<ol style="list-style-type: none"> 1. Understand the various issues and practices of Conservation 2. Expose the status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies

			<ol style="list-style-type: none"> 3. Understand the various acts, rules and guidelines for the preservation, conservation and restoration of buildings 4. Understand the importance of heritage, issues and practices of conservation through case studies. 5. Understanding on historic materials and their properties various technologies for investigating masonry, foundation and also traditional and modern repair methods.
		XAR 904B – ADVANCED STRUCTURES	<ol style="list-style-type: none"> 1. Understand the various aspects of advanced structural systems 2. Demonstrate the knowledge on material properties and the impact on construction. 3. Work with various building codes, regulations related new materials construction 4. Select the suitable construction methods to achieve innovative structures. 5. Analyze the given condition and arrive a appropriate sustainable construction solution
		XAR 904C – ENERGY EFFICIENT ARCHITECTURE	<ol style="list-style-type: none"> 1. Know about the need to use alternative sources of energy in view of the depleting resources and climate change. 2. Exposed to simple and passive design considerations 3. Exposed to alternative sources of energy and are exposed to passive design 4. Understand the day lighting and natural ventilation in design in addition to the future 5. Exposed recent trends in creating sustainable built environment
		XAR904D MATERIAL AND TECHNOLOGY FOR SUSTAINABLE ARCHITECTURE	<ol style="list-style-type: none"> 1. Understand the various aspects of sustainability 2. Demonstrate the knowledge on material properties and the impact on construction. 3. Work with various building codes, regulations related to sustainable construction 4. Select the suitable construction methods to achieve sustainable design. 5. Analyze the given condition and arrive a appropriate sustainable construction solution.

PROGRAMME : M . Arch Full Time

S. NO	SEMESTER	COURSE CODE & NAME	COURSE OUTCOMES (COS)
	I	YAR101 EMERGING PRACTICES IN HOUSING	<ol style="list-style-type: none"> 1. Understand the problems in housing from industrial era and solution found to resolve the problems by the contemporary architects 2. Understand the latest development, issues and design strategies governing the Housing in National and international level 3. Analyze the current housing problems and create housing standards 4. Getting knowledge about housing demands and future of mass housing. 5. Understand the design standards considering the diverse points of view and Apply it in design based on the relevant criteria
		YAR 102 APPROPRIATE TECHNOLOGY AND SUSTAINABLE CONSTRUCTION	<ol style="list-style-type: none"> 1. Understand the various aspects of sustainability 2. Demonstrate the knowledge on design principles 3. related to sustainable construction 4. Learn sustainable construction practices 5. Select the suitable construction materials and methods to achieve sustainable design. 6. Analyze the given condition and arrive an appropriate sustainable construction solution with a case study report.
		YAR103 ADVANCED STUDIES IN REGIONAL AND VERNACULAR ARCHITECTURE	<ol style="list-style-type: none"> 1. Exposed to an overview of the various approaches and concepts to the study of vernacular architecture. 2. Understand the study of Indian vernacular architecture as a process and also to provide an overview of various approaches and concepts 3. Aware of Indian vernacular architecture as a process and not a product 4. Analyze a settlement and understand its vernacular approach 5. Discuss the suitability of vernacular concepts in present concept
		YAR104 – SERVICES IN HIGH RISE BUILDINGS	<ol style="list-style-type: none"> 1. Outline the issues in high rise buildings and introduction to Automation. 2. Illustrate the concepts of water supply and waste distribution in high rise buildings 3. Summarize the various HVAC, Electrical and mechanical systems in high rise buildings. 4. Categorize the types of vertical transportation systems and its application in high rise buildings

			5. Summarize the various safety systems in high rise buildings
		YAR 105 – ARCHITECTURAL DESIGN STUDIO – I (Housing)	<ol style="list-style-type: none"> 1. Understand the impact of globalization, real estate development, legal issues involved, policy and infrastructure development 2. Critical Analysis of housing standards 3. Integrating of standards of various housing typologies 4. Produce designs to resolve the housing problems 5. Design sustainable urban built environment to provide healthful environments and reduce the environmental impacts.
XIII	II	YAR 201 – CONTEMPORARY THEORIES AND TRENDS	<ol style="list-style-type: none"> 1. Understand the Architectural theories and principles in new trend in Architecture 2. Understand the Structural expressionism in High Tech Architecture. 3. Understand the Alternate practices in new Trends 4. Understand the post modernism in Regional context 5. Understand the impact of sustainability at global level
		YAR202– RESEARCH METHODOLOGY	<ol style="list-style-type: none"> 1. Understand the concepts & Issues in Research through samples 2. Understand the research process through Data collection, analysis and frame of questioner. 3. Understand the data collection from secondary data using Digital and Manual documentation 4. Demonstrate the research writing from the samples 5. Demonstrate the case study paper writing and presentation
		YAR204 – DIGITAL DESIGN PROCESS IN ARCHITECTURE	<ol style="list-style-type: none"> 1. Understand the various concepts and theories of digital architecture 2. Understand ideas of contemporary digital architects and their design process 3. Able to apply the theories and Design using digital media 4. Gain knowledge on digital design software and scripting methodologies
		YAR205 – BUILDING MANAGEMENT SYSTEM	<ol style="list-style-type: none"> 1. Illustrate the basics of building management systems, scope and its importance. 2. Outline the basics of Digital Controllers. 3. Categorize all the aspects of BMS and its role in advanced building services. 4. Outline the security aspects of BMS and its application in buildings

			5. Summarize the various technological advancements, Intelligent managements at urban level.
		YAR 206 – ARCHITECTURAL DESIGN STUDIO – II	<ol style="list-style-type: none"> 1. Understand the optimal designing, balancing the basics of architectural design with emerging new technical and planning parameters. 2. Critical Analysis of relevant standards and create buildings as positive additions to the city 3. Understand the emerging technical areas and Application of building management system 4. Design sustainable urban built environment to provide healthful environments and reduce the environmental impacts.
XIV	III	YAR 301 – SUSTAINABLE URBAN LANDSCAPE	<ol style="list-style-type: none"> 1. Understand the ecosystem and its role in landscape. 2. Understand and Analyze the characteristics of plants and its application in design. 3. Analyze the culture and history of landscape and their interpretation. 4. Understand and Analyze the impact of urbanization in landscape
		YAR302 HERITAGE CONSERVATION PLANNING	<ol style="list-style-type: none"> 1. Understand the need and benefits of urban conservation. 2. Sensitize as well as informed to carry forth this understanding in the realm of practice/ research. 3. Understand the conservation issues and practices of urban conservation at various levels and scales 4. Understanding of the architect's responsibility to work conserve heritage aspects and to improve the quality of life for urban built environment.
		YAR303 – URBAN DESIGN PRACTICES	<ol style="list-style-type: none"> 1. To understand the theories and elements of Urban Design 2. To understand the application of methodologies adopted in urban design. 3. Gaining knowledge of application in urban renewal and development through case studies.
		YAR 305–DISSERTATION	<ol style="list-style-type: none"> 1. Undertake the research systematically in a chosen topic. 2. Analyses and interpret the information obtained from the study. 3. Organize the collected information graphically 4. understanding leading to formation of thesis ideas 5. Develop a report of the analyzed

			information with the logical reasoning and conclusion.
		YAR 306 – ARCHITECTURAL DESIGN STUDIO – III	<ol style="list-style-type: none"> 1. Understand the optimal designing, balancing the basics of architectural design with emerging new technical and planning parameters. 2. Critical Analysis of relevant standards and create buildings as positive additions to the city 3. Understand the legislation and regulations and apply the same for the inner city development, historic precinct development with the conservation and landscaping details 4. Design sustainable urban built environment to provide healthful environments and reduce the environmental impacts.
XV	VI	XAR401 – THESIS	<ol style="list-style-type: none"> 1. Formulate design project independently by identifying the issues at individual building level and urban level. 2. Determine the requirements and other relevant information for chosen projects. 3. Plan Undertake a study, analyze and identify the issues in chosen area of interest 4. Integrate various contemporary/ advanced issues and techniques into the architectural design process. 5. Identify and go in depth into specific and appropriate aspects relating to the discipline of architecture and reflect this in the realm of design.
ELECTIVES			
XVI		YAR 203-A ADVANCED MATERIALS AND CONSTRUCTION TECHNOLOGY	<ol style="list-style-type: none"> 1. Understand the various modern materials and its application 2. Demonstrate the knowledge on structural systems in tall buildings and other advanced structures 3. Learn the techniques of Prefab and precast construction and modular coordination 4. Work with various safety practices adopted in construction sites 5. Analyze the case study examples of a tall building wrt to its structural systems and service cores
		YAR 203B – ARCHITECTURE AND CRITICAL THEORY	<ol style="list-style-type: none"> 1. Understand the difference between theories and practices in architecture. 2. Understand the evolution of form as an influencing factor in built environment 3. Gain knowledge on various tools to evaluate modernity

			<ol style="list-style-type: none"> 4. Recognizing the aesthetics in architecture in various typologies. 5. Analyze the different issues in architecture
		YAR 304A ENVIRONMENT AND BEHAVIOR	<ol style="list-style-type: none"> 1. Understand the various aspects of Environmental Behavior and it's relationship with environment. 2. Demonstrate the knowledge on Environmental Psychology, Environment and Behavior relationship. 3. Work with different approaches related to Environment and Behavior and Environment psychology. 4. Select the space and understand about the Environment and Behavior with relation to different approaches. 5. Analyze the given condition by the surroundings and psychological approach.
		YAR 304B ENERGY SIMULATION AND MODELLING	<ol style="list-style-type: none"> 1. Understand the various aspects of Energy and it's forms of energy. 2. Demonstrate the knowledge on solar, sun angles and it's impact in the design. 3. Work with various simulation software's and building analyses through the software's. 4. Select the suitable simulation software in order to achieve proper analysis result. 5. Analyze the given condition by using simulation software's for various factors in the building.

PROGRAMME: M. Arch Full Time

PROGRAMME OUTCOME (PO)

At the time of graduation, competency of the student is measured through the attainment of programme outcomes. The quantification of programme outcomes attainment is measured through the assessment of established course outcomes for each subject.

PROGRAM OUTCOMES	
PO 1	Ability to understand and frame the design requirements considering the diverse points of view to reach well-reasoned conclusions based on the relevant criteria and standard.
PO 2	Ability to Demonstrate all round skill in design and research.
PO 3	Ability to use digital tools to simulate, analyze and convey essential design ideas at each stage of the design process.
PO 4	Understanding of the architect's responsibility to work in the public interest, conserve heritage aspects and to improve the quality of life for urban built environment.
PO 5	Ability to incorporate technological developments in assembly of materials, systems, and components appropriate for a building design.
PO 6	Ability to analyze Contemporary Theories and Trends in research and design process.
PO 7	Work collaboratively with teams of architects and various interdisciplinary design teams involved in the building industry, incorporating the financial implications, negotiating contracts, selecting service consultants.
PO 8	Ability to design sustainable urban built environment to provide healthful environments and reduce the environmental impacts.
PO 9	Sensitive enough to strictly adhere to the code of conduct prescribed by the competent authority to practice the profession in the country with respect to building codes and regulations, safety aspects and upheld the value of the profession at its highest.
PO 10	Ability to contribute further to society through their design/research/ teaching
PROGRAM SPECIFIC OUTCOME	
PSO1	Understand the concept of energy in buildings and the impact of energy crisis in building industry and ability to design energy efficient buildings.
PSO2	Understand the planning aspects from the macro to micro level and ability to develop a planning, urban design proposal.

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Programme outcomes (POs) and Course Outcomes(COs) of

DEPARTMENT OF AEROSPACE ENGINEERING

Programmes offered:

S.No.	Programme Name	PO and CO
1	B.Tech.Aerospace Engineering	Yes

1. a. Programme Outcomes (POs)

PO	PROGRAM OUTCOMES
PO ₁	Apply the basic concepts of mathematics, science and Engineering in both Aerospace and other disciplines wherever it is required.
PO ₂	Proficient to analyze both technical and non-technical problems in different perspective with full concentration and effort.
PO ₃	Design and develop creative smart solutions for various applications.
PO ₄	Investigate the situation and act accordingly to solve the complex & real time Engineering problems.
PO ₅	Utilize the most advanced modeling and Analysis software to design and Analyze fluid, structural, thermal, magnetic and aerospace related problems, which would save money, man power and time.
PO ₆	Undertaking research projects by applying structural, material, propulsion and aerodynamic knowledge which would be practically useful for the societal needs.
PO ₇	Apply Engineering knowledge to develop innovative concepts for the business sustainability without exploiting the nature and the environment.
PO ₈	Show Professional ethics & responsibility in profession without any compromise in the rules & practices of working environment.
PO ₉	Capable to work as individual and as a team wherever it is required and depending upon the situation to expose their skill & knowledge in the competitive world.
PO ₁₀	Communicate effectively with international clients as user friendly and able to prepare and maintain records, files & documents upto the industry needs.
PO ₁₁	Manage finance, variable technical and non-technical projects in different working environment.
PO ₁₂	Engage in lifelong learning for the self-improvement for the survival of the fittest.
PROGRAMME SPECIFIC OUTCOMES (PSOS)	
PSO ₁	Apply automation and control techniques for aerospace applications
PSO ₂	Analyze and apply aerodynamics and propulsion related aspects in Aerospace Engineering.

1. b Course Outcomes (COs)

Sl.No	Semester	Course Code and Name	Course Outcome (COs)
1.	I	XMA101/CALCULUS AND LINEAR ALGEBRA	<ol style="list-style-type: none">CO1 Apply orthogonal transformation to reduce quadratic form to canonical forms.CO2 Apply power series to tests the convergence of the sequences and series. Half range Fourier sine and cosine series.Find the derivative of composite functions and implicit functions. Euler's theorem and Jacobian.Explain the functions of two variables by Taylor's expansion, by finding maxima and minima with and without constraints using Lagrangian Method. Directional derivatives, Gradient, Curl and Divergence.Apply Differential and Integral calculus to notions of Curvature and to improper integrals.
2.	I	XCP102/PROGRAMMING FOR PROBLEM SOLVING	<ol style="list-style-type: none">CO1 Define programming fundamentals and Solve simple programs using I/O statementsCO2 Define syntax and write simple programs using control structures and arraysCO3 Explain and write simple programs using functions and pointersCO4 Explain and write simple programs using structures and unionsCO5 Explain and write simple programs using files and Build simple projects.
3.	I	XGS103/ENGLISH	<ol style="list-style-type: none">CO1 Ability to recall the meaning for proper usageCO2 Apply the techniques in sentence patternsCO3 Identify the common errors in sentencesCO4 Construct the Nature and Style of sensible WritingCO5 Practicing the writing skills and Grasping the techniques in learning sounds and etiquettes
4.	I	XAC104/APPLIED CHEMISTRY	<ol style="list-style-type: none">CO1 Identify the periodic properties such as ionization energy, electron affinity, oxidation states and electro negativity. Describe the various water quality parameters like hardness and alkalinity.CO2 Explain and Measure microscopic chemistry in terms of atomic, molecular orbitals and intermolecular forces.CO3 Interpret bulk properties and processes using thermodynamic and kinetic considerations.CO4 Describe, Illustrate and Discuss the chemical reactions that are used in the synthesis of molecules.

			5. CO5 Apply, Measure and Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
5.	I	XWP105/WORKSHOP PRACTICES	<ol style="list-style-type: none"> 1. CO1 Summarize the machining methods and Practice machining operation. 2. CO2 Defining metal casting process, moulding methods and relates Casting and Smithy applications. 3. CO3 Plan basic carpentry and fitting operation and Practice carpentry and fitting operations. 4. CO4 Summarize metal joining operation and Practice welding operation. 5. CO5 Illustrate the, electrical and electronics basics and Makes appropriate connections.
6.	II	XMA201/CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLE	<ol style="list-style-type: none"> 1. CO1 Find double and triple integrals and to find line, surface and volume of an integral by Applying Greens, Gauss divergence and Stokes theorem. 2. CO2 Solve first order differential equations of different types which are solvable for p, y, x and Clairaut's type. 3. CO3 Solve Second order ordinary differential equations with variable coefficients using various methods. 4. CO4 Use CR equations to verify analytic functions and to find harmonic functions and harmonic conjugate. 5. Conformal mapping of translation and rotation. Mobius transformation. 6. CO5 Apply Cauchy residue theorem to evaluate contour integrals involving sine and cosine function and to state Cauchy integral formula, Liouville's theorem. 7. Taylor's series, zeros of analytic functions, singularities, Laurent's series.
7.	II	XES202/ENVIRONMENTAL SCIENCES	<ol style="list-style-type: none"> 1. CO1 Describe the significance of natural resources and explain anthropogenic impacts. 2. CO2 Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance. 3. CO3 Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon 4. CO4 Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development. 5. CO5 Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.

8.	II	XBE203/ELECTRICAL AND ELECTRONICS ENGINEERING SYSTEMS	<ol style="list-style-type: none"> CO1 Define, Relate, the fundamentals of electrical parameters and build and explain AC, DC circuits by Using measuring devices CO2 Define and Explain of operation of DC and AC machines. CO3 Recall and Illustrate various semiconductor devices and their applications and displays the input output characteristics of basic semiconductor devices. CO4 Relate and Explain the number systems and logic gates. Construct the different digital circuit. CO5 Label and Outline the different types of microprocessors and their applications
9.	II	XAP204/APPLIED PHYSICS FOR ENGINEERS	<ol style="list-style-type: none"> CO1 Identify the basics of mechanics, explain the principles of elasticity and determine its significance in engineering systems and technological advances. CO2 Illustrate the laws of electrostatics, magneto-statics and electromagnetic induction; use and locate basic applications of electromagnetic induction to technology. CO3 Understand the fundamental phenomena in optics by measurement and describe the working principle and application of various lasers and fibre optics. CO4 Analyse energy bands in solids, discuss and use physics principles of latest technology using semiconductor devices. CO5 Develop Knowledge on particle duality and solve Schrodinger equation for simple potential.
10.	II	XEG205/ENGINEERING GRAPHICS AND DESIGN	<ol style="list-style-type: none"> CO1 Apply the national and international standards, construct and practice various curves CO2 Interpret, construct and practice orthographic projections of points, straight lines and planes. CO3 Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids. CO4 Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids. CO5 Construct sketch and practice isometric and perspective views of simple and truncated solids.
11.	III	XMA101/TRANSFORMS AND DIFFERENTIAL EQUATIONS	<ol style="list-style-type: none"> CO1 Solve standard types of first order differential equation and to solve linear partial differential equations of second order with constant coefficients. Elimination of arbitrary constants and functions. CO2 State Dirichlet's condition. Explain general Fourier series of the curve $y = f(x)$ in the interval $(0, 2\pi)$ $(-\pi, \pi)$, $(0, 2\ell)$, $(-\ell, \ell)$ and $(0, \pi)$. Perform harmonic analysis

			<p>3. CO3 Solve the standard Partial Differential Equations, arising in engineering Problems, like one dimensional Wave equation and Heat flow equation by Fourier series method in Cartesian coordinates.</p> <p>Classify second order quasi PDE.</p> <p>4. CO4 Find the Fourier transform and Fourier sine and cosine transforms of simple functions using definition and its properties.</p> <p>5. CO5 Apply the properties of Z transform to Find the Z transform and inverse Z transform of sequence and functions, and to solve the difference equation using them.</p>
12.	III	XAS302/MATERIAL SCIENCE AND METALLURGY	<p>1. CO1 Recall the Basic Properties of Engineering Materials</p> <p>2. CO2 Classify the concepts of iron and steel.</p> <p>3. CO3 Analyze the heat treatment process and its applications.</p> <p>4. CO4 Analyze the nonmetallic materials and its applications.</p> <p>5. CO5 Describe the process of powder metallurgy and its applications</p> <p>6. CO6 List the Properties and applications of smart materials</p>
13.	III	XAS303/ SOLID MECHANICS AND FLUID MECHANICS	<p>1. CO1 Describe the concepts of stress and strain at a point and express the stress-strain relationship for homogenous, isotropic materials; explain shear force and bending moment diagrams for cantilever, simply supported beams.</p> <p>2. CO2 Calculate bending stress and shear stress in beams; Select the beam specimen, Express deflection equation.</p> <p>3. CO3 Measure rotation of rod due to torsion; Classify principal stresses; explain the stresses, strains associated with thin-wall spherical and cylindrical pressure vessels.</p> <p>4. CO4 Describe fluid properties; Express the ideas of fluid statics and kinematics.</p> <p>5. CO5 Explain about boundary layer.</p> <p>6. CO6 Compare and describe the performance of centrifugal and reciprocating pump.</p>
14.	III	XEM304/ENGINEERING MECHANICS	<p>1. CO1 Explain the principles forces, laws and their applications.</p> <p>2. CO2 Classification of friction, and apply the forces in Trusses and beams.</p> <p>3. CO3 Explain and Apply moment of Inertia and Virtual work</p> <p>4. CO4 Outline and Examine Dynamics</p> <p>5. CO5 Explain free and forced vibration</p>

15.	III	XUM305/ ENTREPRENEURSHIP DEVELOPMENT	<ol style="list-style-type: none"> 1. CO1 Recognise and describe the personal traits of an entrepreneur. 2. CO2 Determine the new venture ideas and analyse the feasibility report. 3. CO3 Develop the business plan and analyse the plan as an individual or in team. 4. CO4 Describe various parameters to be taken into consideration for launching and managing small business. 5. CO5 Explain the technological management and Intellectual Property Rights
16.	III	XAS306/ENGINEERING THERMODYNAMICS	<ol style="list-style-type: none"> 1. CO1 Describe the laws of thermodynamics and their application to a wide range of systems. 2. CO2 Analyze the work and heat interactions associated with a prescribed process path and to perform thermodynamic analysis of a flow system. An ability to evaluate entropy changes and familiarity with calculations of the efficiencies of heat engines and other related engineering devices. 3. CO3 Assess the efficiency and mean effective pressure of different thermodynamic air standard cycles. 4. CO4 Describe the pure substance (an ideal gas) and its applications in various flow and non flow process, and ability to evaluate the efficiencies. 5. CO5 Describe the construction and working principle of different types of compressors. 6. CO6 Compare the different refrigeration and air-conditioning systems and able to calculate the COP /cooling load for various applications.
17.	IV	XAS401/AERODYNAMICS-I	<ol style="list-style-type: none"> 1. CO1 Recall the history of aviation and Study of basic aerodynamics. 2. CO2 Explain various flows and Calibrate the wind tunnel 3. CO3 Express combinational stream functions for various flows and Calibrate pressure distribution over Cylinder. 4. CO4 Explain Kutta Transformations and Calibrate pressure distribution over various models 5. CO5 Sketch the flow visualization over the models, Explain Lifting line theory and Present solution to real time problems. 6. CO6 Display the Boundary Layer Flow over models and Discuss Navier Stokes's Equation.
18.	IV	XAS402/AIRCRAFT STRUCTURES-I	<ol style="list-style-type: none"> 1. CO1 Recall engineering mechanics and explain fuselage and wing structures. 2. CO2 Draw and explain statically determinate and indeterminate structures.

			<ol style="list-style-type: none"> CO3 Discuss and analyze the behavior of elastic structures subjected to combined loads, including bending, torsion and axial loads. CO4 Explain and Use Euler's formula for various columns to find out critical load. Distinguish Euler's formula and Rankine's formula. CO5 Explain the real time application of columns. CO6 List the theories of failure and explain them and then utilize the failure theories to investigate the engineering structures. Uses of failure theories in Aircraft structures.
19.	IV	XUM403/HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY	<ol style="list-style-type: none"> CO1 Relate and Interpret the human ethics and human relationships CO2 Explain and Apply gender issues, equality and violence against women CO3 Classify and Develop the identify of women issues and challenges CO4 Classify and Dissect human rights and report on violations. CO5 List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
19.	IV	XAS404/AIRCRAFT PROPULSION	<ol style="list-style-type: none"> CO1 Describe the concepts of piston engine and Jet engine and measures valve timing, frictional power of diesel engine and port timing of petrol engine. CO2 Express the performance of Inlets and diffusers CO3 Classify the Combustion chamber and measures flash point, fire point, free and forced convection over a flat plate. CO4 Assess the performance characteristics of turbo machineries of aircraft's jet engine CO5 Describe the nozzle performance of jet engine CO6 Discuss about the needs of aircraft propulsion.
20.	IV	XAS405/ELEMENTS OF SATELLITE TECHNOLOGY	<ol style="list-style-type: none"> CO1 Describe the basic satellite network systems. CO2 Estimate the orbital maneuver with help of orbit equation and satellite trajectories. CO3 Explain the structural configuration and need of thermal control in satellite. CO4 Differentiate the different control methods and systems of satellite. CO5 Judge the power system and bus electronics requirements for the satellite operation. CO6 Explain the telemetry and telecomm and systems.
21.	V	XAS501/AERODYN AMICS-II	<ol style="list-style-type: none"> CO1 Recall the basic concepts of Aerodynamics and Explain compressible flow for various conditions

			<ul style="list-style-type: none"> 2. CO2 Generalize the concepts of Normal shock 3. CO3 Analyze about oblique shock and flow past through various shapes 4. CO4 Analyze differential equations of motions for steady compressible flows at Linearized condition 5. CO5 Interpret various designs of Aero foils and Explain its characteristics 6. CO6 Infer the various types of wind tunnels and Discuss study of flow visualization methods
22.	V	XAS502/AIRCRAFT STRUCTURES-II	<ul style="list-style-type: none"> 1. CO1 Express the flexure formula and apply it to symmetrical and unsymmetrical sections of beams. 2. CO2 Describe stresses in beams and compute shear flow in open sections. 3. CO3 Discuss shear flow in closed sections and distinguish single cell and multi-cell structures. 4. CO4 Explain bucking of plates; calculate crippling stresses by Needham's and Gerard's methods. 5. CO5 Explain and analyze the stresses in wing and fuselage structures of an aircraft. 6. CO6 Choose the specimen and measure the deflection; explain structural repair works.
23	V	XAS503/ROCKETS AND SPACECRAFT PROPULSION	<ul style="list-style-type: none"> 1. CO1 Describe the basic principle of operation of ramjet and scramjet 2. CO2 Illustrate solid, liquid and hybrid technology in space 3. CO3 Explain the operation of nuclear rocket and its types in space 4. CO4 Classify various electric propulsion techniques in space 5. CO5 Illustrate the applications of propulsion concepts in space 6. CO6 Explain the need of rocket and spacecraft propulsion
24.	V	XAS504/SPACE MECHANICS	<ul style="list-style-type: none"> 1. CO1 Recall about basis of Solar system and Describe about its reference frames and systems 2. CO2 Analyze various problems of Space Vehicles and Assess their characteristics 3. CO3 Illustrate about Satellite Injections and Criticize its limitations 4. CO4 Illustrate about Satellite Injections and Criticize its limitations 5. CO5 Describe about Interplanetary Trajectories and Explain its concepts 6. CO6 Define various phases of Missile trajectory and Discuss about Space Environment

25.	V	XASM01/ELEMENTS OF DRONE TECHNOLOGY	<ol style="list-style-type: none"> 1. CO1Outline the history of Unmanned Aerial Vehicle and Classify the various UAV design configurations with applications. 2. CO2Explain the various design configurations of UAV and relate with their design standards. 3. CO3Classify the types of power plants and payloads used in drone system. 4. CO4Examine and classify the failure modes of UAV components. 5. CO5Compare the deployment of UAV in different aspects.
26.	VI	XAS601/UAV TECHNOLOGIES	<ol style="list-style-type: none"> 1. CO1 Describe the design considerations of Unmanned Aerial Vehicle and Identify the various roles of UAV. Classify the UAV system and Discuss the applications of UAV 2. CO2 Explain the various types of sensors and Communication systems used in UAV also Discuss the Data link system used in UAV 3. CO3 Discuss the various design configurations of HTOL, VTOL and Hybrid models. And Analyze useful of solar cells u in UAV. 4. CO4 Examine and classify the failure modes of components and control systems in UAV. 5. CO5 Define use of Navigation systems in UAV and Distinguish of various Navigation systems. 6. CO6 Explain the concepts and characteristics of Swarming and Measure the goals and operational issues of various UAV systems.
27.	VI	XAS602/FINITE ELEMENT ANALYSIS	<ol style="list-style-type: none"> 1. CO1 Recognize the significance and importance of finite element methods to the professional design engineer. 2. CO2 Discuss the fundamentals of finite element methods for small displacement linear elastic analysis (statics). 3. CO3 Use stress strain relationship and express it for continuum elements with examples. 4. CO4 Analyze the stresses and displacement in non-linear finite element. 5. CO5 Apply the knowledge to develop good models and to interpret the numerical results in design. 6. CO6 Explain the procedure of FEA in aviation.
28.	VI	XAS603/FLIGHT DYNAMICS	<ol style="list-style-type: none"> 1. CO1Recall the forces and moments and apply to investigate the flight performance of aircraft in different situations. 2. CO2Express and Calculate the range, endurance and performance of an aeroplane, for simple accelerating cases such as take-off, landing and turning.

			3. CO3 Explain and calculate the influence of forces and moments on the static and dynamic stability of aircraft including longitudinal and lateral motions for stick fixed condition and select the aerofoil. 4. CO4 Explain and calculations to predict aircraft stability for stick free condition and proceed the stability analysis. 5. CO5 Distinguish and compute the conditions of aircraft lateral and directional static stability. 6. CO6 Explain and Examine the dynamics and control of flight vehicles.
29.	VI	XAS604/AVIONICS	1. CO1 Know the basics of Avionics in Civil and Military Aircraft systems 2. CO2 Describe the Data buses MIL–STD 1553 B – ARINC 429 -ARINC 629 and to understand the avionics architecture. 3. CO3 Classify the various displays, I/O devices and power systems and comparing the Military and Civil Requirements. 4. CO4 Explain about RADAR and its operation procedures 5. CO5 Identify the future avionics architecture 6. CO6 Understand the FAR rules and its requirements
30.	VI	XASM02/CAD MODELLING	1. CO1 Summarize sketcher tools. 2. CO2 Sketch part design. 3. CO3 Manipulate assembly design. 4. CO4 Interpret drafting. 5. CO5 Demonstrate wireframe and surface design. 6. CO6 Design an aircraft model.
31.	VII	XAS701/COMPUTATIONAL FLUID DYNAMICS	1. CO1 Describe the basic definitions and governing equations of CFD. 2. CO2 Explain and manipulate the approach of finite difference method. 3. CO3 Illustrate and measure the basic techniques of finite volume method 4. CO4 Formulate and measure the basic techniques of finite element method. 5. CO5 Appraise the applications of CFD in various fields. 6. CO6 Explain the use of CFD in Aerospace vehicles.
PROFESSIONAL ELECTIVES-I			
1.	IV	XASE01/AIRCRAFT SYSTEMS AND INSTRUMENTS	1. CO1 Explain the components and concepts of various aircraft systems. 2. CO2 Compare the basic and modern control systems. 3. CO3 Study the functions of fuel system and Examine the auxiliary Aircraft power plant systems.

			<ul style="list-style-type: none"> 4. CO4 Outline the needs of Air-conditioning systems and cabin pressurization system. 5. CO5 Differentiate the use of flight instruments and Navigation Instruments. 6. CO6 Inspect the needs of engine instruments and their operations.
2.	IV	XASE02/SENSORS AND MEASUREMENTS	<ul style="list-style-type: none"> 1. CO1 Classify the types of measurement system and its classifications. 2. CO2 Explain the concepts of Strain gauges 3. CO3 Explain the physical principles and characteristics of different types of displacement, pressure and temperature sensors and transducer. 4. CO4 Classify the photo and piezo electric sensors applications. 5. CO5 Express the working principle and its characteristics of different bridge circuits used in signal conditioning and to know about the signal analyzer. 6. CO6 Discuss the working principle of display and recording devices.
3.	IV	XASE03/CONTROL SYSTEMS	<ul style="list-style-type: none"> 1. CO1 Intify the basic elements, derive the transfer function and Construct the transfer function of Simple pneumatic, hydraulic and thermal systems. 2. CO2 Explain the performance of open and closed loop system. 3. CO3 Describe the Time domain and show the response of time. 4. CO4 Explain Frequency domain. 5. CO5 Construct and verify the frequency response. 6. CO6 Describe the digital control systems.
4.	IV	XASE04/AIRFRAME MAINTENANCE AND REPAIR	<ul style="list-style-type: none"> 1. CO1 Recall different equipments used in welding shop, Explain various repair techniques used in sheet metal. 2. CO2 List out types of plastics used in airframes and its maintenance. 3. CO3 Describe the cleaning process of fiber reinforced plastic (FRP) materials. 4. CO4 Discuss the various leveling procedure of jacking, weighing and assembly. 5. CO5 Review of hydraulic, pneumatic system their trouble shooting and maintenance practice. 6. CO6 Discuss the safety practices of material storage and handling.
5.	IV	XASE05/THEORY OF ELASTICITY	<ul style="list-style-type: none"> 1. CO1 Recall strength of material and use stress-strain relationship to calculate the displacements.

			2. CO2 Distinguish plane stress and plane strain problems. 3. CO3 Use of Airy's stress function in elastic structures. 4. CO4 Apply and Analyze Navier's theory, St. Venant's theory and Prandtl's theory on torsion. 5. CO5 State classical plate theory. 6. CO6 Apply Navier's theory for plates.
PROFESSIONAL ELECTIVES-II			
1.	V	XASE06/HEAT TRANSFER	1. CO1 Describe and solve basic conduction, convection and radiation problems 2. CO2 Explain the concepts of one-dimensional and multi-dimensional steady and unsteady state conduction heat transfer, and relevant boundary and initial conditions and to solve the problems. 3. CO3 Express the physical concepts, laws and governing equations of convection heat transfer. Understand the convection heat-transfer problems for laminar and turbulent flows in internal and external configurations, including the basics of the boundary layer concept. Solve the problems. 4. CO4 Learn to select and use of various empirical correlations for dimensionless and dimensional convection heat transfer coefficients and to solve the problems. 5. CO5 Illustrate the physical concepts of black body and gray body radiation. Carry out thermal radiation exchange analysis between black and gray surfaces and understand the view factors concept. 6. CO6 Extrapolate the problem solving ability in heat transfer in gas turbine, to understand aerodynamic and ablative heat transfer.
2.	V	XASE07/MECHANICS OF MACHINES	1. CO1 Demonstrate a good understanding of the principles of the mechanics of machines. 2. CO2 Solve problems involving bearings, pulleys, open and cross belt drive. 3. CO3 Solve problems involving power transmission through clutches, chains, belts and gears. 4. CO4 Solve problems involving operation of Cam shaft for maintain the firing order in piston engine 5. CO5 Design and measure the problems involving mechanisms, balancing and vibration 6. CO6 Select and evaluate suitable mechanisms for various applications including vibration, noise and lubrication systems
3.	V	XASE08/WIND TUNNEL	1. CO1 Recall about basis of Buckingham pi Theorem and Describe about various methods of model testing

		TECHNIQUES	<ol style="list-style-type: none"> CO2 Illustrate various Wind Tunnels and Sketch its layouts CO3 Explain about Calibration of Subsonic and Supersonic Wind Tunnels CO4 Demonstrate Measuring Devices used in Wind tunnels CO5 Explain various balancing methods used in wind tunnels CO6 Recall about Visualization Methods and Describe about various methods of Optical Flow visualization
4.	V	XASE09/THEORY OF VIBRATIONS	<ol style="list-style-type: none"> CO1 Explain the concepts of various vibration modes. CO2 Outline the motions of natural frequency and compare with various methods. CO3 Classify the vibration analysis in experimental methods for forced and free vibration tests. CO4 Measure the torsional vibrations of the beams. CO5 Identify the types of methods used to solve transient vibration problems. CO6 Extend the methods of Non-Linear vibrations.
5.	V	XASE10/COMPOSITE MATERIALS	<ol style="list-style-type: none"> CO1 Outline the reinforcements, matrices and explain the elasticity approach, thermal effects over a lamina. CO2 Categorize the elastic constants for anisotropic, orthotropic and isotropic materials. CO3 Explain the Stress-strain relations and determine the material properties CO4 Classify the various types of laminates. CO5 Examine various types of resins and its properties, explain the different manufacturing process. CO6 Analyze the sandwich construction and material approach.
PROFESSIONAL ELECTIVES-III			
1.	VI	XASE11/SPACE WEAPONS AND WARFARE	<ol style="list-style-type: none"> CO1 Outline the fundamental concepts of weapons with various trajectories and targets. CO2 Explain the sequence of employment and command operations in various weapons against target. CO3 Classify the threat assessment of theatre ballistic missile and relate their limitations and uncertainties conditions of various phases. CO4 Analyze the quality and development process of defence architecture. CO5 Examine the characteristics and performance of multiple radars with external cueing process.

			6. CO6 Assess the guidance and maneuvering system of space weapons.
2.	VI	XASE12/AUTOMATION AND CONTROL ENGINEERING	1. CO1 Describe Manufacturing Lead Time (MLT), Production Rate, Plant capacity by applying the concepts of automated production and able to initiate design of the components for automated production system. 2. CO2 Infer in the design of transfer mechanisms that may be need for work part transfer in manufacturing sector. Expose to buffer storage mechanisms. 3. CO3 Apply the Utilization and Availability of the infrastructure in the Automated Production Line (APL) and to implement the concept of Line balancing. 4. CO4 Analyze the major components of a Programmable Logic Controller (PLC). 5. CO5 Interpret the operation of PLC modules. 6. CO6 Express the PLC programming with different condition. Use PLC for industrial process control.
3.	VI	XASE13/HIGH TEMPERATURE MATERIALS	1. CO1 Describe the causes and effects of creep formation 2. CO2 Estimate the design for creep resistance 3. CO3 Classify the fractures and its maps for different alloys and oxides 4. CO4 Explain the effect of alloying elements on hot corrosion and methods of combat hot corrosion 5. CO5 Outline the oxidation reaction and hot corrosion of materials 6. CO6 Criticize the use of super alloys and other materials used for aircraft and spacecraft construction.
4.	VI	XASE14/AIRCRAFT RULES AND REGULATIONS CAR I AND II	1. CO1 Explain about CAR series A and B 2. CO2 Describe about investigation and defect analysis, explain the maintenance process. 3. CO3 CAR series F explain about Procedure for issue / revalidation of Type Certificate of aircraft and its engines / propeller 4. CO4 Understand the mandatory modifications and inspections in CAR series 'L' & 'M' 5. CO5 Explain the registration markings, weight balance control and aircraft logbooks. 6. CO6 Explain the use of CAR I and II.
5.	VI	XASE15/AEROELASTICITY	1. CO1 Summarize the concepts of Aeroelasticity 2. CO2 Explain the instability conditions of aircraft for lifting surface 3. CO3 Examine the Aeroelastic problems in aileron reversal speed, control, etc...

			4. CO4 Analyze the various Aeroelastic instability conditions of aileron, rudder, elevator 5. CO5 Discuss the different Aeroelastic problems in tall slender structures, suspension bridges and aerospace vehicles. 6. CO6 Explain the use of Aeroelasticity in aviation.
PROFESSIONAL ELECTIVES-IV			
1.	VII	XASE16/EXPERIMENTAL STRESS ANALYSIS	1. CO1 Describe the basic principles of measurements and its characters. 2. CO2 Distinguish the different extensometer and its advantages and disadvantages. 3. CO3 Explain various parameters of electrical strain gauges and its applications. 4. CO4 Outline the basic concepts of photoelasticity and its usage 5. CO5 Compare the various non destructive testing methods related to Aeronautical and Aerospace Engineering 6. CO6 Discuss about the need of experimental stress analysis.
2.	VII	XASE17/AIRCRAFT ENGINE MAINTENANCE	1. CO1 Recall about basis of Piston engine and Describe about its Maintenance Procedures. 2. CO2 Illustrate various inspections methods of Piston Engine and Explain its overhaul procedures. 3. CO3 Explain about checks and maintenance to be carried out for piston engine parts. 4. CO4 Recall about basis of Jet engine and inspection procedures. 5. CO5 Describe about Maintenance Procedures of Jet engine. 6. CO6 Illustrate various inspections methods of Jet Engine and Explain its overhaul procedures.
3.	VII	XASE18/NAVIGATION SYSTEMS	1. CO1 Outline the basics of navigational equipments and Air Traffic Control 2. CO2 Summarize all types of aircraft systems and instruments based on its functionality and uses. 3. CO3 Describe the principles of radio transmission and reception and explain the properties of electromagnetic waves 4. CO4 Explain about inertial navigation systems. 5. CO5 Preparation of charts for pilotage and flight planning, and to know about the Future air navigation systems 6. CO6 Explain the use of navigation systems in aviation.
4.	VII	XASE19/FATIGUE	1. CO1 Describe the basics of fatigue of structures.

		AND FRACTURE MECHANICS	2. CO2 Explain various stress concentration factors 3. CO3 Estimate statistical aspects of fatigue behavior 4. CO4 Generalize the physical aspects of fatigue 5. CO5 Outline concepts behind the fracture mechanics 6. CO6 Assess the fatigue design and testing
5.	VII	XASE20/HELICOPTER MAINTENANCE	1. CO1 Understand the basic fundamentals of helicopter. 2. CO2 Illustrate various inspections methods of rotor tracking and understand the concept of flight control system 3. CO3 Apply the knowledge of maintaining the Helicopter Rotors and Transmission mechanisms. 4. CO4 Recall about the fundamentals of helicopter and understand the operating and maintenance procedure of power plants and tail rotors. 5. CO5 Explain the inspections methods for maintaining the fuselage and airframe construction used in helicopter 6. CO6 Explain the procedure of helicopter maintenance.
PROFESSIONAL ELECTIVES-V			
1.	VII	XASE21/ROCKETS AND MISSILES	1. CO1 Explain the design considerations of igniters, injectors and combustion chamber used in rocket system. 2. CO2 Identify the elements and components of missiles and rockets. 3. CO3 Assess the forces and moments acting on rocket and missiles. 4. CO4 Compare the one dimensional and two dimensional rocket motions in free space and gravitational field. 5. CO5 Inspect the staging and control methods of rockets and missiles. 6. CO6 Examine the performance of materials used rockets and missiles.
2.	VII	XASE22/DISASTER MANAGEMENT	1. CO1 Describe the concept of disaster, hazard. 2. CO2 Distinguish various disasters and their impacts. 3. CO3 Explain disaster risk reduction methods. 4. CO4 Outline inter-relationship between disasters and development. 5. CO5 Discuss about disaster risk management in India. 6. CO6 Answer about recent disasters and disaster remedies.
3.	VII	XASE23/AIR TRAFFIC CONTROL AND AERODROME	1. CO1 Classify ATS air spaces and Describe about Objectives, Scope and provision of ATS

		DESIGN	<ol style="list-style-type: none"> CO2 Learn to Organize ATS routes and significant points for ATC clearances CO3 Illustrate flight plans and position report. CO4 Explain about RADAR and its operation procedures CO5 Express about basic terminologies of Aerodrome and Generalize its values CO6 Explain about Lightning, Runway operations and Obstacle Restriction systems
4.	VII	XASE24/MISSILE GUIDANCE AND CONTROL	<ol style="list-style-type: none"> CO1 Outline the history of missiles and explain the elements of missile system. CO2 Examine the autopilot system response with various aerodynamic parameters and missile configurations. CO3 Evaluate the missile guidance law with proportional navigation system. CO4 Able to interpret the two body problem of the ballistic missile. CO5 Classify the missile and express the tracking equation of motion. CO6 Identify the factors involved in weapon delivery system
5	VII	XASE25/AIR TRANSPORTATION AND AIRCRAFT MAINTENANCE	<ol style="list-style-type: none"> CO1 Compare the different modes of transports and to know the various levels of management systems. CO2 Describe the economical status of airlines related to passenger fares, Fleet planning and to evaluate the aircraft and aircrew members. CO3 Understand the basics of ground operations and classify the various types of scheduling CO4 Summarize the various maintenance and monitoring process. CO5 Apply the NDT techniques in aircraft industry and to monitoring the various parts of the aircraft. CO6 Explain the procedure of the aircraft maintenance.
PROFESSIONAL ELECTIVES-VI			
1.	VIII	XASE26/THEORY OF PLATES AND SHELLS	<ol style="list-style-type: none"> CO1 Describe the materials used for Plates and shells structures in aerospace vehicles CO2 Estimate the small deflection theory of plates CO3 Generalize the shear deformation and large deflection of plates CO4 Generalize the shear deformation and large deflection of plates CO5 Outline the stability and instability of plates. CO6 Answer the applications of theory of plates and shells.

2.	VIII	XASE27/ SPACE CRAFT POWER SYSTEMS	<ol style="list-style-type: none"> 1. CO1 Recall the spacecraft environment & design consideration 2. CO2 Describe the power generation for spacecraft 3. CO3 Generalize the energy storage technology for spacecraft 4. CO4 Uses of batteries in spacecraft and application of fuel cells 5. CO5 Examine the concepts of power converters 6. CO6 Discuss the power control, conditioning and distribution of the spacecraft.
3.	VIII	XASE28/CRYOGENICS	<ol style="list-style-type: none"> 1. CO1 Explain the fundamental concepts of cryogenics and Describe the various types of propellants used in cryogenics. 2. CO2 Estimate the production of low temperature for cryogenics and their effects. 3. CO3 Generalize the efficiency of cryogenic systems and Study the performance of cooling systems. 4. CO4 Outline the cycles of cryogenic plants and compare with numerical problems. 5. CO5 Illustrate the various applications of cryogenics in space technologies. 6. CO6 Outline the types of materials used in cryogenic systems.
4.	VIII	XASE29/HYPERSONIC AERODYNAMICS	<ol style="list-style-type: none"> 1. CO1 Recall about the basics of Hypersonic Aerodynamics and Describe about relations of viscous and inviscid hypersonic flows 2. CO2 Classify the Newtonian laws 3. CO3 Describe shock expansion theory 4. CO4 Explain Boundary layer theory for Hypersonic flows 5. CO5 Express about viscous interaction and Generalize it for Hypersonic flow theory 6. CO6 Explain about high temperature effects and Classify its techniques for hypersonic vehicles
5.	VIII	XASE30/COMPUTER INTEGRATED MANUFACTURING	<ol style="list-style-type: none"> 1. CO1 Recall CAD and CAM; Describe about computer integrated manufacturing. 2. CO2 Explain about production planning and control. 3. CO3 Classify cellular manufacturing technology. 4. CO4 Discuss about flexible manufacturing system and automated guided vehicle system. 5. CO5 Explain about the use of industrial robotics. 6. CO6 Answer the applications of computer integrated manufacturing.

OPEN ELECTIVES			
1.	V.VI.VII,VI I	XASOE1/ELEMENTS OF AERONAUTICS	<ol style="list-style-type: none"> 1. CO1 Understand the historical background of air vehicles. 2. CO2 Explain important physical features of aircraft and space flight systems. 3. CO3 Discuss the various Fuselage constructions and materials used in air vehicles. 4. CO4 Classify the types of power plants used in aircraft and aerospace vehicles. 5. CO5 Be able to apply basic principles of aircraft systems. 6. CO6 Answer the applications of aircrafts.
2.	V.VI.VII,VI I	XASOE2/FUNDAME NTALS OF ROCKETS AND MISSILES	<ol style="list-style-type: none"> 1. CO1 Recall spacecraft history; Describe about satellites, launch vehicles and orbits. 2. CO2 Classify about rocket propulsion. 3. CO3 Explain about cryogenic technology. 4. CO4 Discuss about missile classification, missile aerodynamics and missile propulsion. 5. CO5 Explain about missile control and guidance. 6. CO6 Answer the applications of rockets and missiles.

**Programme and Course Outcomes of
DEPARTMENT OF BIOTECHNOLOGY**

Programmes offered:

S.No.	Programme Name	PO and CO
1	B.Tech Biotechnology	Yes

B.TECH – Biotechnology - Full Time

PROGRAM OUTCOMES	
PO 1	The fundamental concepts of both engineering and life sciences and apply it to a wide range of interdisciplinary work.
PO 2	An ability to analyse complex engineering problems, conduct experiments in biotechnology and apply in the field by generating innovative, economical and feasible solutions.
PO 3	An experience to develop a process that meets the specific needs of societal and environmental problems to draw meaningful conclusions.
PO 4	To draw conclusion in research based methods for value addition to existing products.
PO 5	Soft-skills through classroom seminars, institutional and industry interactions, use of modern technique and ICT tools.
PO 6	Soft-skills through classroom seminars, institutional and industry interactions, use of modern technique and ICT tools.
PO 7	An ability to update the modern techniques in biotechnological essential for protecting the environment and sustainable development.
PO 8	An ability to demonstrate themselves as morally responsible citizens by being aware of his/her roles, duties, professional and ethical responsibilities and rights.
PO 9	A Positive attitude and interpersonal skills to function in multidisciplinary teams and setups.
PO 10	An ability to communicate, comprehend and write effective reports.
PO 11	An enthusiasm for life-long learning and urge to contribute to technology and society by working in a need-based and problem-solving projects.
PO 12	An ability to use the techniques, skills, and modern engineering tools necessary for Engineering practice
PROGRAM SPECIFIC OUTCOME	
PSO1	Knowledge and skills to become an herbal biotechnology entrepreneur for product commercialization.
PSO2	An ability to extend the research initiatives in bioenergy fields.

S.no	Semester	Course Code and Name	Cos
1.	I	XMA101 - CALCULUS AND LINEAR ALGEBRA	<ol style="list-style-type: none"> 1. Apply orthogonal transformation to reduce quadratic form to canonical forms. 2. Apply and Respond power series to tests the convergence of the sequences and series, half range Fourier sine and cosine series. 3. Find the derivative of composite functions and implicit functions. Euler's theorem and Jacobian 4. Explain the functions of two variables by Taylors expansion, by finding maxima and minima with and without constraints using Lagrangian Method. Directional derivatives, Gradient, Curl and Divergence. 5. Apply Differential and Integral calculus to notions of Curvature and to improper integrals.
2.		XES 102 - ENVIRONMENTAL SCIENCES	<ol style="list-style-type: none"> 1. Describe the significance of natural resources and explain anthropogenic impacts. 2. Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance. 3. Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon 4. Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development. 5. Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.
3.		XBE 103-ELECTRICAL AND ELECTRONICS ENGINEERING SYSTEMS	<ol style="list-style-type: none"> 1. Define, Relate the fundamentals of electrical parameters and build and explain AC, DC circuits by Using measuring devices 2. Define and Explain the operation of DC and AC machines. 3. Recall and Illustrate various semiconductor devices and their applications and displays the input output characteristics of basic semiconductor devices. 4. Relate and Explain the number systems and logic gates. Construct the different digital circuit. 5. Label and Outline the different types of microprocessors and their applications.
4.		XAP 104-APPLIED PHYSICS FOR ENGINEERS	<ol style="list-style-type: none"> 1. Identify the basics of mechanics, explain the principles of elasticity and determine its significance in engineering systems and technological advances.

			<ol style="list-style-type: none"> 2. Illustrate the laws of electrostatics, magneto-statics and electromagnetic induction; use and locate basic applications of electromagnetic induction to technology. 3. Understand the fundamental phenomena in optics by measurement and describe the working principle and application of various lasers and fiber optics. 4. Analyze energy bands in solids, discuss and use physics principles of latest technology using semiconductor devices. 5. Develop Knowledge on particle duality and solve Schrodinger equation for simple potential.
5.		XEG 105-ENGINEERING GRAPHICS	<ol style="list-style-type: none"> 1. Apply the national and international standards, construct and practice various curves 2. Interpret, construct and practice orthographic projections of points, straight lines and planes. 3. Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids. 4. Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids. 5. Construct sketch and practice isometric and perspective views of simple and truncated solids.
6.	II	XMA 201-CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLES	<ol style="list-style-type: none"> 1. Find double and triple integrals and to find line, surface and volume of an integral by Applying Greens, Gauss divergence and Stokes theorem. 2. Solve first order differential equations of different types which are solvable for p, y, x and Clairant's type. 3. Solve Second order ordinary differential equations with variable coefficients using various methods. 4. Use CR equations to verify analytic functions and to find harmonic functions and harmonic conjugate. 5. Conformal mapping of translation and rotation. Mobius transformation. 6. Apply Cauchy residue theorem to evaluate contour integrals involving sine and cosine function and to state Cauchy integral formula, Louwville's theorem. Taylor's series, zeros of analytic functions, singularities, Laurent's series.
7.		XCP 202-PROGRAMMING FOR PROBLEM SOLVING	<ol style="list-style-type: none"> 1. Define programming fundamentals and Solve simple programs using I/O statements 2. Define syntax and write simple programs using control structures and arrays 3. Explain and write simple programs using functions and pointers

			<ol style="list-style-type: none"> 4. Explain and write simple programs using structures and unions 5. Explain and write simple programs using files and Build simple projects
8.		XGS 203-ENGLISH	<ol style="list-style-type: none"> 1. Ability to recall the meaning for proper usage 2. Apply the techniques in sentence patterns 3. Identify the common errors in sentences 4. Construct the Nature and Style of sensible Writing 5. Practicing the writing skills. 6. Grasping the techniques in learning sounds and etiquettes
9.		XAC 204-APPLIED CHEMISTRY FOR ENGINEERS	<ol style="list-style-type: none"> 1. Identify the periodic properties such as ionization energy, electron affinity, oxidation states and electro negativity. Describe the various water quality parameters like hardness and alkalinity. 2. Interpret bulk properties and processes using thermodynamic and kinetic considerations. 3. Explain and Measure microscopic chemistry in terms of atomic, molecular orbitals and intermolecular forces. 4. Describe, Illustrate and Discuss the chemical reactions that are used in the synthesis of molecules. 5. Apply, Measure and Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
10.		XWP 205-WORKSHOP PRACTICES	<ol style="list-style-type: none"> 1. Summarize the machining methods and Practice machining operation. 2. Defining metal casting process, molding methods and relates Casting and Smithy applications. 3. Plan basic carpentry and fitting operation and Practice carpentry and fitting operations. 4. Summarize metal joining operation and Practice welding operation. 5. Illustrate the, electrical and electronics basics and Makes appropriate connections.
11.	III	XPS 301-PROBABILITY AND STATISTICS	<ol style="list-style-type: none"> 1. Explain conditional probability, independent events; find expected values and Moments of Discrete random variables with properties. 2. Find distribution function, Marginal density function, conditional density function, Define density function of conditional distribution functions normal, exponential and gamma distributions. 3. Find measures of central tendency, statistical parameters of Binomial, Poisson and Normal, correlation, regression.

			<ol style="list-style-type: none"> Rank Correlation coefficient of two variables. Explain large sample test for single proportion, difference of proportion, single mean, difference of means and difference of standard deviations with simple problems. Explain small sample test for single mean, difference of mean and correlation coefficients, variance test, chi-square test with simple Problems.
12.		XBT302-MATERIAL AND ENERGY BALANCE	<ol style="list-style-type: none"> Interpret different unit systems and Express the composition gas liquid and solid systems Compute the material balances across different unit operations Compute the material balances across chemical reactors Explain the energy balance calculations for systems with and without chemical reactions Describe the humidification operations
13.		XBT 303-BIOCHEMISTRY	<ol style="list-style-type: none"> Recognize and Understand about role of water and amino acids. Recognize and Understand proteins and their structures. Also, will learn about enzymes. Recognize and Understand about carbohydrate and glycobiology. Recognize and Understand about Nucleotides and Nucleic acids. Recognize and Understand lipids and biosignalling.
14.		XBT 304-MICROBIOLOGY	<ol style="list-style-type: none"> Comprehend knowledge about historical perspective of microbiology and its developments. Recognize the fundamental concepts in the structure and functioning of a prokaryotic cell. Perform staining techniques to observe microorganisms Acquire knowledge about microbial taxonomy and microbial classification methods. Demonstrate the microbial nutritional requirements. Perform culturing techniques to isolate microorganisms Choose the appropriate media for the cultivation of microorganisms and Acquire knowledge on the bacterial growth, growth curve and control of microorganisms. Demonstrate the various industrial applications of microorganisms.
15.		XBT 305-UNIT OPERATIONS	<ol style="list-style-type: none"> Interprets and Analyze the dimensional homogeneity of unit operations Distinguishes types of fluids and fluid flow, Explain the energy balances across fluid moving systems

			<ol style="list-style-type: none"> 3. Demonstrates the Particles, Size reduction, agitation, mixing, centrifugation and filtration operations 4. Analyze the mechanism of conduction and convection mode of heat transfer 5. Outlines the modes of mass transfer operations and Describes the basic principles in distillation, extraction and drying
16.		XUM 306-HUMAN ETHICS	<ol style="list-style-type: none"> 1. Relate and Interpret the human ethics and human relationships 2. Explain and Apply gender issues, equality and violence against women 3. Classify and Develop the identify of women issues and challenges 4. Classify and Dissect human rights and report on violations. 5. List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
17.	IV	XES 401-MATERIAL SCIENCE	<ol style="list-style-type: none"> 1. Study and understanding the basic properties of materials 2. Study and analyze the heat treatment process and its applications 3. Compare and analyze the non-metallic materials and applications 4. Explain and distinguish of engineering materials (mechanical and metallurgical) 5. List and discuss the properties and applications of modern engineering materials.
18.		XBT 402-GENETICS	<ol style="list-style-type: none"> 1. Relate and Interpret Reproduction as the basis of heredity and Gene interactions 2. Explain and Apply principles of dominance and segregation 3. Classify and Develop Quantitative traits and polygenic inheritance 4. Classify and Dissect linking the inheritance of genes to chromosomes and chromosomes as arrays of genes 5. List and respond DNA Replication and Transcription
19.		XBT 403-CELL BIOLOGY	<ol style="list-style-type: none"> 1. Study and understand the origin of eukaryotic cells and cells specialization 2. Recognize the fundamental concepts in the structure and functioning of a eukaryotic cell. 3. Acquire knowledge on the transport of proteins between intracellular compartments

			<ul style="list-style-type: none"> 4. Acquire knowledge about cell cycles mitosis and meiosis 5. Describe cellular signaling and types of signaling receptors
20.		XBT 404- BIOENERGETICS AND METABOLISM	<ul style="list-style-type: none"> 1. Discuss and Remember fundamental and metabolism pathways 2. Discuss and Remember biosynthesis of fatty acid and cholesterol 3. Discuss and Remember oxidative phosphorylation and photophosphorylation 4. Discuss and Remember biosynthesis of amino acids and nucleotides 5. Discuss and Remember report on metabolic order and disease
21.		XBT 405-CHEMICAL ENGINEERING THERMODYNAMICS	<ul style="list-style-type: none"> 1. State the basic laws of thermodynamics and explain the fundamentals of thermodynamics. 2. Interpret and analyze the PVT relationship for various systems. 3. Know the thermodynamic relations and estimate the thermodynamic properties. 4. Analyze and evaluate the phase equilibrium in various systems like miscible and immiscible systems. 5. Knows the chemical equilibrium for industrial reactions and will calculate required free energy, equilibrium rate constant and conversion.
22.		XUM 406- ENTREPRENEURSHIP DEVELOPMENT	<ul style="list-style-type: none"> 1. Recognize and describe the personal traits of an entrepreneur. 2. Determine the new venture ideas and analyses the feasibility report. 3. Develop the business plan and analyze the plan as an individual or in team. 4. Describe various parameters to be taken into consideration for launching and managing small business. <p>Describe Technological management and Intellectual Property Rights</p>
23.		XUM 407- CONSTITUTION OF INDIA	<ul style="list-style-type: none"> 1. Understand the Constitutional History 2. Understand the Powers and Functions 3. Understand the Legislature 4. Understand the Judiciary 5. Understand the Centre State relations
24.		XBT 501- BIOINSTRUMENTATION	<ul style="list-style-type: none"> 1. Explain the basics and fundamentals of analytical techniques and describe the various calibration techniques.

			<ol style="list-style-type: none"> 2. Describe the spectrophotometric methods and perform the experiments related to spectroscopy. 3. Understand the electrochemical techniques and apply it in various applications in biotechnology. 4. Know the principle of instrumentation and applications of various imaging techniques in biological field. 5. Distinguish the various separation and sequencing techniques
25.		XBT 502-MOLECULAR BIOLOGY	<ol style="list-style-type: none"> 1. Relate and Interpret DNA and RNA structure and its role 2. Explain and Apply and its replication and repair 3. Classify and Develop transcription and post transcriptional modifications 4. Classify and Dissect translation and post translational processing 5. List and respond gene regulations
26.		XBT 503-BIOPROCESS ENGINEERING	<ol style="list-style-type: none"> 1. Recall and identify the basic parts of a fermenter and its operations. 2. Identify, reproduce, and demonstrate the different media components involved in a fermentation process. 3. Interpret, describe and differentiate various control systems involved in bioreactor. 4. Recognize, discuss and measure the various transport phenomena involved in bioprocesses. 5. understand the scale up procedure of mixing, aeration and know the applications to develop a bio product.
27.		XBT 504A-PLANT BIOTECHNOLOGY	<ol style="list-style-type: none"> 1. Describe the plant tissue culture and knows various media for tissue culture. 2. Compare the various gene transfer methods in plants and relate each other with its pros and cons. 3. Explain the various tissue culture techniques and describes the protoplast isolation techniques 4. Relate and analyze various plant breeding and related techniques 5. Choose and apply the plant genetics to develop commercially important products.
28.		XBT 504B-FOOD TECHNOLOGY	<ol style="list-style-type: none"> 1. Outline the scope and importance of food biotechnology and describe the biotechnological approaches to modify the foods 2. Discuss on the fermentation strategies for different fermented foods and their microbiology aspects 3. Explain different biotechnological approaches to produce genetically modified foods

			<ol style="list-style-type: none"> Describe the techniques adapted to preserve different kinds of foods Discuss the guidelines and regulations given for food safety and analysis
29.		XBT 504C-CHEMICAL REACTION ENGINEERING	<ol style="list-style-type: none"> Recall and explain the kinetics of a chemical reaction Interpret and modify the batch reactor data Compare and evaluate the performance of batch, PFR and CSTR reactors. Identify and discuss the designs for single and multiple reactions. Describe characteristics of RTD curves.
30.		XUM 506-EMPLOYABILITY SKILL AND REPORT WRITING	<ol style="list-style-type: none"> Prepare how to face an interview and to learn how to prepare for an interview Knowledge on a career related communication and learning the different formats of CV Communicates with the group of people in discussion Learn to search research papers, prepare seminars. Execute the learning by writing scientific papers
31.		XUM 507-ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	<ol style="list-style-type: none"> Relate and Interpret the Indian Traditional Knowledge Systems Explain and Apply Yogic-science and wisdom capsules Classify and Develop of Yoga and holistic health care system Classify and Dissect human rights and report on List and respond to family values, universal brotherhood,
32.	VI	XUM 601-ECONOMICS FOR ENGINEERS	<ol style="list-style-type: none"> Summarize the value of money for economic aspects Explain and identify the capital requirements for process plants. Explain and identify the best alternates for process plants Compare various projects and investigate economic feasibility. Explain the principles of management and marketing.
33.		XBT 602-BIOREACTOR DESIGN	<ol style="list-style-type: none"> Understand and describe the fundamentals of enzyme catalyzed reaction and its kinetics. Outline the cell kinetics and choose an appropriate method for finding the parameters for growth. Recognize, perform and detect various immobilization techniques for a biochemical process.

			<ol style="list-style-type: none"> Identify and select a kinetic model and design a bioreactor according to a biochemical process Identify, select and follow a bioreactor for a particular process.
34.		XBT 603-RECOMBINANT DNA TECHNOLOGY	<ol style="list-style-type: none"> Recall the basic concepts of gene cloning and various Restriction and modification enzymes Explain and distinguish various vector systems Describes, Compares and Identifies various techniques involved. Discusses, Manipulates and Describes various screening and selection methods. Explain and Apply the applications of rDNA technology under Biosafety guidelines.
35.		XBT 604-IMMUNOLOGY	<ol style="list-style-type: none"> Outline the general concepts of immune system and describe the cells and organs of the immune system Explains the properties of antigens and antibodies and identify their interactions via various tests. Describe various mechanisms of antigen presentation and discuss the role of MHC in Ag Presentation. Compares the different types of hypersensitive reactions and explain the autoimmune diseases. Comprehend the types, mechanism of vaccines and respond to the various immunization techniques
36.		XBT 605 A-ANIMAL BIOTECHNOLOGY	<ol style="list-style-type: none"> Explain animal cell culture media and animal cell culture techniques. Describe various gene transfer methods in animal cells. Analyze various micromanipulation techniques and reproduce them in fertilization technology. Distinguish various methods and techniques for production of transgenic animals and cloning. Describe manipulation strategies to improve livestock production including meat and milk production
37.		XBT 605 B-NANOBIOTECHNOLOGY	<ol style="list-style-type: none"> Recall the basic concepts characterization techniques and illustrate the methods of nanoparticles synthesis. Construct microfluidic devices and relate its advantages. Design and Develop theragnostic nanoparticles Outlines the environmental applications of nanoparticles Understands the Fundamentals of Nanocarriers and design a drug delivery system.

38.		XBT 605C-HEAT TRANSFER	<ol style="list-style-type: none"> 1. Calculate the thermal resistance and compute the conduction heat transfer rates in any system. 2. Compute the heat transfer rate in any convection system. 3. understanding of heat exchangers equipments and applications 4. Calculate the heat transfer coefficients and heat transfer rates for a given radiation-system 5. Compute the key parameters for any single effect evaporator.
39.	VII	XBT 701 A-PROTEIN ENGINEERING	<ol style="list-style-type: none"> 1. Explain and understand the amino acid characteristics and primary structure of proteins 2. Explain and analyze the secondary and super secondary structural features 3. Describe and compare the different level of protein structure and their folding mechanism. 4. Explain the protein structure its function al relationship and relate that in various examples. 5. Explain the protein engineering concepts and assist that in various engineered protein production.
40.		XBT 701B-PHARMACEUTICAL BIOTECHNOLOGY	<ol style="list-style-type: none"> 1. identify the potential avenues and requirements from the biotechnologists in pharmaceutical industries and describe the scope and applications of biotechnology in pharmacy 2. Outline the pharmacodynamics, pharmacokinetics of drugs 3. Describe various adverse effects of drugs 4. Explain the manufacturing process for various therapeutical products including vaccines, enzymes, interleukins, hormones 5. Comprehend the methods applied to test the quality of drugs and other biopharmaceuticals
41.		XBT 701 C-MASS TRANSFER FUNDAMENTALS	<ol style="list-style-type: none"> 1. Explain the basic principles in diffusional mass transfer and calculate the rate of the mass transfer under one dimensional steady state diffusion 2. Describe the operations of Distillation and absorption and calculate number trays for distillation and absorption tower 3. List situations where liquid–liquid extraction might be preferred to distillation 4. Discuss the salient features of Separation by adsorption, chromatographic separation process and Explain the concept of breakthrough in fixed-bed adsorption. 5. Describe the salient features and mechanism involved in Drying and Design cooling towers.

42.		XBT 702- BIOINFORMATICS AND COMPUTATIONAL BIOLOGY	<ol style="list-style-type: none"> 1. Explain the importance and basic concepts in bioinformatics and differentiate various databases. 2. Understands the significance of sequence analysis and performs sequence alignment. 3. Explain and Construct phylogenetic trees to study phylogenetic relationships 4. Predict and Analysis the protein structure and molecular docking 5. Understand the steps involved in drug discovery process.
43.		XBT 703-DOWNSTREAM PROCESSING	<ol style="list-style-type: none"> 1. Recall and describe the basics of bioseparation process. 2. Outline and differentiate the different methods of downstream processing. 3. Identify, locate and select a specific method for a production process. 4. Recognize, perform and detect various separation technique for a bioproduct development 5. Identify, choose and follow the different methods for the purification of a particular product.
44.		XBT 704 A-CANCER BIOLOGY	<ol style="list-style-type: none"> 1. Outline the regulation and modulation of cell cycle in cancer by various signal switches 2. Explain and compare various types of carcinogenesis and its metabolism 3. Illustrate the role of activation of kinases, identification of oncogenes, and conforms the role of telomere. 4. Explain metastasis and its significant clinical markers for invasion and metastasis 5. Describe and compiles molecular tool for early diagnosis of cancer, different forms of cancer therapy.
45.		XBT 704 B-STEM CELL BIOTECHNOLOGY	<ol style="list-style-type: none"> 1. Able to recall and interpret the biology of stem cells. 2. Explain and develop the embryonic stem cell culturing. 3. Discuss and analyze the differentiation of stem cells 4. Explain and evaluate the various techniques involved in stem cell assay. 5. Discuss and apply the various applications of stem cells.
46.		XBT 704 C-METABOLIC ENGINEERING	<ol style="list-style-type: none"> 1. State and understands the role of transport processes in metabolic pathways and material balance 2. Analyze the regulation of enzymes involved in metabolic pathways

			<ol style="list-style-type: none"> 3. Build algorithms for biosynthesis pathways 4. Explain metabolic flux analysis and its role in manipulation of metabolite production. 5. Explain and compile various strategies to manipulate the production of industrially important Metabolites
47.		XUM 706-CYBER SECURITY	<ol style="list-style-type: none"> 1. To learn the basic concepts of networks and cyber-attacks. 2. To define the concepts of system vulnerability scanning and the scanning tools 3. To understand the network defense mechanisms and the tools used to detect and quarantine network attacks. 4. To learn the different tools for scanning. 5. To identify the types of cybercrimes, cyber laws and cyber-crime investigations.
48.	VIII	XBT OE 1- INTELLECTUAL PROPERTY RIGHTS	<ol style="list-style-type: none"> 1. Understand the significance of IPR and identify various types of IPR. 2. Understand the process of registration and infer the valuation of IP. 3. Understand the legal framework and infer legislative process in India. 4. Understand the international commitment and imply suitable market for the registered IP. 5. Explain the specification and infer values for IP.
49.		XBTOE 2-INDUSTRIAL SAFETY AND RISK MANAGEMENT	<ol style="list-style-type: none"> 1. State the basic classification of safety measures and explain the fundamentals of Industrial Safety. 2. Interpret and analyze the Hazard and Audit System 3. Know the Risk Management and estimate the First Aid types and properties. 4. Analyze and evaluate Safety Procedures 5. Knows the safety handling and will analyze the related Chemicals Safety and Storages.
50.		XBT OE 3-FOOD AND NUTRITION	<ol style="list-style-type: none"> 1. Outline the nutritional composition of foods and describe the calorific value of different food products 2. Discuss the classification of foods and explain nutritional deficiency 3. Outline different causes of food spoilage and its preservation methods 4. Describe the recommended dietary allowances of nutrition according to different age groups 5. Discuss the nutritional needs of people at different stages of their life

51.		XBTOE 4- INTRODUCTION TO MATLAB FOR ENGINEERS	<ol style="list-style-type: none"> 1. State the basic of MATLAB and explain the fundamentals. 2. Interpret and apply the MATLAB functions. 3. Interpret the Matrix with MATLAB and estimate the Engineering properties. 4. Apply and evaluate the MATLAB Array operations in linear equations. 5. Knows the MATLAB applications and apply on engineering domain.
52.		XBT OE5-PROJECT MANAGEMENT	<ol style="list-style-type: none"> 1. Explain and understanding the basic principles of project and the management system 2. Analyze and understanding the risks in project execution. 3. List the project control system and interpret to the evaluation. 4. Discuss the salient features of team work and analyze the effective implementation. 5. Discuss the salient features of work environment and analyze the effective implementation.

Program Outcomes and Course Outcomes of

DEPARTMENT OF CIVIL ENGINEERING

Programmes Offered:

S.No.	Programme Name	PO and CO
1	B.Tech Civil Engineering	Yes
2	M.Tech Civil Engineering	Not Applicable
3	Ph.D	Not Applicable

B.TECH – CIVIL ENGINEERING

PROGRAMME OUTCOME (PO)

At the time of graduation, competency of the student is measured through the attainment of programme outcomes. The quantification of programme outcomes attainment is measured through the assessment of established course outcomes for each subject.

PROGRAM OUTCOMES	
PO 1	Apply the knowledge of mathematics, science, Engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.
PO 2	Identify, formulate, research literature and analysis complex civil engineering problems reaching substantiated conclusions using first principles of mathematics and Engineering Sciences.
PO 3	Design solutions for complex civil engineering problems and design system components or processes that meet the specified needs with appropriate considerations for the public health and safety and the cultural, societal and environmental conservations
PO 4	An ability to plan, draw and design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
PO 5	An ability to work effectively as an individual and a team.
PO 6	An ability to identify, formulate, and solve engineering problems.
PO 7	An understanding of professional and ethical responsibility in a global context
PO 8	An ability to articulate and communicate ideas persuasively and effectively both in written and oral.
PO 9	A recognition of the need for, and an ability to engage in lifelong learning
PO 10	A knowledge of contemporary issues relevant to engineering practice
PO 11	An ability to understand the critical issues of professional practice such as the procurement of work, financial management and the interaction with contractors during the construction phase of a project.
PO 12	An ability to use the techniques, skills, and modern engineering tools necessary for Engineering practice
PROGRAM SPECIFIC OUTCOME	
PSO1	Capably plan, analyse and design the civil engineering structures.
PSO2	Apply knowledge of three technical areas appropriate to Civil Engineering such as Geotechnical, Environmental and water resources engineering etc.

GRADUATE ATTRIBUTES

1. Knowledge base for Engineering: Demonstrate competence in mathematics, natural sciences, engineering fundamentals and specialized engineering knowledge appropriate to the programme.
2. Analytical Skills: Identify, formulate, analyse and solve diverse engineering problems.
3. Design: Solution for complicated open-ended engineering problems and design the components with appropriate standards to meet specified needs with proper attention to public health, safety, environment and society.
4. Experimental Investigation: Technical skills to conduct investigation, interpretation of observed data and provide solution for multifaceted problems.
5. Modern Engineering tools usage: Acquire, select, manipulate relevant techniques, resources and advanced engineering ICT tools to operate simple to complex engineering activities.
6. Impact of engineering on society: Provide a product / project for use by the public towards their health, welfare, safety and legal issues to serve the society effectively.
7. Environment and Sustainability: Design eco-friendly and sustainable products in demonstrating the technology development to meet present and future needs.
8. High Ethical Standards: Practice ethical codes and standards endorsed by professional engineers.
9. Leadership and team work: Perform as an individual and as a leader in diverse teams and in multi-disciplinary scenarios.
10. Communication Skills: Professional communication with the society to comprehend and formulate reports, documentation, effective delivery of presentation and responsible to clear instructions.
11. Project management and Finance: Appropriate in incorporating finance and business practices including project, risk and change management in the practice of engineering by understanding their limitations.
12. Life-long learners: Update the technical needs in a challenging world in equipping themselves to maintain their competence.

B.TECH. – CIVIL ENGINEERING (FT) - COs

S.NO	SEMESTER	COURSE CODE & NAME	COS
1.	I	XMA101-MATHEMATICS-I(CALCULUS AND LINEAR ALGEBRA)	<p>CO1 Apply orthogonal transformation to reduce quadratic form to canonical forms.</p> <p>CO2 Apply power series to tests the convergence of the sequences and series. Half range Fourier sine and cosine series.</p> <p>CO3 Find the derivative of composite functions and implicit functions Euler's theorem and Jacobian</p> <p>CO4 Explain the functions of two variables by Taylors expansion, by finding maxima and minima with and without constraints using Lagrangian Method. Directional derivatives, Gradient, Curl and Divergence.</p> <p>CO5 Apply Differential and Integral calculus to notions of curvature and to improper integrals.</p>
2.	I	XES 102 ENVIRONMENTAL SCIENCES	<p>CO1 Describe the significance of natural resources and explain anthropogenic impacts.</p> <p>CO2 Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance</p> <p>CO3 Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon</p> <p>CO4 Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development</p> <p>CO5 Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection</p>
3.	I	XBE 103 ELECTRICAL AND ELECTRONICS ENGINEERING SYSTEMS	<p>CO1 Define, Relate, the fundamentals of electrical parameters and build and explain AC, DC circuits by Using measuring devices</p> <p>CO2 Define and Explain the of operation of DC and AC machines.</p> <p>CO3 Recall, Illustrate, various semiconductor Devices and their applications and displays the input output characteristics of basic semiconductor devices</p> <p>CO4 Relate Explain, the number systems and logic gates. Construct the different digital circuit.</p> <p>CO5 Label, Outline different types of micro-processors and their applications.</p>

4.	I	XAP104- APPLIED PHYSICS FOR ENGINEERS	<p>CO1 Identify the basics of mechanics, explain the principles of elasticity and determine its significance in engineering systems and technological advances.</p> <p>CO2 Illustrate the laws of electrostatics, magnetostatics and electromagnetic induction; use and locate basic applications of electromagnetic induction to technology.</p> <p>CO3 Understand the fundamental phenomena in optics by measurement and describe the working principle and application of various lasers and fibre optics.</p> <p>CO4 Analyze energy bands in solids, discuss and use physics principles of latest technology using semiconductor devices.</p> <p>CO5 Develop Knowledge on particle duality and solve Schrödinger equation for simple potential.</p>
5.	I	XEG 105- ENGINEERING GRAPHICS AND DESIGN	<p>CO1 Apply the national and international standards, construct and practice various curves</p> <p>CO2 Interpret, construct and practice orthographic projections of points, straight lines and planes.</p> <p>CO3 Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids.</p> <p>CO4 Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids</p> <p>CO5 Construct sketch and practice isometric and perspective views of simple and truncated solids.</p>
6.	II	XMA201- CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLE	<p>CO1 Find double and triple integrals and to find line, surface and volume of an integral by Applying Greens, Gauss divergence and Stokes theorem</p> <p>CO2 Solve first order differential equations of different types which are solvable for p, y, x and Clairaut's type</p> <p>CO3 Solve Second order ordinary differential equations with variable coefficients using various methods</p> <p>CO4 Use CR equations to verify analytic functions and to find harmonic functions and harmonic conjugate. Conformal mapping of translation and rotation. Mobius transformation.</p>

			CO5 Apply Cauchy residue theorem to evaluate contour integrals involving sine and cosine function and to state Cauchy integral formula, Liouville's theorem. Taylor's series, zeros of analytic functions, singularities, Laurent's series.
7.	II	XCP202- PROGRAMMING FOR PROBLEM SOLVING	CO1 Define programming fundamentals and Solve simple programs using/O statements CO2 Define syntax and write simple programs using control structures and arrays CO3 Explain and write simple programs using functions and pointers CO4 Explain and write simple programs using structures and unions CO5 Explain and write simple programs using files and Build simple projects
8.	II	XGS 203- ENGLISH	CO1 Ability to recall the meaning for proper usage CO2 Apply the techniques in sentence patterns CO3 Identify the common errors in sentences CO4 Construct the Nature and Style of sensible Writing CO5 Practicing the writing skills CO6 Grasping the techniques in learning sounds and etiquettes
9.	II	XAC204- APPLIED CHEMISTRY FOR ENGINEERS	CO1 Identify the periodic properties such as ionization energy, electron affinity, oxidation states and electro negativity. Describe the various water quality parameters like hardness and alkalinity CO2 Explain and Measure microscopic chemistry in terms of atomic, molecular orbitals and intermolecular forces. CO3 Interpret bulk properties and processes using thermodynamic and kinetic considerations. CO4 Describe, Illustrate and Discuss the chemical reactions that are used in the synthesis of molecules. CO5 Apply, Measure and Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
10.	II	XBW205- WORKSHOP/MANUFAC TURING PRACTICES	CO1 Summarize the machining methods and Practice machining operation CO2 Defining metal casting process, moulding methods and relates Casting and Smithy applications.

			<p>CO3 Plan basic carpentry and fitting operation and Practice carpentry and fitting operations</p> <p>CO4 Summarize metal joining operation and Practice welding operation.</p> <p>CO5 Illustrate the, electrical and electronics basics and Makes appropriate connections.</p>
	III	XCE301-TRANSFORMS AND COMPUTATIONAL TECHNIQUES	<p>CO1 Find the Laplace Transform of standard functions and to solve ODE and PDE (simple problems).</p> <p>CO2 Find the Fourier Transform and Z-transform of standard functions.</p> <p>CO3 Solve polynomial and transcendental equation using by Newton-Raphson method. Find Interpolation with equal and unequal intervals.</p> <p>CO4 Find numerical differentiation and integration by trapezoidal rule, simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule.</p> <p>CO5 Solve ordinary differential equations by Taylor's series method, Euler and modified Euler's method and Runge-kutta method of fourth order.</p>
11.	III	XCE302-DISASTER PREPAREDNESS AND PLANNING	<p>CO1 Understand basic concepts in Disaster Management</p> <p>CO2 Understand Definitions and Terminologies used in Disaster Management and able to Analyzing Relationship between Development and Disasters</p> <p>CO3 Able to understand Categories of Disasters</p> <p>CO4 Understand the Challenges posed by Disasters</p> <p>CO5 Understand Impacts of Disasters Key Skills</p>
12.	III	XCE 303- COMPUTER AIDED CIVIL ENGINEERING DRAWING	<p>CO1 Develop Parametric design and the conventions of formal engineering drawing</p> <p>CO2 Draw and interpret 2D & 3D drawings.</p> <p>CO3 Communicate a design idea/concept graphically/ visually</p> <p>CO4 Examine a design critically and with understanding of CAD</p> <p>CO5 Get a Detailed study of an engineering artifact</p>
13.	III	XCE304- ENGINEERING MECHANICS	<p>CO1 Apply Mathematics, Science, and Engineering</p> <p>CO2 Identify, formulate, and solve engineering problems</p>

			<p>CO3 Apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of the limitations.</p> <p>CO4 Design and conduct experiments, as well as to analyze and interpret data</p> <p>CO5 Comprehend the thermodynamics and their corresponding processes that influence the behaviour and response of structural components</p>
14.	III	XCE 305- ENERGY SCIENCE AND ENGINEERING	<p>CO1 List and generally explain the main sources of energy and their primary applications nationally and internationally</p> <p>CO2 Understand effect of using these sources on the environment and climate</p> <p>CO3 Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment.</p> <p>CO4 List and describe the primary renewable energy resources and technologies</p> <p>CO5 Quantify energy demands and make comparisons among energy uses, resources, and technologies.</p> <p>CO6 Understand the Engineering involved in projects utilizing these sources</p>
15.	III	XCE306-SURVEYING-I	<p>CO1 Identify the Principles and functions of various surveying methods</p> <p>CO2 Identify the methods of Leveling and determine the reduced levels</p> <p>CO3 Classify the methods of Contouring and Measure the capacity of Reservoir</p> <p>CO4 Describe the methods and measure the angles and distances using Theodolite</p> <p>CO5 Understand the measurement of distance and heights of objects using tachometric principle</p>
16.		XCE 307- INTRODUCTION TO CIVIL ENGINEERING	<p>CO1 Develop Parametric design and the conventions of formal engineering drawing</p> <p>CO2 Produceandinterpret2D&3Ddrawings</p> <p>CO3 Communicate a design idea/concept graphically/ visually</p> <p>CO4 Examine a design critically and with understanding of CAD</p> <p>CO5 Get a Detailed study of an engineering artifact</p>

17.		XGS 308- EFFECTIVE TECHNICAL COMMUNICATION	<p>CO1 Identify the features of a technical project report and Knowledge on the linguistic competence to write a technical report</p> <p>CO2 Integrate both technical subject skill and language skill to write a project.</p> <p>CO3 The learner identifies and absorbs the pronunciation of sounds in English Language and learns how to mark the stress in a word and in a sentence properly</p> <p>CO4 Confidence to present a project in 10 to 15 minutes</p>
18.	IV	XCE 401- MECHANICAL ENGINEERING	<p>CO1 After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions</p> <p>CO2 Students can Study the changes in thermodynamic properties of substances</p> <p>CO3 The students will be able to study the performance of energy conversion devices</p> <p>CO4 The students will be able to differentiate between high grade and low grade energies</p> <p>CO5 Student can apply the energy balance to systems operating at different cycles.</p>
19.	IV	XCE 402 INSTRUMENTATION & SENSOR TECHNOLOGIES FOR CIVIL ENGINEERING APPLICATIONS	<p>CO1 Understand the principles of operation and characteristics of instrumentation and integrated sensor systems.</p> <p>CO2 Understand right use of sensors and instruments for differing applications along with limitations.</p> <p>CO3 Recognize and Apply measurement best practice and identify ways to improve measurement and evaluation</p> <p>CO4 Solve problems in instrumentation and measurement systems.</p>
20.	IV	XCE 403 – ENGINEERING GEOLOGY	<p>CO1 Site characterization and how to collect, analyze, and report geologic data using standards in engineering practice</p> <p>CO2 The fundamentals of the engineering properties of Earth materials and fluids</p> <p>CO3 Rock mass characterization and the mechanics of planar rock slides and topples</p> <p>CO4 Soil characterization and the Unified Soil Classification System.</p> <p>CO5 The mechanics of soils and fluids and their influence on settlement, liquefaction, and soil slope stability.</p>

21.	IV	XCE 404- MECHANICS OF FLUIDS	<p>CO1 Understand the broad principles of fluid statics, kinematics and dynamics</p> <p>CO2 Understand definitions of the basic terms used in fluid mechanics</p> <p>CO3 Understand classifications of fluid flow</p> <p>CO4 Application of the continuity, momentum and energy principles</p> <p>CO5 Understanding and analyzing distribution of water through pipe</p>
22.	IV	XCE 405 – MECHANICS OF SOLIDS	<p>CO1 Analyse various situations involving structural members subjected to combined stresses by application of Mohr's circle of stress</p> <p>CO2 Calculate the shear force and bending moment occurs at various loading conditions.</p> <p>CO3 Evaluate the shear stress distribution for beams of various sections</p> <p>CO4 Calculate the deflection at any point on a beam subjected to a combination of loads</p> <p>CO5 Evaluate torsion problems in bars and thin walled members.</p>
23.	IV	XCE 406- GEOTECHNICAL ENGINEERING	<p>CO1 Carry out soil classification, solve any PRACTICAL problems related to soil stresses estimation, permeability and seepage including flow net diagram</p> <p>CO2 Estimate the stresses under any system of foundation loads solve PRACTICAL problems related to consolidation settlement and time rate of settlement</p> <p>CO3 Transfer the concept of soil investigation for any civil engineering construction</p> <p>CO4 Analyze earth retaining structures for any kind of soil medium</p> <p>CO5 Evaluate bearing capacity for proper foundations for any kind of shallow foundation system</p> <p>CO6 Assess the pile and pile group capacity for any kind of soil including group efficiency and negative friction</p>
24.		XCE 407- SURVEYING-II	<p>CO1 Illustrate the features of Triangulation system</p> <p>CO2 Understand the importance of advanced techniques involved in surveying such as Hydrographic surveying, Electronic Distance Measurement, Global Positioning System, Photogrammetric and Remote Sensing.</p>

			<p>CO3 Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering and surveying activities</p> <p>CO4 Translate the knowledge gained for the implementation of Civil infrastructure facilities</p> <p>CO5 Relate the knowledge on Surveying to the new frontiers of science like Hydrographic surveying, Electronic Distance Measurement, Global Positioning System, Photogrammetric and Remote Sensing.</p>
25.		XCE 408- MATERIALS TESTING &EVALUATION	<p>CO1 Understand the use of non-conventional Civil Engineering materials</p> <p>CO2 Understand the various modes of failure in compression, tension, and shear</p> <p>CO3 Understand the standard testing and evaluation procedure</p> <p>CO4 Apply the concepts of fracture mechanics to various materials</p> <p>CO5 Adopt special concreting technologies to meet out the modern construction requirements</p>
26.	V	XCE501 MECHANICS OF MATERIALS	<p>CO1 Understand the concept of theories of failure</p> <p>CO2 Understand the deformation and strains under different load action and response in terms of forces and moments</p> <p>CO3 Able to understand the Thin-walled Pressure Vessels</p> <p>CO4 Understand the energy methods used to derive the equations to solve engineering problems</p> <p>CO5 Illustrate stability of columns and plastic design</p>
27.	V	XCE502 HYDRAULIC ENGINEERING	<p>CO1 Compute the coefficients using the theory of boundary layer</p> <p>CO2 Perform dimensional analysis for problems in fluid mechanics</p> <p>CO3 Illustrate the various theories dealing with the flow phenomenon of fluids and Design the open channels</p> <p>CO4 Classify and design of the hydro-machinery and the components, function and use of different types of turbines.</p> <p>CO5 Describe and Discuss the working principles of pumps.</p>

28.	V	XCE 503 STRUCTURAL ANALYSIS	CO1 Identify the behavior of structural element under various loading condition. CO2 Analyse the continuous beams and rigid frames by slope deflection method. CO3 Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway. CO4 Superimpose the effects of settlement and rotation of the supports over the regular analysis. CO5 Apply knowledge on advanced methods of analysis of structures including arches and cables.
29.	V	XCE504 HYDROLOGY AND WATER RESOURCES ENGINEERING	CO1 Understand the interaction among various processes in the hydrologic cycle CO2 Understand the forms of precipitation and measurements. CO3 Understand runoff , ground water and well hydrology CO4 Understand water requirement of crops-Crops and crop seasons in India, Methods of applying water. CO5 Understand application of Distribution systems- canal, Dams, reservoir and spillway.
30.	V	XCE 505 ENVIRONMENTAL ENGINEERING	CO1 Understand the impact of humans on environment and environment on humans CO2 Identify and value the effect of the pollutants on the environment: atmosphere, water and soil. CO3 Plan strategies to control, reduce and monitor pollution. CO4 Select the most appropriate technique for the treatment of water, wastewater solid waste and contaminated air. CO5 Conversant with basic environmental legislation
31.	V	XCE506 TRANSPORTATION ENGINEERING	CO1 Carry out surveys involved in planning and highway alignment CO2 Design the geometric elements of highways and expressways CO3 Carry out traffic studies and implement traffic regulation and control measures and intersection design . CO4 Characterize pavement materials

			CO5 Design flexible and rigid pavements as per IRC
32.	V	XCE507 CONSTRUCTION ENGINEERING &MANAGEMENT	CO1 Understand the basic concepts of construction management such as types and functions of management, life-cycle stages of projects, project delivery types of contracts, and bidding CO2 Ascertain a basic ability to plan, control and monitor construction projects with respect to time and cost CO3 Understanding of modern construction practices. CO4 Receiving an idea how construction projects are administered with respect to contract structuresand issues. CO5 Ability to put forward ideas and understandings to others with effective communication processes.
33.	V	XMG508 PROFESSIONAL PRACTICE LAWÐICS	CO1 To Understand the various stakeholders roles and ethicsgoverning the profession CO2 To able to contracts management and dispute resolution mechanisms; CO3 To give an understanding of Intellectual Property Rights, Patents. CO4 Able to understand construction related laws CO5 To develop ideas of the legal and practical aspects of their profession
34.	V	XCI509 CONSTITUTION OF INDIA	CO1 Understand the salient features of Indian Constitution CO2 Gather the information on the contours of Constitutional Rights and Duties CO3 know the functions and powers of Governance CO4 Summarise the Responsibilities of Local administration CO5 Able to understand the Function of Election Commission
35.	VI	XCE 601 STRUCTURAL ENGINEERING	CO1 Apply their knowledge of structural mechanics in design problems of structural engineering CO2 Acquire the skills to solve problems with different loads on concrete and steel CO3 Design the Reinforced concrete elements CO4 Design the steel elements CO5 Understand the behavior of special structural elements

36.	VI	XCE602 ENGINEERING ECONOMICS, ESTIMATION AND COSTING	CO1 Understand the Economics in general, Economics of India particularly for public sector agencies and private sector businesses CO2 Understand the principles and methods of measurements CO3 Understand the methodology of pricing and to determine the unit cost of “components” CO4 Learning from Laboratory demonstration and field visits CO5 Prepare the actual estimate of any property/project
37.		XCEE01 PAVEMENT DESIGN	CO1 Understand the components of highway and airport pavements CO2 Utilize identified traffic factors efficiently in the pavement design. CO3 Optimally design of flexible pavements CO4 Optimally design of rigid pavements CO5 Assess pavement performance and suggest rectification options.
38.		XCEE02 AIRPORT PLANNING AND DESIGN	CO1 Gain an insight on the planning and site selection of Airport . CO2 Know about layout and passenger facility systems. CO3 Analyze and design the elements for orientation of runways. CO4 Design and maintain the pavements . CO5 Understand the importance of navigational aids
39.		XCEE03 PORT AND HARBOUR ENGINEERING	CO1 Develop an understanding of overall Port and Harbour Engineering and its impact. CO2 Absorbs the Key design Characteristics for design of Elements like Groins,Break waters, jetties etc. CO3 Fully conversant with advanced topics like coastal protection. CO4 Acquire a basic understanding about Navigational Aids CO5 Understand the various features in Ports, their construction, works and coastal Regulations to be adopted.

40.		XCEE04 RAILWAY ENGINEERING	CO1 Understand the methods of route alignment CO2 Identify the elements of permanent way CO3 Design and analyse the geometric elements CO4 Design the layout of track junctions CO5 Understand the Construction techniques and Maintenance of Track laying and Railway stations.
41.		XCEE05 ADVANCED STRUCTURAL ANALYSIS	CO1 Identify the behavior of indeterminate structure by influence lines. CO2 Apply knowledge on advanced methods of analysis of structures including for planes and rigid frames. CO3 Superimpose the effects of settlement and rotation of the supports over the regular analysis. CO4 Apply knowledge of finite element for determinate and indeterminate structures. CO5 Recognize the plastic analysis of structural elements.
42.		XCEE06 DESIGN OF CONCRETE STRUCTURES	CO1 Perceive the knowledge on basics of design CO2 Interpret ultimate and serviceability limit state approaches in current structural design philosophy CO3 Understand the design concept of structural elements CO4 Model building structure and analyse structural elements for design actions
43.		XCEE 07 CONCRETE TECHNOLOGY	CO1 Analyse the properties of ingredients of Concrete CO2 Design a concrete mix for various grade CO3 Assess the quality of concrete CO4 Identify the causes of distress in concrete CO5 Suggest suitable solution for practical problems in concrete construction
44.		XCEE08 DESIGN OF STEEL STRUCTURES	CO1 Design of structural connections CO2 Design of tension members CO3 Design of compression members CO4 Understand fabrication of plate girders and gantry girders CO5 Understand the plastic behaviour of steel section.

45.		XCEE09 PRESTRESSED CONCRETE STRUCTURES.	CO1 Understand the need of the prestressed concrete and the methods of prestressing. CO2 Identify and apply the design codes relevant for the design of prestressed concrete members CO3 Accomplish the design calculation to predict circular prestressing behaviour of prestressed concrete structures. CO4 Understand the behaviour of composite section and analyse the stress under different conditions. CO5 Analyse the behaviour of statically indeterminate structures for the primary and secondary moments.
46.		XCEE 10 BRIDGE ENGINEERING	CO1 Understand the components of bridges CO2 Assess the behavior of various bridges. CO3 Design the steel and concrete bridges CO4 Design the Cable and suspension bridges CO5 Design the substructure of bridges.
47.		XCEE11 FOUNDATION ENGINEERING	CO1 Learn about types and purposes of different foundation systems and structures CO2 Explain about the systematic methods for designing foundations CO3 Evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behaviour. CO4 Apply necessary theoretical background for design and construction of foundation systems. CO5 Assess the load carrying capacity of deep foundation for any kind of soil including group efficiency and negative friction
48.		XCEE12 ENVIRONMENTAL GEOTECHNOLOGY	CO1 Analyse the soil contamination concentration and type CO2 Be trained to develop sustainable and environmentally sound solutions for geotechnical problems CO3 Solving environmental engineering problems unique to several soil and subsurface conditions. CO4 Monitor and analyse quality of ground water CO5 Suggest the steps to remediation of soil and groundwater

49.		XCEE13 GEOTECHNICAL DESIGN	<p>CO1 explain the various investigation specifications as per the infrastructure to be build on the proposed site</p> <p>CO2 Evaluate the properties of materials required for the constructing a desired geotechnical infrastructure</p> <p>CO3 Understand the design concepts of various foundation systems</p> <p>CO4 Classify the design principles of dams, pavement and retaining walls</p> <p>CO5 Design a underground storage system, buried structures, Geosynthetics</p>
50.		XCEE14 EARTHQUAKE ENGINEERING	<p>CO1 Describe the basis of vibrations</p> <p>CO2 Analyse SDOF and MDOF systems with distributed mass for continuous system.</p> <p>CO3 Quantify the effect of seismic waves.</p> <p>CO4 Understand the concept of response spectrum and application of structural dynamics.</p> <p>CO5 Able to design of Earthquake resistant structures with codal provisions</p>
51.		XCEE15 DESIGN OF HYDRAULIC STRUCTURES	<p>CO1 Design the Tank irrigation structure and draw the components.</p> <p>CO2 Design of dams and energy dissipation structures</p> <p>CO3 Design and plot canal transmission structures</p> <p>CO4 Analyse and design canal regulation structures</p> <p>CO5 Develop strategies for water management in irrigation structures.</p>
52.		XCEE16 BASICS OF COMPUTATIONAL HYDRAULICS	<p>CO1 Simulation of the flow of water, together with its consequences</p> <p>CO2 Apply hydrodynamic techniques and 1 dimensional expansions and contractions</p> <p>CO3 Understand linearized method of characteristics</p> <p>CO4 Able to understand forms of conservation and applications</p> <p>CO5 Do different flow modeling using software</p>
53.		XCEE17 URBAN HYDROLOGY AND HYDRAULICS	<p>CO1 Understand the importance of short duration rainfall runoff data for urban hydrology studies</p> <p>CO2 Understand the importance of short duration rainfall runoff data for urban hydrology studies</p> <p>CO3 Understand the importance of short duration rainfall runoff data for urban hydrology studies</p>

			<p>CO4 Learn some of the best management practices in urban drainage.</p> <p>CO5 Understand the concepts of preparation master urban drainage system.</p>
54.		XCEE18 GROUNDWATER ENGINEERING	<p>CO1 Relate and Interpret the Development and evolution of ecosystems.</p> <p>CO2 Explain and Apply Fluvial Ecosystem Diversity.</p> <p>CO3 Classify and Develop the stream water chemistry.</p> <p>CO4 Classify and Dissect necessity of Water quality models.</p> <p>CO5 List and respond to Formulation of anisotropic and non-homogenous flow of groundwater.</p>
55.		XCEE19 WATER QUALITY ENGINEERING	<p>CO1 Understand the significance of Physio-chemical treatment for water and wastewater</p> <p>CO2 Recognize the principles of Physical treatment</p> <p>CO3 Acquire knowledge on Chemical Treatment</p> <p>CO4 Apply the principles of treatment methodologies and to design the Municipal water treatment plants</p> <p>CO5 Apply the principles and to design the Industrial water treatment units</p>
56.		XCEE20 SURFACE HYDROLOGY	<p>CO1 Calculate the various components of hydrologic cycle</p> <p>CO2 Apply the principle of hydrograph to estimate flood characteristics</p> <p>CO3 Understand the infiltration processes</p> <p>CO4 Able to understand the runoff detailing</p> <p>CO5 Estimate the flood peak discharge</p>
57.		XCEE 21 ENVIRONMENTAL FLUID MECHANICS	<p>CO1 apply knowledge of basic mathematics, science, and engineering</p> <p>CO2 Ability to function on multi-disciplinary teams</p> <p>CO3 Ability to identify, formulate and solve engineering problems</p> <p>CO4 Ability to understand the impact of engineering solutions in a global and societal context</p> <p>CO5 Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</p>

58.		XCEE22 WATER RESOURCES FIELD METHODS.	CO1 understand Site characterization Basic surveying and the measurement technologies CO2 Measure and record the details water- resources CO3 Understand the methods and sampling of water. CO4 Sampling of volatile organic compounds and maintain data quality. CO5 Understand groundwater monitoring wells and stream flow monitoring stations
59.		XCEE23 REPAIR & REHABILITATION OF STRUCTURES.	CO1 Understand the importance of maintenance and repair CO2 Understand the concept of quality assurance of concrete properties CO3 Understand the various concrete materials used for repair works CO4 Knowledge in the application of repair techniques in concrete construction CO5 Understand the repair, rehabilitation and retrofitting of structures
60.		XCEE24 BUILDING CONSTRUCTION PRACTICE	CO1 Able to understand the construction activities CO2 Perceive the knowledge on various masonry and finishes CO3 Explain the shuttering and scaffolding methods CO4 Identify various techniques adopted in sub structure construction CO5 Understand the different techniques used in super-structures
61.		XCEE25 CONSTRUCTION EQUIPMENT AND AUTOMATION	CO1 Identify construction equipment appropriate to tasks CO2 Estimate equipment ownership and operating costs CO3 Estimate and schedule activities using equipment productivity and cost data CO4 Understand contemporary issues pertaining to construction methods, equipment usage and management. CO5 Recognize the concept of intelligent buildings
62.		XCEE26 CONTRACTS MANAGEMENT	CO1 Recognize the various types of construction contracts CO2 Understand the tenders, arbitration and legal requirements CO3 Gain knowledge about various tax laws CO4 Able to analyse, evaluate and design construction contract documents CO5 Gain knowledge in labour regulations.

63.		XCEE27 ENVIRONMENTAL LAW AND POLICY	CO1 Describe different methods for setting environmental goals and the means to achieve those goals CO2 Read and understand legal opinions and analyze opinions to find legal principles CO3 Apply common law environmental remedies and explain how those remedies supplement environmental statutory law CO4 Apply major common law environmental causes of action and environmental law statutes to factual situations.
64.		XCEE28 SOLID AND HAZARDOUS WASTE MANAGEMENT	CO1 Characterize the physical and chemical composition of Solid and Hazardous waste CO2 Explain the functional elements for solid waste management System CO3 Identify the methods of collection, segregation and transport of solid and Hazardous waste CO4 Understand the techniques and methods used in energy recovery and recovery of materials from solid wastes CO5 Describe methods of disposal of solid and hazardous waste.
65.		XCEE29 AIR AND NOISE POLLUTION AND CONTROL	CO1 Understand the effects of air pollutants CO2 Understand the particulate control methods CO3 Understand the gaseous pollutants and controlling methods CO4 Acquire knowledge on air sampling and pollutant measurement CO5 Recognise the concepts of noise pollution and control methods
66.		XCEE30 ENVIRONMENTAL IMPACT ASSESSMENT	CO1 Understand the EIA process to apply for research, planning, project CO2 Acquire the knowledge on Assessment methodologies CO3 Understand the concepts of legal, economic, social, administrative and technical process. CO4 Create Environmental audit reports CO5 Experienced and Trained in Environmental Planning and related professions
67.		XCEMO1 REAL ESTATE AND VALUATION	CO1 Apply the concept of property valuation and appraisal CO2 Practice valuation for different properties using different methods CO3 Perform an applied real estate analysis in a business situation

68.		XCEM02 DIGITAL LAND SURVEYING AND MAPPING	CO1 Understand the importance of digital surveying and mapping of earth surface. CO2 Understand the importance of total station and its working & measurements for land surveying. CO3 Understand the importance of Fundamentals, working & measurements using GPS for land surveying. CO4 Learn some of the best management practices in, digital surveying procedure, working, data reduction etc. CO5 Understand the concepts of preparation of master demonstration of a digital land surveying and mapping of an area.
69.		XCEM03 GENERAL REPAIRS & REMEDIAL WATERPROOFING	CO1 Understand the mortars used for repairs CO2 Acquire knowledge about bonding agents and injection system CO3 Learn the protective coating
70.		XCEM04 BUILDING REGULATIONS AND APPROVAL PROCESS	CO1 Prepare building plans according to rules and regulations. CO2 Able to create documents for building approval. CO3 Able to apply approval for building.
71.		XCEM05 COMPUTATIONAL SKILLS FOR GEOTECHNICAL APPLICATIONS	CO1 Solve linear and non-linear equations using numerical techniques. CO2 Apply finite difference and finite element method for analysing behaviour of geotechnical structures. CO3 Apply correlation and regression analysis for the geotechnical data.
72.		XCEM06 STRUCTURAL QUALITY ASSESSMENT	CO1 Understand the types of distress in structures. CO2 Analyse the reason for deterioration of structures CO3 Suggest the solution for affected structures.
73.		XCEM07 PLUMBING AND SANITARY INSTALLATIONS	CO1 Understand the type of materials and joining CO2 Acquire knowledge water line and sanitary line installations CO3 Learn the safety aspects

Programme and Course Outcomes of

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

1. B.Tech, ECE

PROGRAMME OUTCOME (PO)	
PO1	Able to apply the knowledge of Mathematics, Science, Engineering and Technology in the field of Electronics and Communication Engineering.
PO2	Capable to identify and analyse the Electronics and Communication engineering problems.
PO3	Proficient to provide solutions to meet the specific needs of the public health, safety, environment and society.
PO4	Competent to conduct experiments, interpret the data and compare the performance and provide solutions for complex problems.
PO5	Adept to handle modern Electronics and Communication Engineering tools, equipments and software.
PO6	Skillful to design Electronics and Communication products and validate by analysis and test for the benefit of the society towards safety and legal issues.
PO7	Efficient to develop a Electronics and Communication system or process to meet the economical growth, eco friendly environment and sustainability.
PO8	Instill to integrate professional, ethical and social responsibility in all walks of life.
PO9	Masterful to lead the group activities or as a team member for best outputs.
PO10	Effective to comprehend and formulate reports, deliver presentations and respond to the queries with clear ideas.
PO11	Capable to incorporate business practices and project management for the economical growth of the nation.
PO12	Able to update technical knowhow and engage in lifelong learning to meet the challenges of the modern world.
PROGRAM SPECIFIC OUTCOMES(PSOS)	
PSO1	Will be able to specialize networking practice.
PSO2	Will be able to specialize in Wireless Communications pertaining to physical layer.

Course Outcomes for all the Courses

SEMESTER	COURSE CODE	COURSE OUTCOME
I	XMA101 CALCULUS AND LINEAR ALGEBRA	CO1 Apply orthogonal transformation to reduce quadratic form to canonical forms.
		CO2 Apply power series to tests the convergence of the sequences and series. Half range Fourier sine and cosine series.
		CO3 Find the derivative of composite functions and implicit functions. Euler's theorem and Jacobian
		CO4 Explain the functions of two variables by Taylors expansion, by finding maxima and minima with and without constraints using Lagrangian Method. Directional derivatives, Gradient, Curl and Divergence.
		CO5 Apply Differential and Integral calculus to notions of Curvature and to improper integrals.
	XCP102 PROGRAMMING FOR PROBLEM SOLVING	CO1 Define programming fundamentals and Solve simple programs using I/O statements
		CO2 Define syntax and write simple programs using control structures and arrays
		CO3 Explain and write simple programs using functions and pointers
		CO4 Explain and write simple programs using structures and unions
		CO5 Explain and write simple programs using files and Build simple projects
	XGS103 ENGLISH	CO1 Ability to recall the meaning for proper usage
		CO2 Apply the techniques in sentence patterns
		CO3 Identify the common errors in sentences
		CO4 Construct the Nature and Style of sensible Writing
		CO5 Practicing the writing skills
		CO6 Grasping the techniques in learning sounds and etiquettes
	XAC104 APPLIED CHEMISTRY FOR ENGINEERS	CO1 Identify the periodic properties such as ionization energy, electron affinity, oxidation states and electro negativity. Describe the various water quality parameters like hardness and alkalinity.

		<p>CO2 Explain and Measure microscopic chemistry in terms of atomic, molecular orbitals and intermolecular forces.</p> <p>CO3 Interpret bulk properties and processes using thermodynamic and kinetic considerations.</p> <p>CO4 Describe, Illustrate and Discuss the chemical reactions that are used in the synthesis of molecules.</p> <p>CO5 Apply, Measure and Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques</p>
	XWP105 WORKSHOP PRACTICES	<p>CO1 Summarize the machining methods and Practice machining operation.</p> <p>CO2 Defining metal casting process, moulding methods and relates Casting and Smithy applications.</p> <p>CO3 Plan basic carpentry and fitting operation and Practice carpentry and fitting operations.</p> <p>CO4 Summarize metal joining operation and Practice welding operation.</p> <p>CO5 Illustrate the, electrical and electronics basics and Makes appropriate connections.</p>
	XMA201 CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLE	<p>CO1 Find double and triple integrals and to find line, surface and volume of an integral by Applying Greens, Gauss divergence and Stokes theorem.</p> <p>CO2 Solve first order differential equations of different types which are solvable for p, y, x and Clairaut's type.</p> <p>CO3 Solve Second order ordinary differential equations with variable coefficients using various methods.</p> <p>CO4 Use CR equations to verify analytic functions and to find harmonic functions and harmonic conjugate. Conformal mapping of translation and rotation. Mobius transformation.</p> <p>CO5 Apply Cauchy residue theorem to evaluate contour integrals involving sine and cosine function and to state Cauchy integral formula, Liouville's theorem. Taylor's series, zeros of analytic functions, singularities, Laurent's series.</p>
	XES202 ENVIRONMENTAL SCIENCES	<p>CO1 Describe the significance of natural resources and explain anthropogenic impacts.</p> <p>CO2 Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.</p>

		<p>CO3 Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon</p> <p>CO4 Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development.</p> <p>CO5 Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.</p>
	<p>XBE203</p> <p>ELECTRICAL AND ELECTRONICS ENGINEERING SYSTEMS</p>	<p>CO1 Define, Relate, the fundamentals of electrical parameters and build and explain AC, DC circuits by Using measuring devices</p> <p>CO2 Define and Explain the operation of DC and AC machines.</p> <p>CO3 Recall, Illustrate, various semiconductor Devices and their applications and displays the input output characteristics of basic semiconductor devices.</p> <p>CO4 Relate Explain, the number systems and logic gates. Construct the different digital circuit.</p> <p>CO5 Label, Outline different types of microprocessors and their applications.</p>
	<p>XAP204</p> <p>APPLIED PHYSICS FOR ENGINEERS</p>	<p>CO1 Identify the basics of mechanics, explain the principles of elasticity and determine its significance in engineering systems and technological advances.</p> <p>CO2 Illustrate the laws of electrostatics, magneto-statics and electromagnetic induction; use and locate basic applications of electromagnetic induction to technology.</p> <p>CO3 Understand the fundamental phenomena in optics by measurement and describe the working principle and application of various lasers and fibre optics.</p> <p>CO4 Analyse energy bands in solids, discuss and use physics principles of latest technology using semiconductor devices.</p> <p>CO5 Develop Knowledge on particle duality and solve Schrodinger equation for simple potential.</p>
	<p>XEG205</p> <p>ENGINEERING GRAPHICS</p>	<p>CO1 Apply the national and international standards, construct and practice various curves</p> <p>CO2 Interpret, construct and practice orthographic projections of points, straight lines and planes.</p> <p>CO3 Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids.</p>

		<p>CO4 Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids.</p> <p>CO5 Construct sketch and practice isometric and perspective views of simple and truncated solids.</p>
	<p>XMA301</p> <p>TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS</p>	<p>CO1: Solve standard types of first order and second order partial differential equations with constant coefficients.</p> <p>Elimination of arbitrary constants and functions.</p> <p>CO2 State Dirichlet's condition. Explain general Fourier series of the curve $y = f(x)$ in the interval $(0, 2\pi)$ $(-\pi, \pi)$, $(0, 2\ell)$, $(-\ell, \ell)$ and $(0, \pi)$.</p> <p>Perform harmonic analysis</p> <p>CO3 Solve the standard Partial Differential Equations, arising in engineering Problems, like one dimensional</p> <p>Wave equation and Heat flow equation by Fourier series method in Cartesian coordinates.</p> <p>Classify second order quasi pde.</p> <p>CO4 Find the Fourier transform and Fourier sine and cosine transforms of simple functions using definition and its properties.</p> <p>CO5 Apply the properties of Z transform to Find the Z transform and inverse Z transform of sequence and functions, and to solve the difference equation using them.</p>
	<p>XEC302</p> <p>ELECTRONIC DEVICES</p>	<p>CO1 Define the principles of semiconductor physics.</p> <p>CO2 Describe the operation and characteristics of semiconductor diodes.</p> <p>CO3 Understand the operation and Characteristics of BJT and FET</p> <p>CO4 Discuss the operation and characteristics of power electronic and optoelectronic diodes</p> <p>CO5 Illustrate the Integrated Circuit fabrication processes.</p>
	<p>XEC303</p> <p>DIGITAL SYSTEM DESIGN</p>	<p>CO1 Understand the fundamental concepts and Karnaugh map techniques used in digital electronics.</p> <p>CO2 Understand the fundamental concepts of combinational logic circuits</p> <p>CO3 Understand the fundamental concepts of Sequential logic circuits</p> <p>CO4 Explain the function of Logic Families, Memories and Programmable Logic Devices</p>

		CO5 Use VHDL to simulate combinational and sequential logic circuits.
	XEC304 SIGNALS AND SYSTEMS	CO1 Describe and Classify the signals & systems CO2 Find and Apply FT and DFT and Analyze the properties of LSI systems. CO3 Find and solve Laplace Transform to study the response of LSI systems CO4 Find and solve Z transform to study the performance of Discrete Time Signals CO5 Interpret the relation between the continuous and discrete time signals by Sampling and Reconstruction.
	XUM305 ENTREPRENEURSHIP DEVELOPMENT	CO1 Recognise and describe the personal traits of an entrepreneur. CO2 Determine the new venture ideas and analyse the feasibility report. CO3 Develop the business plan and analyse the plan as an individual or in team. CO4 Describe various parameters to be taken into consideration for launching and managing small business. CO5 Explain the technological management and Intellectual Property Rights
	XUM306 CONSTITUTION OF INDIA	CO1 Understand the Constitutional History CO2 Understand the Powers and Functions CO3 Understand the Legislature CO4 Understand the Judiciary CO5 Understand the Centre State relations
	XEC307 NETWORK THEORY	CO1 Describe and Understand the concepts of nodal, mesh analysis and network theorems. CO2 Recognize and Distinguish the response of a network CO3 Distinguish RL, RC and RLC networks and Analyze their characteristics CO4 Understand the various functions of network and the stability of network. CO5 Classify and Explain the different types of filters

	<p>XEC308</p> <p>ELECTRONICS DEVICES AND NETWORKS LAB</p>	<p>CO1 Construct and Verify the characteristics of semiconductor diodes.</p> <p>CO2 Construct and Verify the characteristics of Transistors</p> <p>CO3 Construct and study the characteristics of Opto electronic diodes</p> <p>CO4 Construct and study the output of Rectifiers</p> <p>CO5 Construct and Verify the characteristics of Network theorems, filters and resonance circuits.</p>
	<p>XEC309</p> <p>DIGITAL SYSTEM DESIGN LAB</p>	<p>CO1 Choose the logic gates and Use them for various applications</p> <p>CO2 Assemble Combinational logic circuits and Verify their operation</p> <p>CO3 Assemble Sequential logic circuits and Verify their operation</p> <p>CO4 Design Counters and Shift Registers and Demonstrate their output</p> <p>CO5 Create digital circuits and display the results using VHDL</p>
	<p>XEC401</p> <p>PROBABILITY THEORY AND STOCHASTIC PROCESSES</p>	<p>CO1 Describe sets, its operation and basics of probability by examples and solve problems associated.</p> <p>CO2 Describe and Demonstrate PMF, PDF, CDF of discrete and continues random variable</p> <p>CO3 Describe Joint distributions and apply them to communication systems problems</p> <p>CO4 Describe random sequences and limit theorems and solve problems</p> <p>CO5 Describe stochastic and solve problems related to communication system which involves stochastic process.</p>
	<p>XUM402</p> <p>TOTAL QUALITY MANAGEMENT</p>	<p>CO1 List and Explain the basic concepts of total quality concepts and its limitations.</p> <p>CO2 Analyze and Explain the Customer satisfaction, Employee involvement, supplier selection and appraise the performance by TQM principle</p> <p>CO 3 Explain and Apply the Statistical Process Control Tools</p> <p>CO4 Select and Explain the different TQM tools and their significance</p> <p>CO5 Explain the importance aspects of different quality systems.</p>

	<p>XUM403</p> <p>HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY</p>	<p>CO1 Relate and Interpret the human ethics and human relationships</p> <p>CO2 Explain and Apply gender issues, equality and violence against women</p> <p>CO3 Classify and Develop the identify women issues and challenges</p> <p>CO4 Classify and Dissect human rights and report on violations.</p> <p>CO5 List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.</p>
	<p>XEC404</p> <p>ELECTRO DYNAMICS AND ELECTROMAGNETIC WAVES</p>	<p>CO1 Classify the basic Electrostatic theorems and laws.</p> <p>CO2 Discuss the behavior of Electric fields in matter and Polarization concepts.</p> <p>CO3 Classify the basic Magneto static theorems and laws and Infer the magnetic properties of matter.</p> <p>CO4 Summarize the concepts of electrodynamics and Derive the Maxwell's equations.</p> <p>CO5 Familiarize Electromagnetic wave propagation</p> <p>CO6 Explain Electromagnetic wave polarization.</p>
	<p>XEC405</p> <p>TRANSMISSION LINES AND WAVEGUIDES</p>	<p>CO1 Explain the various types of transmission lines and its characteristics</p> <p>CO2 Understand the high frequency line, power and impedance measurements</p> <p>CO3 Analyze the characteristics of TE and TM waves</p> <p>CO4 Analyze impedance matching using smith chart</p> <p>CO5 Understand passive filters and basic knowledge of active RF components</p> <p>CO6 Design RF system transceiver design</p>
	<p>XEC406</p> <p>ANALOG COMMUNICATION</p>	<p>CO1 Understand the basics of communication system and analog modulation techniques</p> <p>CO2 Apply the basic knowledge of signals and systems and Understand the concept of Frequency modulation</p> <p>CO3 Apply the basic knowledge of electronic circuits and Understand the effect of Noise in communication system and noise performance of AM system</p> <p>CO4 Understand the effect of noise performance of FM system.</p> <p>CO5 Construct pulse modulation system and Differentiate their system performance</p>

		CO6 Understand FDM and TDM techniques
	XEC407 ELECTRONIC CIRCUITS	CO1 Design and analyze feedback amplifiers CO2 Design Oscillator circuits CO3 Illustrate the frequency response of tuned amplifiers CO4 Discuss wave shaping circuits and multivibrators . CO5 Tell the working principle of power amplifiers CO6 Explain about DC converters
	XEC408 MICROPROCESSORS AND MICROCONTROLLERS	CO1 Understand the architecture and function of 8086 microprocessor CO2 Understand and execute programs based on 8086 microprocessor. CO3 Illustrate 8086 System Bus Structure CO4 Explain I/O interfacing CO5 Illustrate the architecture of 8051 CO6 Design and implement 8051 microcontroller based systems
	XEC409 ELECTRONIC CIRCUITS LAB	CO1 Verify series and shunt feedback amplifiers CO2 Design and verify various oscillators CO3 Design and verify Tuned amplifiers CO4 Design and demonstrate Multivibrators CO5 Construct and observe the waveform clippers and clampers
	XEC410 MICROPROCESSORS AND MICROCONTROLLERS LAB	CO1 Verify the basic program in Microprocessor systems design with 8085. CO2 Design and perform the Interfacing of peripherals with 8085 Microprocessor. CO3 Assemble and verify the 8051 Microcontroller based arithmetic operations. CO4 Design and demonstrate the Interfacing processes with different priority and real time constraints with 8051 Microcontroller. CO5 Construct and indentify the timer applications using 8051 Microcontroller.
	XEC501 ANALOG INTEGRATED	CO1 Understand the principles of differential amplifiers and operational amplifiers. CO2 Analyze the working of operational amplifiers and basic applications.

	CIRCUITS	CO3 Apply the principles of op-amp for various applications. CO4 Understand the working of multivibrators, filters, schmitt trigger. CO5 Understand and carry out the working of specialized ICs.
	XEC502 DIGITAL COMMUNICATION	CO1 Describe various methods to mitigate the effects of noise and ISI in baseband pulse transmission. CO2 Explain and compare various digital modulation techniques CO3 Describe and apply various error control techniques for reducing bit errors in digital communication. CO4 Explain and illustrate Spread Spectrum Communication. CO5 Explain Multiple Access Schemes
	XEC503 COMPUTER ARCHITECTURE AND ORGANISATION	CO1 Recognize the operation of functional units of a computer CO2 Describe and compute the operation of hardware units associated with a computing device. CO3 Demonstrate the operation of processing unit. CO4 Compare the performance of different types of memory CO5 Recognize the operation of interfacing devices.
	XEC504 DIGITAL SIGNAL PROCESSING	CO1 Find and analyze Discrete Fourier Transform to signal processing CO2 Explain, Design and Apply FIR digital filters CO3 Explain, Design and Apply IIR digital filters CO4 Define and Classify Finite word length CO5 Define and Classify the hardware architecture, construct and justify signal processing modules in hardware
	XEC508 ANALOG INTEGRATED CIRCUITS LAB	CO1 Understand the principles of differential amplifiers and hence operational amplifiers. CO2 Analyze the working of operational amplifiers and basic applications. CO3 Apply the principles of op-amp for various applications. CO4 Understand the working of multivibrators, filters, schmitt trigger. CO5 Understand and carry out the working of specialized ICs.
	XEC509 ANALOG AND	CO1 Construct, Demonstrate and Simulate Amplitude Modulation, Demodulation, sensitivity and selectivity of AM receivers.

	DIGITAL COMMUNICATION LAB	CO2 Construct, Demonstrate and Simulate Frequency Modulation, Demodulation, sensitivity and selectivity of FM receivers.
		CO3 Construct and Demonstrate Frequency Division Multiplexing and demultiplexing.
		CO4 Build, Demonstrate and Simulate various types of analog and digital Pulse Modulations using trainer kits.
		CO5 Simulate performance of digital modulation techniques in AWGN and Rayleigh channels.
	XEC510 DIGITAL SIGNAL PROCESSING LAB	CO1 Computation of linear and circular convolution CO2 Design of digital IIR digital filters. CO3 Design of digital FIR digital filters. CO4 Define and Classify the hardware architecture, construct and justify signal processing modules in hardware CO5 Design of varies projects
	XECM01 PCB DESIGN THROUGH ULTIBOARD	CO1 Describe Printed Circuit Boards and design them using a CAD software.
	XEC602 CONTROL SYSTEMS	CO1 Outline and explain the mathematical modeling of electrical and mechanical systems. CO2 Describe and apply Time domain analysis methods and interpret the stability of the systems. CO3 Describe and apply Frequency domain analysis methods and interpret the stability of the systems. CO4 Explain, solve and justify compensation techniques and controllers CO5 Outline and illustrate various electrical and mechanical systems through control systems.
	XEC603 ANTENNAS AND WAVE PROPAGATION	CO1 Describe, explain, determine, measure and report the parameters of antennas. CO2 Explain, classify, identify, measure and practice dipoles, arrays and loop antennas. CO3 Describe, apply, measure and report antennas for wideband applications. CO4 Explain, relate, measure and perform the radiation from apertures and lens antennas. CO5 Outlineand explain the methods of wave propagation and associated parameters.

	XEC607 VLSI DESIGN AND EMBEDDED SYSTEMS	<p>CO1 Outline, explain the IC fabrication techniques, design rules pertaining to CMOS technology and construct and report the design of logic gates.</p> <p>CO2 Design, create, construct and report the combinational and sequential circuits using Verilog</p> <p>CO3 Describe, understand, construct and report embedded system design and development</p> <p>CO4 Describe, understand, react and perform the software and hardware concept of processor in real time environment.</p> <p>CO5 Define, select, compare, reproduce and identify the peripherals in embedded systems.</p>
	XEC608 VLSI DESIGN AND EMBEDDED SYSTEMS LAB	<p>CO1 Understand the concept of FGPA and construct the FPGA circuits.</p> <p>CO2 Define, select and develop the codes for the circuit using verilog.</p> <p>CO3 Describe, understand, and construct the embedded system design and develop the software and hardware concept of processor in real time environment.</p> <p>CO4 Describe and understand the serial communication port ,RTOS on embedded systems</p> <p>CO5 Understand the interfacing of data I/O devices with embedded systems in real time and use the peripherals in embedded systems.</p>
	XECM02 PLC AND SENSORICS	<p>CO1 Describe the role of PLC and sensorics in Industrial Automation and integrate them using Indra logic software.</p>
	XEC702 MICROWAVE ENGINEERING AND FIBER OPTIC COMMUNICATION	<p>CO1 Describe, demonstrate and analyze the parameters of passive microwave components.</p> <p>CO2 Describe, assemble, demonstrate, measure and analyze the parameters of microwave sources and construct microwave bench. Outline, assemble and distinguish various semiconductor devices.</p> <p>CO4 Explain, assemble, measure and analyze the transmission characteristics of optical fibers.</p> <p>CO5 Explain, identify and measure the characteristics of optical sources and detectors.</p>
	XEC706 MICROWAVE ENGINEERING AND FIBER OPTIC	<p>CO1 Study the different types of microwave components</p> <p>CO2 Demonstrate the characteristics of microwave tube</p> <p>CO3 Demonstrate the characteristics of microwave device</p>

	COMMUNICATION LAB	CO4 Study the different microwave measurements and radiation pattern of antenna CO5 Demonstrate the characteristics of optical sources and optical detectors
	XECM03 MATLAB FOR WIRELESS COMMUNICATION	CO1 Represent various blocks of wireless communication as a programme and show that simulation results are same as theoretical.
	XEC505A MEDICAL ELECTRONICS	CO1 Describe and explain the basics of the biomedical signals and associated recording instrumentation CO2 Describe and understand the methods of measuring of bio-chemical and non electrical parameters CO3 Describe and discuss the assist devices and bio-telemetry CO4 Understand and categorize the principles of radiological equipment CO5 Explain the various diagnostic and therapeutic equipment and electrical safety
	XEC505B COMMUNICATION NETWORKS	CO1 Define and Identify the components required to build different types of networks CO2 Choose the required functionality at each layer for given application CO3 Explain and define the routing concept CO4 Define and Identify solution for each functionality at each layer CO5 Explain and Trace the flow of information from one node to another node in the network
	XEC505C NANO TECHNOLOGY AND APPLICATIONS	CO1 Describe the basic science behind the properties of materials. CO2 Interpret the creation, characterization, and manipulation of nanoscale materials. CO3 Describe and explain the nano structures CO4 Comprehend the exciting applications of nanotechnology at the leading edge of scientific research CO5 Apply their knowledge of nanotechnology to identify how they can be exploited for new applications.
	XEC604A SWITCHING THEORY	CO1 Describe the operational characteristics of switching techniques. CO2 Outline the working principle of different Switching types and Explain the working the SONET Multiplexing

		<p>CO3 Describe and Analyze the working concept of Digital Subscriber Access</p> <p>CO4 Compare and Discuss the operational characteristics of switching techniques.</p> <p>CO5 Analyze the traffic characterization of switching networks.</p>
	<p>XEC604B</p> <p>CMOS ANALOG IC DESIGN</p>	<p>CO1 Realize the concepts of Analog MOS devices and current mirror circuits.</p> <p>CO2 Design different configuration of Amplifiers and feedback circuits.</p> <p>CO3 Analyze the characteristics of frequency response of the amplifier and its noise.</p> <p>CO4 Analyze the performance of the stability and frequency compensation techniques of OpAmp Circuits.</p> <p>CO5 Construct switched capacitor circuits and PLLs</p>
	<p>XEC604C</p> <p>STATISTICAL THEORY OF COMMUNICATION</p>	<p>CO1 To know, analyze, apply and manipulate linear data structures</p> <p>CO2 To know, analyze, apply and manipulate nonlinear data structures</p> <p>CO3 To know, analyze, apply and manipulate sorting techniques</p> <p>CO4 To know, analyze, apply and manipulate graph algorithms</p> <p>CO5 To know and analyze algorithm design techniques</p>
	<p>XEC702A</p> <p>FUNDAMENTALS OF DATA STRUCTURES IN C</p>	<p>CO1 Implement linear and non-linear data structure operations using C</p> <p>CO2 Suggest appropriate linear / non-linear data structure for any given data set.</p> <p>CO3 Apply hashing concepts for a given problem</p> <p>CO4 Modify or suggest new data structure for an application</p> <p>CO5 Appropriately choose the sorting algorithm for an application</p>
	<p>XEC702B</p> <p>ROBOTICS AND AUTOMATION</p>	<p>CO1 Explain the classification , need and application of robots.</p> <p>CO2 Examine different sensors and actuators for applications like maze solving and self driving cars.</p> <p>CO3 Design a 2R robot & an end-effector and solve the kinematics and dynamics of motion for robots.</p>

		<p>CO4 Explain navigation and path planning techniques along with the control architectures adopted for robot motion planning.</p> <p>CO5 Describe the impact and progress in AI and other research trends in the field of robotics.</p>
	<p>XEC702C</p> <p>INTERNET OF THINGS</p>	<p>CO1 Describe Internet of Things (IoT) and explain various IoT related technologies.</p> <p>CO2 Describe resource management in IoT.</p> <p>CO3 Describe and distinguish various architecture, platforms, services of IoT.</p> <p>CO4 Explain how IoT can be integrated to IP.</p> <p>CO5 Describe various IoT applications.</p>
	<p>XEC703A</p> <p>WIRELESS COMMUNICATIONS</p>	<p>CO1 Characterize a wireless channel and evolve the system design specifications.</p> <p>CO2 Design a cellular system based on resource availability and traffic demands.</p> <p>CO3 Explain keying techniques.</p> <p>CO4 Identify suitable signalling and multipath mitigation techniques.</p> <p>CO5 Identify for the multiple antenna techniques wireless channel and system under consideration.</p>
	<p>XEC703B</p> <p>WIRELESS NETWORKS</p>	<p>CO1 Conversant with the latest 3G/4G networks and its architecture.</p> <p>CO2 Design and implement wireless network environment for any application using latest wireless protocols and standards.</p> <p>CO3 Ability to select the suitable network depending on the availability and requirement.</p> <p>CO4 Explain and describe WLANS and WWANS.</p> <p>CO5 Implement different type of applications for smart phones and mobile devices with latest network strategies.</p>
	<p>XEC703C</p> <p>AD HOC AND WIRELESS SENSOR NETWORKS</p>	<p>CO1 Know the basics of Ad hoc networks and Wireless Sensor Networks.</p> <p>CO2 Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement.</p> <p>CO3 Apply the knowledge to identify appropriate physical and MAC layer protocols.</p> <p>CO4 Understand the transport layer and security issues possible in Ad hoc and sensor networks.</p> <p>CO5 Be familiar with the OS used in Wireless Sensor Networks and build basic modules.</p>

	XEC801A PRINCIPLES OF SPEECH PROCESSING	CO1 Design speech compression techniques CO2 Configure speech compression techniques CO3 Configure speech recognition techniques CO4 Design speaker recognition systems CO5 Design text to speech synthesis systems
	XEC801B MULTIMEDIA COMPRESSION AND COMMUNICATION	CO1 Design audio compression techniques CO2 Configure Text, image and video compression techniques CO3 Describe text compression techniques CO4 Select suitable service model for specific application CO5 Configure multimedia communication network
	XEC801C DIGITAL IMAGE PROCESSING	CO1 Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms. CO2 Operate on images using the techniques of smoothing, sharpening and enhancement. CO3 Understand the restoration concepts and filtering techniques. CO4 Learn the basics of segmentation, features extraction. CO5 Learn the compression and recognition methods for color models.

Programme Outcomes and Course Outcomes of

NANOTECHNOLOGY DIVISION / DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

S.No.	Programme Name	PO and CO
1	M.Tech Nanotechnology (Integrated)	Yes
2	M.Tech (Nanotechnology)-2 Year	Not Applicable
3	Ph.D	Not Applicable

1. a. M.Tech Nanotechnology (Integrated)

PROGRAM OUTCOMES (POS)	
PO 1	To provide knowledge and understanding of the key principles of nanotechnology including the relationship between Nano and various sciences, mathematics and Engineering sciences
PO 2	To expose analysis and design techniques and of details of new concepts and technologies relevant to the area of nano.
PO 3	To equip on methods and processes involved in the development and evaluation of different kinds of Nanomaterials and products
PO 4	To equip scientific and intellectual tools required to define and formulate research problems, and to detail the methodologies needed to address them
PO 5	To equip the scientific and intellectual tools required to design and analyze key physics/chemical/biological/engineering processes related to nanotechnology
PO 6	To provide a wide range of intellectual, practical and transferable skills that will allow students to develop careers in nanotechnology research, industry and other professional areas of the economy
PO 7	To develop deep knowledge of nanotechnology applications in society and especially in health/environment/energy
PO 8	To expose industrial designs and processes and to innovations in the nanotechnology industry
PO 9	To develop deep knowledge of standards and the nanotechnology commercial environments and standardisation processes and to be able to contribute to such processes through appreciation of their contexts, economic and regulatory drivers and limitations
PO 10	To provide knowledge and skills to allow for independent learning, individually and/or within a group.
PO 11	To equip on global understanding of the impacts and issues regarding nanotechnology and applications
PO 12	To become a responsible citizen of the society
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO 1	Knowledge and generation of intellectual capital (Paper, poster, presentation, patent etc) in the areas of Nano architecture, Nanomaterials, Nanosystems and their encompassing applications
PSO 2	Ability to identify tailor made Nano applications for Local and Societal needs by (a) Improving efficiency of existing systems by developing innovative low cost solutions (b) New product development

1. c. Course Outcome for all the course

SEMESTER	COURSE CODE	COURSE OUTCOME
I	XMA 101 ALGEBRA, DIFFERENTIAL CALCULUS AND THEIR APPLICATIONS	<p>CO1 Explain the Properties of Eigen values and Eigen vectors of the matrices, Make Use of orthogonal and similarity transformation and Construct the quadratic form to Canonical form.</p> <p>CO2 Define and Find the radius and circle of curvature in cartesian and polar coordinates and to Explain evolutes and envelopes.</p> <p>CO3 Explain the convergence of series of positive terms, alternating series, and power series using tests of convergence.</p> <p>CO4 Find total and partial derivatives, Taylor series expansions of functions and the extremum of functions and their applications.</p> <p>CO5 Solve the linear equations of second and higher order with constant and variable coefficients and simultaneous first order differential equations and to Apply Method of variation of parameters to Solve the differential equation</p>
	XEM102 ENGINEERING MECHANICS	<p>CO1 Identify and choose various types of loading and support conditions that act on structural and dynamic systems.</p> <p>CO2 Apply pertinent mathematical, physical and engineering mechanics principles to the system to predict the problem.</p> <p>CO3 Apply knowledge on the concepts of centroid and moment of inertia of various sections and solids.</p> <p>CO4 Model the problem using free-body diagrams and accurate equilibrium equations and finding the solution.</p> <p>CO5 Develop concepts of friction, rigid body kinematics and dynamics with an emphasis on the modeling and analysis and solving simple dynamic problems involving kinematics and momentum.</p>
	XBE103 ELECTRICAL AND ELECTRONICS ENGINEERING SYSTEMS	<p>CO1 Define, Relate, the fundamentals of electrical parameters and build and explain AC, DC circuits by Using measuring devices</p> <p>CO2 Define and Explain the of operation of DC and AC machines.</p> <p>CO3 Recall, Illustrate , various semiconductor Devices and their applications and displays the input output characteristics of basic semiconductor devices.</p>

		<p>CO4 Relate, Explain, the number systems and logic gates. Construct the different digital circuit.</p> <p>CO5 Label, Outline different types of microprocessors and their applications.</p>
	<p>XAP104 APPLIED PHYSICS</p>	<p>CO1 Identify the basics of mechanics, explain the principles of elasticity, viscosity and determine its significance in engineering systems and technological advances.</p> <p>CO2 Describe the production, propagation, perception & analysis of acoustical wave and locate basic acoustical problem encountered in constructed buildings.</p> <p>CO3 Understand the fundamental phenomena in optics by measurement and describe the working principle and application of various lasers and fibre optics.</p> <p>CO4 Analyse different crystal structures, discuss and use physics principles of latest technology by visualizing.</p> <p>CO5 Develop Knowledge on engineering materials, its properties and application.</p>
	<p>XGS105 STUDY SKILLS AND LANGUAGE LABORATORY</p>	<p>CO1 Identify different strategies of reading and writing skills.</p> <p>CO2 Revisethe library skills in their learning process.</p> <p>CO3 Apply different techniques to various types of material such as a novel, newspaper, poem, drama and other reading papers.</p> <p>CO4 Use visual aids to support verbal matters into language discourse.</p> <p>CO5 Prepare to face the written exam with confidence and without any fear or tension.</p>
	<p>XUM106 HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY</p>	<p>CO1 Relate and Interpret the human ethics and human relationships</p> <p>CO2 Explain and Apply gender issues, equality and violence against women</p> <p>CO3 Classify and Develop the identify of women issues and challenges</p> <p>CO4 Classifyand Dissect human rights and report on violations.</p> <p>CO5 List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.</p>
	<p>XMA201 CALCULUS AND LAPLACE</p>	<p>CO1 MakeUse of standard results to Find the Laplace transforms of derivatives and integrals and tosolve differential equations.</p>

II	TRANSFORMS	CO2	Apply multiple integral concepts to Find the area, volume and to understand the order of integration.
		CO3	Define the gradient, divergent curl of vectors. Find directional derivative, unit vector normal to the surface. Apply corresponding theorems to Find the line, surface and Volume integrals.
		CO4	Construct and examine the analytic functions, and their the complex Conjugate and to Explain the concept of conformal mapping and to Construct the bilinear transformation.
		CO5	Explain the poles, singularities and residues of functions and to solve the problems using contour integration
	XCP202 COMPUTER PROGRAMMING	CO1	Define programming fundamentals and Solve simple programs using I/O statements.
		CO2	Define syntax and write simple programs using control structures and arrays
		CO3	Explain and write simple programs using functions and pointers
		CO4	Explain and write simple programs using structures and unions
		CO5	Explain and write simple programs using files and Build simple projects
	XWE203 MECHANICAL AND CIVIL ENGINEERING SYSTEMS	CO1	Define and visualize the working principles of the various boilers, turbines and engines
		CO2	Differentiate and auscultate the measurements by using various metrology instruments
		CO3	Categorise and palpate the various metal forming, joining and cutting processes
		CO4	Characterize and diagnose the quality of the good Building materials; and measure linear and angular dimensions
		CO5	Summarize and palpate the components of a substructures and super structures.
	XAC204 APPLIED CHEMISTRY	CO1	Identify and describe the various water quality parameters and methods to purify water in contest with boilers and domestics usage.
		CO2	Explain the fundamental principles of electrochemical reactions, its applications in redox reactions and calculate the different electrochemical processes.
		CO3	Interpret the types of corrosion, use and measure its control by various methods including protective techniques.
		CO4	Describe, Illustrate and Discuss the generation of energy in batteries, nuclear reactors, solar cells, fuel cells and anaerobic digestion.

		CO5 Apply and measure the different types of spectral techniques for quantitative chemical analysis and list nanomaterials for various engineering processes.
	XEG205 ENGINEERING GRAPHICS	CO1 Apply the national and international standards, construct and practice various curves CO2 Interpret, construct and practice orthographic projections of points, st. lines and planes. CO3 Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids. CO4 Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids. CO5 Construct sketch and practice isometric and perspective views of simple and truncated solids.
	XGS206 SPEECH COMMUNICATION	CO1 Identify different styles to various forms of public speaking skills and presentation skills CO2 Understand and identify the proper tone of language required in writing and speaking CO3 Adapt the speech structures and develop the speech outline according to the audience. CO4 Ability to communicate and develop presentation skills CO5 Equip the speaker to face the audience without any anxiety.
III . . .	XMA301 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	CO1 Explain and Demonstrate the basic concepts in partial differential equations and to solve linear, nonlinear, homogeneous and non homogeneous partial Differential equations. CO2 Demonstrate the basic concept and properties of Fourier series and to state Parseval's identity and Dirichlet's condition. CO3 Solve the standard Partial Differential Equations, arising in engineering Problems, like Wave equation and Heat flow equation by Fourier series method. CO4 Explain and Apply the concept of Fourier transform and its properties. CO5 State and Apply the properties of Z transform and to Find the Z transform and inverse Z transform .
	XNT302 INTRODUCTION TO NANOTECHNOLOGY	CO1 Outline the role of nano in civilization and explain methods to show various features CO2 Identify and relate the forces and states CO3 List and describe various Nano materials CO4 Explain nanomaterial fabrication and characterization methods

		CO5 Appraise the real world applications of Nano and build their design
	XNT303 BIOLOGY FOR ENGINEERS	CO1 Identify different structural components of cells and its functions and describe and relates the functions of different types of bio-molecules CO2 Remember and apply the mechanisms underlying molecular biological processes on signal transduction and various tissues. CO3 Understand the immune system and construct the experiment on Agglutination CO4 Understand Molecular structure and function of genes and adapts the DNA for the selected sample CO5 Understand the principles of bioinformatics tools and simulate the molecular structure
	XNT304 FLUID MECHANICS	CO1 An understanding of fluid Mechanics fundamentals, including concepts of mass and momentum conservation. CO2 An ability to apply the Bernoulli equation to solve problems in fluid mechanics. CO3 An ability to apply control volume analysis to problems in fluid mechanics CO4 An ability to use potential flow theory to solve problems in fluid mechanics CO5 An ability to perform Dimensional analysis for problems in fluid mechanics.
	XCHOE1 MASS TRANSFER FUNDAMENTALS	CO1 Explain the basic principles in diffusional mass transfer and calculate the rate of the mass transfer under one dimensional steady state diffusion CO2 Describe the operations of Distillation and absorption and calculate number trays for distillation tower CO3 Discuss the salient features of Separation by adsorption, chromatographic separation and Extraction/ leaching CO4 Describe the salient features and mechanism involved in Drying and crystallization
	XEP306 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT	CO1 Recognise and describe the personal traits of an entrepreneur. CO2 Determine the new venture ideas and analyse the feasibility report. CO3 Develop the business plan and analyse the plan as an individual or in team. CO4 Describe various parameters to be taken into consideration for launching and managing small business.

		CO5 Explain the technological management and Intellectual Property Rights
	XGS307 INTERPERSONAL COMMUNICATION	CO1 Recognize culture and a need for interpersonal communication. CO2 Demonstrate the need for effective communication between two people. CO3 Explain family and social relationships and need for socialization. CO4 Justify the IP principles as to how to reduce and repair conflict in interpersonal relationships. CO5 Make use of effective and appropriate language at various interpersonal situations to avoid conflict.
IV	XRP401 RANDOM PROCESSES	CO1 Understand the natural environment and its relationships with human activities. CO2 Characterize and analyze human impacts on the environment. CO3 Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems. CO4 Acquire practical skills for scientific problem-solving, including familiarity with laboratory and field instrumentation, computer applications, statistical and modelling techniques. CO5 Understand and implement scientific research strategies, including collection, management, evaluation, and interpretation of environmental data. Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments.
	XUM402 ENVIRONMENTAL SCIENCE AND ENGINEERING	CO1 Understand the natural environment and its relationships with human activities. CO2 Characterize and analyze human impacts on the environment. CO3 Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems. CO4 Acquire practical skills for scientific problem-solving, including familiarity with laboratory and field instrumentation, computer applications, statistical and modelling techniques. CO5 Understand and implement scientific research strategies, including collection, management, evaluation, and interpretation of environmental data. Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments.

	<p>XNT403</p> <p>PRINCIPLES OF CHEMICAL ENGINEERING</p>	<p>CO1 Recognize the different units of measurements in basic chemical calculations and Calculate the composition of solutions and gas mixtures in different system of units and</p> <p>CO2 Solve the material balances for distillation, extraction, mixing, absorption and evaporation operations and develop block diagrams</p> <p>CO3 Explain the basic principles of chemical reactions and reactors. Operate batch and Plug flow reactors</p> <p>CO4 Interpret the characteristics of different types of fluids and filtration systems. Calibrates the flow meters, handle pumps and filtration systems</p> <p>CO5 Describe the mechanism of different modes of heat transfer and measure rate of heat transfer in heat exchange equipments</p>
	<p>XNT404</p> <p>NANO APPLICATIONS</p>	<p>CO1 Know and Understand the Current status of Nanotechnology applications on various fields</p> <p>CO2 Relate and Understand the properties of diferent nanomaterials and its relavant applications</p> <p>CO3 Identify the drawbacks of conventional techniques/products used in selected fields</p> <p>CO4 Outline the Evolution of nanotechnology concepts to overcome the drawbacks of conventional techniques</p> <p>CO5 Describe the Societal impact of nanotechnology.</p>
	<p>XMS405</p> <p>MATERIALS SCIENCE</p>	<p>CO1 Recallanddistinguish various crystal structures.</p> <p>CO2 Describeanddiscuss the defects at the atomic and microstructure scales and their impact.</p> <p>CO3 Describe the various Ceramic, Electrical & Electronic Materials.</p> <p>CO4 Describe the basics of mechanical properties of material and identify how they can be tested.</p> <p>CO5 RecognizeandDescribevariousMagnetic Materials and Nano Materials.</p>
	<p>XNT406</p> <p>NANOSYSTEMS AND THEIR DESIGN</p>	<p>CO1 Compare characteristics of conventional machining, micromachining, solution-phase chemistry, Biochemistry, and molecular manufacturing Write scaling laws and explain potential energy surface. Build complex molecular structures by combining atoms and molecular fragments and simulate their motion</p> <p>CO2 Discuss the Molecular dynamics and positional uncertainty</p> <p>Study the vibrational properties of nanoscale systems</p> <p>Calculate elastic constants based on classical potential</p>

		<p>CO3 Explain Transitions, Errors, Damage and Energy Dissipation. Calculate the phonon bandstructure and density of states</p> <p>CO4 Describe Mechanosynthesis and Nanoscale Structural Components. Construct a sensor by molecular positioning</p> <p>CO5 Appraise Mobile Interfaces and Moving Parts Construct and evaluate molecular gear and bearing</p>
	XGS407 TECHNICAL COMMUNICATION	<p>CO1 Identify the features of a technical project report and Knowledge on the linguistic competence to write a technical report</p> <p>CO2 Integrate both technical subject skill and language skill to write a project.</p> <p>CO3 Confidence to present a project in 10 to 15 minutes</p> <p>CO4 The learner identifies and absorbs the pronunciation of sounds in English Language and learns how to mark the stress in a word and in a sentence properly</p> <p>CO5 Enables the speaker speaks clearly and fluently with confidence and it trains the learner to listen actively and critically</p>
V	XNT501 QUANTUM MECHANICS FOR ENGINEERS	<p>CO1 Understand the basic ideas of QM through demonstrations of quantum system and formulation of Hamiltonian eigen value problem</p> <p>CO2 Explain the basis for description of elements & bonds, Apply in Hydrogen atom and discuss eigen functions</p> <p>CO3 Explain, the basis for description to multiple particle and discuss eigen functions</p> <p>CO4 Explain, the basis for description to heavier elements & their bonds</p> <p>CO5 Describe and Discuss time evolution and the development with advanced concept of angular momentum</p>
	XNT502 NANOMATERIALS FABRICATION TECHNIQUES- I	<p>CO1 Describe and Demonstrate the Fabrication nanomaterial</p> <p>CO2 Describe the basics of Theorem of electric circuits and identify how they can be tested.</p> <p>CO3 Describe the Physical techniques and Recognize the different types of processing</p> <p>CO4 Identify the different types of chemical methods and how they can be tested. Describe the basics of Chemical methods for fabrication</p> <p>CO5 Describe the basic Self Assembly and identify and Recognize the different types of processing</p>

	XNT504 NANOMATERIALS CHARACTERIZATION TECHNIQUES- I	CO1 Demonstrate the understand the Metrology concepts relevant to the nanomaterials CO2 Identify and Understand and Realize the Standards of nanometrology and its calibration techniques CO3 Understand and Apply the principles of Optical tools and its applications to characterize the nanomaterials and nanostructures CO4 Classify and Evaluate the different spectroscopic techniques and its application for nanomaterials charecterization CO5 Understand and Apply the principles and applications of surface charectization techniques for nanomaterials
	XNT505 ENGINEERING THERMODYNAMICS	CO1 To Recall the basic laws of thermodynamics and Apply them. CO2 To Summarize the concepts in statistical thermodynamics CO3 To Construct models of statistical thermodynamics. CO4 To Analyze and Use thermodynamic principles in chemical and metallurgical processes. CO5 To Summarize phase transitions.
	XGS507 BUSINESS COMMUNICATION	CO1 Define and Identify different styles to various forms of business communication. CO2 Identify the proper tone of language required in writing and speaking in business communication. CO3 Display knowledge on grammar and other linguistic features in writing various forms of business communication. CO4 Distinguish between letters and memos and various forms of Business Communication. CO5 Prepare business reports, minutes, proposals.
VI	XTQ601 TOTAL QUALITY MANAGEMENT	CO1 List and Explain the basic concepts of total quality concepts and its limitations. CO2 Analyze and Explain the Customer satisfaction, Employee involvement, supplier selection and appraise the performance by TQM principle. CO3 Explain and Apply the Statistical Process Control Tools. CO4 Select and Explain the different TQM tools and their significance. CO5 Explain the importance aspects of different quality systems.

	XNT602 COLLOIDS AND SURFACES ENGINEERING	CO1 Define and explain colloids and its properties CO2 Understand and describe the properties of interfaces CO3 Understand and describe the properties of interfaces CO4 Explain radiation and light scattering colloids and surfaces CO5 Understand and explain the Vander walls forces and its significance on colloids and surfaces
	XNT603 NANOMATERIALS FABRICATION TECHNIQUES- II	CO1 Define and explain different Self assembly techniques and its principles for nanomaterial fabrication CO2 List and Describe self-assembly techniques for nanomaterial fabrication CO3 Find and illustrate the Nano fabrication techniques using photon beam CO4 Label and explain the Nanofabrication by Charged Beams CO5 Label, Outline different types of nanomaterial fabrication using Scanning probes
	XNT604 NANOMATERIALS CHARACTERIZATION TECHNIQUES- II	CO1 Explain the concepts Basic Micro scopes CO2 Explain and understand Types of microscopes to characterise the nano materials CO3 Determine and Describe the Magnetic Resonance Spectroscopy & Thermal analysis techniques CO4 Describe and Illustrate the Electrical characterization techniques & Magnetic characterization techniques CO5 Classify and Describe the Optical characterization techniques
	XGS607 ACADEMIC WRITING	CO1 Identify the features and types of paragraph writing. CO2 Comprehends the meaning and principles of discourse CO3 Adapts thenuances of language used in various types of essays CO4 Constructs novel ideas creatively and competence in writing CO5 Produce correct, proper, and fluent pieces of writing
VII	XNT702 HEALTH AND SAFETY ISSUES OF NANOTECHNOLOGY	CO1 Relate the toxic effects of nanotechnology on human health. CO2 Analyse the various issues on environmental effects. CO3 Identify suitable remedial measures

		CO4 Suggest start-of-the pipe solution for environmental issues based on nanomaterials CO5 Work out problems on nanomaterials related to toxicity. To frame a model policy on preventing health hazards.
	XNT703 NANO COMPOSITES	CO1 Define and explain nano ceramics CO2 Understand and describe the fabrication, properties and applications of metal based nano composites CO3 List and understand the design of super hard materials CO4 Understand and explain the novel nano composites CO5 Understand and describe the fabrication, properties and applications of polymer based nano composites
	XUM706 CYBER SECURITY	CO1 understand the Cyber Security Policy, Laws and Regulations CO2 discuss the Cyber Security Management Concepts CO3 understand the Cyber Crime and Cyber welfare CO4 discuss on issues related to Information Security Concepts CO5 understand various security threats
VIII	XNT803 CAREER DEVELOPMENT SKILLS	CO1 Identify career related communication, and learning the different formats of CV / Resume. CO2 Prepare for an interview and to learn how to face for an interview CO3 Perform /communicate effectively with a group of people in a group discussion
	XNT804 MEMS AND NEMS	CO1 Ability to understand the operation of micro devices, micro systems and their applications CO2 Ability to design the micro devices, micro systems using the MEMS fabrication process. CO3 Gain a knowledge of basic approaches for various sensor design CO4 Gain a knowledge of basic approaches for various actuator design CO5 Develop experience on micro/nano systems for photonics. Gain the technical knowledge required for computer-aided design, fabrication, analysis and characterization of nano-structured materials, micro-and nano-scale devices.
	XNT805 SURFACE PLASMON RESONANCE	CO1 Ability to understand the operation of micro devices, micro systems and their applications CO2 Ability to design the micro devices, micro systems using the MEMS fabrication process.

		<p>CO3 Gain a knowledge of basic approaches for various sensor design</p> <p>CO4 Gain a knowledge of basic approaches for various actuator design</p> <p>CO5 Develop experience on micro/nano systems for photonics.</p> <p>Gain the technical knowledge required for computer-aided design, fabrication, analysis and characterization of nano-structured materials, micro- and nano-scale devices.</p>
	XNT506A EMERGING TOOLS FOR BIOLOGY AND MEDICINE	<p>CO1 Explain and Discuss the nanoscale paradigm in terms of properties at the nanoscale dimension</p> <p>CO2 Identify and Build the current nanotechnology solutions for selected biological issue</p> <p>CO3 Read and Present current nanotechnology literature applied to a particular problem domain</p> <p>CO4 Apply key concepts in materials science, chemistry, physics, biology and engineering to the field of nanotechnology</p> <p>CO5 Identify career paths and Acquire knowledge on advanced biomedical stream</p>
	XNT506B ENZYME TECHNOLOGY	<p>CO1 To Classify and Describe enzymes. Detection of enzyme activity.</p> <p>CO2 To Summarize and Measure the parameters of enzyme kinetics.</p> <p>CO3 To Identify and Discuss enzyme extraction procedures.</p> <p>CO4 To Classify and Describe enzyme immobilization.</p> <p>CO5 To Explain and select biosensors according to various applications.</p>
	XNT506C ELECTRIC AND ELECTRONIC CIRCUITS	<p>CO1 Describe the basics of Theorem of electric circuits and identify how they can be tested.</p> <p>CO2 Classify and explain AC and DC Machines and show the input output characteristics of Machines</p> <p>CO3 Recognize and Describe various Power plants and about Protection switch gears</p> <p>CO4 Describe the basics of Semiconductor devices identify how they can be tested.</p> <p>CO5 Describe the basic of digital electronics and identify Opto electronics devices.</p>
	XNT506D MECHANICAL SYSTEMS DESIGN	<p>CO1 Define mechanical systems and solve various mechanical system elements in mathematical form.</p> <p>CO2 Explain different mechanical system behaviour and their configurations</p>

		<p>CO3 Explain about cylinders, Design different type of cylinders and pressure vessels and Solve for different dimensions of cylinders and pressure vessels.</p> <p>CO4 Find and Tell different configurations of belt conveyor system, Measure design parameters of belt conveyor system, solve for different conditions of material transportation system.</p> <p>CO5 Explain about high energy ball mill Identify sketch Mohr's circle for different complex loading conditions in 2D Solve stress value for different failure condition.</p>
	XNT506E MECHANICS OF MATERIALS	<p>CO1 Understand the concepts of Stress and Strain</p> <p>CO2 Analyse deformation in shaft and springs</p> <p>CO3 Identify the stresses in thin and thick cylinders</p> <p>CO4 Solve beams for transverse loading</p> <p>CO5 Calculate the deflection of Symmetric beams</p>
	XNT605A NANO-PHYSICS	<p>CO1 Define and explain modern electronics</p> <p>CO2 Understand and describe the solid state physics</p> <p>CO3 Understand and describe about two dimensional electron systems</p> <p>CO4 Explain single electron tunnelling</p> <p>CO5 Understand and explain the principle and methods of sample growth and fabrication</p>
	XNT605B MOLECULAR ASSEMBLER – MOLECULAR MODELLING	<p>CO1 Define and explain the various molecular simulation theory and its principles</p> <p>CO2 Understand and describe the properties of interfaces</p> <p>CO3 Understand and describe the property analysis using Classical statistical mechanics</p> <p>CO4 Investigate and interpret the property optimization of molecules using molecular dynamics</p> <p>CO5 Understand and explain the Monte Carlo simulation and its applications</p>
	XNT605C NANO-SENSORS, NANO-ACTUATORS AND NANO-PROBES	<p>CO1 Understand the sensor principles, characteristics, functional specification and classify the sensors based on their measured.</p> <p>CO2 Explain the types of sensors, conditioning the signal and actuators and their applications</p> <p>CO3 Explain, the micromachining tools for nano systems</p> <p>CO4 Describe and Discuss sensors and their measurements</p>
	XNT605D	<p>CO1 Define and explain the manipulation and assembly of nanorobotics</p>

	NANOROBOTICS	CO2 Understand and describe types of nanomanipulation CO3 Understand and describe the sensing and fast imaging systems and its principles CO4 Explain nanorobotic assembly by CAD and others CO5 Understand and explain applications of nanorobot.
	XNT605E NANO-OPTICS AND NANO-PHOTONICS	CO1 Know and understand the basics concepts of Nano optics CO2 Understand and describe the optical properties of various materials CO3 Know and understand the basics concepts of nanophotonics CO4 Understand and Explain the nanophotonic devices CO5 Understand and explain nanobiophotonics and its biomedical applications
	XNT606A NANOSTRUCTURED MOLECULAR ARCHITECTURES	CO1 Explain the investigation of molecular architecture using Raman, Fluorescence and STM CO2 Understand and describe the localized plasma resonance of metal nanoparticles using NFOI CO3 Understand and explain the molecular structure using non linear spectroscopy CO4 Explain the molecular dynamics using photon force measurement CO5 Understand and explain construction of micro spectroscopic systems for molecular dynamics
	XNT606B NANOPHOTONICS FOR BIOTECHNOLOGY AND NANOMEDICINE	CO1 Define and explain basic concepts of nano photonics with biological molecules CO2 Understand and describe Second-Harmonic Generation with nano bio photonics CO3 Understand and describe the infrared spectroscopic imaging for biological applications CO4 Explain the basic concepts of plasmonics and application on biomedical field CO5 Understand and explain the interferometric techniques and its applications in nanomedicine
	XNT606C NANO-SPINTRONICS	CO1 Explain Basic Concept of Introduction to Spintronics CO2 Explain and understand Transport in magnetic materials CO3 Determine and Describe Nanomagnetism CO4 Describe and Illustrate the Spin transfer torque CO5 Classify and Describe the Spintronic Devices

	XNT606D NANOMATERIALS AND PHOTOCATALYTIC NANOPARTICLES FOR WATER/AIR DETOXIFICATION	CO1 Identify and describe the aspects of Free electron theory and its features, band gap and difference between conductors, semiconductors and Insulators. CO2 Explain the fundamental principles and different routes of synthesis of various nanoparticles. CO3 Interpret the various characterization techniques, use and identify the nanomaterials synthesized with the help of these techniques. CO4 Describe, Illustrate and Discuss the Photo catalytic mechanism, general pathways & kinetics CO5 Apply and measure the different types of nanomaterials for detoxification of air and water.
	XNT701A MEMS AND NEMS FABRICATION	CO1 Explain Basic concept of MEMS and NEMS CO2 Explain and understand Fabrication Process CO3 Determine and Describe Mechanical and Thermal MEMS CO4 Describe and Illustrate the Magnetic and RF MEMS CO5 Classify and Describe the MOEMS and Micro fluidic Systems
	XNT701B NANOCOATINGS	CO1 Explain the basic concepts of coating CO2 Explain And Understand The Special Coating Technique CO3 Determine And Describe Hard And Soft Coatings CO4 Describe And Illustrate The Surface Coating CO5 Classify And Describe The Characterization Technique And Application Of Nano coating
	XNT701C THIN FILM	CO1 Explain Basic Concept of THIN FILM DEPOSITION TECHNIQUES Introduction CO2 Explain and understand CHARACTERIZATION TECHNIQUES Surface analysis techniques CO3 Determine and Describe ADSORPTION AND DIFFUSION IN THIN FILMS CO4 Describe and Illustrate the STRESS IN THIN FILMS CO5 Classify and Describe the MODIFICATION OF SURFACES AND FILMS
	XNT701D NANOSCAFFOLD AND CHARACTERIZATION TECHNIQUES	CO1 Explain Basic Concept of nano scaffolds CO2 Explain and understand Methods and techniques Nano scaffolds CO3 Determine and Describe Characterization Techniques of Nan scaffolds CO4 Describe and Illustrate the Application of Nano Scaffolds CO5 Classify and Describe the future trends on scaffolds
	XNT705A NANO &	CO1 Explain Basic Concept of Encapsulation Techniques CO2 Explain and understand Nanoencapsulation Techniques

	SHOCKWAVES	CO3 Determine and Describe Nano encapsulation Techniques based on specialized equipments CO4 Describe and Illustrate the Preparation Methods And Mechanisms CO5 Classify and Describe the Application Of Encapsulation Technique
	XNT705B LITHOGRAPHIC TECHNIQUES	CO1 Explain Basic Concept Of Micro fabrication CO2 Explain And Understand Photolithography And Patterning Of Thin Films CO3 Determine And Describe Direct Writing Methods - Maskless Optical Lithography CO4 Describe And Illustrate The Electron Beam Lithography (Ebl), X-Ray And Ion Beam Lithography CO5 Classify And Describe The Nanoimprint Lithography And Soft Lithography
	XNT705C SELF ASSEMBLY TECHNIQUES	CO1 Explain Basic Concept of Introduction CO2 Explain and understand Self Assembled monolayers techniques CO3 Determine and Describe Bottom up method CO4 Describe and Illustrate Self assembly technique in printing CO5 Classify and Describe the Biological Application
	XNT705D NANO IN WIRELESS COMMUNICATIONS	CO1 Explain the nanotechnology applications on wireless communication CO2 Explain and understand applications of nanotechnology on fiber optics and microwave communications CO3 Determine and Describe applications of CNT in telecommunications CO4 Describe and Illustrate MEMS based application on wireless communications CO5 List , explain and practice the feasible experiments on nano wireless communication
	XNT705E OPTIMIZATION TECHNIQUES	CO1 Explain Formulate optimization problems CO2 Explain and understand the various types of functions CO3 Determine and Describe the concept of optimality criteria for various type of optimization problems CO4 Describe and Illustrate the various constrained and unconstrained problems in single variable as well as multivariable CO5 Classify and Describe the methods of optimization in real life situation
	XNT802A GRAPHENE NANOTECHNOLOGY	CO1 Explain Basic Concept of Graphene CO2 Explain and understand Properties of graphene CO3 Determine and Describe Synthesis of Graphene

		CO4 Describe and Illustrate the Characterization of Graphene CO5 Classify and Describe the Application of Graphene
	XNT802B CARBON NANOTUBE	CO1 Explain Basic Concept Of Carbon Nanotube CO2 Explain And Understand Properties Of Carbon Nanotubes CO3 Determine And Describe Application Of Carbon Nanotubes CO4 Describe And Illustrate The Metal Nanoparticles CO5 Classify And Describe The Synthesis Process Of Metal Nanoparticles
	XNT802C FULLERENE	CO1 Explain the Structure of Fullerenes CO2 Explain and understand the Symmetry Considerations of Fullerene Molecules CO3 Determine and Describe the Synthesis, Extraction, and Purification of Fullerenes CO4 Describe and Illustrate the Fullerene Growth, Contraction, and Fragmentation CO5 Classify and Describe the Crystalline Structure of Fullerene Solids
	XNT802D QUANTOM DOT	CO1 Explain Basic Concept of Quantum dots CO2 Explain and understand Quantum Mechanical Tunnel Devices CO3 Determine and Describe Semiconductor and Device CO4 Describe and Illustrate the Quantum computing CO5 Classify and Describe the Quantum DOT cellular Automata
	XNT802E POLYMERIC CARRIER	CO1 Explain Basic Concept of Polymers CO2 Explain and understand Microstructure of polymer chains CO3 Determine and Describe Mechanical properties CO4 Describe and Illustrate the Flow properties of polymer CO5 Classify and Describe the Polymer Fabrication Techniques
	XNT802F LIGNOCELLULOSES BIOMASS	CO1 Explain Basic structure and properties of Lignocellulose CO2 Explain and understand biodiesel production using lignocellulose CO3 Determine and Describe Bioethanol production from lignocellulose CO4 Describe and Illustrate the Bio refinery applications of lignocellulose CO5 Describe the other chemical and polymer production applications of lignocellulose

Programme and Course Outcomes of

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Programmes offered:

S.No.	Programme Name	PO and CO
1	B.Tech EEE	Yes

B.Tech EEE

PROGRAMME OUTCOME (PO)	
PO1	Apply the knowledge of mathematics, science, engineering fundamentals, to the solution of complex problems in Electrical and Electronics Engineering.
PO2	Identify, formulate, research literature and analyze complex Electrical and Electronics Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design solutions for complex Electrical and Electronics Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions, related to Electrical and Electronics Engineering.
PO5	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex Electrical and Electronics Engineering activities with an understanding of the limitations.
PO6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO11	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Ability to design and answer the problems in the field of Power Engineering by applying the knowledge acquired from Electrical Machines, Power Electronics, Electric Circuit Analysis, Power Systems & other related topics.
PSO2	Graduates will be able to develop and support Renewable based systems

COs

SL.NO.	SEMESTER	COURSE CODE &NAME	COS
1	I	XMA101 APPLIED MATHEMATICS	<ol style="list-style-type: none"> 1. Apply orthogonal transformation to Reduce quadratic form to canonical forms. 2. Apply power series to tests the convergence of the sequences and series. Half range Fourier sine and cosine series 3. Find the derivative of composite functions and implicit functions. Euler's theorem and Jacobian 4. Explain the functions of two variables by Taylors expansion, by finding maxima and minima with and without constraints using Lagrangian Method. Directional derivatives, Gradient, Curl and Divergence 5. Apply Differential and Integral calculus to notions of Curvature and to improper integrals.
2		XES 102 ENVIRONMENTAL SCIENCES	<ol style="list-style-type: none"> 1. Describe the significance of natural resources and explain anthropogenic impacts. 2. Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance 3. Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon. 4. Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development. 5. Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection
3		XBE 103 ELECTRICAL AND ELECTRONICS ENGINEERING SYSTEMS	<ol style="list-style-type: none"> 1. Define and Relate the fundamentals of electrical parameters and build and explain AC, DC circuits by Using measuring devices. 2. Define and Explain the operation of DC and AC machines. 3. Recall and Illustrate various semiconductor devices and their applications and displays the input output characteristics of basic semiconductor devices. 4. Relate and Explain the number systems and logic gates Construct the different digital circuit.

			5. Label and Outline the different types of microprocessors and their applications.
4		XAP 104 APPLIED PHYSICS FOR ENGINEERS	<ol style="list-style-type: none"> 1. Identify the basics of mechanics, explain the principles of elasticity and determine its significance in engineering systems and technological advances 2. Illustrate the laws of electrostatics, magneto-statics and electromagnetic induction; use and locate basic applications of electromagnetic induction to technology. 3. Understand the fundamental phenomena in optics by measurement and describe the working principle and application of various lasers and fibre optics. 4. Analyze energy bands in solids, discuss and use physics principles of latest technology using semiconductor devices. 5. Develop Knowledge on particle duality and solve Schrodinger equation for simple potential.
5		XEG 105 ENGINEERING GRAPHICS	<ol style="list-style-type: none"> 1. Apply the national and international standards, construct and practice various curves 2. Interpret, construct and practice orthographic projections of points, straight lines and planes 3. Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids 4. Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids 5. Construct sketch and practice isometric and perspective views of simple and truncated solids
6	II	XMA 201 CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLE	<ol style="list-style-type: none"> 1. Find double and triple integrals and to find line, surface and volume of an integral by Applying Greens, Gauss divergence and Stokes theorem. 2. Solve first order differential equations of different types which are solvable for p, y, x and Clairaut's type 3. Solve Second order ordinary differential equations with variable coefficients using various methods 4. Use CR equations to verify analytic functions and to find harmonic functions and harmonic conjugate Conformal mapping of

			<p>translation and rotation. Mobius transformation.</p> <p>5. Apply Cauchy residue theorem to evaluate contour integrals involving sine and cosine function and to state Cauchy integral formula, Liouville's theorem. Taylor's series, zeros of analytic functions, singularities, Laurent's series.</p>
7		XCP 202 PROGRAMMING FOR PROBLEM SOLVING	<p>1. Define programming fundamentals and Solve simple programs using I/O statements.</p> <p>2. Define syntax and write simple programs using control structures and arrays.</p> <p>3. Explain and write simple programs using functions and pointers.</p> <p>4. Explain and write simple programs using structures and unions.</p> <p>5. Explain and write simple programs using files and Build simple projects</p>
8		XGS 203 ENGLISH	<p>1. Ability to recall the meaning for proper usage.</p> <p>2. Apply the techniques in sentence patterns</p> <p>3. Identify the common errors in sentences</p> <p>4. Construct the Nature and Style of sensible Writing</p> <p>5. Practicing the writing skills</p> <p>6. Grasping the techniques in learning sounds and etiquettes</p>
9		XAC 204 APPLIED CHEMISTRY FOR ENGINEERS	<p>1. Identify the periodic properties such as ionization energy, electron affinity, oxidation states and electro negativity. Describe the various water quality parameters like hardness and alkalinity.</p> <p>2. Explain and Measure microscopic chemistry in terms of atomic, molecular orbitals and intermolecular forces.</p> <p>3. Interpret bulk properties and processes using thermodynamic and kinetic considerations.</p> <p>4. Describe, Illustrate and Discuss the chemical reactions that are used in the synthesis of molecules.</p> <p>5. Apply, Measure and Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques</p>

10		XWP 205WORKSHOP PRACTICES	<ol style="list-style-type: none"> 1. Summarize the machining methods and Practice machining operation 2. Defining metal casting process, moulding methods and relates Casting and Smithy applications. 3. Plan basic carpentry and fitting operation and Practice carpentry and fitting operations 4. Summarize metal joining operation and Practice welding operation 5. Illustrate the, electrical and electronics basics and Makes appropriate connections.
11	III	XEE 301ELECTRICAL CIRCUIT ANALYSIS	<ol style="list-style-type: none"> 1. Apply network theorems for the analysis of electrical circuits. Respond network theorems for the analysis of electrical 2. Comparing the transient and steady-state response of R, RL and RLC electrical circuits. Describe the circuits transient and steady-state response of RL and RC electrical circuits 3. Analyze circuits in the sinusoidal steady-state (single-phase and three-phase). Construct and analyze of Single-phase transformer for its Sinusoidal response 4. Laplace transforms analysis of ac circuits. Construct and analyze of RLC Series and parallel resonance circuits 5. To Understand the concept of one port and two port network functions.
12		XEE 302ANALOG ELECTRONICS	<ol style="list-style-type: none"> 1. Understand the characteristics of diode and analyze the rectifier circuits. 2. Understand the characteristics of transistor. 3. Understand the concept of MOSFET and analyze the circuits and its characteristics 4. Classify and explain different types of amplifier 6. Recall and explain linear and non-linear application of OP-AMP
13		XEE 303ELECTRICAL MACHINES - I	<ol style="list-style-type: none"> 1. Understand the operation of DC machines. 2. Understand the winding concepts of DC machine. 3. Understand the motoring and generating concepts of DC machine. 4. Analyze single phase and three phase transformers circuits Understand the various loss in magnetic circuits.

14		XEE 304ELECTROMAGNETIC FIELDS	<ol style="list-style-type: none"> 1. To understand the basics of vector and outline different coordinate system. 2. To understand the concept of static electric field for simple configuration using gauss and Coulombs law 3. Define the knowledge of electrostatics using, boundary conditions, Poisson's and Laplace equation 4. Recall the magnetic field configuration using Different laws and outline time varying electric and magnetic fields using Maxwell's equation 5. Recall the concept of magnetization and magnetic field configuration using boundary condition.
15		XEE 305TRANSMISSION AND DISTRIBUTION	<ol style="list-style-type: none"> 1. Explain the major components of Transmission and Distribution Systems (TDS). Classify different types of single and three phase transmission line parameters. 2. Outline the types of transmission line efficiency calculations and its performance 3. Explain the different types of insulators and solve for stress and sag in overhead lines 4. Interpret different type's underground cables. 5. Summarize the latest technologies in the field of distribution systems
16		XEE 306 IN-PLANT TRAINING - I	
17	IV	XPS 401PROBABILITY AND STATISTICS	<ol style="list-style-type: none"> 1. Explain conditional probability, independent events; find expected values and Moments of Discrete random variables with their properties. 2. Find distribution function, Marginal density function, conditional density function and to define density function of conditional distribution functions normal, exponential and gamma distributions. 3. Determine the statistical parameters of Binomial, Poisson and Normal and to find correlation, regression and Rank Correlation coefficient of two variables. Moments, skewness and Kurtosis. 4. Explain large sample test for single proportion, difference of proportion, single mean, difference of means and difference of standard deviations with simple problems. C 5. Explain small sample test for single mean, difference of mean and correlation coefficients, variance test, chi square test with simple problems

18		XEE 402DIGITAL ELECTRONICS	<ol style="list-style-type: none"> 1. To Understand numerical values in various number systems and show number conversions between different number Systems 2. To Analyze Boolean functions and minimization techniques using k –maps and postulates and theorems of Boolean Algebra, minimization of Boolean functions using basic laws. 3. To Apply Logic gates and their applications and construct the simple adders and subtractors using logic gates 4. To Understand the process of Analog to Digital conversion and its applications 5. To Understand the process of Digital to Analog conversion and its applications.
19		XEE 403POWER ELECTRONICS	<ol style="list-style-type: none"> 1. To Understand the structure, operation and characteristics of power switching devices. 2. Determine the operation, characteristics and performance parameters of controlled rectifiers. 3. Analysis the operation of DC - DC choppers. 4. Analysis the operation of various inverters and infer the suitable PWM techniques 5. To Understand the concept of various types of AC voltage controllers
20		XEE 404 ELECTRICAL MACHINES - II	<ol style="list-style-type: none"> 1. To Understand the fundamentals of different types of slots and windings used for AC machines 2. To Understand the concepts of pulsating and revolving magnetic fields 3. To Understand the operation of induction machines, torque slip characteristics, equivalent circuit and its phasor diagram 4. To Understand the different types of starting, braking and speed control for induction motors. React the generator operation, self-excitation and doubly-fed Induction machines 5. To Understand the operation of single-phase induction motors and its performance parameters.
21		XUM 405ENTREPRENEURSHIP DEVELOPMENT	<ol style="list-style-type: none"> 1. Recognize and describe the personal traits of an entrepreneur. 2. Determine the new venture ideas and analyze the feasibility report.

			<ol style="list-style-type: none"> 3. Develop the business plan and analyze the plan as an individual or in team. 4. Describe various parameters to be taken into consideration for launching and managing small business. 5. Describe Technological management and Intellectual Property Rights
22		XEE 406 SIGNALS AND SYSTEMS	<ol style="list-style-type: none"> 1. Understand the concepts of continuous time and discrete time systems 2. Analyse systems in complex frequency domain. 3. Learn about Fourier transformation techniques 4. Learn about Laplace transformation techniques 5. Learn about Z- transformation techniques
23	V	XEE 501 POWER SYSTEMS - I (APPARATUS AND MODELLING)	<ol style="list-style-type: none"> 1. Demonstrate the per phase analysis of power system 2. Develop the model of various components of power system and Construct the Y Bus and Z Bus for a power system 3. Analyse the power system network with symmetrical and unsymmetrical faults. Calibrate the fault current in a power system. 4. Summarize the power flow equation. Assess the voltage profile of a power system by performing the load flow analysis and Identify the line loss and line flow 5. Classify and determine the stability of power system. Detect the transient behaviour of power system when it is subjected to a fault.
24		XEE 502 CONTROL SYSTEMS	<ol style="list-style-type: none"> 1. Identify the basic elements, derive the transfer function and Compute the overall gain of the control system and Construct the transfer function of DC motors and DC generators 2. Explain the performance of First and Second order system with static and dynamic error coefficients 3. Describe the frequency domain specifications and show the response of frequency response. 4. Determine the stability of the systems and Design the suitable compensator and controller for the given performance criteria of the control system

			5. Describe State transition matrix. Explain State space model and construct and verify the canonical state model and Kalman's test for controllability and observability.
25		XEE 503 MICROPROCESSORS AND MICROCONTROLLERS	<ol style="list-style-type: none"> 1. To understand the fundamentals of microprocessors, microcontrollers and embedded systems 2. To understand the architecture, Timing diagrams and Execution cycles of 8051 3. To understand the types of addressing modes, Instruction types and to understand the basic concepts of programming 4. To understand interfacing design of peripherals like I/O, A/D, D/A, timer etc. 5. To understand communication protocols and interfacing with external devices
26		XEE E1* PROFESSIONAL ELECTIVE - 1	
27		X** OE* OPEN ELECTIVE - 1	
		XUM 506 CONSTITUTION OF INDIA	<ol style="list-style-type: none"> 1. Understand the Constitutional History 2. Understand the Powers and Functions 3. Understand the Legislature 4. Understand the Judiciary 5. Understand the Centre State relations
28		XEE 507 IN-PLANT TRAINING - II	
29		XEE M01 MINOR COURSE - I	
30	VI	XUM 601 ECONOMICS FOR ENGINEERS	<ol style="list-style-type: none"> 1. Understand the concepts of economics in engineering 2. Interpret Break-even analysis. 3. Illustrate value engineering procedure. 4. Understand and analyze replacement problem 5. Explain depreciation.
31		XEE 602 POWER SYSTEMS - II (OPERATION AND CONTROL)	<ol style="list-style-type: none"> 1. Explain power system load characteristics and generation reserve requirements 2. Demonstrate and Apply the mathematical knowledge to model and analysis of power system for frequency control 3. Identify fundamental aspects of reactive power and its effect on system voltage and

			<p>Select the suitable voltage control method for the system operating condition</p> <p>4. Formulate economic dispatch and unit commitment problem and its solution.</p> <p>5. Apply computer control methods for power system operation and control</p>
32		XEE E2* PROFESSIONAL ELECTIVE - 2	
33		XEE E3* PROFESSIONAL ELECTIVE - 3	
34		X** OE* OPEN ELECTIVE - 2	
35		XUM 606 DISASTER MANAGEMENT	<p>1. Understanding the concepts of application of types of disaster preparedness</p> <p>2. On completion of this course the students will be able to understand planning essentials of disaster</p> <p>3. Have a good understanding of importance of seismic waves occurring globally</p> <p>4. On completion of this course, the students will be able to perform drill essential for disaster mitigation</p> <p>5. Have a keen knowledge on essentials of risk reduction</p>
36		XEE M02 MINOR COURSE - II	
37	VII	XEE E4* PROFESSIONAL ELECTIVE - 4	
38		XEE E5* PROFESSIONAL ELECTIVE - 5	
39		XUM 703 HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY	<p>1. Adapt the human values and Social Justice.</p> <p>2. Discuss and accept Gender Equality, empowerment and feminism</p> <p>3. Recognize the status of women and analyze the issues related to women</p> <p>4. Demonstrate the human rights and good governance</p> <p>5. Adapt the human values and Social Justice</p>
40		X** OE* OPEN ELECTIVE - 3	
41		X** OE* OPEN ELECTIVE - 4	
42		XEE 706 PROJECT PHASE	

		- I	
43		XEE 707 IN-PLANT TRAINING - III	
44		XEE M03 MINOR COURSE - III	
45	VIII	XUM 801 CYBER SECURITY	<ol style="list-style-type: none"> 1. Able to understand the Cyber Security Policy, Laws and Regulations 2. Able to discuss the Cyber Security Management Concepts 3. Able to understand the Cyber Crime and Cyber welfare 4. Able to discuss on issues related to Information Security Concepts 5. Able to understand various security threats
46		XEE E6* PROFESSIONAL ELECTIVE - 6	
47		X** OE* OPEN ELECTIVE -5	
48		XEE 804 PROJECT PHASE - II	

Programme Outcomes and Course Outcomes of
DEPARTMENT OF MECHANICAL ENGINEERING

Programmes Offered:

S.No.	Programme Name	PO and CO
1.	B.Tech Mechanical Engineering	Yes
2.	M.Tech Mechanical Engineering	Yes
3.	Ph.D	Not Applicable

B.TECH – Mechanical Engineering

PROGRAM OUTCOMES	
PO 1	An ability to apply principles of engineering, basic science, and mathematics to model and analyze components or processes
PO 2	An ability to design and conduct experiments, as well as to analyze and interpret data
PO 3	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability, and sustainability
PO 4	An ability to function on multi-disciplinary teams
PO 5	An ability to identify, formulate, and solve engineering problems
PO 6	An understanding of professional and ethical responsibility
PO 7	An ability to communicate effectively
PO 8	Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
PO 9	An ability to engage in life-long learning
PO 10	A knowledge of contemporary issues
PO 11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
PO 12	An ability to imbibe principles of engineering, basic science, and mathematics to design and realize physical systems, components, or processes
PROGRAM SPECIFIC OUTCOME	
PSO1	an ability to work professionally in design and manufacturing systems
PSO2	an ability to work professionally in energy systems

COURSE OUTCOMES

S. NO	SEMESTER	COURSE CODE & NAME	COS
1.	I	XMA101- CALCULUS AND LINEAR ALGEBRA	<p>CO1 Apply orthogonal transformation to reduce quadratic form to canonical forms.</p> <p>CO2 Apply power series to tests the convergence of the sequences and series. Half range Fourier sine and cosine series.</p> <p>CO3 Find the derivative of composite functions and implicit functions. Euler's theorem and Jacobian.</p> <p>CO4 Explain the functions of two variables by Taylor's expansion, by finding maxima and minima with and without constraints using Lagrangian Method. Directional derivatives, Gradient, Curl and Divergence.</p> <p>CO5 Apply Differential and Integral calculus to notions of Curvature and to improper integrals.</p>
2.	I	XCP102- PROGRAMMING FOR PROBLEM SOLVING	<p>CO1 Define programming fundamentals and Solve simple programs using I/O statements</p> <p>CO2 Define syntax and write simple programs using control structures and arrays</p> <p>CO3 Explain and write simple programs using functions and pointers</p> <p>CO4 Explain and write simple programs using structures and unions</p> <p>CO5 Explain and write simple programs using files and Build simple projects</p>
3.	I	XGS103- ENGLISH	<p>CO1 Ability to recall the meaning for proper usage</p> <p>CO2 Apply the techniques in sentence patterns</p> <p>CO3 Identify the common errors in sentences</p> <p>CO4 Construct the Nature and Style of sensible Writing</p> <p>CO5 Practicing the writing skills</p> <p>CO6 Grasping the techniques in learning sounds and etiquettes</p>
4.	I	XAC104- APPLIED CHEMISTRY FOR ENGINEERS	<p>CO1 Identify the periodic properties such as ionization energy, electron affinity, oxidation states and electro negativity. Describe the various water quality parameters like hardness and alkalinity.</p> <p>CO2 Explain and Measure microscopic chemistry in terms of atomic, molecular orbitals and intermolecular forces</p>

			<p>CO3 Interpret bulk properties and processes using thermodynamic and kinetic considerations.</p> <p>CO4 Describe, Illustrate and Discuss the chemical reactions that are used in the synthesis of molecules.</p> <p>CO5 Apply, Measure and Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques</p>
5.	I	XWP105- WORKSHOP PRACTICES	<p>CO1 Summarize the machining methods and Practice machining operation.</p> <p>CO2 Defining metal casting process, moulding methods and relates Casting and Smithy applications.</p> <p>CO3 Plan basic carpentry and fitting operation and Practice carpentry and fitting operations.</p> <p>CO4 Summarize metal joining operation and Practice welding operation.</p> <p>CO5 Illustrate the, electrical and electronics basics and Makes appropriate connections.</p>
6.	II	XMA201- CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLE	<p>CO1 Find double and triple integrals and to find line, surface and volume of an integral by Applying Greens, Gauss divergence and Stokes theorem.</p> <p>CO2 Solve first order differential equations of different types Which are solvable for p, y, x and Clairaut's type.</p> <p>CO3 Solve Second order ordinary differential equations with Variable coefficients using various methods.</p> <p>CO4 Use CR equations to verify analytic functions and to find Harmonic functions and harmonic conjugate. Conformal mapping of translation and rotation. Mobius transformation</p> <p>CO5 Apply Cauchy residue theorem to evaluate contour integrals involving sine and cosine function and to state Cauchy integral formula, Liouville's theorem. Taylor's series, zeros of analytic functions, singularities, Laurent's series.</p>
7.	II	XES202- ENVIRONMENTAL SCIENCES	<p>CO1 Describe the significance of natural resources and explain anthropogenic impacts.</p> <p>CO2 Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.</p> <p>CO3 Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon</p>

			<p>CO4 Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development.</p> <p>CO5 Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.</p>
8.	II	XBE203- ELECTRICAL AND ELECTRONIC ENGINEERING SYSTEMS	<p>CO1 Define, Relate, the fundamentals of electrical parameters and build and explain AC, DC circuits by Using measuring devices</p> <p>CO2 Define and Explain of operation of DC and AC machines.</p> <p>CO3 Recall and Illustrate various semiconductor devices and their applications and displays the input output characteristics of basic semiconductor devices.</p> <p>CO4 Relate and Explain the number systems and logic gates. Construct the different digital circuit.</p> <p>CO5 Label and Outline the different types of microprocessors and their applications.</p>
9.	II	XAP204- APPLIED PHYSICS FOR ENGINEERS	<p>CO1 Identify the basics of mechanics, explain the principles of elasticity and determine its significance in engineering systems and technological advances.</p> <p>CO2 Illustrate the laws of electrostatics, magneto-statics and electromagnetic induction; use and locate basic applications of electromagnetic induction to technology.</p> <p>CO3 Understand the fundamental phenomena in optics by measurement and describe the working principle and application of various lasers and fibre optics.</p> <p>CO4 Analyse energy bands in solids, discuss and use physics principles of latest technology using semiconductor devices.</p> <p>CO5 Develop Knowledge on particle duality and solve Schrodinger equation for simple potential.</p>
10.	II	XEG205- ENGINEERING GRAPHICS	<p>CO1 Apply the national and international standards, construct and practice various curves</p> <p>CO2 Interpret, construct and practice orthographic projections of points, straight lines and planes.</p> <p>CO3 Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids.</p>

			<p>CO4 Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids.</p> <p>CO5 Construct sketch and practice isometric and perspective views of simple and truncated solids.</p>
11.	III	XME301- PDE, PROBABILITY & STATISTICS	<p>CO1 Solve homogeneous and non homogeneous linear partial differential equations of second order by complementary function and particular integral method.</p> <p>CO2 Solve one dimensional heat equation, wave equation using separation of variables method to simple problems in Cartesian coordinates.</p> <p>CO3 Find expectation values and moments of a discrete and continuous random variables and their properties, distribution functions Define densities of normal, exponential and gamma.</p> <p>CO4 Find statistical parameters of the Binomial, Poisson and Normal distributions and to find correlation, regression and rank correlation coefficients of two variables.</p> <p>CO5 Apply large sample test for single proportion, difference of proportions, single mean, difference of means and to test ratio of variances, Chi square.</p>
12.	III	XME302- THERMODYNAMICS	<p>CO1 After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions</p> <p>CO2 Students can Study the changes in thermodynamic properties of substances</p> <p>CO3 The students will be able to study the performance of energy conversion devices</p> <p>CO4 The students will be able to differentiate between high grade and low grade energies.</p> <p>CO5 Student can apply the energy balance to systems operating at different cycles.</p>
13.	III	XME303- STRENGTH OF MATERIALS	<p>CO1 After completing this course, the students should be able to recognize various types loads applied on machine components of simple geometry and understand the nature of internal stresses that will develop within the components</p> <p>CO2 The students will be able to evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading</p> <p>CO3 CO3- The students will be able to understand inertia and different types of springs and</p>

			<p>evaluate the different types of inertia and deflection of different types of beams with different loading conditions.</p> <p>CO4 CO4- The students will be able to understand torsion on shaft and springs and evaluate deflection, torsional stresses on shaft, helical spring and leaf spring</p> <p>CO5 CO5- After completing this course, The students will be able to understand and compute stresses in hollow cylindrical and spherical objects.</p>
14.	III	XEM304- ENGINEERING MECHANICS	<p>CO1 Explain the principles forces, laws and their applications.</p> <p>CO2 Classification of friction, and apply the forces in Trusses and beams.</p> <p>CO3 Explain and Apply moment of Inertia and Virtual work</p> <p>CO4 Outline and Examine Dynamics.</p> <p>CO5 Explain free and forced vibration.</p>
15.	III	XUM305- ENTREPRENEURSHIP DEVELOPMENT	<p>CO1 Recognise and describe the personal traits of an entrepreneur.</p> <p>CO2 Determine the new venture ideas and analyse the feasibility report.</p> <p>CO3 Develop the business plan and analyse the plan as an individual or in team.</p> <p>CO4 Describe various parameters to be taken into consideration for launching and managing small business.</p> <p>CO5 Explain the technological management and Intellectual Property Rights</p>
16.	III	XME306- MANUFACTURING PROCESSES	<p>CO1- Summarise the metal casting and metal forming process. Identify the defects in the metal casting process.</p> <p>CO2- Relate the various cutting force components for the formation of chip. Identify the tool wear, tool life, cutting tool materials, cutting fluids.</p> <p>CO3- Compare various additive manufacturing and joining process</p> <p>CO4- Explain electrical energy and chemical based unconventional machining process</p> <p>CO5- Explain mechanical and thermal energy based unconventional machining process</p>

17.	IV	XME401- APPLIED THERMODYNAMICS	<p>CO1- Understanding of basic fuel types and Calculation of air fuel mixtures or combustion</p> <p>CO2- After completing this course, the students will get a good understanding of various practical power cycles and heat pump cycles.</p> <p>CO3- Understanding of basic principles of psychometric and solving the problems of psychometric chart.</p> <p>CO4- They will be able to understand phenomena occurring in high speed compressible flow</p> <p>CO5- They will be able to analyze energy conversion in various thermal devices such as combustors, air coolers, nozzles, diffusers, steam turbines and reciprocating compressors.</p>
18.	IV	XME402- SOLID MECHANICS	<p>CO1- Understand and apply the concepts of 3-dimensional state of strain and stress under different types of loading</p> <p>CO2- Understand and apply constitutive relations for simple geometries</p> <p>CO3- Apply the deformation concepts for plane stress and plane strain problems</p> <p>CO4- Apply the deformation concepts for complex cases</p> <p>CO5- Understand and apply energy and potential methods.</p>
19.	IV	XUM403-HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALIT	<p>CO1- Relate and Interpret the human ethics and human relationships</p> <p>CO2- Explain and Apply gender issues, equality and violence against women</p> <p>CO3- Classify and Develop the identify of women issues and challenges.</p> <p>CO4- Classifyand Dissect human rights and report on violations.</p> <p>CO5- List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.</p>
20.	IV	XME404- FLUID MECHANICS & FLUID MACHINES	<p>CO1- Recalling of fluids properties and understanding the equations related to fluid flow. Ability to solve problems related to momentum equation and Bernoulli's equation</p> <p>CO2-Understanding the concept of incompressible fluid flow fluid flow through channels and ducts. Discuss the concept of boundary layer and ability apply Darcy Weisbach equation in different condition</p>

			<p>CO3- Understanding the need and methods of dimensional analysis and ability to derive equations using dimensional analysis</p> <p>CO4- Explain the working of different types of pumps and ability to analyze its performance</p> <p>CO5- Explain the working of different types of turbines and ability to analyze its performance</p>
21.	IV	XME405- MATERIALS ENGINEERING	<p>CO1- Recall the Basic Properties of Engineering Materials.</p> <p>CO2- Classify static failure theories.</p> <p>CO3- Classify the concepts of iron and steel.</p> <p>CO4- Analyze the heat treatment process and its applications.</p> <p>CO5- Analyze the properties of alloys.</p>
22.	IV	XME406- INSTRUMENTATION & CONTROL	<p>CO1- Understand the measurement of various quantities using instruments, their accuracy & range, and the techniques for controlling devices.</p> <p>CO2- Understand the instrumentation system and elements.</p> <p>CO3- Design various Controllers</p> <p>CO4- Understand the instrumentation system models and functions.</p> <p>CO5- Create a project using Instrumentation systems.</p>
23.	V	XME501- OPERATIONS RESEARCH	<p>CO1- Explain the basic concepts of optimization and To Formulate and Solve linear programming problems.</p> <p>CO2- Apply the concepts of transportation problem, assignment problem and travelling salesman problem Participate in the class discussion in the transportation model.</p> <p>CO3- Explain and demonstrate the basic concepts of PERT- CPM and their applications in product planning control.</p> <p>CO4- Solve the Minimal Spanning Tree Problem, Shortest Route Problem, Maximal Flow Problem and Minimal Cost Capacitated Flow Problem. Reproduce the Network model.</p> <p>CO5- Apply the concepts of Game theory to Find the solution and saddle point.</p>

24.	V	XME502- HEAT TRANSFER	<p>CO1- Understand the basic modes of heat transfer and Compute temperature distribution in steady-state and unsteady-state heat conduction.</p> <p>CO2- Interpret and analyse forced and free convection heat transfer.</p> <p>CO3- Understand the principles of radiation heat transfer and basics of mass transfer.</p> <p>CO4- Design heat exchangers using LMTD and NTU methods.</p> <p>CO5- Understand the basic concepts of mass transfer</p>
25.	V	XME503- AUTOMOBILE ENGINEERING	<p>CO1- Define and identifies the vehicle construction, types and specification of engines.</p> <p>CO2- Differentiate and calibrates Ignition, Fuel Supply and Emission Control System.</p> <p>CO3- Categories and illustrate the various types of clutches and gear boxes.</p> <p>CO4- Characterize and determine the suspension, steering geometry and wheel specification.</p> <p>CO5- Assembles and Summarize theElectrical systems and Dash board instrumentations.</p>
26.	V	XME504- CAD / CAM	<p>CO1-DefineDesign Process, CAD, CAM and explain various stages of design and different types of design process explain the DOM conceptCAM along with benefits of CAD</p> <p>CO2- Classify and explain different graphical primitives and transformations systems along with complex geometry generation techniques.Classify and outline the various Data structure and management systems.</p> <p>CO3- Define modeling and Classify different types of geometric models also outlinedifferent features of solid modeling packages</p> <p>CO4- Explain and contrast NCCNC DNC also illustrate various tools ,devices and mechanisms used inside NC,CNC and DNC</p> <p>CO5-Listimportant NC Codes and createCNC code for simple CNC operations like turning and facing.</p>
27.	V	XME505- KINEMATICS AND THEORY OF MACHINES	<p>CO1- To understand the kinematics and rigid- body dynamics of kinematically driven machine</p> <p>CO2- To understand the motion of linked mechanisms in terms of the displacement, velocity and acceleration at any point in a rigid link</p>

			<p>CO3- To be able to design some linkage mechanisms and cam systems to generate specified output motion</p> <p>CO4- To understand the kinematics of gear trains</p> <p>CO5- To understand the friction mechanisms in bearing clutches and brakes.</p>
28.	V	XUM506- CONSTITUTION OF INDIA	<p>CO1- Understand the Constitutional History</p> <p>CO2- Understand the Powers and Functions</p> <p>CO3-Understand the Legislature</p> <p>CO4-Understand the Judiciary</p> <p>CO5-Understand the Centre State relations</p>
29.	V	XME507- MECHANICAL ENGINEERING LABORATORY (THERMAL) I	<p>CO1- Measure various properties of fluids using equipments.</p> <p>CO2- Characterize the performance of various fluid machineries.</p> <p>CO3- Determine the various thermal properties.</p> <p>CO4- Identify the Performance of the engines and Analyze the heat transfer coefficients in different modes</p> <p>CO5- Determine and Experiment with emissivity and vapour compression system.</p>
30.	VI	XUM601- ECONOMICS FOR ENGINEERS	<p>CO1- Explain the concepts of economics in engineering and identify element of cost to prepare cost sheet</p> <p>CO2- Calculate and Explain the Break-even point and marginal costing</p> <p>CO3- Summarize and Use value engineering procedure for cost analysis</p> <p>CO4- Estimate replacement problem</p> <p>CO5- Compute, Explain and make Use of different methods of depreciation</p>
31.	VI	XME 602- MANUFACTURING TECHNOLOGY	<p>CO1- Construct the Degrees of freedom, principles of location and clamping, principles of jig design, fool proofing, elements of jigs, locates fixture design</p> <p>CO2- Explain the basic principles of measurements classify the various linear and angular measuring equipments and distinguish their principle of operation and applications.</p> <p>CO3- Explain the Assembly of different components</p> <p>CO4- Explain and demonstrate the basic concepts of PERT- CPM and their applications in product planning control.</p>

			CO5- Explain the basic concepts of optimization and To Formulate and Solve linear programming problems.
32.	VI	XME603- DESIGN OF MACHINE ELEMENTS	<p>CO1- Describe the design process, material selection, calculation of stresses and stress concentrations under variable loading.</p> <p>CO2- have a design knowledge on sliding and rolling contact bearing</p> <p>CO3- Summarize the knowledge in helical, leaf, disc and torsional springs</p> <p>CO4- Analyze bolted joints in eccentric loading. Examine the welded joints for vessels and steel structures. Differentiate rigid and flexible couplings and also the knuckle joints.</p> <p>CO5- Recognize the need for friction drives and positive drives. Apply BIS standards and catalogues in design and selection of belts and chain for requirement, Select suitable drive combination based on requirement.</p>
33.	VI	XME606- MECHANICAL ENGINEERING LABORATORY (DESIGN) II	<p>CO1-Definedifferent mechanical properties and solvevarious deformation problems under different stress and loading conditions.</p> <p>CO2- Indentify Strain for various objects.</p> <p>CO3- Examine the molecular structures of heat treated samples.</p> <p>CO4- Study about various velocity ratios, kinematic mechanisms and cam –follower motions.</p> <p>CO5- Determine the frequencies of various kinematic systems.</p>
34.	VII	XME702- AUTOMATION IN MANUFACTURING	<p>CO1- Define automation and classify different types of automation along with recent trends of automation in manufacturing.</p> <p>CO2- Classify and describe computer aided technologies in manufacturing.</p> <p>CO3- Classify and explain different automation technologies and building blocks of systems.</p> <p>CO4- Describe product modelling and simulation techniques in manufacturing</p> <p>CO5- Define additive manufacturing and explain the recent advancements in additive manufacturing.</p>
35.	VII	XUM706- CYBER SECURITY	<p>CO1- Able to understand the Cyber Security Policy, Laws and Regulations</p> <p>CO2- Able to discuss the Cyber Security Management Concepts</p>

			<p>CO3- Able to understand the Cyber Crime and Cyber welfare</p> <p>CO4- Able to discuss on issues related to Information Security Concepts</p> <p>CO5- Able to understand various security threats</p>
36.	VII	XME707- MECHANICAL ENGINEERING LABORATORY (MANUFACTURING) III	<p>CO1-Experiment and Measure various machining operations and its cutting forces involved</p> <p>CO2- Create and choose the CNC suitable part programming for the corresponding job.</p> <p>CO3- Experiment the sample with EDM.</p> <p>CO4- Understand the operation of pick and place robot.</p> <p>CO5- Explain the basic principles of measurements classify the various linear and angular measuring equipments and distinguish their principle of operation and applications.</p>
PROFESSIONAL ELECTIVES LIST			
1.	(VI,VII,VIII) ELECTIVE	XMEE01- GAS DYNAMICS AND SHOCK WAVES	<p>CO1- Define and apply energy and Momentum equations for compressible flows Explain and apply regions of flow, reference velocities. Mach number</p> <p>CO2-Define Isentropic flow through variable area ducts Explain and apply T-s and H-s diagrams for nozzle and diffuser flows, mass flow rate through nozzles and diffusers</p> <p>CO3- Define fanno flow and Rayleigh flow equations Explain and apply variation of flow properties, Mach number with duct length, maximum heat transfer for Rayleigh flow</p> <p>CO4- Define Normal shock governing equations Explain and apply Prandtl Meyer equation, Flow in convergent and divergent nozzle, Fanno flow and Rayleigh flow with normal shock</p> <p>CO5-Explain Aircraft and rocket propulsion classify Jet engines for aircraft and rocket propulsion apply performance Jet engines for aircraft and rockets</p>
2.	(VI,VII,VIII) ELECTIVE	XMEE02- POWER PLANT ENGINEERING	<p>CO1- What are the types of thermal power plants, systems operation and handling and cogeneration systems?</p> <p>CO2- Describe gas turbine and combined cycle power plants systems components and operation</p> <p>CO3- How nuclear energy conversion, nuclear power plant subsystems works and types of nuclear reactors.</p>

			<p>CO4- What is the potential of exploiting renewable energy systems, and hydro power plant systems and components</p> <p>CO5- Extend energy economics and environmental issues of different power plants.</p>
3.	(VI,VII,VIII) ELECTIVE	XMEE03- REFRIGERATION AND AIR CONDITIONING	<p>CO1- To familiarize with the terminology associated with refrigeration systems and air conditioning</p> <p>CO2- To understand basic refrigeration processes</p> <p>CO3- To provide an overview of sorption system</p> <p>CO4- To understand the basics of psychrometry and practice of applied psychrometrics</p> <p>CO5- To acquire the skills required to model, analyse and design different refrigeration as well as air conditioning processes and components</p>
4.	(VI,VII,VIII) ELECTIVE	XMEE04- RENEWABLE ENERGY SOURCES	<p>CO1- To know the energy demand of world, nation and available resources to fulfill the demand</p> <p>CO2- To know about the problems associated with the conventional energy resources for sustainable development</p> <p>CO3- To know about the exploration of nonconventional energy resources and their effective tapping technologies</p> <p>CO4- To acquire the knowledge of modern energy conversion technologies</p> <p>CO5- Select appropriate energy conservation method to reduce the wastage of energy</p>
5.	(VI,VII,VIII) ELECTIVE	XMEE05- ADVANCED I.C.ENGINES	<p>CO1- Understand working and performance of IC Engines through thermodynamic cycles</p> <p>CO2- Outline emission formation mechanism of IC engines, its effects and the legislation standards.</p> <p>CO3- Understand working principles of instrumentation used for engine performance and emission parameters.</p> <p>CO4- Evaluate methods for improving the IC engine performance.</p> <p>CO5- Understand the latest developments in IC Engines and alternate fuels.</p>
6.	(VI,VII,VIII) ELECTIVE	XMEE06- ENERGY CONSERVATION AND MANAGEMENT	<p>CO1- Remember and Understand about the Energy scenarios.</p> <p>CO2- Understand about the energy conservation techniques.</p> <p>CO3- Understand about the energy conservation in various thermal applications.</p>

			<p>CO4- Understand about the energy conservation in various mechanical applications.</p> <p>CO5- Remember and Understand about energy economics.</p>
7.	(VI,VII,VIII) ELECTIVE	XMEE07- FINITE ELEMENT ANALYSIS	<p>CO1- Solve problems by applying standard finite element techniques</p> <p>CO2- Analyze 1-D finite elements and to build the stiffness matrix..</p> <p>CO3- Examine 2-D finite element continuum for structural applications</p> <p>CO4- Apply axisymmetric formulation for specific applications.</p> <p>CO5- Make use of finite element principles in isoparametric applications.</p>
8.	(VI,VII,VIII) ELECTIVE	XMEE08- DESIGN OF TRANSMISSION SYSTEMS	<p>CO1- Recall the need for friction drives and positive drives and select suitable drive.</p> <p>CO2- Design spur and helical gear by considering strength and life.</p> <p>CO3- Estimate the dimensions of bevel and worm gears</p> <p>CO4- Design of multi-speed gearbox and construct ray diagram and kinematic arrangement diagram for multi-speed gearbox.</p> <p>CO5- Apply the uniform pressure and wear theories to design the various clutches and Design braking system for various applications</p>
9.	(VI,VII,VIII) ELECTIVE	XMEE09- MECHANICAL VIBRATIONS	<p>CO1- Define vibration and Classify different types of vibrations also Model different types of vibrations on mechanical systems</p> <p>CO2- Classify different degrees of freedom systems Model different degrees of freedom systems also solve for different types of motion</p> <p>CO3- Define motion and Classify different types of motion also Model different types of equations of motion solve different types of equations of motion</p> <p>CO4- Define Transient vibration and continuous systems and Classify different types of excitation also Model different types of vibration based on laplace transformation also continuous system solve using different types of governing equation</p> <p>CO5- Measure Vibration Classify different types of exciters and analyzers also Explain different aspects of vibration control solve different vibration control problems</p>

10 .	(VI,VII,VIII) ELECTIVE	XMEE10- COMPUTATIONAL FLUID DYNAMICS	<p>CO1- Define and apply governing equations of fluid dynamics Explain and apply turbulence kinetic energy equations, mathematical behavior of PDE on CFD</p> <p>CO2- Define methods of deriving the discretization equations Explain and apply different methodologies for deriving solution</p> <p>CO3- Define and explain steady / transient one dimensional conduction equation. Apply finite volume formulation for conduction problems.</p> <p>CO4- Explain and Solve steady one dimensional conduction and diffusion problems</p> <p>CO5- Solve fluid flow field calculations using CFD models</p>
11 .	(VI,VII,VIII) ELECTIVE	XMEE11- MACHINE DRAWING	<p>CO1- To Understand the codes and practices.</p> <p>CO2- To apply tolerances and fits in the drawings.</p> <p>CO3- To remember the symbols of machine drawing</p> <p>CO4- To understand the working fasters like cotter joint, knuckle joint, etc.,</p> <p>CO5- To understand the working components</p>
12 .	(VI,VII,VIII) ELECTIVE	XMEE12- DESIGN OF JIGS AND FIXTURES AND PRESS TOOLS	<p>CO1- Understand the locating and clamping principles.</p> <p>CO2- Study about jigs and fixtures and its principles.</p> <p>CO3- Understand about press working terminologies and elements.</p> <p>CO4- Classify and understand bending and drawing dies.</p> <p>CO5- Understand various forming techniques.</p>
13 .	(VI,VII,VIII) ELECTIVE	XMEE13- MATHEMATICAL MODELLING AND SIMULATION	<p>CO1- Define system and Classify different aspects of systems also Model different types of mechanical systems</p> <p>CO2- Define random number Model different degrees of freedom systems also compile code for different types of random numbers</p> <p>CO3- Explain Problem simulation using different methods and Classify different types of simulation tools Model systems using different representational tools solve fortypical simulation problem</p> <p>CO4- Classify different types of simulation languages available also able to select suitable simulation languages for different simulation problem also demonstrate expertise on any one simulation language</p>

			CO5- Interpret development of simulation models Classify simulation models Explain different types of systems develop simulation code for real-time problem solve the problem using simulation tools
14	(VI,VII,VIII) ELECTIVE	XMEE14- COMPUTER AIDED DESIGN	CO1- Apply fundamentals of computer graphics and relate 2D and 3D transformations. CO2- Summarize Mathematical Representation for curves and surfaces CO3- Make use of concepts of visual realism and computer animation CO4- Build the model by understanding the concept of ASSEMBLY CO5- Interpret relevant CAD Standards
15	(VI,VII,VIII) ELECTIVE	XMEE15- UNCONVENTIONAL MANUFACTURING TECHNOLOGY	CO1- Explain the principles of material removal mechanism of advanced machining processes such as mechanical, electro-chemical. CO2-Classify the mechanism of Mechanical machining processes and economic considerations in Ultrasonic machining process. CO3- Determine Thermal Metal Removal Processes, characteristics of spark eroded surface, machine tool selection. CO4- Interpret Electro Chemical machining process, economic aspects of ECM and problems on estimation. CO5- Relate Generation and control of electron beam for machining, laser beam machining and comparison
16	(VI,VII,VIII) ELECTIVE	XMEE16- MICROELECTROMECHANICAL SYSTEMS	CO1- Identify working principles of currently available micro sensors, actuators. CO2- Compare the positive and negative consequences of scaling down certain physical quantities that are pertinent to micro systems CO3- List materials for common micro components and devices. CO4- Choose a micromachining technique, such as bulk micromachining and surface micromachining for a specific MEMS fabrication process CO5- Select the suitable MEMS packaging
17	(VI,VII,VIII) ELECTIVE	XMEE17- INDUSTRIAL SAFETY	CO1- Evaluate the safety performance of an organization from accident records CO2- Explain the functions and activities of safety engineering department

			<p>CO3- Select complex man machine systems using human factors engineering tools so as to achieve comfort, worker satisfaction, efficiency, error free and safe workplace environment</p> <p>CO4- Choose the various physiological functions of our body and the test methods for periodical monitoring of health</p> <p>CO5- List out important legislations related to Health , Safety and Environment</p>
18 .	(VI,VII,VIII) ELECTIVE	XMEE18- INDUSTRIAL ROBOTICS	<p>CO1- Understand about robot configurations and drives.</p> <p>CO2- Classify various components and operations of robots.</p> <p>CO3- Understanding about sensors and machine vision systems.</p> <p>CO4- Analyze the robot programming</p> <p>CO5- Apply the robots in different fields.</p>
19 .	(VI,VII,VIII) ELECTIVE	XMEE19- TOTAL QUALITY MANAGEMENT	<p>CO1- List and Explain the basic concepts of total quality concepts and its limitations.</p> <p>CO2- Analyze and Explain the Customer satisfaction, Employee involvement, supplier selection and appraise the performance by TQM principle.</p> <p>CO3- Select and Explain the different TQM tools and their significance</p> <p>CO4- Explain and Apply the Statistical Process Control Tools.</p> <p>CO5- Explain the importance aspects of different quality systems.</p>
20 .	(VI,VII,VIII) ELECTIVE	XMEE20- PRODUCT DESIGN AND DEVELOPMENT	<p>CO1- Classify the processes involved in product development and different techniques.</p> <p>CO2- Find the various product specifications and principles needed for the product development process.</p> <p>CO3- List the various product development concepts and issues.</p> <p>CO4- Recall the industrial design process and DFM and also about other design principles.</p> <p>CO5- Define the various techniques involved in the prototyping process.</p>
21 .	(VI,VII,VIII) ELECTIVE	XMEE21- COMPUTER INTEGRATED MANUFACTURING	<p>CO1- Define the manufacturing activities interrelated with computers for plant operations.</p>

			<p>CO2- Understand the concept of Group Technology and the various approaches of Computer Aided Process Planning.</p> <p>CO3- Organize the shop floor control</p> <p>CO4- Compare the system modeling tools in CIM and the fundamental concepts of data communications.</p> <p>CO5- Discuss the applications of database and system protocol</p>
22 .	(VI,VII,VIII) ELECTIVE	XMEE22- PROCESS PLANNING AND COST ESTIMATION	<p>CO1- Understand about material selection and Process planning and its factors , parameters</p> <p>CO2- Classify about various activities involved in Process planning</p> <p>CO3-Remember about various cost estimation</p> <p>CO4- Analyze various costs, allowances and machining time for various operations.</p> <p>CO5- Classify and Analyze various costs</p>
23 .	(VI,VII,VIII) ELECTIVE	XMEE23- COMPOSITE MATERIALS	<p>CO1- Understand the mechanical behavior of Composite materials</p> <p>CO2- Understand the characteristics of composite materials</p> <p>CO3-Classify and Analyze various manufacturing methods of composite materials.</p> <p>CO4- Remember various assumptions of composite materials.</p> <p>CO5- Analyze the composite materials.</p>
24 .	(VI,VII,VIII) ELECTIVE	XMEE24- AUTOMOTIVE ELECTRONICS	<p>CO1- Classify the lighting system and accessories.</p> <p>CO2- Define the starter and its maintenances</p> <p>CO3- Identify and interpret charging system</p> <p>CO4- Analyze the concepts of automotive electronic engine management system, dashboard and warning systems</p> <p>CO5- Compare the working principle of various sensors</p>
25 .	(VI,VII,VIII) ELECTIVE	XMEE25- RELIABILITY ENGINEERING	<p>CO1-Classify the Reliability and uses Failure data, failure modes, and reliability in terms of hazard rate and failure density function;Hazard models and bath tub curve; applicability of Weibull distribution</p> <p>CO2- Make use of Maintenance - its role and scope in total organisational context basic guidelines for design of organisation structure for follows maintenance; Centralised vs decentralised maintenance;</p> <p>CO3-Examine the corrective, planned, preventive and predictive maintenance; opportunistic</p>

			<p>maintenance; Measurement of maintenance work Identifies the, Reliability and Human Engineering , Reliability Management</p> <p>CO4- Analysis the Maintenance Theory –Inspection and verify the Failure Diagnosis Markov Maintenance Process</p> <p>CO5-Recall the Basic laws of probability, Conditional probability, Random variable, sample distribution, statistical hypothesis, statistical tests of significance, correlation, regression compare the ANNOVA theory and SWOT</p>
OPEN ELECTIVES LIST			
1.	VII,VIII	XMEOE1- PRODUCT DESIGN AND DEVELOPMENT	<p>CO1 Classify the processes involved in product development and different techniques.</p> <p>CO2 Find the various product specifications and principles needed for the product development process.</p> <p>CO3 List the various product development concepts and issues.</p> <p>CO4 Recall the industrial design process and DFM and also about other design principles.</p> <p>CO5 Define the various techniques involved in the prototyping process.</p>
2.	VII,VIII	XMEOE2- RENEWABLE ENERGY SOURCES	<p>CO1 To know the energy demand of world, nation and available resources to fulfill the demand</p> <p>CO2 To know about the problems associated with the conventional energy resources for sustainable development</p> <p>CO3 To know about the exploration of nonconventional energy resources and their effective tapping technologies</p> <p>CO4 To acquire the knowledge of modern energy conversion technologies</p> <p>CO5 Select appropriate energy conservation method to reduce the wastage of energy</p>
3	VII,VIII	XMEOE3- MICROELECTROMECHANICAL SYSTEMS	<p>CO1 Identify working principles of currently available micro sensors, actuators.</p> <p>CO2 Compare the positive and negative consequences of scaling down certain physical quantities that are pertinent to micro systems</p> <p>CO3 List materials for common micro components and devices.</p> <p>CO4 Choose a micromachining technique, such as bulk micromachining and surface micromachining for a specific MEMS fabrication process</p> <p>CO5 Select the suitable MEMS packaging</p>

B.TECH –MECHANICAL ENGINEERING (Part- Time)

COURSE OUTCOMES

S.No	SEMESTER	COURSE CODE &NAME	COs
1.	I	PMA101- CALCULUS AND LINEAR ALGEBRA	<p>CO1- Apply differential and integral calculus to notions of curvature and to improper integrals.</p> <p>CO2- State Rolle's theorem, Mean value theorems, Taylors and Maclaurin theorems with remainders and to apply L'Hospital's rule.</p> <p>CO3- Apply power series to tests the convergence of the sequences and series and to find the half range fourier sine and cosine series.</p> <p>CO4- Find maxima, minima and saddle points using method of Lagrange multipliers and to find directional derivatives, gradient, curl and divergence.</p> <p>CO5- Find eigen values and eigen vectors and to state and verify cayley Hamilton theorem and to use orthogonal transformation to diagonalise the matrix.</p>
2.	I	PEM102- ENGINEERING MECHANICS	<p>CO1- Explain the principles forces, laws and their applications.</p> <p>CO2- Classification of friction, and apply the forces in Trusses and beams.</p> <p>CO3- Explain and Apply moment of Inertia and Virtual work</p> <p>CO4- Outline and Examine Dynamics</p> <p>CO5- Explain free and forced vibration</p>
3.	I	PME103- MATERIALS ENGINEERING	<p>CO1- Recall the Basic Properties of Engineering Materials.</p> <p>CO2- Classify static failure theories.</p> <p>CO3- Classify the concepts of iron and steel.</p> <p>CO4- Analyze the heat treatment process and its applications.</p> <p>CO5- Analyze the properties of alloys.</p>
4.	I	PME104- THERMODYNAMICS	<p>CO1- After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions</p> <p>CO2- Students can Study the changes in thermodynamic properties of substances</p>

			<p>CO3- The students will be able to study the performance of energy conversion devices</p> <p>CO4- The students will be able to differentiate between high grade and low grade energies.</p> <p>CO5- Student can apply the exergy balance to systems operating at different cycles.</p>
5.	I	PUM105- ENVIRONMENTAL SCIENCE	<p>CO1- Describe the significance of natural resources and explain anthropogenic impacts.</p> <p>CO2- Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.</p> <p>CO3- Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon.</p> <p>CO4- Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development.</p> <p>CO5- Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.</p>
6.	II	PMA201-MATHEMATICS II (ODE & COMPLEX VARIABLES)	<p>CO1- Apply Greens theorem, Gauss divergence theorem, Stokes theorem to find area and volume using multiple integrals in Cartesian form by having simple applications involving cubes, sphere and rectangular parallelepipeds.</p> <p>CO2- Solve first order differential equations of different types which are solvable for p, y, x and Clairaut's type.</p> <p>CO3- Solve second order ordinary differential equations with variable coefficients using method of variation of parameters, Cauchy Euler equation, power series, Legendre polynomials and Bessel functions of the first kind.</p> <p>CO4- Use CR equations to verify analytic functions, harmonic functions, find harmonic conjugate and to find conformal mapping of translation and rotation.</p> <p>CO5- Apply Cauchy residue theorem to evaluate contour integrals involving sine and cosine function and to state Cauchy integral formula, Liouville's theorem.</p>

7.	II	PME202- APPLIED THERMODYNAMICS	<p>CO1- Understanding of basic fuel types and Calculation of air fuel mixtures or combustion</p> <p>CO2- After completing this course, the students will get a good understanding of various practical power cycles and heat pumpcycles.</p> <p>CO3- Understanding of basic principles of psychrometry and solving the problems of psychrometric chart.</p> <p>CO4- They will be able to understand phenomena occurring in high speed compressibleflow</p> <p>CO5- They will be able to analyze energy conversion in various thermal devices such as combustors, air coolers, nozzles, diffusers, steam turbines and reciprocating compressors</p>
8.	II	PME203-FLUID MECHANICS MACHINES	<p>CO1- Recalling of fluids properties and understanding the equations related to fluid flow. Ability to solve problems related to momentum equation and Bernoulli's equation</p> <p>CO2- Understanding the concept of incompressible fluid flow fluid flow through channels and ducts. Discuss the concept of boundary layer and ability apply Darcy Weisbach equation in different condition</p> <p>CO3- Understanding the need and methods of dimensional analysis and ability to derive equations using dimensional analysis</p> <p>CO4- Explain the working of different types of pumps and ability to analyze its performance</p> <p>CO5- Explain the working of different types of turbines and ability to analyze its performance</p>
9.	II	PME204- MANUFACTURING PROCESSES	<p>CO1- Analyze and identify the basic process of foundry.</p> <p>CO2-Listthe forging operations and distinguishhand forging with power forging.</p> <p>CO3- Recall the traditional metal joining processes and Relate them with respect to the advantages and applications.</p> <p>CO4- Classify and select the suitable machining processes.</p>

			CO5- Compare the types of plastics and choose the suitable plastic moulding processes.
10.	II	PUM205- CONSTITUTION OF INDIA	CO1- Understand the Constitutional History CO2- Understand the Powers and Functions CO3- Understand the Legislature CO4- Understand the Judiciary CO5- Understand the Centre State relations
11.	III	PMA301-MATHEMATICS-III (PDE, PROBABILITY & STATISTICS)	CO1-Solve homogeneous and non homogeneous linear partial differential equations of second order by complementary function and particular integral method. CO2- Solve one dimensional heat equation, wave equation using separation of variables method to simple problems in Cartesian coordinates. CO3- Explain conditional probability independence of events, Discrete random variables, continuous random variables, Poisson approximation to the binomial distributions and to find Marginal and conditional density functions. CO4- Find statistical parameters of the Binomial, Poisson and Normal distributions and to find correlation, regression and rank correlation coefficients of two variables. CO5- Apply large sample test for single proportion, difference of proportions, single mean, difference of means and to test ratio of variances, Chi square.
12.	III	PME302- HEAT TRANSFER	CO1- Understand the basic modes of heat transfer and Compute temperature distribution in steady-state and unsteady-state heat conduction. CO2- Understand the conduction in pin fins CO3- Interpret and analyse forced and free convection heat transfer. CO4- Understand the principles of radiation heat transfer and basics of mass transfer. CO5- Understand the basic concepts of mass transfer
13.	III	PME303- STRENGTH OF MATERIALS	CO1- After completing this course, the students should be able to recognize various types loads applied on machine components of simple geometry and understand the nature of internal stresses that will develop within the components

			<p>CO2- The students will be able to evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading</p> <p>CO3- The students will be able to understand inertia and different types of springs and evaluate the different types of inertia and deflection of different types of beams with different loading conditions.</p> <p>CO4- The students will be able to understand torsion on shaft and springs and evaluate deflection, torsional stresses on shaft, helical spring and leaf spring</p> <p>CO5- After completing this course, The students will be able to understand and compute stresses in hollow cylindrical and spherical objects.</p>
14.	III	PME304- MECHANICAL ENGINEERING LABORATORY (THERMAL) I	<p>CO1- Measure various properties of fluids using equipments.</p> <p>CO2- Characterize the performance of various fluid machineries.</p> <p>CO3- Determine the various thermal properties.</p> <p>CO4- Identify the Performance of the engines and Analyze the heat transfer coefficients in different modes</p> <p>CO5- Determine and Experiment with emissivity and vapour compression system.</p>
15.	III	PUM305- ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	<p>CO1-Relate and Interpret the Indian Traditional Knowledge Systems</p> <p>CO2-Explain and Apply Yogic-science and wisdom capsules</p> <p>CO3-Classify and Develop of Yoga and holistic health care system</p> <p>CO4-Classify and Dissect human rights and report on</p> <p>CO5-List and respond to family values, universal brotherhood,</p>
16.	IV	PME401- INSTRUMENTATION AND CONTROL	<p>CO1- Understand the measurement of various quantities using instruments, their accuracy & range, and the techniques for controlling devices.</p> <p>CO2- Understand the instrumentation system and elements.</p> <p>CO3- Design various Controllers</p> <p>CO4- Understand the instrumentation system models and functions.</p> <p>CO5- Create a project using Instrumentation systems.</p>

17.	IV	PME402- KINEMATICS & THEORY OF MACHINES	<p>CO1- To understand the kinematics and rigid-body dynamics of kinematically driven machine</p> <p>CO2- To understand the motion of linked mechanisms in terms of the displacement, velocity and acceleration at any point in a rigid link</p> <p>CO3- To be able to design some linkage mechanisms and cam systems to generate specified output motion</p> <p>CO4- To understand the kinematics of gear trains</p> <p>CO5- To understand the friction mechanisms in bearing clutches and brakes.</p>
18.	IV	PME403- SOLID MECHANICS	<p>CO1- Understand and apply the concepts of 3-dimensional state of strain and stress under different types of loading</p> <p>CO2- Understand and apply constitutive relations for simple geometries</p> <p>CO3- Apply the deformation concepts for plane stress and plane strain problems</p> <p>CO4- Apply the deformation concepts for complex cases</p> <p>CO5- Understand and apply energy and potential methods.</p>
19.	IV	PME404- MECHANICAL ENGINEERING LABORATORY (DESIGN) II	<p>CO1-Definedifferent mechanical properties and solvevarious deformation problems under different stress and loading conditions.</p> <p>CO2- Indentify Strain for various objects.</p> <p>CO3- Examine the molecular structures of heat treated samples.</p> <p>CO4- Study about various velocity ratios, kinematic mechanisms and cam –follower motions.</p> <p>CO5- Determine the frequencies of various kinematic systems.</p>
20.	IV	PUM405- PROFESSIONAL ETHICS AND HUMAN VALUES	<p>CO1- Identify the core values that shape the ethical behavior of an engineer.</p> <p>CO2- Utilize opportunities to explore one's own values in ethical issues.</p> <p>CO3- Become aware of ethical concerns and conflicts.</p> <p>CO4- Enhance familiarity with codes of conduct.</p> <p>CO5- Increase the ability to recognize and resolve ethical dilemmas.</p>

21.	V	PME501- MANUFACTURING TECHNOLOGY	<p>CO1- Construct the Degrees of freedom, principles of location and clamping, principles of jig design, fool proofing, elements of jigs, locates fixture design</p> <p>CO2- Explain the basic principles of measurements classify the various linear and angular measuring equipments and distinguish their principle of operation and applications.</p> <p>CO3- Explain the Assembly of different components</p> <p>CO4- Explain and demonstrate the basic concepts of PERT- CPM and their applications in product planning control.</p> <p>CO5- Explain the basic concepts of optimization and To Formulate and Solve linear programming problems.</p>
22.	V	PME502- DESIGN OF MACHINE ELEMENTS	<p>CO1- Describe the design process, material selection, calculation of stresses and stress concentrations under variable loading.</p> <p>CO2- Design the solid, hollow shafts and to finding the critical speeds also have a design knowledge on sliding and rolling contact bearing</p> <p>CO3- Summarize the knowledge in helical, leaf, disc and torsional springs</p> <p>CO4- Analyze bolted joints in eccentric loading. Examine the welded joints for vessels and steel structures. Differentiate rigid and flexible couplings and also the knuckle joints.</p> <p>CO5- Recognize the need for friction drives and positive drives. Apply BIS standards and catalogues in design and selection of belts and chain for requirement, Select suitable drive combination based on requirement.</p>
23.	V	PUM505- ENGLISH	<p>CO1- Ability to recall the meaning for proper usage</p> <p>CO2- Apply the techniques in sentence patterns</p> <p>CO3- Identify the common errors in sentences</p> <p>CO4- Construct the Nature and Style of sensible Writing</p> <p>CO5- Practicing the writing skills</p> <p>CO6- Grasping the techniques in learning sounds and etiquettes</p>
24.	VI	PME601- AUTOMATION IN MANUFACTURING	<p>CO1- Define automation and classify different types of automation along with recent trends of automation in manufacturing.</p>

			<p>CO2- Classify and describe computer aided technologies in manufacturing.</p> <p>CO3- Classify and explain different automation technologies and building blocks of systems.</p> <p>CO4- Describe product modelling and simulation techniques in manufacturing</p> <p>CO5- Define additive manufacturing and explain the recent advancements in additive manufacturing.</p>
25.	VI	PME604- MECHANICAL ENGINEERING LABORATORY (MANUFACTURING) III	<p>CO1- Experiment and Measure various machining operations and its cutting forces involved.</p> <p>CO2- Create and choose the CNC suitable part programming for the corresponding job.</p> <p>CO3- Experiment the sample with EDM.</p> <p>CO4- Understand the operation of pick and place robot.</p> <p>CO5- Explain the basic principles of measurements classify the various linear and angular measuring equipments and distinguish their principle of operation and applications.</p>
26.	VI	PUM605- OPERATIONS RESEARCH	<p>CO1- Explain the basic concepts of optimization and To Formulate and Solve linear programming problems.</p> <p>CO2- Apply the concepts of transportation problem, assignment problem and travelling salesman problem Participate in the class discussion in the transportation model.</p> <p>CO3- Explain and demonstrate the basic concepts ofPERT- CPM and their applications in product planning control.</p> <p>CO4- Solve the Minimal Spanning Tree Problem, Shortest Route Problem, Maximal Flow Problem and Minimal Cost Capacitated Flow Problem. Reproduce the Network model.</p> <p>CO5- Apply the concepts of Game theory to Find the solution and saddle point.</p>
PROFESSIONAL ELECTIVES LIST			
1.	V	PME503A- REFRIGERATION AND AIR CONDITIONING	<p>CO1- To familiarize with the terminology associated with refrigeration systems and air conditioning</p> <p>CO2- To understand basic refrigeration processes</p> <p>CO3- To provide an overview of sorption system</p>

			<p>CO4- To understand the basics of psychrometry and practice of applied psychrometrics</p> <p>CO5- To acquire the skills required to model, analyse and design different refrigeration as well as air conditioning processes and components</p>
2.	V	PME503B-FLUID POWER ENGINEERING	<p>CO1- Classify and Apply the various fluid power systems, fluids and symbols</p> <p>CO2-Classify various hydraulic pumps.</p> <p>CO3-Explain various hydraulic system components.</p> <p>CO4-Design various hydraulic valves.</p> <p>CO5-Classify and Explain various pneumatic systems and components.</p> <p>CO6- Design various Pneumatic circuits.</p>
3.	V	PME503C- ENERGY CONVERSION SYSTEMS	<p>CO1- Remember and Understand about the Energy scenarios.</p> <p>CO2- Understand about the energy conservation techniques.</p> <p>CO3- Understand about the energy conservation in various thermal applications.</p> <p>CO4- Understand about the energy conservation in various mechanical applications.</p> <p>CO5- Remember and Understand about energy economics.</p>
4.	V	PME503D- METROLOGY AND MEASUREMENTS	<p>CO1- List various characteristics of measurements.</p> <p>CO2-Classify various linear and angular measuring instruments.</p> <p>CO3-Explain form measuring tools.</p> <p>CO4-Apply laser advancements in metrology.</p> <p>CO5-Measure various properties of instruments.</p>
5.	V	PME504A- NANOTECHNOLOGY	<p>CO1-Explain historical developments of Nano materials.</p> <p>CO2-Explain production of Nano particles and Classify various techniques.</p> <p>CO3-Apply various characterization techniques.</p> <p>CO4-List and Explain various molecular manufacturing techniques.</p> <p>CO5-Apply Nano particles in various fields.</p>
6.	V	PME504B- CAD / CAM	<p>CO1-Define Design Process, CAD, CAM and explain various stages of design and different types of design process explain the DOM concept CAM along with benefits of CAD</p> <p>CO2- Classify and explain different graphical primitives and transformations systems</p>

			<p>along with complex geometry generation techniques. Classify and outline the various Data structure and management systems.</p> <p>CO3- Define modeling and Classify different types of geometric models also outline different features of solid modeling packages</p> <p>CO4- Explain and contrast NC/CNC/DNC also illustrate various tools, devices and mechanisms used inside NC, CNC and DNC</p> <p>CO5- List important NC Codes and create CNC code for simple CNC operations like turning and facing.</p>
7.	V	PME504C- TRIBOLOGY	<p>CO1-Classify the types of engineering surface.</p> <p>CO2-List Plastic and elastic properties.</p> <p>CO3-Explain about mechanism of friction.</p> <p>CO4-List and Classify the lubricant properties and grades.</p> <p>CO5-Explain various equations for dimensional analysis.</p>
8.	V	PME504D- THERMAL ENGINEERING	<p>CO1-List and Apply Various gas power cycles.</p> <p>CO2-Classify engine systems and components.</p> <p>CO3-Explain various steam cycles, nozzles and turbines.</p> <p>CO4-Classify air compressors and its types.</p> <p>CO5-Explain various refrigeration and Air conditioning cycles and Psychrometric charts.</p>
9.	VI	PME602A- AUTOMOBILE ENGINEERING	<p>CO1- Define and identifies the vehicle construction, types and specification of engines.</p> <p>CO2- Differentiate and calibrates Ignition, Fuel Supply and Emission Control System.</p> <p>CO3- Categories and illustrate the various types of clutches and gear boxes</p> <p>CO4- Characterize and determine the suspension, steering geometry and wheel specification.</p> <p>CO5- Assembles and Summarize the Electrical systems and Dash board instrumentations.</p>
10.	VI	PME602B- COMPUTATIONAL FLUID DYNAMICS	<p>CO1- Define and apply governing equations of fluid dynamics Explain and apply turbulence kinetic energy equations, mathematical behavior of PDE on CFD</p> <p>CO2-Define methods of deriving the discretization equations Explain and</p>

			<p>apply different methodologies for deriving solution</p> <p>CO3- Define and explain steady / transient one dimensional conduction equation. Apply finite volume formulation for conduction problems.</p> <p>CO4- Explain and Solve steady one dimensional conduction and diffusion problems</p> <p>CO5- Solve fluid flow field calculations using CFD models</p>
11.	VI	PME602C- FINITE ELEMENT ANALYSIS	<p>CO1- Solve problems by applying standard finite element techniques</p> <p>CO2- Analyze 1-D finite elements and to build the stiffness matrix.</p> <p>CO3- Examine 2-D finite element continuum for structural applications</p> <p>CO4- Apply ax symmetric formulation for specific applications.</p> <p>CO5- Make use of finite element principles in isoperimetric applications.</p>
12.	VI	PME602D- OPTIMUM UTILIZATION OF HEAT AND POWER	<p>CO1-Classify Various power plants and governing of turbines.</p> <p>CO2-Define and explain non conventional power generation systems.</p> <p>CO3-Explain about energy economics.</p> <p>CO4-Identify and Compare electrical power transmission.</p> <p>CO5-Select electrical drives and Design of lighting scheme in industry.</p>
13.	VI	PME603A- AUTOMATION AND CONTROL ENGINEERING	<p>CO1-Classify types of automation strategies and Costs</p> <p>CO2-Analyze various automated flow systems.</p> <p>CO3-Explain about NC and robotics</p> <p>CO4-Explain automated handling systems.</p> <p>CO5-List and Apply various manufacturing support systems.</p>
14.	VI	PME603B- MODERN MANUFACTURING TECHNOLOGY, JIT, AMT	<p>CO1-List and Explain various Manufacturing automation strategies.</p> <p>CO2-Define various automated storage handling systems.</p> <p>CO3-Apply Lean manufacturing principles.</p> <p>CO4-Analyze the impact of Six sigma.</p> <p>CO5-List various manufacturing technologies.</p>
15.	VI	PME603C- RELIABILITY	<p>CO1-Classify the Reliability and uses Failure data, failure modes, and reliability in terms of</p>

		ENGINEERING	<p>hazard rate and failure density function; Hazard models and bath tub curve; applicability of Weibull distribution</p> <p>CO2- Make use of Maintenance - its role and scope in total organisational context basic guidelines for design of organisation structure for follows maintenance; Centralized vs decentralized maintenance;</p> <p>CO3- Examine the corrective, planned, preventive and predictive maintenance; opportunistic maintenance; Measurement of maintenance work Identifies the, Reliability and Human Engineering , Reliability Management</p> <p>CO4- Analysis the Maintenance Theory – Inspection and verify the Failure Diagnosis Markov Maintenance Process</p> <p>CO5- Recall the Basic laws of probability, Conditional probability, Random variable, sample distribution, statistical hypothesis, statistical tests of significance, correlation, regression compare the ANNOVA theory and SWOT</p>
16.	VI	PME603D- ADVANCED I.C.ENGINES	<p>CO1- Understand working and performance of IC Engines through thermodynamic cycles.</p> <p>CO2- Outline emission formation mechanism of IC engines, its effects and the legislation standards.</p> <p>CO3- Understand working principles of instrumentation used for engine performance and emission parameters.</p> <p>CO4- Evaluate methods for improving the IC engine performance.</p> <p>CO5- Understand the latest developments in IC Engines and alternate fuels.</p>
17.	VII	PME701A- POWER PLANT ENGINEERING	<p>CO1- What are the types of thermal power plants, systems operation and handling and cogeneration systems?</p> <p>CO2- Describe gas turbine and combined cycle power plants systems components and operation</p> <p>CO3- How nuclear energy conversion, nuclear power plant subsystems works and types of nuclear reactors.</p> <p>CO4- What is the potential of exploiting renewable energy systems, and hydro power plant systems and components</p> <p>CO5- Extend energy economics and environmental issues of different power plants.</p>

18.	VII	PME701B- MATHEMATICAL MODELLING AND SIMULATION	<p>CO1- Define system and Classify different aspects of systems also Model different types of mechanical systems</p> <p>CO2- Define random number Model different degrees of freedom systems also compile code for different types of random numbers</p> <p>CO3- Explain Problem simulation using different methods and Classify different types of simulation tools Model systems using different representational tools solve for typical simulation problem</p> <p>CO4- Classify different types of simulation languages available also able to select suitable simulation languages for different simulation problem also demonstrate expertise on any one simulation language</p> <p>CO5- Interpret development of simulation models Classify simulation models Explain different types of systems develop simulation code for real-time problem solve the problem using simulation tools</p>
19.	VII	PME701C- ENGINEERING ECONOMICS AND COST ANALYSIS	<p>CO1-Understand the concept of economy, costs, supply and demand.</p> <p>CO2-Compare and Differentiate various cash flow methods.</p> <p>CO3-Explain about Value engineering and its methods.</p> <p>CO4-Understand about replacement and maintenance analysis.</p> <p>CO5-Explain about depreciation and Identify its methods.</p>
20.	VII	PME701D- MATERIALS MANAGEMENT AND INDUSTRIAL ENGINEERING	<p>CO1-Understand about material and inventory management.</p> <p>CO2-Apply the concept of Leadership.</p> <p>CO3-Define the importance of human resources in industry</p> <p>CO4-Classify the financial management and budgets.</p> <p>CO5-Design various plant layouts.</p>

M.TECH –RENEWABLE ENERGY

PROGRAM OUTCOMES	
PO 1	An ability to apply principles of engineering, basic science, and mathematics to model and analyze components or processes
PO 2	An ability to design and conduct experiments, as well as to analyze and interpret data
PO 3	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability, and sustainability
PO 4	An ability to function on multi-disciplinary teams
PO 5	An ability to identify, formulate, and solve engineering problems
PO 6	An understanding of professional and ethical responsibility
PO 7	An ability to communicate effectively
PO 8	Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
PO 9	An ability to engage in life-long learning
PO 10	A knowledge of contemporary issues
PO 11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
PO 12	An ability to imbibe principles of engineering, basic science, and mathematics to design and realize physical systems, components, or processes
PROGRAM SPECIFIC OUTCOME	
PSO1	an ability to work professionally in design and manufacturing systems
PSO2	an ability to work professionally in energy systems

M.TECH –RENEWABLE ENERGY

COURSE OUTCOMES

S.No	SEMESTER	COURSE CODE &NAME	COs
1.	I	YRE101- SOLAR ENERGY SYSTEMS	CO1-Understand the concepts of Solar radiation and its components CO2-Design and Classify Solar plate collectors CO3-Apply Solar Collectors in many fields. CO4-Simulate and Design solar Systems. CO5-Understanding about Solar PV systems.
2.	I	YRE102- WIND ENERGY, TIDAL ENERGY AND OTEC	CO1- Understanding of various measurement techniques and instrumentation CO2- Understanding of operation and performance analysis of wind mill and wind turbines CO3- System design for power generation and hybridization CO4- Understanding of wave and tidal energy developments CO5- Understanding of OTEC conversion concepts
3.	I	YRE103- PROCESS MODELLING AND SIMULATION IN ENERGY SYSTEMS	CO1-Classify the modeling techniques of energy systems. CO2-Analyze the various process elements. CO3-Develop various model buildings. CO4-Solve energy problems using various methods. CO5-Solving various equations in models.
4.	I	YRE106- SOLAR ENERGY LAB	CO1- Able to evaluate the performance of solar energy gadgets
5.	I	YRM107- RESEARCH METHODOLOGY AND IPR	CO1-Understand the research problems. CO2-Analyze the research papers. CO3-Understand the report writing ans methods. CO4-Define and Understand about IPR CO5-Classify various Patent rights. CO6-Apply and Understand new developments in IPR.
6.	I	YEGOE1- ENGLISH FOR RESEARCH PAPER WRITING	CO1-Understand about Sentence making and errors. CO2-Clarify and Analyze the paper plagiarisms.

			<p>CO3-Review the research paper.</p> <p>CO4-Identify the skills needed for writing.</p> <p>CO5-Understand and discuss the skills required for paper conclusion.</p> <p>CO6-Analyze the Paper content quality and Language.</p>
7.	I	YRE109- MAT AND SCILAB	<p>CO1- Able to write program or code for numerical methods using MATLAB or SCILAB</p> <p>CO2- Able to write program or code on solution methods for problems using MATLAB or SCILAB</p> <p>CO3- Able to write program or code on optimization problems using MATLAB or SCILAB</p>
8.	II	YRE201- BIO ENERGY SYSTEMS	<p>CO1- Explain bio fuel and its key prospects</p> <p>CO2- Understand and list down different preparation and characterization techniques related to biomass</p> <p>CO3- Understand and explain different types of biogas technologies</p> <p>CO4- Explain the mechanism of gasification of bio mass and list down different types of gasification methods and gasifier</p> <p>CO5- Design experiments related to biomass and cogeneration systems.</p>
9.	II	YRE202- COMPUTATIONAL FLUID DYNAMICS	<p>CO1-Classify the Boundary conditions and problems.</p> <p>CO2-Understand the concept of heat conduction.</p> <p>CO3-Analyze and Determine various incompressible fluids flows.</p> <p>CO4-Understand the Convection heat transfer and Simulate FEM.</p> <p>CO5-Develop various turbulence models.</p>
10.	II	YRE203- ELECTRICAL ENERGY TECHNOLOGY	<p>CO1-Understand the Power systems fundamentals.</p> <p>CO2-Define and Apply various electric energy Conversion devices.</p> <p>CO3-Understand about various electrical devices.</p> <p>CO4-Classify various hybrid power generation systems.</p> <p>CO5-Analyze the characteristics of Power Quality.</p>

11.	II	YRE206- BIO ENERGY AND CFD LAB	CO1- Able to perform experiment and characterization of bio fuels by analytical methods CO2- Able to model and simulate flow related energy problems.
12.	II	YRE207- MINI PROJECT	CO1- Observe and identify energy related problem CO2- Conduct experiments related to engineering problem CO3- Verify and analyze experimental data in engineering problem
13.	II	YPSOE1- CONSTITUTION OF INDIA	CO1- Understand the Constitutional History CO2- Understand the Powers and Functions CO3- Understand the Legislature CO4- Understand the Judiciary CO5- Understand the Centre State relations
14.	III	YRE301- PROJECT PHASE – I	CO1- Observe and identify the research gap existing in research area CO2- Design experiments related to research area CO3- Collect and analyze experimental data
15.	IV	YRE401- PROJECT PHASE – II	CO1- Analyze real-time experimental process CO2- Create prototype or real model solution of engineering problem CO3- Compile results as scientific / engineering article
16.	ELECTIVE	YRE104A- FLUID DYNAMICS AND HEAT TRANSFER	CO1-Understand the various fluids, properties and flows. CO2-Analyze various fluids and its dynamics. CO3-Understand the convection heat transfer and Apply empirical correlations. CO4-Apply Analogy between momentum and heat transfer. CO5-Apply Fluid dynamics in various fields.
17.	ELECTIVE	YRE104B- ENERGY CONSERVATION IN HVAC	CO1-Design and Analyze various energy system components. CO2-Claasify various Air conditioning systems. CO3-Identify and Analyze energy demand based on loads. CO4-List down the factors affecting energy usage. CO5-Evaluate modeling of buildings and Simulate energy systems.

18.	ELECTIVE	YRE104C- FUELS AND COMBUSTION TECHNOLOGY	<p>CO1- Understanding of various fuels and its characteristics and determination of calorific values and its analysis</p> <p>CO2- Understanding of combustion process and its analysis</p> <p>CO3- Familiarity with flame structures, stability and ignition systems</p> <p>CO4- Understanding of working principles of industrial furnaces</p> <p>CO5- Understanding of various coal burning methods</p>
19.	ELECTIVE	YRE105A- ENVIRONMENTAL ENGINEERING	<p>CO1-Explain the growth and consequences of environmental pollutions.</p> <p>CO2-Classify the properties of air pollutants and List air pollution control methods and equipments.</p> <p>CO3-Understand the water pollution and its sources.</p> <p>CO4-Classify and List various Solid waste disposal methods.</p> <p>CO5- List various types of pollutions.</p>
20.	ELECTIVE	YRE105B- CARBON SEQUESTRATION AND TRADING	<p>CO1-Understand about Green house gas and its impacts.</p> <p>CO2-List the practices of Carbon sequestration.</p> <p>CO3- Analyze how to handle the risks and reduce it?</p> <p>CO4-Enumerate Case studies about Carbon sequestration.</p> <p>CO5-ImPLY and Follow the rules and regulations carbon sequestration.</p>
21.	ELECTIVE	YRE105C- WASTE MANAGEMENT AND ENERGY RECOVERY	<p>CO1-List and Classify Solid wastes and its Properties.</p> <p>CO2- Understand about Waste treatment and recycling.</p> <p>CO3-Claasify waste disposal systems and Understand about Monitoring systems.</p> <p>CO4-List the sources of Hazardous wastes and Analyze the methods for waste management.</p> <p>CO5-Explain various energy generation methods from waste and Apply waste management in various fields.</p>

22.	ELECTIVE	YRE204A- OPTIMUM UTILIZATION OF HEAT AND POWER	<p>CO1- Summarise the energy conversion techniques.</p> <p>CO2- Summarise concepts of energy schemes and CHP</p> <p>CO3- Explain pinch technology and process integration</p> <p>CO4- Summarise heat exchangers and heat pumps for energy recovery</p> <p>CO5- Explain the applications of CHP in various sectors</p>
23.	ELECTIVE	YRE204B- STATISTICAL TOOLS FOR A DATA ANALYSIS	<p>CO1- Identify the research objectives and discuss the methods of research design, needs and concepts.</p> <p>CO2- Outline the offline and online search methods, Summarize the literature search.</p> <p>CO3- List the seven tools of quality and describe the statistical fundamentals for implementing the statistical process control techniques to improve the quality.</p> <p>CO4- Analyze and relate the engineering data, Design the models.</p> <p>CO5- Calculate and compare the mechanical measurements, Analyze and relate the results.</p>
24.	ELECTIVE	YRE204C- SUSTAINABLE DEVELOPMENT	<p>CO1- Identify the industrial activity for sustainable development and discuss the regulations for cleaner production.</p> <p>CO2-Summarise the cleaner production concept.</p> <p>CO3-Explain the cleaner production assessment steps & skills and analyze the economic evolution.</p> <p>CO4- Quote the life cycle analysis and practice the environmental standards.</p> <p>CO5- Investigate the industrial applications of CP, LCA, EMS & environmental audit and prepare the report.</p>
25.	ELECTIVE	YRE205A- INSTRUMENTATION TECHNOLOGY FOR ENERGY SYSTEMS	<p>CO1- Understanding of concepts of measurements and characteristics of instruments</p> <p>CO2- Understanding of measurement of pressure and application of pressure gauges</p> <p>CO3- Familiarity with measurement of temperature and heat flux</p> <p>CO4- Understanding of working principles of flow meters and hydrometers</p>

			CO5- Understanding of various transducers and process control loops and their elements
26.	ELECTIVE	YRE205B- HYDROGEN AND NUCLEAR ENERGY	CO1-Understanding the basic concepts of hydrogen and nuclear energy CO2- Understanding the batteries and fuel cells CO3- Familiarity with Nuclear power plants CO4- Understanding of nuclear power plants in safety aspects. CO5-Understanding of nuclear waste management system.
27.	ELECTIVE	YRE205C- ENERGY MODELING, ECONOMICS AND PROJECT MANAGEMENT	CO1- Understand different economic concepts CO2- Analyze environmental inputs and outputs CO3- Understand and analyze energy demand CO4- List down and explain different economic aspects of standalone power supply systems. CO5- Understand and able to use project management tools
28.	ELECTIVE	YRE302A- ENERGY AUDIT AND MANAGEMENT	CO1-Understand about Energy consumptions and its scenarios. CO2-Apply energy conservation methods in various thermal utilities. CO3-Design and Apply energy conservation in pumps and compressors. CO4-Identify the potential areas to energy audit. CO5-Analyze about energy management.
29.	ELECTIVE	YRE302B- UNIT OPERATIONS IN INDUSTRIES	CO1-Understanding the basic concepts of crushing, grinding size separation & conveying of bulk solids CO2- Understanding various types of mixing and filtration equipment's and its application. CO3- Understanding of Evaporation techniques. CO4- Understanding of humidification, cooling towers and dryers. CO5- Familiarity with distillation process.
30.	ELECTIVE	YRE302C- CAD/CAM AND SIMULATION OF RENEWABLE ENERGY SYSTEMS	CO1- Understanding the basic concepts of CAD systems related with energy systems CO2- Designing of advanced modeling techniques related with energy systems CO3- Familiarity with programming language and hardware systems CO4- Understanding of CAD modeling and simulation of solar and wind equipments

			CO5- Understanding of CAD modeling and simulation of gasifier systems
31.	OPEN ELECTIVE	YREOE1-HYDRO POWER TECHNOLOGY	<p>CO1- Understanding the concept of Hydrology, various measurement techniques of rainfall. Demonstrating the hydro electricity project layout and their economics with their demand</p> <p>CO2- Understanding the concepts of Hydroelectric Power proto type Stations and performance analysis. Updating and Refurbishing of Turbines</p> <p>CO3-Differentiate between several Hydro turbines and identify their selection based on their typical applications.</p> <p>CO4- Understanding basic design and construction of Hydroelectric Power Stations and their Auxiliary systems-Remaining Life cycle analysis</p> <p>CO5- Demonstrating the concepts of Small, Mini, Micro Hydro power plants and their hydro turbines</p>
32.	OPEN ELECTIVE	YREOE2- ENERGY EFFICIENT BUILDING	<p>CO1- Understanding the Building Science Architecture and its various components significance to indoor Environment</p> <p>CO2- Understanding and demonstrating the Thermal analysis and human comfort, Concept of Solar temperature and its significance, various factors that affect energy use in buildings</p> <p>CO3- Understanding the principles of solar passive heating & cooling concepts</p> <p>CO4- Understanding the need of Building energy survey and the principles of energy auditing, energy management matrix, economics of energy conservation opportunities in buildings</p> <p>CO5- Understanding and the application of Energy conservation principles through site selection, sitting & orientation of landscape elements</p>

M.TECH –RENEWABLE ENERGY (Part – Time)

COURSE OUTCOMES

S.No	SEMESTER	COURSE CODE AND NAME	COs
1.	I	PYRE101-SOLAR ENERGY SYSTEMS	CO1-Understand the concepts of Solar radiation and its components CO2-Design and Classify Solar plate collectors CO3-Apply Solar Collectors in many fields. CO4-Simulate and Design solar Systems. CO5-Understanding about Solar PV systems.
2.	I	PYRE102-WIND ENERGY, TIDAL ENERGY AND OTEC	CO1- Understanding of various measurement techniques and instrumentation CO2-Understanding of operation and performance analysis of wind mill and wind turbines CO3- System design for power generation and hybridization CO4- Understanding of wave and tidal energy developments CO5- Understanding of OTEC conversion concepts
3.	I	PYRE104-SOLAR ENERGY LAB	CO1- Able to evaluate the performance of solar energy gadgets
4.	II	PYRE201-BIO-ENERGY SYSTEMS	CO1- Explain bio fuel and its key prospects CO2-Understand and list down different preparation and characterization techniques related to biomass CO3- Understand and explain different types of biogas technologies CO4- Explain the mechanism of gasification of bio mass and list down different types of gasification methods and gasifier CO5- Design experiments related to biomass and cogeneration systems.
5.	II	PYRE202-RESEARCH METHODOLOGY AND IPR	CO1-Understand the research problems. CO2-Analyze the research papers. CO3-Understand the report writing ans methods. CO4-Define and Understand about IPR CO5-Classify various Patent rights. CO6-Apply and Understand new developments in IPR.

6.	II	PYRE204-BIO AND THERMAL ENERGY LAB	CO1-Able to perform experiment and characterization of bio fuels by analytical methods CO2-Able to Perform experiment and determine Calorific values and various properties.
7.	III	PYRE301-COMPUTATIONAL FLUID DYNAMICS	CO1-Classify the Boundary conditions and problems. CO2-Understand the concept of heat conduction. CO3-Analyze and Determine various incompressible fluids flows. CO4-Understand the Convection heat transfer and Simulate FEM. CO5-Develop various turbulence models.
8.	III	PYRE304-COMPUTATIONAL FLUID DYNAMICS LAB	CO1- Analyze and Solve Fluid flow problems. CO2- To Understand the fundamental of fluid flow and measuring equipments. CO3- Study and Analyze the flow problems using CFD software.
9.	IV	PYRE404-MAT AND SCI LAB	CO1-Able to write program or code for numerical methods using MATLAB or SCILAB CO2- Able to write program or code on solution methods for problems using MATLAB or SCILAB CO3-Able to write program or code on optimization problems using MATLAB or SCILAB
10.	V	PYRE501- PROJECT PHASE – I	CO1-Observe and identify the research gap existing in research area CO2-Design experiments related to research area CO3- Collect and analyze experimental data
11.	VI	PYRE601- PROJECT PHASE – II	CO1- Analyze real-time experimental process CO2- Create prototype or real model solution of engineering problem CO3- Compile results as scientific / engineering article
12.	ELECTIVE	PYRE103A- FUELS AND COMBUSTION TECHNOLOGY	CO1-Understanding of various fuels and its characteristics and determination of calorific values and its analysis CO2- Understanding of combustion process and its analysis CO3- Familiarity with flame structures, stability and ignition systems CO4-Understanding of working principles of industrial furnaces CO5-Understanding of various coal burning methods

13.	ELECTIVE	PYRE103B- WASTE MANAGEMENT AND ENERGY RECOVERY	<p>CO1-List and Classify Solid wastes and its Properties.</p> <p>CO2-Understand about Waste treatment and recycling.</p> <p>CO3-Claasify waste disposal systems and Understand about Monitoring systems.</p> <p>CO4-List the sources of Hazardous wastes and Analyze the methods for waste management.</p> <p>CO5-Explain various energy generation methods from waste and Apply waste management in various fields.</p>
14.	ELECTIVE	PYRE103C- FLUID DYNAMICS AND HEAT TRANSFER	<p>CO1-Understand the various fluids, properties and flows.</p> <p>CO2-Analyze various fluids and its dynamics.</p> <p>CO3-Understand the convection heat transfer and Apply empirical correlations.</p> <p>CO4-Apply Analogy between momentum and heat transfer.</p> <p>CO5-Apply Fluid dynamics in various fields.</p>
15.	ELECTIVE	PYRE203A- HYDRO POWER TECHNOLOGY	<p>CO1- Understanding the concept of Hydrology, various measurement techniques of rainfall. Demonstrating the hydro electricity project layout and their economics with their demand</p> <p>CO2-Understanding the concepts of Hydroelectric Power proto type Stations and performance analysis. Updating and Refurbishing of Turbines</p> <p>CO3-Differentiate between several Hydro turbines and identify their selection based on their typical applications.</p> <p>CO4-Understanding basic design and construction of Hydroelectric Power Stations and their Auxiliary systems-Remaining Life cycle analysis</p> <p>CO5-Demonstrating the concepts of Small, Mini, Micro Hydro power plants and their hydro turbines</p>
16.	ELECTIVE	PYRE203B- OPTIMUM UTILIZATION OF HEAT AND POWER	<p>CO1-Summarise the energy conversion techniques.</p> <p>CO2- Summarise concepts of energy schemes and CHP</p> <p>CO3- Explain pinch technology and process integration</p> <p>CO4- Summarise heat exchangers and heat pumps for energy recovery</p>

			CO5- Explain the applications of CHP in various sectors
17.	ELECTIVE	PYRE203C- ENVIRONMENTAL ENGINEERING	<p>CO1-Explain the growth and consequences of environmental pollutions.</p> <p>CO2-Classify the properties of air pollutants and List air pollution control methods and equipments.</p> <p>CO3-Understand the water pollution and its sources.</p> <p>CO4-Classify and List various Solid waste disposal methods.</p> <p>CO5- List various types of pollutions.</p>
18.	ELECTIVE	PYRE303A- ELECTRICAL ENERGY TECHNOLOGY	<p>CO1-Understand the Power systems fundamentals.</p> <p>CO2-Define and Apply various electric energy Conversion devices.</p> <p>CO3-Understand about various electrical devices.</p> <p>CO4-Classify various hybrid power generation systems.</p> <p>CO5-Analyze the characteristics of Power Quality.</p>
19.	ELECTIVE	PYRE303B- ENERGY CONSERVATION IN HVAC	<p>CO1-Design and Analyze various energy system components.</p> <p>CO2-Classify various Air conditioning systems.</p> <p>CO3-Identify and Analyze energy demand based on loads.</p> <p>CO4-List down the factors affecting energy usage.</p> <p>CO5-Evaluate modeling of buildings and Simulate energy systems.</p>
20.	ELECTIVE	PYRE303C- SUSTAINABLE DEVELOPMENT	<p>CO1-Identify the industrial activity for sustainable development and discuss the regulations for cleaner production.</p> <p>CO2-Summarise the cleaner production concept.</p> <p>CO3- Explain the cleaner production assessment steps & skills and analyze the economic evolution.</p> <p>CO4- Quote the life cycle analysis and practice the environmental standards.</p> <p>CO5- Investigate the industrial applications of CP, LCA, EMS & environmental audit and prepare the report</p>
21.	ELECTIVE	PYRE401A- HYDROGEN AND NUCLEAR ENERGY	CO1-Understanding the basic concepts of hydrogen and nuclear energy

			<p>CO2- Understanding the batteries and fuel cells</p> <p>CO3- Familiarity with Nuclear power plants</p> <p>CO4- Understanding of nuclear power plants in safety aspects.</p> <p>CO5-Understanding of nuclear waste management system.</p>
22.	ELECTIVE	PYRE401B- INSTRUMENTATION TECHNOLOGY FOR ENERGY SYSTEMS	<p>CO1-Understanding of concepts of measurements and characteristics of instruments</p> <p>CO2- Understanding of measurement of pressure and application of pressure gauges</p> <p>CO3-Familiarity with measurement of temperature and heat flux</p> <p>CO4-Understanding of working principles of flow meters and hydrometers</p> <p>CO5- Understanding of various transducers and process control loops and their elements</p>
23.	ELECTIVE	PYRE401C- ENERGY MODELING, ECONOMICS AND PROJECT MANAGEMENT	<p>CO1- Understand different economic concepts</p> <p>CO2- Analyze environmental inputs and outputs</p> <p>CO3- Understand and analyze energy demand</p> <p>CO4- List down and explain different economic aspects of standalone power supply systems.</p> <p>CO5-Understand and able to use project management tools</p>
24.	ELECTIVE	PYRE402A- STATISTICAL TOOLS FOR A DATA ANALYSIS	<p>CO1-Identify the research objectives and discuss the methods of research design, needs and concepts.</p> <p>CO2-Outline the offline and online search methods, Summarize the literature search.</p> <p>CO3- List the seven tools of quality and describe the statistical fundamentals for implementing the statistical process control techniques to improve the quality.</p> <p>CO4-Analyze and relate the engineering data, Design the models.</p> <p>CO5- Calculate and compare the mechanical measurements, Analyze and relate the results.</p>
25.	ELECTIVE	PYRE402B- UNIT OPERATIONS IN INDUSTRIES	<p>CO1-Understanding the basic concepts of crushing, grinding size separation & conveying of bulk solids</p> <p>CO2-Understanding various types of mixing and filtration equipment's and its application.</p>

			<p>CO3- Understanding of Evaporation techniques.</p> <p>CO4- Understanding of humidification, cooling towers and dryers.</p> <p>CO5- Familiarity with distillation process.</p>
26.	ELECTIVE	PYRE402C- CAD/CAM AND SIMULATION OF RENEWABLE ENERGY SYSTEMS	<p>CO1- Understanding the basic concepts of CAD systems related with energy systems</p> <p>CO2-Designing of advanced modeling techniques related with energy systems</p> <p>CO3-Familiarity with programming language and hardware systems</p> <p>CO4-Understanding of CAD modeling and simulation of solar and wind equipments</p> <p>CO5-Understanding of CAD modeling and simulation of gasifier systems</p>
27.	OPEN ELECTIVE	PYREOE1A- ENERGY AUDIT AND MANAGEMENT	<p>CO1-Understand about Energy consumptions and its scenarios.</p> <p>CO2-Apply energy conservation methods in various thermal utilities.</p> <p>CO3-Design and Apply energy conservation in pumps and compressors.</p> <p>CO4-Identify the potential areas to energy audit.</p> <p>CO5-Analyze about energy management.</p>
28.	OPEN ELECTIVE	PYREOE1B- CARBON SEQUESTRATION AND TRADING	<p>CO1-Understand about Green house gas and its impacts.</p> <p>CO2-List the practices of Carbon sequestration.</p> <p>CO3-Analyze how to handle the risks and reduce it?</p> <p>CO4-Enumerate Case studies about Carbon sequestration.</p> <p>CO5-Impley and Follow the rules and regulations carbon sequestration.</p>
29.	OPEN ELECTIVE	PYREOE2A- PROCESS MODELING AND SIMULATION IN ENERGY SYSTEMS	<p>CO1-Classify the modeling techniques of energy systems.</p> <p>CO2-Analyze the various process elements.</p> <p>CO3-Develop various model buildings.</p> <p>CO4-Solve energy problems using various methods.</p> <p>CO5-Solving various equations in models.</p>

30.	OPEN ELECTIVE	PYREOE2B- ENERGY EFFICIENT BUILDING	<p>CO1-Understanding the Building Science Architecture and its various components significance to indoor Environment</p> <p>CO2-Understanding and demonstrating the Thermal analysis and human comfort, Concept of Solar temperature and its significance, various factors that affect energy use in buildings</p> <p>CO3-Understanding the principles of solar passive heating & cooling concepts</p> <p>CO4-Understanding the need of Building energy survey and the principles of energy auditing, energy management matrix, economics of energy conservation opportunities in buildings</p> <p>CO5-Understanding and the application of Energy conservation principles through site selection, sitting & orientation of landscape elements</p>
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Programme Outcomes and Course Outcomes of
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Programmes offered:

S.No.	Programme Name	PO and CO
1.	B.Tech CSE	Yes
2.	Ph.D	Not Applicable

B.TECH CSE

PROGRAMME OUTCOME (PO)	
PO1	An ability to apply knowledge of computing and mathematics appropriate to the discipline.
PO2	An ability to analyze a problem, interpret data, and define the computing system requirements which would be appropriate to the solution.
PO3	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
PO4	An ability to apply creativity in the design of systems which would help to investigate the complex problem and provide software solution.
PO5	An ability to use the computing techniques, skills, and modern system tools necessary for practice as a CSE professional
PO6	An ability to analyze the local and global impact of computing on individuals, organizations, and society
PO7	An ability to develop and use the software systems within realistic constraints environmental, health and safety, manufacturability, and sustainability considerations
PO8	An ability in an understanding of professional, ethical, legal, security and social issues and responsibilities
PO9	An ability to function effectively on teams and individually to accomplish a common goal
PO10	An ability to communicate effectively with a range of audiences by written and oral
PO11	Ability to plan, organize and follow best practices and standards so that the project is completed as successfully by meeting performance, quality at CMM level, budget and time
PO12	An ability to engage in Lifelong learning and continuing professional development
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Ability to employ latest computer languages, environments and platforms for solving problems in the areas of emerging communication technologies.
PSO2	Ability to use knowledge in data analytics and mining for industrial problems

COs

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	XMA101 CALCULUS AND LINEAR ALGEBRA	<ol style="list-style-type: none"> 1. Apply orthogonal transformation to reduce quadratic form to canonical forms 2. Apply power series to tests the convergence of the sequences and series. Half range Fourier sine and cosine series. 3. Find the derivative of composite functions and implicit functions. Euler's theorem and Jacobian 4. Explain the functions of two variables by Taylors expansion, by finding maxima and minima with and without constraints using Lagrangian Method. Directional derivatives, Gradient, Curl and Divergence. 5. Apply Differential and Integral calculus to notions of Curvature and to improper integrals.
		XCP102 PROGRAMMING FOR PROBLEM SOLVING	<ol style="list-style-type: none"> 1. Define programming fundamentals and Solve simple programs using I/O statements 2. Define syntax and write simple programs using control structures and arrays 3. Explain and write simple programs using functions and pointers 4. Explain and write simple programs using structures and unions 5. Explain and write simple programs using files and Build simple projects
		XGS103 ENGLISH	<ol style="list-style-type: none"> 1. Ability to recall the meaning for proper usage 2. Apply the techniques in sentence patterns 3. Identify the common errors in sentences 4. Construct the Nature and Style of sensible Writing 5. Practicing the writing skills 6. Grasping the techniques in learning sounds and etiquettes
		XAC104 APPLIED CHEMISTRY FOR ENGINEERS	<ol style="list-style-type: none"> 1. Identify the periodic properties such as ionization energy, electron affinity, oxidation states and electro negativity. Describe the various water quality parameters like hardness and alkalinity

			<ol style="list-style-type: none"> Interpret bulk properties and processes using thermodynamic and kinetic considerations Explain and Measure microscopic chemistry in terms of atomic, molecular orbitals and intermolecular forces. Apply, Measure and Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques Describe, Illustrate and Discuss the stereochemistry and chemical reactions that are used in the synthesis of molecules.
		XWP105 WORKSHOP PRACTICES	<ol style="list-style-type: none"> Summarize the machining methods and Practice machining operation. Defining metal casting process, moulding methods and relates Casting and Smithy applications. Plan basic carpentry and fitting operation and Practice carpentry and fitting operations Summarize metal joining operation and Practice welding operation Illustrate the, electrical and electronics basics and Makes appropriate connections
	II	XMA201 CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLE	<ol style="list-style-type: none"> Find double and triple integrals and to find line, surface and volume of an integral by Applying Greens, Gauss divergence and Stokes theorem Solve first order differential equations of different types which are solvable for p, y, x and Clairaut's type Solve Second order ordinary differential equations with variable coefficients using various methods Use CR equations to verify analytic functions and to find harmonic functions and harmonic conjugate. Conformal mapping of translation and rotation. Mobius transformation. Apply Cauchy residue theorem to evaluate contour integrals involving sine and cosine function and to state Cauchy integral formula, Liouville's theorem. Taylor's series, zeros of analytic functions, singularities, Laurent's series.

		<p>XUM202</p> <p>ENVIRONMENTAL SCIENCE</p>	<ol style="list-style-type: none"> 1. Describe the significance of natural resources and explain anthropogenic impacts. 2. Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance. 3. Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon 4. Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development. 5. Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.
		<p>XBE203</p> <p>ELECTRICAL AND ELECTRONICS ENGINEERING SYSTEMS</p>	<ol style="list-style-type: none"> 1. Define and Relate the fundamentals of electrical parameters and build and explain AC, DC circuits by Using measuring devices 2. Define and Explain the operation of DC and AC machines. 3. Recall and Illustrate various semiconductor devices and their applications and displays the input output characteristics of basic semiconductor devices. 4. Relate and Explain the number systems and logic gates. Construct the different digital circuit. 5. Label and Outline the different types of microprocessors and their applications.
		<p>XAP204</p> <p>APPLIED PHYSICS FOR ENGINEERS</p>	<ol style="list-style-type: none"> 1. Identify the basics of mechanics, explain the principles of elasticity and determine its significance in engineering systems and technological advances. 2. Illustrate the laws of electrostatics, magneto-statics and electromagnetic induction; use and locate basic applications of electromagnetic induction to technology. 3. Understand the fundamental phenomena in optics by measurement and describe the working principle and application of various lasers and fibre optics. 4. Analyse energy bands in solids, discuss and use physics principles of latest technology using semiconductor devices.

			5. Develop Knowledge on particle duality and solve Schrodinger equation for simple potential.
		XEG 205 ENGINEERING GRAPHICS	<ol style="list-style-type: none"> 1. Apply the national and international standards, construct and practice various curves 2. Interpret, construct and practice orthographic projections of points, straight lines and planes. 3. Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids. 4. Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids. 5. Construct sketch and practice isometric and perspective views of simple and truncated solids.
	III	XMA301 PROBABILITY AND STATISTICS	<ol style="list-style-type: none"> 1. Explain conditional probability, independent events, find expected values and Moments of Discrete random variables with properties. 2. Find distribution function, Marginal density function, conditional density function, define density function of conditional distribution functions normal, exponential and gamma distributions. 3. Find measures of central tendency and to determine statistical parameters of Binomial, Poisson and Normal and to find correlation, regression and Rank Correlation coefficient of two variables. 4. Explain large sample test for single proportion, difference of proportion, single mean, difference of means and difference of standard deviations with simple problems. 5. Explain small sample test for single mean, difference of mean and correlation coefficients, variance test, chisquare test with simple Problems.
		XCS302 ANALOG AND DIGITAL ELECTRONIC CIRCUITS	<ol style="list-style-type: none"> 1. Classify and describe the basics of devices and discuss the applications 2. Apply op-amp concept to analyze and design the applications circuits 3. Apply the Boolean algebra to design the digital logic families

			<ol style="list-style-type: none"> Describe and design the Combinational digital circuits Discuss and design the Sequential digital circuits
		XCS303 DATA STRUCTURE AND ALGORITHMS	<ol style="list-style-type: none"> Understand and apply linear data structures Understand and apply nonlinear data structures Understand and apply sorting techniques Understand and apply graph algorithms Design different algorithm techniques.
		XCS304 OBJECT ORIENTED PROGRAMMING	<ol style="list-style-type: none"> To understand the basic concepts of OOP and classes and objects in C++. To develop a solution to problems and demonstrating the usage of file handling in C++. To understand the basic concepts of OOP in Java and design patterns. To apply the ability to program with Multithreading and Exception handling in java. To demonstrate the ability to develop a solution to various I/O manipulation operations and connectivity to database.
		XES306 ENTREPRENEURSHIP DEVELOPMENT	<ol style="list-style-type: none"> Recognise and describe the personal traits of an entrepreneur. Determine the new venture ideas and analyze the feasibility report. Develop the business plan and analyze the plan as an individual or in team. Describe various parameters to be taken into consideration for launching and managing small business. Describe Technological management and Intellectual Property Rights
		XCI 307 CONSTITUTION OF INDIA	<ol style="list-style-type: none"> Understand the Constitutional History Understand the Powers and Functions Understand the Legislature Understand the Judiciary Understand the Centre State relations
	IV	XMA401 DISCRETE MATHEMATICS	<ol style="list-style-type: none"> Define and Explain Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set,

			<p>Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets.</p> <ol style="list-style-type: none"> 2. Define and Explain Basic counting techniques- inclusion and exclusion, pigeon-hole principle, permutation and combination. 3. Define and Explain The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. 4. Define and Explain Algebraic Structures with one Binary Operation and two Binary Operations. 5. Define and Explain Graphs and their properties.
		<p>XCS402 COMPUTER ARCHITECTURE AND ORGANIZATION</p>	<ol style="list-style-type: none"> 1. Describe functional unit of computer and Recognize various Addressing modes. 2. Describe and Analyze of arithmetic unit. 3. Describe and Recognize the basic processing unit. 4. Explain and Illustrate the memory System. 5. Explain and Analyze the I/O Organization.
		<p>XCS403 OPERATING SYSTEMS</p>	<ol style="list-style-type: none"> 1. Understand the fundamental concepts of Operating system 2. Understand and implement the process management, CPU scheduling algorithms, threads and Real time scheduling. 3. Understand and implement recognize the inter-process communication, synchronization and deadlocks. 4. Understand and implement the memory management techniques. 5. Understand the concepts of storage management, Disk Management and file management.
		<p>XCS404 DESIGN AND ANALYSIS OF ALGORITHMS</p>	<ol style="list-style-type: none"> 1. Explain and classify the characteristics and analysis of algorithm and propose the correct algorithmic strategy to solve any problem. 2. Design algorithms for any problem based on the strategy and sorting and searching problems.

			<ol style="list-style-type: none"> 3. Analyze any given algorithm and express its complexity in asymptotic notation 4. Explain the limitations of algorithm and Identify any problem as belonging to the class of P, NP-Complete or NP-Hard 5. Propose approximation algorithm for any NP problem
		XUM405 TOTAL QUALITY MANAGEMENT	<ol style="list-style-type: none"> 1. List and Explain the basic concepts of total quality concepts and its limitations. 2. Analyze and Explain the Customer satisfaction, Employee involvement, supplier selection and appraise the performance by TQM principle. 3. Explain and Apply the Statistical Process Control Tools. 4. Select and Explain the different TQM tools and their significance. 5. Explain the importance aspects of different quality systems
	V	XCS502 FOR MAL LANGUAGE & AUTOMATA THOERY	<ol style="list-style-type: none"> 1. Explain and Fundamental of the basic kinds of finite automata and their capabilities 2. Describe regular and context-free languages 3. Describe transform regular expressions to grammars 4. Explain Constructions of Turing Machines 5. Describe the key results in algorithmic complexity, computability.
		XCS503 DATABASE MANAGEMENT SYSTEMS	<ol style="list-style-type: none"> 1. Construct queries with relational database system with the basics of SQL 2. Relate and Apply the design principles for logical design of databases, including ER model and normalization approach 3. Define and Explain the basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, B+ tree and hashing. 4. Define and Explain the basic issues of transaction processing and concurrency control. 5. Work successfully in a team by design and development of database application systems.

		XCS504 SOFTWARE ENGINEERING	<ol style="list-style-type: none"> 1. Describe, understand and compare various methods of software development activities and software development process models. 2. Describe, Ability to develop, classify and analyze the knowledge of human-computer interaction and design software architecture for various application. 3. Describe, apply, Analyze, evaluate and test the basics of software testing and metrics. 4. Describe, apply, Analyze, evaluate and test the basics of software maintenance and software project management concepts 5. Understand and , Explain, develop and utilize the advanced software engineering concepts and software engineering development tools
		XCS505 IT WORKSHOP(SCILAB/MATLAB)	<ol style="list-style-type: none"> 1. Understand the main features of the MATLAB development environment 2. Use the MATLAB GUI effectively 3. Design simple algorithms to solve problems 4. Write simple programs in MATLAB to solve scientific and mathematical problems 5. graphical representations and tips for designing and implementing MATLAB code
		XCS507 WEB DESIGN	<ol style="list-style-type: none"> 1. Understand and perform the learning principles and techniques of client-side programming with HTML5. 2. Understand, demonstrate and use the Joomla Tool.
	VI	XCS601 COMPILER DESIGN	<ol style="list-style-type: none"> 1. Describe the compilers and its construction tools and specification of tokens. 2. Describe and apply various parsing techniques for parsing the string. 3. Illustrate and construct intermediate language. 4. Describe the code generation and make use of code generator to generate target code. 5. Explain code optimization and apply the optimization technique

		XCS602 COMPUTER NETWORKS	<ol style="list-style-type: none"> 1. Understanding the networks components and Analyzing the various network components. 2. Describe and Recognize the network error detection and correction methods. 3. Identify and interpret the network switching and addressing methods and develop the various routing simulations. 4. Analyse a transport layer functions and setup connection oriented protocol. 5. Describe the Application layer functions and network security and Build simple NS2 simulations
	VII	XUMC701 CYBER SECURITY	<ol style="list-style-type: none"> 1. To identify, learn, practice, and understand the basic concepts of networks and cyber-attacks. 2. To define the concepts of system vulnerability scanning and the scanning tools 3. To demonstrate, describe, and differentiate the network defense mechanisms and identify and apply the tools used to detect and quarantine network attacks. 4. To describe, differentiate, apply the different tools for scanning. 5. To identify and list the types of cybercrimes, cyber laws and cyber-crime investigations.
		XCSE51 ARTIFICIAL INTELLIGENCE	<ol style="list-style-type: none"> 1. Represent knowledge using propositional calculus and predicate calculus. 2. Solve search problems by applying a suitable search strategy 3. Use inference rules to produce predicate calculus expression. 4. Apply and design a fuzzy logic system using fuzzy rules 5. Understand various optimization methods and know about genetic algorithm
		XCSE52 GRAPH THEORY	<ol style="list-style-type: none"> 1. Write precise and accurate mathematical definitions of objects in graph theory. 2. Use mathematical definitions to identify and construct examples and to distinguish examples from non-examples. 3. Validate and critically assess a mathematical proof.

			<ol style="list-style-type: none"> 4. Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions. 5. Reason from definitions to construct mathematical proofs.
		XCSE53 DATA COMMUNICATION	<ol style="list-style-type: none"> 1. Understand the basic concepts for data communication 2. Understand the error detection and error correction in the data link layer. 3. Understand and analyze networks layer functions and subnet creation 4. Understand the concepts of transport layer 5. Recognize the design issue of application layer
		XCSE54 INFORMATION THEORY AND CODING	<ol style="list-style-type: none"> 1. Describe the basic notions of information and channel capacity 2. Describe the Pulse code Modulation Systems 3. Explain and Apply the error control coding 4. Describe and Analyze compression and decompression techniques 5. Explain and Illustrate Multimedia communication Techniques
		XCSE61 WEB AND INTERNET TECHNOLOGY	<ol style="list-style-type: none"> 1. Understand the technological foundations of the Internet and core Internet protocols 2. Understand the fundamental tools and technologies for web design. 3. Develop code to demonstrate, understanding of knowledge related to XML 4. Identify and outline the threats, firewalls and authentication mechanism. 5. Use fundamental skills to host a website.
		XCSE62 Queuing Theory and Modelling	<ol style="list-style-type: none"> 1. Define discrete and continuous random variables and to Find the expected values and moment generating functions of discrete and continuous distributions. 2. Explain the standard distribution and Identify the different distribution 3. Explain the joint and Marginal distribution and to Find the Correlation and regression. 4. Explain the Markovian models and to Find the characteristics of the models

			5. Explain the basic concepts of queuing theory
		XCSE63 DISTRIBUTED SYSTEMS	<ol style="list-style-type: none"> 1. Describe basics of Distributed Systems, Trends in Distributed Systems and Challenges. 2. Define inter process communication and Explain internet protocols for external data representation and multi cast communication. 3. Explain peer to peer services and illustrate different file system and naming. 4. Describe Synchronization and replication in distributed system. 5. Explain Process management and Resource management in distributed system.
		XCSE64 CRYPTOGRAPHY AND NETWORK SECURITY	<ol style="list-style-type: none"> 1. Explain the common network vulnerabilities and attacks 2. Describe and compare the security of different cryptographic algorithm 3. Identify the possible threats to each mechanism and ways to protect against these threats 4. Outline the requirements and mechanisms for identification and authentication. 5. Explain the requirements of real-time communication security and issues related to the security of web services.
		XCSE66 DATA MINING	<ol style="list-style-type: none"> 1. Describe the different data mining techniques and compare data mining systems with database systems 2. Apply the concepts of pre-processing and characterization 3. Construct a classifier from the given dataset by using classification algorithms 4. Discover clusters for a given database by applying clustering algorithms 5. Describe the concepts of Knowledge Mining - Web Mining –Text Mining- Spatial Mining - Temporal Mining.
		XCSE67 OPTIMIZATION TECHNIQUES	<ol style="list-style-type: none"> 1. Understandthe basic concepts of linear programming 2. Define and Explainthe advancements in Linear programming techniques 3. Explain the non-linear programming techniques

			<ol style="list-style-type: none"> 4. Discuss the interior point methods of solving problems 5. Describe the dynamic programming method
		XCSE68 Multi Agent Intelligent Systems	<ol style="list-style-type: none"> 1. Describe the basic concepts of Context Awareness. 2. Describe the concepts in Distributed and Heterogeneous context. 3. Describe the principles of Dynamic current negotiation 4. Explain the concepts of Context aware mobile and pervasive systems 5. Describe the security issues in Context aware computing
		XCSE69 IMAGE PROCESSING	<ol style="list-style-type: none"> 1. Describe how digital images are represented and manipulated in a computer 2. Explain about various image transforms techniques. 3. Apply the knowledge of image enhancement and restoration techniques in different applications. 4. Apply the image segmentation methods for a particular application. 5. Compare various image compression techniques.
		XCSE6A CONTEXT AWARE COMPUTING	<ol style="list-style-type: none"> 1. Describe the basic concepts of Context Awareness. 2. Describe the concepts in Distributed and Heterogeneous context. 3. Describe the principles of Dynamic current negotiation 4. Explain the concepts of Context aware mobile and pervasive systems 5. Describe the security issues in Context aware computing
		XCSE71 INFORMATION RETRIEVAL	<ol style="list-style-type: none"> 1. Define and Explain document and query structure. 2. Explain, Develop and Estimate query matching and text analysis. 3. Explain and Measure information retrieval performances. 4. Explain and Estimate performance improvement measures. 5. Explain web search, crawling and link analysis.

		XCSE72 CLOUD COMPUTING	<ol style="list-style-type: none"> 1. Describe and understand the idea of evolution of cloud computing and its services available today. 2. Describe, Ability to develop, classify and analyze components of cloud computing and its business perspective 3. Describe, apply, analyze and evaluate the various cloud development tools. 4. Explain, Analyze, Demonstrate knowledge on services, architecture, types of infrastructural models, disaster recovery and Virtualization 5. Understand, Explain, develop and analyze the case studies to derive the best practice model to apply when developing and deploying cloud based applications.
		XCSE73 FAULT TOLERANCE COMPUTING	<ol style="list-style-type: none"> 1. Explain the definition, fundamentals and application of fault tolerance. 2. Describe the availability, safety and fault prevention against the system. 3. Identify the possible failure rate and the process to clear the failure by the mechanism process. 4. Outline the schemes of redundancy, evaluation and techniques to avoid redundancy. 5. Explain the fault tolerance techniques and programming to avoid the fault tolerance
		XCSE74 COMPUTER GRAPHICS	<ol style="list-style-type: none"> 1. Illustrate the working of appropriate drawing and clipping algorithms for 2D objects. 2. Produce an object after applying the required 2D/ 3D transformation techniques. 3. Explain different color models like RGB and CMYK. 4. Identify the visible and invisible surfaces of 3D objects by applying a suitable surface detection algorithm. 5. Develop 2D/3D animation for a given scenario by applying the principles of animation.
		XCSE75 ADVANCED OPERATING SYSTEM	<ol style="list-style-type: none"> 1. Describe the various synchronization, scheduling and memory management issues 2. Demonstrate the mutual exclusion, deadlock detection and agreement protocols of Distributed operating system

			<ol style="list-style-type: none"> Discuss the various resource management techniques issues and various deadlock detection algorithm and resolution for distributed systems. Describe and analyze the various agreement problems and solutions. Understand and explain the various Mechanisms for building Distributed File Systems, Design issues and install open source kernel modify existing open source kernels in terms of functionality or features used.
		XCSE77 VIRTUALIZATION	<ol style="list-style-type: none"> Deploy legacy OSs on virtual machines Understand the intricacies of server, storage, network, desktop and application virtualizations Design new models for virtualization Design and develop cloud applications on virtual machine platforms Design new models for Bigdata processing in cloud
		XCSE79 ADHOC AND SENSOR NETWORKS	<ol style="list-style-type: none"> Describe the design issues in ad hoc and sensor networks. Describe and distinguish the different types of MAC protocols. Describe the different types of adhoc routing protocols. Explain the TCP issues in adhoc networks. Describe the architecture and protocols of wireless sensor networks.
		XCSE7A EMBEDDED SYSTEMS	<ol style="list-style-type: none"> Discuss the structural units in Embedded processor. Understand and apply the embedded networking Discuss the development environment of embedded systems. Describe the real time operating system based embedded system design. Understand and develop embedded system applications.
		XCSE81 BIG DATA ANALYTICS	<ol style="list-style-type: none"> Describe the characteristics of Big Data and the issues involved and describe the evolution of analytical process Demonstrate various data analysis methods

			<ol style="list-style-type: none"> 3. Describe and demonstrate stream computing in Big Data Analytics 4. Perform market basket analysis and demonstrate clustering techniques 5. Explain the Big Data Framework and visualization methods
		XCSE84 SOFT COMPUTING	<ol style="list-style-type: none"> 1. Illustrate the nuance of soft computing and depict the Genetic Algorithm concepts 2. explain the evolution of Artificial Neural Network and various types of neural networks 3. Recognize the supervised learning method and unsupervised learning methods and demonstrate it in various applications 4. Comprehend the fuzzy systems and its hybrid methods and demonstrate it in various applications 5. Describe the Swarm Intelligence usage
		XCSE85 INTERNET OF THINGS	<ol style="list-style-type: none"> 1. Get an idea of some of the application areas where Internet of Things can be applied. 2. Understand the Standardization Protocol for IoT 3. Understand the concepts of Web of Things. 4. Understand the concepts of Cloud of Things with emphasis on Mobile cloud Computing. 5. Understand the basic concepts of aspect oriented software development
		XCSE86 REAL TIME SYSTEMS	<ol style="list-style-type: none"> 1. Describe the real time operating system concepts, the associated issues & Techniques. 2. Understand the fundamentals of Scheduling and features of programming languages 3. Discuss the concepts of Real Time Databases. 4. Explain the fundamentals of real time communication 5. Understand the evaluation techniques present in Real Time System.
		XCSE87 INFORMATION SECURITY	<ol style="list-style-type: none"> 1. Explain the basics of information security. 2. Describe the legal, ethical and professional issues in information security

			<ol style="list-style-type: none"> 3. Explain the aspects of risk management. 4. Describe aware of various standards in the Information Security System 5. Describe and Design implementation of Security Techniques.
	Common sub	XUME 706 CYBER SECURITY	<ol style="list-style-type: none"> 1. Able to understand the Cyber Security Policy, Laws and Regulations 2. Able to discuss the Cyber Security Management Concepts 3. Able to understand the Cyber Crime and Cyber welfare 4. Able to discuss on issues related to Information Security Concepts 5. Able to understand various security threats
		E-WASTE MANAGEMENT	<ol style="list-style-type: none"> 1. Able to find the technologies for waste electrical and electronic equipment 2. Able to explain the methods of Mechanical Processing of waste disposal 3. Able to classify the sources of Hydrometallurgical Processing 4. Able to summarize the Electronic Waste Recycling 5. Able to demonstrate the methods for Batteries disposal

Programme and Course Outcomes of

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

Programmes offered:

S.No.	Programme Name	PO and CO
1	BCA	Yes
2	MCA	Yes
3	M.Phil (CS)	Not Applicable
4	Ph.D	Not Applicable

1. a. BCA – Programme Outcomes

PROGRAM OUTCOMES	
PO 1	To apply fundamental knowledge of mathematics and Principles of Computing techniques to solve the problems in computer science and application areas.
PO 2	To analyze a computing requirement and apply programming principles for providing effective solutions.
PO 3	To design an innovative interface method to bring the complete requirement and visualize the result for decision making.
PO 4	To investigate and apply modern tools and technologies in the construction of software system.
PO 5	To practice team communication, effective management and Interpersonal skill for the successful computing professional and entrepreneur.
PO 6	To apply contextual knowledge of professional, ethical, legal, and security to assess societal, health, legal and cultural issues.
PO 7	To extend enthusiasm for self-improvement through continuous professional development and life-long learning.
PROGRAM SPECIFIC OUTCOME	
PSO1	Maintaining the system, applications, Software and network components in a computing environment
PSO2	Developing dynamic website and web enabled applications.

1.b. BCA – Course Outcomes

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	XGL101 COMMUNICATION SKILLS IN ENGLISH	<ol style="list-style-type: none"> 1. Explain the process of communication and its types 2. Recall various sounds and use it in proper context 3. Organise meeting events and recording it constructively 4. Adapt methods of framing questions and using punctuations 5. Demonstrate the basic skills at the time of interview and presentations
2		XGL102A / XGL102 BARIVIAL TAMIL / COMPREHENSIVE ENGLISH	<ol style="list-style-type: none"> 1. (milahsk; fhZjy;) gy;NtW mwptpay; Jiw rhu;e;j El;gq;fs;> fiyr; nrhy;yhf;f cj;jpfs; Nghd;wtw;iwj; jkpo;nkhop %yk; mwpe;Jnfhs;sy;. 2. (njupTnra;jy;)tlkhop Ntu;r;nrhw;fs;> Gtpapay;> epytpay; gw;wpg; goe;jkpo; ,yf;fpaq;fs; %yk; mwpe;Jnfhs;sy;. 3. (tpsf;Fjy;)njhy;fhg;gpak; %yk; mwptpay; nra;jpfisczu;jy;. 4. (gad;gLj;Jjy;) gy;NtWfy;tpj; Jiw rhu;e;j gpupTfs;> gy;NtW fy;tpj; Jiw rhu;e;j gpupTfs; Fwpj;J njspTngwy;. 5. (gFj;jy;) mwptpay; rpWfijfspd; Njhw;wk; kw;Wk; tsu;r;rp epiy ehlfq;fspd; gq;F Fwpj;J njspTngWjy;.
3		XCA103 PROGRAMMING	<ol style="list-style-type: none"> 1. Describe the concept of C programming and its fundamental illustrate and implement various control statements and arrays 2. Build an application program using various controls statements and arrays 3. Differentiate and Implement structures and unions 4. Develop an application program using structures and unions 5. Explain and Implement the pointer concepts 6. Develop an application program using structures and unions 7. Develop a program to create and process a file for different applications

4		XCA104 ALGEBRA, CALCULUS AND ANALYTICAL GEOMETRY	<ol style="list-style-type: none"> 1. Explain and Find derivative functions in differential calculus. 2. Solve the definite and indefinite integrals using various techniques. 3. Apply orthogonal transformation to determine eigen values and eigen vectors of a given matrix. 4. Solve problems using Binomial, exponential and logarithmic series expansions. 5. Find the distance between two points and Explain section formulae, slope form and intercept form.
5		XCA105 COMPUTER ORGANIZATION AND ARCHITECTURE	<ol style="list-style-type: none"> 1. Demonstrate basic number systems, Boolean expression simplification and logic gates manipulation 2. Explain the functions of various components in digital system 3. Describe general Instruction types, formats, addressing modes and organization 4. Summarize various modes of Data transfer and interface 5. Classifies memory organization and management
6		XUM106 HUMAN ETHICS, VALUES , RIGHTS AND GENDER EQUALITY	<ol style="list-style-type: none"> 1. Relate and Interpret the human ethics and human relationships 2. Explain and Apply gender issues, equality and violence against women 3. Classify and Develop the identify of human rights and their violations 4. Classify and Dissect necessity of human rights and report on violations. 5. List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
1	II	XGL201 ENGLISH FOR EFFECTIVE COMMUNICATION	<ol style="list-style-type: none"> 1. Explain the process of listening and its characteristics 2. Practicing the types of speeches 3. Recognize the basic expressions and using it effectively 4. Construct the means of writing contents to media 5. Employing various techniques in preparing communication letters

2		XES202 ENVIRONMENTAL STUDIES	<ol style="list-style-type: none"> 1. Describe the significance of natural resources and explain anthropogenic impacts. 2. Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance 3. Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon 4. Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development 5. Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection
3		XCA203 OBJECT ORIENTED PROGRAMMING WITH C++	<ol style="list-style-type: none"> 1. Define basic concepts on object oriented programming 2. Apply structure and inline functions 3. Explain the types of inheritances and Applying various levels of Inheritance for real time problems 4. Apply the OOPs concepts class and object 5. Explain the operator Overloading functions 6. Apply various overloading methods for different applications 7. Describe and apply the Polymorphism concepts 8. Apply and implement operator overloading functions 9. Responding on design of dynamic memory allocation 10. Define and explain file concept and exception handlings in C++ 11. Apply and implement file operations
4		XCA204 DISCRETE MATHEMATICS	<ol style="list-style-type: none"> 1. Define the properties and laws of sets, relations and functions. 2. Participate in the class discussion in the operation of set using venn Diagram. 3. Explain the basic concepts of logic to calculate the normal forms, tautologies and contradiction.

			<ol style="list-style-type: none"> 4. Apply the counting principle permutation and combination and pigeonhole principle to solve the problem. 5. Reproduce model related to counting principle 6. Explain the types of lattices and to show lattices as partially ordered sets. 7. Explain the properties of semi groups and groups and any set with binary operation as a semigroup and group with examples.
5		XCA205 COMPUTER NETWORKS	<ol style="list-style-type: none"> 1. Explain the OSI reference model used in the network 2. Describe the DLL services and different protocols. 3. Differentiate various networking commands and its functions 4. Compare the various routing algorithms. 5. Describes the congestion control in the network layer 6. Builds a program for the congestion control 7. Demonstrate and Illustrate the transport layer and the congestion control algorithm. 8. Integrates different socket programming using TCP and UDP 9. Adapts different RAW sockets for packet capturing and filtering 10. Summarize the application layer and the naming service.
6		XCA206 DATA STRUCTURES AND ALGORITHMS	<ol style="list-style-type: none"> 1. Illustrate the classification of data types and operations of stack. 2. Build a program to implement the operations of stack. 3. Chooses various applications that function as stack. 4. Explain the functions of queue and its types 5. Build a program to implement the operations of queue. 6. Selects the real word applications in queue 7. Describe the operations of linked list and its advantages

			<ol style="list-style-type: none"> 8. Build an application to demonstrate the functions of linked list 9. Practices the linked list concept in real time applications 10. Recall the recursion function in various problems. 11. Writes the recursion program for various problems in C 12. Describe the concepts of tree and sorting 13. Build an application in C for traversing a tree and sorting concept 14. Gives the importance of tree traversing and sorting techniques.
1	III	XCA301 HTML AND DHTML	<ol style="list-style-type: none"> 1. List out the tags of Text Formatting and Tables 2. Starts to work with Text Formatting tags 3. Performs data organization in List and tables with variety of samples 4. Demonstrate the List, Links and Images. 5. Builds the web site with List, Links and Images. 6. Selects the necessary tag used for designing the website. 7. Explain Frames in HTML for developing the webpage 8. Assembles all the web sites linked with Frames 9. Explain and Develop static web page with HTML form elements 10. Compiles the form element in a web document. 11. Explain DHTML with Java script and CSS 12. Practices with CSS, Java Script and DHTML 13. Organizes the Dynamic web pages with static webpages
2		XCA302 DATABASE MANAGEMENT SYSTEMS	<ol style="list-style-type: none"> 1. Describe the database architecture and its applications 2. Sketch the ER diagram for real world applications 3. Uses various ER diagram for a similar concepts from various sources

			<ol style="list-style-type: none"> Discuss about the relational algebra and calculus Construct various queries in SQL and PL/SQL Compiles various queries in SQL, Relational Calculus and Algebra Describe the various normalization forms Apply the normalization concepts for a table of data Practices a table and implement the normalization concepts Explain the storage and accessing of data. Illustrate the query processing in database management. Define the concurrency control and deadlock concept
3		XCA303 VISUAL PROGRAMMING	<ol style="list-style-type: none"> Understand basic controls and events Recognize Various controls for different applications Describe and apply intrinsic and extrinsic control sin programming Understand and implement connections and operations in database Understand and Implement various VC++ controls & events
		XCA304 STATISTICAL AND NUMERICAL METHODS	<ol style="list-style-type: none"> Explain the statistical data in the form of table, diagram and graph and to find various statistics, correlation, rank correlation and regression coefficients. Define null and alternate hypothesis and to Apply test statistic. Define discrete and continuous random variables and to Find the expected values and moment generating functions of discrete and continuous distributions. Explain computational numerical methods to Solve algebraic and transcendental equations and systems of linear equations. Solve the Numerical Differentiation and Integration and to Apply the Trapezoidal and Simpson's rules.+
	IV	XCA401DATA ANALYTICS	<ol style="list-style-type: none"> Demonstrate Data Management in Worksheet Organises the data in worksheet

			<ol style="list-style-type: none"> 3. Performs data organization in worksheet with variety of samples 4. Interpret Formulas in an Excel Spread sheet 5. Selects formulas for calculating the data in a spread sheet 6. Apply Statistical and Mathematical functions for given samples 7. Manipulate the data with statistical and Mathematical functions 8. Apply the type of charts to analyse the data 9. Displays the chart for any real time data 10. Explain Analysis Toolpak for statistical concepts 11. Starts to work with Analysis Toolpak 12. Practices Analysis Toolpak with different samples
		XCA402 JAVA PROGRAMMING	<ol style="list-style-type: none"> 1. Explain the history and features of java 2. Describe and implement the class, packages and interfaces 3. Participating in creating packages and interfaces for applications domain. 4. Describe and implement the inheritance concepts 5. Implement various level of inheritance for given applications 6. Describe and implement various types of exception and its handling methods 7. Build a program to implement exception handling concepts 8. illustrate the Applets methods in Graphics, AWT controls and event handling 9. Build an application using event handling method
		XCA403RESOURCE MANAGEMENT TECHNIQUES	<ol style="list-style-type: none"> 1. Explain the basic concepts of optimization and to formulate and Solve Linear Programming problems. 2. Explain and Apply the concepts of Transportation problem and Assignment problem. 3. Explain and Apply the concepts of sequencing problem

			<ol style="list-style-type: none"> 4. Explain and Demonstrate the basic concepts of PERT-CPM and their applications in product planning control. 5. Solve the Minimal Spanning Tree Problem, Shortest Route Problem, Maximal Flow Problem and Minimal Cost Capacitated Flow Problem.
4		XCA404 OPERATING SYSTEMS	<ol style="list-style-type: none"> 1. Explain the operating system functions 2. Implement the process and various process scheduling algorithms 3. Executes the different types of scheduling algorithms 4. Outline process cooperation and inter process communication 5. Recognize the principles of concurrency 6. Builds a program model for deadlock prevention and avoidance 7. Describe various memory management concepts 8. Integrates different memory management techniques 9. Apply the fixed size and variable size page replacement algorithm 10. Implement and understand the file organization
1	V	XCA501XML AND WEB SERVICES	<ol style="list-style-type: none"> 1. Explain the concepts of XML 2. Starts to work with XML tags 3. Demonstrate the XML schema and DTD 4. Builds the middleware with XML schema and DTD 5. Explain the XML presentation and Transformation technique 6. Assembles all the CSS tags to represent the XML data 7. Outline the Web Services Building Block 8. Adapt the XML concepts to work with Webservices 9. Organizes the webservices with XML tags 10. Uses the XML concepts to perform the Webservices
2		XCA502A SOFTWARE ENGINEERING	<ol style="list-style-type: none"> 1. Explain the various types of software process models 2. Illustrate the concept of software planning activities, risk management and estimation 3. Describe the various software design models

			<ol style="list-style-type: none"> 4. Derive and Illustrate the test case and various testing methods 5. Summarize the software configuration management and quality assurance
		XCA502B COMPILER DESIGN	<ol style="list-style-type: none"> 1. Describe the role of compilers 2. Understand parser, parsing and grammar 3. Understand Boolean Algebra and intermediate code generation 4. Understand various types of errors and code generation 5. Apply optimization and storage management
3		XCA503A UNIX AND SHELL PROGRAMMING	<ol style="list-style-type: none"> 1. Explain UNIX operating system and architectures 2. Builds an operating system environment to work with various applications. 3. Performs networking commands in an operating system 4. Explain UNIX File Systems and Commands 5. Selects commands to perform the execution 6. Describe the operating system processes and its execution 7. Manipulate the UNIX processes 8. Explain the Shell Environment concepts 9. Displays the Shell environment and processing technique 10. Explain Shell Programming statements 11. Starts to work with Shell Programming 12. Practices the Shell programming control structures
		XCA503B WEB SCRIPTING FRAMEWORK	<ol style="list-style-type: none"> 1. Explain Java Script concepts used in Web programming 2. Builds web programs with java script statements 3. Reports the web pages developed with Java script 4. Demonstrate VB Script concepts 5. Constructs the VB Script programs with various statements 6. Uses the VB Script concepts to create the programs

			<ol style="list-style-type: none"> 7. Explain the concepts of Ruby on Rails 8. Organizes the concepts to create the web pages 9. Explain the concepts of Struts 10. Builds a program with Struts 11. Explain the concepts of Hibernate 12. Starts to work with Hibernate 13. Practices concepts of Hibernate
4		XCA504A ENTERPRISE RESOURCE PLANNING	<ol style="list-style-type: none"> 1. Explain the functionalities of Enterprise resource planning 2. Characterize the ERP implementation procedures 3. Describes the elements of ERP 4. Differentiate the available ERP packages 5. Summarize the models of ERP with other related technologies
		XCA504B ORGANIZATIONAL BEHAVIOR	<ol style="list-style-type: none"> 1. Explain the organizational behavior and human relations. 2. Analyze the individual behaviors, perceptions and emotions 3. Reaction to many different situations 4. Understanding the job characteristics and motivation theory. 5. Demonstrate the decision making and creativity. 6. Recognizing own abilities and responsibilities 7. Understanding group behavior and teamwork.
1	VI	XCA601 INTRODUCTION TO GRAPHICS DESIGN	<ol style="list-style-type: none"> 1. Understand various image file formats and attributes 2. Working with various images for different manipulations 3. Understand painting and color options and tools 4. Design various invitations, posters and logo 5. Design a brochure, card and website
2		XCA602A .NET TECHNOLOGIES	<ol style="list-style-type: none"> 1. Knowledge on .Net Technologies basic controls and events 2. Knowledge on Object Oriented Programming with C#

			<ol style="list-style-type: none"> Understand and implement VB.Net Apply and Implement C#.Net and VB.Net using various tools Understand Framework and threads
		XCA602B PROGRAMMING WITH PHP AND MYSQL	<ol style="list-style-type: none"> Explain the basic function of PHP and uses of open sources technologies. Build a program in PHP to implement the looping and conditional Explain the array and functions in PHP. Build a program to implement cookies, session and file concept. Selects the real word problems and applied techniques in cookies and session. Describe the various DB architectures, constraints and normalization forms. Explain the statements in MySQL and its effectiveness. Build a application to construct various queries inMySQL Identifies differences between the SQL and MySQL features and functions. Describe to implement PHP and MySQL. Build a application to implement PHP and MySQL.
3		XCA603A MOBILE COMPUTING	<ol style="list-style-type: none"> Describes the medium access control layers Characterize the wireless transmission technologies Describe the mobile network layer and IP packet delivery Comprehend TCP and the transmission mobile transport layer Characterizing mobile transport layer Summarize the WAP and its applications
		XCA603B DISTRIBUTED COMPUTING	<ol style="list-style-type: none"> Explain the Concept of Distributed Computing Assemble the Networking components Outline the concept of Message Passing Starts with Message Passing Practices the Message Passing concepts Describe the Distributed shared memory concept

			<ol style="list-style-type: none"> 7. Demonstrate the Resource Management concept 8. Constructs the load balancing & sharing techniques 9. Practices to load balancing & sharing 10. Describe the Distributed File Systems 11. Constructs the Distributed file system techniques
		XCA603CBLOCK CHAIN	<ol style="list-style-type: none"> 1. Describe distributed database 2. Understand block chain network 3. Understand crypto currency and bitcoin 4. Understand crypto currency regulation 5. Apply block chain applications
4		XCA604 PROJECT WORK	<ol style="list-style-type: none"> 1. Practice the Requirements Analysis 2. Create the Design for their project 3. Create the Coding 4. Plan for Testing 5. Solve the Conclusion

GENERIC ELECTIVE I :

	XCAOE1	C AND C++ PROGRAMMING LANGUAGE	<ol style="list-style-type: none"> 1. Knowledge on C programming fundamentals 2. Understand and Apply structure and union 3. Understand on advanced concept of pointers and files 4. Knowledge on object oriented technologies 5. Apply and Implement levels of Inheritance
	XCAOE2	DIGITAL IMAGING AND EDITING TECHNIQUES	<ol style="list-style-type: none"> 1. Explain the various attributes of Photoshop basics. 2. Identify the concept of working with layers 3. Describe the various forms of Painting tools 4. Recognize the advanced tools for making colors 5. Describe advanced techniques for selection and masking

GENERIC ELECTIVE II :

	XCAOE3	BUSINESS ANALYTICS WITH WORKSHEET	<ol style="list-style-type: none"> 1. Demonstrate Data Management in Worksheet 2. Organises the data in worksheet 3. Interpret Formulas in an Excel Spread sheet 4. Selects formulas for calculating the data in a spread sheet 5. Apply Statistical and Mathematical functions for given samples 6. Manipulate the data with statistical and Mathematical functions 7. Apply the types of chart to analyse the data 8. Displays the chart for any real time data 9. Explain Analysis Toolpak for statistical concepts 10. Starts to work with Analysis Toolpak
	XCAOE4	ANIMATION AND IMAGING	<ol style="list-style-type: none"> 1. Understanding basic concepts of animation 2. Demonstrate tools and software for animation 3. Applying imaging techniques 4. Applying various graphic editing techniques 5. Differentiate various transformation techniques
GENERIC ELECTIVE III :			
	XCAOE5	MOBILE APPLICATION DEVELOPMENT	<ol style="list-style-type: none"> 1. Explain the various System Management Principles 2. Assembles various system components. 3. Outline the concept of Operating System 4. Performs the installation with Operating System 5. Describe the Host and Server Management 6. Identifies the Web Server management. 7. Demonstrate the Network Management 8. Constructs the IP configuration and network management 9. Describe the Virtualization concepts
	XCAOE6	PROGRAMMING IN PYTHON	<ol style="list-style-type: none"> 1. Explain various types of operators, Data types, Identifiers and string handling methods. 2. Outline the concept of collection data types.

			<ol style="list-style-type: none"> 3. Explain the control structures and looping. 4. Construct programs with control structures. 5. Explain Python's standard library, file and Directory handling 6. Summarize the object oriented concepts. 7. Construct a program with OOPS concepts
GENERIC ELECTIVE IV :			
	XCAOE7	SYSTEM AND NETWORK ADMINISTRATION	<ol style="list-style-type: none"> 1. Explain the various System Management Principles 2. Assembles various system components. 3. Outline the concept of Operating System 4. Performs the installation with Operating System 5. Describe the Host and Server Management 6. Identifies the Web Server management. 7. Demonstrate the Network Management 8. Constructs the IP configuration and network management 9. Describe the Virtualization concepts
	XCAOE8	PHP AND MYSQL	<ol style="list-style-type: none"> 1. Explain the basic function of PHP and uses of open sources technologies. 2. Build a program in PHP to implement the looping and conditional statements 3. Explain the array and functions in PHP. 4. Build a program to implement cookies, session and file concept. 5. Describe the various DB architectures, constraints and normalization forms. 6. Explain the statements in MySQL and its effectiveness. 7. Build a application to construct various queries in MySQL 8. Describe to implement PHP and MySQL. 9. Build an application to implement PHP and MySQL.

2. a. MCA – Programme Outcomes

PROGRAMME OUTCOMES (POs)	
PO1	To apply fundamental knowledge of Mathematics and Principles of Computing technologies in the field of computing sciences and application areas
PO2	To analyze and apply Programming principles, and computer science theory in design and development of solution.
PO3	To design algorithms, conduct experiments and interpret result to provide valid solutions for computing environment.
PO4	To investigate research related issues and apply modern application tool, and appropriate paradigm for the construction of software system.
PO5	Ability to Communicate effectively with the computing community about requirements and able to present the result clearly.
PO6	Ability to work with technical, management, leadership and entrepreneurial skillsso as to deliver effective product within a time constraints
PO7	Ability to apply knowledge of professional, ethical, and security issues involving in creating software and maintaining it.
PO8	Ability to express enthusiasm for self-improvement through continuous professional development and life-long learning.
PROGRAMME SPECIFIC OUTCOME (PSO)	
PSO1	Web Application Development: Analyse the environment of web based application requirement and produce the interactive web site.
PSO2	Structured Software Development Methodologies: Apply structured methods and tools to develop effective software with necessary documents.

2.b. MCA-Course Outcomes

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	YCA101 INFORMATION TECHNOLOGY	<ol style="list-style-type: none"> 1. Describe the various processes to express the data communication. 2. Understand the concepts of Hardware and software process. 3. Recalls the concept of operating systems and its languages. 4. Distinguish the networks and extends the idea of computer networks and its functions. 5. Illustrate the concepts of information security and its applications.
2		YCA102 COMPUTER ORGANIZATION AND ARCHITECTURE	<ol style="list-style-type: none"> 1. Describe general Instruction types, formats, addressing modes and organization 2. Understand the concept of RISC Vs CISC 3. Classifies memory organization and management 4. Summarize various modes of Data transfer 5. Explain SPEC Mark
3		YCA103 DATA STRUCTURES AND ALGORITHMS	<ol style="list-style-type: none"> 1. Explain the classification of data types and operations of stack. 2. Describe the functions of queue and its types 3. Describe the operations of linked list and its advantages 4. Recall the function of recursion in various problems. 5. Describe the various types of sorting
4		YCA104 MATHEMATICAL FOUNDATIONS	<ol style="list-style-type: none"> 1. Describe theory of inference for statement calculus 2. Understand and apply Relation, function and recursion 3. Describe and solve Algebraic structure 4. Describe and solve problems in paths and graph 5. Understand Tress, List structures and graphs
5		YCA105 ACCOUNTING AND MANAGEMENT CONTROL	<ol style="list-style-type: none"> 1. Understand the Basic Accounting and conventions underlying preparation of Financial Statements 2. Understand the Income Measurement 3. Understand the concept of Cost Analysis and Control 4. Understand the Cost Analysis for Control 5. Understand the Management Control Systems

6		YCA106 INFORMATION TECHNOLOGY LAB	<ol style="list-style-type: none"> 1. Describe the concepts of PCs functions and its commands. 2. Apply Unix command for various operations in file. 3. Build a Power Point Slides with some applications. 4. Build an any system using MS-Excel. 5. Apply an application using visual basic.
7		YCA107 PROGRAMMING LAB (C AND DATA STRUCTURES)	<ol style="list-style-type: none"> 1. Describe the concept of C programming and its fundamental 2. Build an application program using various control statements and arrays 3. Develop an application program using structures and unions 4. Build a program to implement the operations of stack. 5. Build a program to implement the operations of queue. 6. Build an application to demonstrate the functions of linked list and traversing a tree.
1	II	YCA201 INTRODUCTION TO MANAGEMENT FUNCTIONS	<ol style="list-style-type: none"> 1. Describe the concepts of Human resource development system 2. Understand the idea of marketing research and organization. 3. Illustrate the concept of Finance Estimation and its functions. 4. Describe the idea about manufacture plan and quality management. 5. Understand the process of strategic planning
2		YCA202 OPERATING SYSTEMS	<ol style="list-style-type: none"> 1. Explain the operating system concept 2. Understand the process and various process scheduling algorithms 3. Practice for different types of scheduling algorithms 4. Describe various memory management concepts and Interprocess Communication and synchronization 5. Integrates different memory management techniques 6. Apply the fixed size and variable size page replacement algorithm 7. Understand the file System and I/O devices 8. Practice for different types of disk scheduling algorithms 9. Explain Performance Measurement, monitoring and evaluation

3		YCA203 TECHNICAL ENGLISH	<ol style="list-style-type: none"> 1. Explain the operating system concept 2. Understand the process and various process scheduling algorithms 3. Practice for different types of scheduling algorithms 4. Describe various memory management concepts and Interprocess Communication and synchronization 5. Integrates different memory management techniques 6. Apply the fixed size and variable size page replacement algorithm 7. Understand the file System and I/O devices 8. Practice for different types of disk scheduling algorithms 9. Explain Performance Measurement, monitoring and evaluation
4		YCA204 PROBABILITY AND COMBINATORIES	<ol style="list-style-type: none"> 1. Describe the basics of probability functions. 2. Understand the concept of expectation functions and its variance. 3. Describe and apply various types of distribution functions 4. Describe and solve problems in permutations and combinations on objects. 5. Understand the Recurrence Relations
5		YCA205 INFORMATION SYSTEM ANALYSIS, DESIGN AND IMPLEMENTATION	<ol style="list-style-type: none"> 1. Describe various models and Design 2. Understand the modeling concept 3. Practice for Developing a Proposal 4. Understand various system design methodologies and tools 5. Practice for Application Development Methodologies and CASE tools 6. Understand Object oriented analysis and design and Object oriented analysis data bases 7. Describe Managerial Issues in Software Projects
6		YCA206 BUSINESS PROGRAMMING LAB	<ol style="list-style-type: none"> 1. Practice various methods to define financial and economic development 2. apply for accounting system 3. Describe and apply various managerial problems 4. solve problem for Retailers 5. Solve the Real time Business problem
7		YCA207 OPERATING SYSTEMS LAB	<ol style="list-style-type: none"> 1. Practice the operating system concept 2. Practice for different types of scheduling algorithms

			<ol style="list-style-type: none"> 3. Apply the fixed size and variable size page replacement algorithm 4. Practice for different types of disk scheduling algorithms 5. Evaluate Performance Measurement, monitoring and evaluation
1	III	YCA301 DATABASE MANAGEMENT SYSTEMS	<ol style="list-style-type: none"> 1. Describe the database architecture and its application 2. Describe about the relational model and algebra 3. Explain the data model and accessing of data. 4. Describe the normalization concept for a table of data 5. Illustrate the query technical processing in database management
2		YCA302 COMPUTER COMMUNICATION NETWORKS	<ol style="list-style-type: none"> 1. Define various methods of topology 2. Understand and apply layer protocol 3. Illustrate various counting and inclusion theory 4. Describe LAN concepts 5. Explain TCP/IP
3		YCA303 OBJECT ORIENTED PROGRAMMING, ANALYSIS AND DESIGN	<ol style="list-style-type: none"> 1. Describe various methods to define object modelling 2. Understand and construct modeling concepts 3. Describe and Discuss the concepts of operations 4. Describe and apply the concepts of designs 5. Describe the concepts of implementation of an application
4		YCA304 MANAGEMENT SUPPORT SYSTEMS	<ol style="list-style-type: none"> 1. Discuss about DSS concept and components 2. Describe the data and model management for DSS 3. Describe about various DSS functionality 4. Understand the concept of DSS Interface and Group discussion 5. Describe Expert System
5		YCA305 STATISTICAL COMPUTING	<ol style="list-style-type: none"> 1. Discuss the basic fundamentals of statistics and measures 2. Identify the concept of sampling technique 3. Describe about the charts and analysis 4. Discuss about the statistics analysis 5. Describe the various implementation
6		YCA306 DATABASE MANAGEMENT SYSTEMS	<ol style="list-style-type: none"> 1. Discuss the basic fundamentals of statistics and measures

		AND JAVA LAB	<ol style="list-style-type: none"> 2. Identify the concept of sampling technique 3. Describe about the charts and analysis 4. Discuss about the statistics analysis 5. Describe the various implementation
7		YCA307 STATISTICAL COMPUTING LABORATORY	<ol style="list-style-type: none"> 1. Practice the basic Computer generation of random numbers 2. Understand and apply set theory and Relations 3. Describe various counting and inclusion theory 4. Apply frequency charts for large data sets 5. Apply statistical package to perform factor analysis and tests of significance
1	IV	YCA401 NETWORK PROGRAMMING	<ol style="list-style-type: none"> 1. Describe various methods to define protocols and System Network Architecture 2. Understand and apply Socket Implementation 3. Describe and apply various Winsock programming 4. Describe and Apply Novel IPX/SPX 5. Understand Advanced programming applications.
2		YCA402 SOFTWARE ENGINEERING	<ol style="list-style-type: none"> 1. Describe various methods to define lifecycle models. 2. Understand and analyse the software inspections 3. Describe and apply various software tools 4. Describe and solve issues in modern GUI 5. Understand CASE tools and Software configuration management.
3		YCA403 ORGANIZATIONAL BEHAVIOUR	<ol style="list-style-type: none"> 1. Describe various methods to analyze Organizational phenomena. 2. Understand and apply interpersonal group processes 3. Describe and apply various structures and its functionalities 4. Describe and solve problems in organizational behaviors 5. Understand methodologies and its behaviors
4		YCA404 BM ELECTIVE I PRACTICAL- INVESTMENT TECHNOLOGY	<ol style="list-style-type: none"> 1. Describe various methods to define Logic and Predicate calculus 2. Understand and apply set theory and Relations

			3. Describe and apply various counting and inclusion theory 4. Describe and solve problems in graph theory 5. Understand Finite state Automata
5		YCA405 NETWORKS LAB	1. Manipulate various operation to define FSK/MSK Modem 2. Starts and apply Sliding Window protocols 3. Develop and implement Routing protocols 4. Develop and solve problems in Application standards 5. Build SNMP
6		YCA406 CASE TOOLS LAB	1. Manipulate various methods to define CASE tools 2. Developing Relational databases 3. Describe and implement various Application development tools 4. Describe and solve problems in developing application software 5. Developing Management tools
1	V	YCA501 ARTIFICIAL INTELLIGENCE AND APPLICATIONS	1. Describe various methods to define AI techniques 2. Understand and apply set theory and Relations 3. Describe and apply various counting and Predicate Logic 4. Describe and solve problems in Probabilistic reasoning 5. Understand Concept of learning the expert systems
2		YCA502 GRAPHICS AND MULTIMEDIA	1. Describe various methods to define line-drawing algorithms 2. Understand and apply 2d and 3d transformations 3. Describe and apply various types multimedia applications 4. Describe and solve problems in development tools 5. Understand hypermedia
3		YCA503 OPTIMIZATION TECHNIQUES	1. Describe various methods to define simplex method 2. Understand and apply branch and bound method. 3. Describe and apply various queuing theory

			<ol style="list-style-type: none"> Describe and solve problems in inventory theory Understand PERT and CPMpath.
4		YCA504 ARTIFICIAL INTELLIGENCE AND APPLICATIONS LAB	<ol style="list-style-type: none"> Manipulate various methods to define AI techniques Starts and apply set theory and Relations Develop and implement various counting and Predicate Logic Develop and solve problems in Probabilistic reasoning Build Concept of learning the expert systems
5		YCA505 OPTIMIZATION TECHNIQUES LAB	<ol style="list-style-type: none"> Manipulate various methods to define simplex method Starts and apply branch and bound method. Develop and implement various queuing theory Develop and solve problems in inventory theory
6		YCA506 INDUSTRIALS LECTURES	<ol style="list-style-type: none"> Identifying the Recent Technologies Preparing the content/Arranging the Seminar Attending the Lectures Implementing the Lectures Answer the Question
7		YCA507 SEMINAR	<ol style="list-style-type: none"> Identifying the Topic Preparing the content/Arranging the Seminar Presenting the content Addressing the Audience Answer the Question
8		YCA508 PROJECT	<ol style="list-style-type: none"> Practice the Requirements Analysis Create the Design for their project Create the Coding Plan for Testing Solve the Conclusion
1	VI	YCA601 SEMINAR	<ol style="list-style-type: none"> Identifying the Topic Preparing the content/Arranging the Seminar Presenting the content Addressing the Audience Answer the Question

2		YCA602 PROJECT	<ol style="list-style-type: none"> 1. Practice the Requirements Analysis 2. Create the Design for their project 3. Create the Coding 4. Plan for Testing 5. Solve the Conclusion
INFORMATION TECHNOLOGY ELECTIVES			
1	IV & V	YCAEE1 PROGRAMMING LANGUAGES AND PARADIGMS	<ol style="list-style-type: none"> 1. Explain the concept of programming languages and paradigms 2. Understand the concept of Expression Control 3. Describe various Procedural languages 4. Understand the Output-based languages 5. Understand the Functional languages
2		YCAEE2 VISUAL PROGRAMMING	<ol style="list-style-type: none"> 1. Explain the concept of Visual programming 2. Understand the concept of Structures and Programming Techniques 3. Understand the concept Object-Oriented programming 4. Understand the Object-oriented development tools 5. Understand the programming techniques
3		YCAEE3 COMPILER DESIGN	<ol style="list-style-type: none"> 1. Explain the concept of Compiler designing 2. Understand the concept of parser Theory 3. Understand the concept syntax analysis 4. Understand the handling techniques 5. Understand the code generation
4		YCAEE4 ADVANCED UNIX PROGRAMMING	<ol style="list-style-type: none"> 1. Describe various methods to define Advanced unix programming 2. Understand and apply processes and System calls 3. Describe and apply various Multiplexing 4. Describe and solve problems in IPC 5. Understand Advanced socket programming
5		YCAEE5 DISTRIBUTED DATABASE MANAGEMENT	<ol style="list-style-type: none"> 1. Describe various methods to define levels of distributed database design 2. Understand and apply time based and quorum based protocols 3. Describe and apply various types of protocols

			4. Describe and solve problems in distributed data dictionary management 5. Understand SQL server
6		YCAEE6 IMAGE PROCESSING	1. Describe the basics of digital image fundamentals. 2. Understand the classifications of Image Processing techniques. 3. Describe and apply various types of feature extraction techniques applicable for image vision. 4. Describe and solve problems in encoding images based on the concept of Fourier transforms. 5. Define the concept of filtering and Restorations.
7		YCAEE7 PARALLEL PROGRAMMING	1. Describe the basics of Parallel Programming techniques. 2. Understand the concept of Data dependency 3. Describe and apply various types of Performance analysis 4. Describe and solve problems in Parallel Programming 5. Understand the Methods for Applying in Programming parallel.
8		YCAEE8 SYSTEM ANALYSIS AND SIMULATION	1. Define Role of modeling 2. Describe Generation of Pseudo-Random Numbers 3. Outline the simulating queuing systems 4. Describe Simulation of Systems 5. Underst and Cases on Simulation
9		YCAEE9 MACHINE LEARNING	1. Understand the Fundamentals of Machine Learning 2. Understand comparison between Machine and Deep Learning 3. Understand concept of supervised and unsupervised machine learning 4. Understand Graphical models 5. Understand Regression
BUSINESS MANAGEMENT ELECTIVES			
1	V	YCABM1 MANAGERIAL ECONOMICS	1. Describe Nature and scope of managerial economics 2. Define and measure elasticity.

			3. Describe Product and cost analysis 4. Describe Production function 5. Understand product and profits
2		YCABM2 CORPORATE PLANNING	1. Describe various methods to define Corporate Planning and Budgeting 2. Understand and apply set Social Responsibilities 3. Describe and apply various Professionalism 4. Describe and solve problems in Mission and Purpose 5. Understand Concept of learning the Organisation Appraisal
3		YCABM3 FOUNDATIONS OF DECISION PROCESSES	1. Describe various methods to define role of decision making 2. Understand and apply game theory and competitive strategies 3. Describe and apply various queuing and inventory models 4. Describe and solve problems in Finance. 5. Understand Systematic problem analysis
4		YCABM4 INVESTMENT TECHNOLOGY	1. Describe various methods to define Source of investment information 2. Understand and apply set Interest Rates 3. Describe and apply various Shares and Valuation 4. Describe and solve problems in Portfolio Theory 5. Underst and Concept of learning the Mutual Funds.
5		YCABM5 BUSINESS FINANCE	1. Describe various methods to define financial and economic development 2. Understand and apply primary and secondary capital market 3. Describe and apply various managerial problems 4. Describe and solve problems in non-banking financial institutions 5. Underst and Credit rating information
6		YCABM6 TAXATION PRACTICES	1. Characterize various scheme of taxation 2. Discuss the various types of assessment 3. Describe the modes of recovery

			4. Describe and apply the wealth and health tax 5. Understand the issues state sales tax
7		YCABM7 MIS FRAMEWORKS AND IMPLEMENTATION	1. Describe variety of framework for identifying information technology 2. Discuss the benefits of IT 3. Describe the new strategic role of information system 4. Describe the business process reengineering 5. Discuss the managing IT function
8		YCABM8 MANAGEMENT OF SOFTWARE PROJECTS	1. Describe various methods to define Software projects 2. Understand and apply project scheduling and project management. 3. Describe and design system life cycle 4. Describe and solve problems related to the project 5. Understand and determine skill requirements
9		YCABM9 BLOCK CHAIN	1. Describe distributed database 2. Understand block chain network 3. Understand crypto currency and bit coin 4. Understand crypto currency regulation 5. Apply block chain applications

Programme and Course Outcomes of

DEPARTMENT OF SOFTWARE ENGINEERING

Programmes offered:

S.No.	Programme Name	PO and CO
1	M.Sc (Software Engineering)	Yes
2	B.Sc (Animation & Multimedia)	Yes
3	B.Sc (Computer Science)	Yes

1.a. M.Sc(Software Engineering) (5 Years Integrated) – Program Outcome

PROGRAMME OUTCOMES (PO's)	
PO 1	Apply the knowledge of mathematics, science and computer science for analyzing software related problems in order to solve complex software systems.
PO 2	Design, implement, verify, validate and maintain software systems to meet the desired needs of the society.
PO 3	Blend the existing principles, technologies and methodologies in the right proportion for the development of software products to afford innovative conclusions.
PO 4	Create, select and apply suitable state-of-the-art techniques, contemporary practices, modern development tool, software framework and programming language to solve complex software engineering problems.
PO 5	Recognize the impact of professional software solutions in the economical, societal and environmental perspective to exhibit the need for flexible adaptation.
PO 6	Understand the professional and ethical responsibility of a software engineer and to function as an individual or a team member/leader in the multi-disciplinary teams.
PO 7	Communicate and make presentations effectively on complex software developmental activities to other software related personnel / society and being able to understand / write effective reports and prepare software documentation.
PO 8	Apply the software development in interdisciplinary environments and recognize the need for independent and life-long learning to adapt to the technological transformation.
PROGRAMME SPECIFIC OUTCOME (PEO's)	
PSO1	Develop the software packages which follow the Software Engineering principles
PSO2	Design the professional dynamic websites with user friendly environment.

1.b. M.Sc(Software Engineering) (5 Years Integrated) – Course Outcome

S.NO	SEM	COURSE CODE & NAME	COS
1	I	XGL101 COMMUNICATION SKILLS IN ENGLISH	<p>CO1 Explain the process of communication and its types</p> <p>CO2 Recall various sounds and use it in proper context</p> <p>CO3 Organise meeting events and recording it constructively</p> <p>CO4 Adapt methods of framing questions and using punctuations</p> <p>CO5 Demonstrate the basic skills at the time of interview and presentations</p>
		XGL102A ARIVIAL TAMIL / / COMPREHENSIVE XGL102B ENGLISH	<p>CO1 Recognize(milahsk; fhZjy;) gy;NtW mwptpay; Jiw rhu;ej El;gq;fs;> fiyr; nrhy;yhf;f cj;jpfs; Nghd;wtw;iwj; jkpo;nkhop %yk; mwpe;Jnfhs;sy;.</p> <p>CO2 Choose (njupTnra;jy;) tlkhop Ntu;r; nrhw;fs;> Gtpapay;> epytpay; gw;wpg; goe;jkpo; ,yf;fpag;fs; %yk; mwpe;Jnfhs;sy;.</p> <p>CO3 Describe (tpsf;Fjy;) njhy;fhg;gpak; %yk; mwptpay; nra;jpfisczu;jy;.</p> <p>CO4 Apply (gad;gLj;Jjy;) gy;NtW fy;tpj; Jiw rhu;ej gpupTfs;> gy;NtW fy;tpj; Jiw rhu;ej gpupTfs; Fwpj;J njspTngwy;.</p> <p>CO5 Analyze (gFj;jy;)mwptpay; rpWfijfspd; Njhw;wk; kw;Wk; tsu;r;rp epiy ehlfq;fspd; gq;F Fwpj;J njspTngWjy;.</p>
		YSE103 COMPUTER FUNDAMENTALS	<p>CO1 Recognize the importance of computer system, application and practice in Libre Office (FOSS) Writer.</p> <p>CO2 Identify and define basic terms and concepts in computer hardware and peripheral devices and Libre Office (FOSS) Impress.</p> <p>CO3 Establish the relationship between hardware and software. Arrange data and Apply formula in Libre Office (FOSS) Calc.</p> <p>CO4 Identify the IO devices. Design database using Libre Office (FOSS) Base.</p> <p>CO5 Identify flowchart component and apply in program and design a project using Libre Office (FOSS).</p>
		YSE104 ALGEBRA, CALCULUS &	<p>CO1 Evaluate the derivatives of given functions</p> <p>CO2 Calculate the definite and indefinite integrals</p>

		ANALYTICAL GEOMETRY	using various techniques.
			CO3 Apply basic operations on matrices to find the inverse of a matrix
			CO4 Solve problems using Binomial, exponential and logarithmic series expansions.
			CO5 Calculate the distance between two points and explain section formulae, slope form and intercept form.
		YSE105 PROBLEM SOLVING USING C	CO1 Recognize the importance of the Structured Programming.
			CO2 Identify the needs of problem solving concepts.
			CO3 Demonstrate the usage of memory management and BeAware of the utilization of the dynamics memory allocation concepts in the real time application.
			CO4 Illustrate the concept of sorting & searching and Contribute more in the team work towards application development.
			CO5 Develop and Establish the application software in C language.
		XUM106 HUMAN ETHICS, VALUES, RIGHTS, AND GENDER EQUALITY	CO1 Relate and Interpret the human ethics and human relationships
			CO2 Explain and Apply gender issues, equality and violence against women
			CO3 Classify and Develop the identify of human rights and their violations
			CO4 Classifyand Dissect necessity of human rights and report on violations.
			CO5 List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
	II	XGL201 ENGLISH FOR EFFECTIVE COMMUNICATION	CO1 Ability to identify the features of a technical project report and Knowledge on the linguistic competence to write a technical report
			CO2 Ability to integrate both technical COURSE skill and language skill to write a project.
			CO3 Confidence to present a project in 10 to 15 minutes
			CO4 The learner identifies and absorbs the pronunciation of sounds in English Language and learns how to mark the stress in a word and in a sentence properly
			CO5 The program enables the speaker speaks clearly and fluently with confidence and it trains the learner to listen actively and

			critically.
		XES 202 ENVIRONMENTAL STUDIES	CO1 Describe the significance of natural resources and explain anthropogenic impacts. CO2 Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance. CO3 Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon CO4 Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development. CO5 The impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.
		YSE203 DISCRETE MATHEMATICS	CO1 Define the properties and laws of sets, relations and functions and Apply the operation of the sets using venn Diagram. CO2 Apply the concepts of logic and to find the normal forms. Explain the tautologies and Contradiction. CO3 Apply the counting principle permutation and combination and to solve the problem. Explain the pigeonhole principle. CO4 Explain the types of lattices and to show lattices as partially ordered sets. CO5 Apply the properties of semi groups and groups and Explain any set with binary operation as a semigroup and group with examples.
		YSE204 DATA STRUCTURES AND ALGORITHMS	CO1 Observe and Explain the concept of data structures and analysis of algorithms CO2 Choose the linear and non linear data structures for solving the problems CO3 Apply and Adapt appropriate C programming techniques such as pointers, dynamic memory allocation, structures to develop solutions for problems CO4 Assess appropriate abstract data types and algorithm techniques CO5 Build an application using algorithm design techniques
		YSE205 COMPUTER ORGANIZATION	CO1 Recognize the operation of functional units of a computer CO2 Describe the computational operation of hardware units associated with a computing

			device.
			CO3 Demonstrate the operation of processing unit.
			CO4 Compare the performance of different types of memory
			CO5 Recognize the operation of interfacing devices.
		YSE206 SOFTWARE ENGINEERING	CO1 Recognize the significance of entire Software Engineering process.
			CO2 Express the functionalities of Cost Estimation and Requirement Specification Techniques.
			CO3 Describe the concepts and guidelines of Software Design, Coding, Testing and Maintenance.
			CO4 Actively Participate in Choosing the appropriate techniques and methods for the real time applications as a team.
			CO5 Analyze the techniques used in the various stages of Software Engineering.
	III	YSE301 MULTIMEDIA SYSTEMS	CO1 Identify and describe the Multimedia components, various html tags, Image editing open source software tools
			CO2 Create webpage with necessary image document (text) and animation and practice in HTML.
			CO3 Gain a working knowledge and develop their skills in editing and altering photographs.
			CO4 Students can renovate the damaged photos. And export the files with various formats and printing devices.
			CO5 Students can draw and develop short clips and banners with animation using flash and create Audio files. Using html image editing and 2D animation software, can develop and deploy a complete web site in internet.
		YSE302 OPERATING SYSTEM	CO1 Identifying the functional architecture of an operating system.
			CO2 Ability to explain the best CPU scheduling algorithms and Calculate scheduling problems
			CO3 Ability to express various memory management techniques and calculate paging problems.
			CO4 Indicate the importance of file system various Operating Systems.
			CO5 Identifying the functional architecture of an operating system.

		YSE303	PROGRAMMING IN JAVA	CO1	Recognize the importance of the Object Oriented Programming.
				CO2	Identify and Achieve the Java Programming concepts and the relationships among them.
				CO3	Illustrate and practice the usage of Arrays, Interface and Packages and also BeAwareof the utilization of the concepts in the real time application.
				CO4	Demonstrate the concept of Multithreaded Programming and Exception Handling and Contribute more in the team work towards application development.
				CO5	Develop andMaintain the Java application software.
		YSE304	SOFTWARE DESIGN & ARCHITECTURE	CO1	Describe the aids of software Design in different stages of the software lifecycle
				CO2	Apply Unified modelling language to document software Design.
				CO3	Analyze, Apply and Evaluate design patterns to enhance the software quality.
				CO4	Design and understand software architecture for large scale software systems.
				CO5	Recognize major software architectural styles, and design patterns.
		XUM306	DISASTER MANAGEMENT	CO1	Understand and Recognizethe concepts of disaster
				CO2	Recognize and describe the causes and effects of disaster
				CO3	Describethe various approaches of risk reduction
				CO4	Demonstrate the inter-relationship between disaster and development
				CO5	Discuss hazard and vulnerability profile of India and respond to drills related to relief
				CO1	Recognize the significance of Python
				CO2	Express the knowledge on events and functions of Python
				CO3	Employ the understanding of the Python and Establish a application programme on their own and actively participate in the teams for designing various projects
	IV	YSE401	SOFTWARE PROJECT MANAGEMENT	CO1	Recognizeand Expressthe importance of project evaluation and planning.

			<p>CO2 Describe and Select the appropriate project approach and effort estimation techniques.</p> <p>CO3 Define and Defend the project activity planning and risk management.</p> <p>CO4 Describe and Classify the project monitoring, control and managing contracts.</p> <p>CO5 Define and Defend the managing people in software environments.</p>
		YSE402 DATA BASE MANAGEMENT SYSTEM	<p>CO1 Recognize and Express the fundamentals of Data Base Management System and Relational database system</p> <p>CO2 Recognize and Explain the Transaction Management and Storage implementation techniques</p> <p>CO3 Sketch and show the Relational data base design for the real time application.</p> <p>CO4 Analyze and Apply proper Relational data base queries</p> <p>CO5 Design and Construct an application with suitable form design and data base</p>
		YSE403 COMPUTER NETWORKS	<p>CO1 Recognize the importance of computer networks and explain the network models, media, layering.</p> <p>CO2 Describe the functionalities of layer and indicate the various network connecting devices.</p> <p>CO3 Demonstrate the unicast and multicast routing.</p> <p>CO4 Match and Show the protocol for real time applications.</p> <p>CO5 Analyze the protocols of application layer and Design a simple networks.</p>
		YSE404 . NET TECHNOLOGIES	<p>CO1 Recognize the basics of .net frame work</p> <p>CO2 Express and relate decision and iteration control structures to implement programs</p> <p>CO3 Predict and Create database connection and manipulate the data source</p> <p>CO4 Choose and Apply controls and reproduce well-structured .NET applications</p> <p>CO5 Construct and demonstrate various real-world applications in ASP.NET with C#</p>
		YSE405A ENTERPRISE RESOURCE PLANNING	<p>CO1 Identify the factors that lead to the development and implementation of ERP systems</p> <p>CO2 Discuss the advantages and disadvantages of implementing an ERP system</p>

			CO3	Describe how an integrated information system can support effective and efficient business processes
			CO4	Create process models that assist with process improvement and ERP implementation
			CO5	Study, analyze and Report future trends of ERP
		YSE405B E-COMMERCE	CO1	Recognize and Discuss the scope of e-commerce
			CO2	Sketch and Develop various Business strategies
			CO3	Survey and Identify the importance and future of e market and EDI
			CO4	Justify and Explain the usage of Internet in e-commerce and various types of e-commerce
			CO5	Practice and Perform Various on line transactions
		YSE405C DIGITAL IMAGE PROCESSING	CO1	Understand image formation and the role human visual system plays in perception of gray and color image data.
			CO2	Use of various applications of image processing in industry, medicine, and defense.
			CO3	Relate the signal processing algorithms and techniques in image enhancement and image restoration.
			CO4	Acquire an appreciation for the image processing issues and techniques and be able to apply these techniques to real world problems.
			CO5	Study independent study and analysis of image processing problems and techniques.
		MINOR COURSE MONGODB	CO1	Recognizethe basics of MongoDB ManagementSystem.
			CO2	Express the knowledge on Creating, Updating, DeletingQueryingIndexing, Aggregation and Replication
	V	YSE501 MOBILE ADHOC NETWORKS	CO1	Define the scenario of Mobile Ad hoc Networks in the world of Computer Networks.
			CO2	Classify the design issues and goals of MAC Protocols.
			CO3	Distinguish the Routing Protocols in the MANET.
			CO4	Compare the classifications of Multicast Protocols.
			CO5	Demonstratethe recent trends in the Wireless Networks.

		YSE502	OBJECT ORIENTED ANALYSIS AND DESIGN	CO1	Recognize the difference between various objects and their relationships
				CO2	Express and Choose appropriate notation associated with each model
				CO3	Design and Explain CASE TOOLS for the construction of UML Models
				CO4	Construct various UML Models
				CO5	Show the importance of System Analysis and Design in solving complex problems
		YSE503	WEB TECHNOLOGIES	CO1	Recognize the significance of Web Technology.
				CO2	Express the knowledge on HTML, CSS and JavaScript and PHP in Web Design.
				CO3	Employ the understanding of the Client and Server side scripts and actively participate in teams for the creation of static and dynamic web pages.
				CO4	Utilize the web designing tools effectively in the real world applications.
				CO5	Design and Establish the Website or Web based Software.
		YSE504	OPERATION RESEARCH	CO1	Explain the basic concepts of optimization and to formulate and Solve Linear programming problems.
				CO2	Explain and Apply the concepts of Transportation problem and Assignment Problem.
				CO3	Explain and Apply the concepts of sequencing problem
				CO4	Explain and Demonstrate the basic concepts of PERT-CPM and their applications in product planning control.
				CO5	Solve the Minimal Spanning Tree Problem, Shortest Route Problem.
		YSE505A	NETWORK PROTOCOLS	CO1	Recognize the foundations of Internet Protocol.
				CO2	Demonstrate the idea of bootstrap and auto configuration.
				CO3	Analyze the functions of file transfer protocol.
				CO4	Manipulate the issues involved in design of voice and video over IP.
				CO5	Control and maintain the internet security and firewall design.

		YSE505B	UNIX AND NETWORK PROGRAMMING	CO1	Recognize the basics of UNIX operating system
				CO2	Discuss various methods to handle signals and exceptions within a process and to control processes
				CO3	Describe how UNIX OS can support effective and efficient interprocess communication
				CO4	Compare the Characteristics of TCP and UDP sockets
				CO5	Create sockets to implement simple client server applications
		YSE505C	WIRELESS SENSOR NETWORK	CO1	Understand the basics of wireless sensor network.
				CO2	Demonstrate the idea behind in physical layer issues, medium Access control Protocols
				CO3	Analyze the network layer characteristics and protocols
				CO4	Indicate the transport layer issues and protocols.
				CO5	Control and maintain the network management and Middleware services
			ANGULAR JS	CO1	Recognize the fundamentals and techniques of Angular JS.
				CO2	Express the knowledge on Invoking, MVC, Validation, Communication over http, cookies and file upload in AngularJS
	VI	YSE601	REQUIREMENTS ENGINEERING	CO1	Identify the importance Graphics Interface.
				CO2	Interpret the understanding on Graphics Interface with various concepts and techniques.
				CO3	Understand the windows concepts and Interpret it in projects
				CO4	Clearly understand the Multimedia components and apply it in projects
				CO5	Understand and Distinguish the various Test and Software tools.
		YSE602	DATA WAREHOUSING AND DATA MINING	CO1	Analyze Multidimensional Intelligent model from typical system
				CO2	Evaluate various mining techniques on complex data objects
				CO3	Understand Data Mining processes using Open Source Data Mining tool.
				CO4	Choose the appropriate techniques and algorithms for extracting data
				CO5	Recognize the knowledge of data mining, data preprocessing and data warehousing

		YSE603	SOFTWARE METRICS	CO1	Recognize the fundamentals of measurement and experimentation
				CO2	Examine various methods of software metrics
				CO3	Differentiate software measurement data
				CO4	Demonstrate the various methods of software reliability
				CO5	Classify the possible tools to manage software metrics
		YSE604A	CLIENT SERVER COMPUTING	CO1	Understand the basics of client server computing
				CO2	Identify Client server architecture, elements and components of computer system. Analysis the performance of computer and efficiency of internal elements.
				CO3	Analyze the Database connectivity and support required for Client server system
				CO4	Recognize the application of client server Computing using Visual C++.
				CO5	Associate with Multiple document interface.
		YSE604B	XML AND WEB SERVICES	CO1	Identify the importance of XML and Web Services.
				CO2	Interpret the understanding on schemas and technologies of XML.
				CO3	Employ the suitable protocol for the development of the web services.
				CO4	Outline the architecture and technologies of Web Services.
				CO5	Distinguish the various methods of the XML Security.
		YSE604C	ADVANCED DATA BASE MANAGEMENT SYSTEMS	CO1	Recognize the basics architectures and distributed database concepts.
				CO2	Demonstrate features of relational and object oriented database.
				CO3	Analyze the different database and implement spatial database
				CO4	Differentiate various data models
				CO5	Examine the cloud database and Big data storage analytics
		YSE605A	PRINCIPLES OF MANAGEMENT	CO1	Recognize the significance of Management Principle.
				CO2	Express the understanding of the concept of planning the events in organization.

			<p>CO3 Employ the understanding of the various scheduling activities and actively participate in terms for the organizing of various events in organization.</p> <p>CO4 Utilize the directing effectively in the real world class room management.</p> <p>CO5 Design and Establish the principles of management concept in day to day activities.</p>
		YSE605B TOTAL QUALITY MANAGEMENT	<p>CO1 Explain the basic concepts of quality management with effective leadership.</p> <p>CO2 Describe and Identify the Continuous process improvement</p> <p>CO3 Relate and Use the old and new seven management tools for statistical process control</p> <p>CO4 Distinguish the concept of total productive Maintenance with Continuous process improvement.</p> <p>CO5 Explain the different methods ISO</p>
		YSE605C ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT	<p>CO1 Recognize and describe the personal traits of an entrepreneur.</p> <p>CO2 Determine the new venture ideas and analyze the feasibility report.</p> <p>CO3 Develop the business plan and analyze the plan as an individual or in team.</p> <p>CO4 Describe various parameters to be taken into consideration for launching and managing small business.</p> <p>CO5 Describe Technological management and Intellectual Property Rights</p>
	VIII	YSE801 SOFTWARE TESTING AND QUALITY ASSURANCE	<p>CO1 Recognize the software quality assurance plan</p> <p>CO2 Demonstrate the software Testing concepts.</p> <p>CO3 Analyze the different testing strategies and methods for test case design.</p> <p>CO4 Identify the levels of testing and management.</p> <p>CO5 Describe various test process.</p>
		YSE802 BIG DATA ANALYTICS USING R	<p>CO1 Analyze the HADOOP and Map Reduce technologies associated with big data analytics Explore on Big Data applications Using NOSQL, Pig and Hive</p> <p>CO2 Design efficient algorithms for mining the data from large volumes.</p> <p>CO3 Understand the fundamentals of various big data analysis techniques</p>

			CO4	Apply the big data analytic techniques for useful business applications.
			CO5	Relate to Workwith big data analytic platform
		YSE803 SOFTWARE PROJECT REPORTS PREPARATION	CO1	Recognize and Express various Types of communication and Documentation.
			CO2	Discuss and Practice the Characteristics and Elements of Spoken and Group Communication
			CO3	Discuss and Analyze the procedure to be followed in Group Communication
			CO4	Propose and Write various types of Letters, Resume, Proposals and Contracts
			CO5	Adapt and follow the appropriate Technology and Standardsfor documentation
		YSE804 MACHINE LEARNING ALGORITHMS	CO1	Understandthe supervised, unsupervised and semi-supervised learning
			CO2	Apply the apt machine learning strategy for any given problem
			CO3	Identifysupervised, unsupervised or semi-supervised learning algorithms for any given problem
			CO4	Recognizethe systems design that uses the appropriate graph models of machine learning
			CO5	Modifythe existing machine learning algorithms to improve classification efficiency
		YSE805A CLOUD COMPUTING	CO1	Recognize the importance of cloud computing behind all communications and day to day life activities.
			CO2	Express the functionalities of each cloud services and aware of the various cloud service providers
			CO3	Employthe understanding of the various scheduling activities and actively participate in terms for the creation of various cloud services.
			CO4	Utilize the cloud services tools effectively in the real world applications.
			CO5	Design and Establish the cloud services and cloud storage
		YSE805B PERVASIVE COMPUTING	CO1	Understand the basics of pervasive computing
			CO2	Design web based applications using XML, WAP and WML
			CO3	Apply the pervasive computing techniques for speech based applications

			CO4 Describe the PDA characteristics and standards CO5 Analyze the issues in the pervasive computing
		YSE805C ADVANCED COMPUTER ARCHITECTURE	CO1 Understand the basic and advanced level of architecture and elements of computer system CO2 Analysis the performance of computer and efficiency of internal elements. CO3 Identify multiprocessor architecture, elements and components of computer system. CO4 Recognize the application of microprocessor in different applications. CO5 Associate with modern architecture.
	IX	YSE901 MOBILE APPLICATION DEVELOPMENT	CO1 Recognize the significance of Android development CO2 Summarize the knowledge on java, xml with android and detect about the android development. CO3 Manipulate and utilize the layout, resources and user interface. CO4 To know about the database in android CO5 Design and test the android environment using exception handling, accessing the cloud data.
		YSE902 CYBER SECURITY	CO1 Describethethe importance of information systems and Classifythe threats and attacks in networks. CO2 DescribeandDefend the concepts of information security. CO3 Define and Defendthe project activity planning and risk management. CO4 Predict and Apply the appropriate biometric system for security. CO5 Identify and Apply the perfect law and Act in real life.
		YSE903 SOFTWARE RELIABILITY	CO1 Recognize the significance of Software Reliability. CO2 Express the knowledge on SDLC CO3 Estimate the understanding of Software Quality Management. CO4 Recognize the significance of Software Reliability Tools CO5 Express the knowledge on Software testing.

		YSE904	USABILITY ENGINEERING	CO1	Identify the importance of Software Reuse and its components
				CO2	Interpret the understanding of Design Patterns
				CO3	Clearly Understand the concepts of Structural Patterns
				CO4	Identify the various Behavioral Patterns and its functions
				CO5	Distinguish the various Architectural patterns.
		YSE905	INTERNET OF THINGS	CO1	Identify the components of IOT and learn the basic issues, policy and challenges in the Internet
				CO2	Design the portable device , program the sensors and microcontrollers
				CO3	Perceive the significance of building the software agents in the real time environments
				CO4	Formulate and Establish the cloud based communication through wifi/ Bluetooth
				CO5	Combine the needed internet resources and implement in the business model

2.a. B.Sc(Animation and Multimedia) – Program Outcome

At the time of graduation, competency of the student is measured through the attainment of programme outcomes. The quantification of programme outcomes attainment is measured through the assessment of established course outcomes for each course.

Graduates of the Three year B.Sc., Animation and Multimedia Programme will have attained the ability to

PROGRAMME OUTCOMES	
PO 1	Apply the fundamental broad-based skills in traditional and digital animation and multimedia techniques for illustrating, editing and manipulating images, audio and video.
PO 2	Design and develop animation projects to meet the desired needs and apply appropriate knowledge to evaluate the societal issues.
PO 3	Use the appropriate state-of-the-art tools and techniques to develop creative and innovative animations.
PO 4	Recognize the impact of animation and multimedia solutions in the economical, societal and environmental perspective to exhibit the need for flexible adaptation.
PO 5	Understand the professional and ethical responsibility of an effective animator and to function as an individual or a team member/leader in the multi-disciplinary teams.
PO 6	Communicate and make presentations effectively.
PO 7	Apply the technical knowledge in the interdisciplinary environments and recognize the need for independent and life-long learning to adapt to the technological transformation.
PROGRAMME SPECIFIC OUTCOME	
PSO1	Design tremendous 2-D or 3-D characters for an animated project.
PSO2	Develop excellent motion capturing movies.

2.b. B.Sc (Animation & Multimedia) – Course Outcome

S.NO	SEM	COURSE CODE & NAME	COS
1	I	XGL101 COMMUNICATION SKILLS IN ENGLISH	<p>CO1 Choose and identify different styles to various forms of public speaking skills and presentation skills.</p> <p>CO2 Understand and identify the proper tone of language required in writing and speaking.</p> <p>CO3 Adapting the speech structures and developing the speech outline.</p> <p>CO4 Ability to communicate and develop presentation skills.</p> <p>CO5 Calibrates the speaker to face the audience without any anxiety.</p>
		XAM102A ARIVIAL TAMIL / COMPREHENSIVE ENGLISH	<p>CO1 Recognize(milahsk; fhZjy;) gy;NtW mwptpay; Jiw rhu;ej El;qg;fs;> fiyr; nrhy;yhf;f cj;jpfs; Nghd;wtw;iwj; jkpo;nkhop %yk; mwpe;Jnfhs;sy;.</p> <p>CO2 Choose (njupTnra;jy;) tlkhop Ntu;r; nrhw;fs;> Gtpapay;> epytpay; gw;wpg; goe;jkpo; ,yf;fpaq;fs; %yk; mwpe;Jnfhs;sy;.</p> <p>CO3 Describe (tpsf;Fjy;) njhy;fhg;gpak; %yk; mwptpay; nra;jpfisczu;jy;.</p> <p>CO4 Apply (gad;gLj;Jy;) gy;NtW fy;tpj; Jiw rhu;ej; gpupTfs;> gy;NtW fy;tpj; Jiw rhu;ej; gpupTfs; Fwpj;J njspTngwy;.</p> <p>CO5 Analyze (gFj;jy;)mwptpay; rpWfijfspd; Njhw;wk; kw;Wk; tsu;r;rp epiy ehlfq;fspd; gq;F Fwpj; njspTngWjy;.</p>
		XAM103 ANIMATION ART	<p>CO1 Recognize the importance of animation.</p> <p>CO2 Demonstrate the character drawing.</p> <p>CO3 Analyze the storyboard and animatics.</p> <p>CO4 Formulate the frame by frame animation.</p> <p>CO5 Organize the animation special effects.</p>
		XAM104 PRINCIPLES OF ANIMATION	<p>CO1 Recognize the importance of drawing and the animation.</p> <p>CO2 Choose the methods to make the drawings for animation.</p> <p>CO3 Describe the stages of animation and achieve the knowledge on animation.</p> <p>CO4 Apply the body languages concepts in making animated characters.</p>

			CO5	Analyze the different actions to be performed by the character to make the realistic animation.
		XAM105 GRAPHICS DESIGN	CO1	Understand and recognize the Graphic Design concepts and its applications.
			CO2	Understand the elements of design and Apply it to produce own shapes and color design.
			CO3	Understand the principles of design and Apply it to develop a page for Website and print media.
			CO4	Understand the poster design concepts and develop posters for advertisement and academic poster presentation.
			CO5	Understand and equip themselves for self-employment and develop Presentation and Communication Skills.
		XUM106 HUMAN ETHICS, VALUES, RIGHTS, AND GENDER EQUALITY	CO1	Relate and Interpret the human ethics and human relationships.
			CO2	Explain and Apply gender issues, equality and violence against women.
			CO3	Classify and Develop the identify of human rights and their violations
			CO4	ClassifyandDissect necessity of human rights and report on violations.
			CO5	List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
	II	XGL201 ENGLISH FOR EFFECTIVE COMMUNICATION	CO1	Ability to identify the features of a technical project report and Knowledge on the linguistic competence to write a technical report
			CO2	Ability to integrate both technical COURSE skill and language skill to write a project.
			CO3	Confidence to present a project in 10 to 15 minutes
			CO4	The learner identifies and absorbs the pronunciation of sounds in English Language and learns how to mark the stress in a word and in a sentence properly
			CO5	The program enables the speaker speaks clearly and fluently with confidence and it trains the learner to listen actively and critically.
		XES 202 ENVIRONMENTAL STUDIES	CO1	Describethe significance of natural resources and explain anthropogenic impacts.
			CO2	Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles

			for maintaining ecological balance.
			CO3 identify the facts, consequences, preventive measures of major pollutionsand recognize the disaster phenomenon
			CO4 Explain the socio-economic, policy dynamics andpractice the control measures of global issues for sustainable development.
			CO5 Recognize the impact of population and the concept of various welfare programs, and applythetmodern technology towards environmental protection.
		XAM203 DIGITAL ART AND DESIGNING	CO1 Recognize the concept of design principles. CO2 Sketch an art using different tools. CO3 Examine various perspectives of drawing. CO4 Describe the various methods of drawings. CO5 Design a fine art using appropriate properties and methodologies.
		XAM204 DIGITAL PHOTOGRAPHY	CO1 Recognize the concept of Photography. CO2 Know an art using different type of photography. CO3 Examine various digital image and processing. CO4 Describe the various methods of image retouching CO5 Design a photo story for visualization.
		XAM205 VISUAL DESIGN	CO1 Recognize the visual effects basics and its types. CO2 Summarize and Classify the fluid and fire effects with other effects. CO3 Comparing the paint effects and liquid effects with other effects. CO4 Implementing and applying special effects with Visual Effects. CO5 Experimenting and checking the visual effects in 2D and 3D effects.
		XAM301 DIGITAL IMAGING SKILLS	CO1 Describe and Express basic concepts in Digital imaging. CO2 Identify and Interpretfundamentals of image file formats. CO3 Compose and Formulatedigital image production CO4 Identify and Explain the common image production

			CO5	Initiate and Organize a colour image processing and compression.
		XAM301 CHARACTER ENVIRONMENT SKETCHING	CO1	Recognize the significance of Pencil Drawing.
			CO2	Express the different ways of line drawing perspective in Pencil drawing.
			CO3	Employ the understanding of the lights in Pencil drawing.
			CO4	Utilize the various shading methods effectively in making the realistic drawings.
			CO5	Design and Draw the drawings using different types of pencils.
		XAM303 AUDIO AND VIDEO EDITING	CO1	Recognize the basics and objectives of editing.
			CO2	Discuss the various types of editing.
			CO3	Explain 2D and 3D graphics.
			CO4	Classify various elements of audio.
			CO5	Describe the procedure for format conversion.
		XAM304 2D ANIMATION	CO1	Recognize the significance of 2D Animation.
			CO2	Summarize the knowledge on animation software and detect about the animation software.
			CO3	Manipulate the symbols and text to animate, and identify and tested the animated symbols and text.
			CO4	Know about the action script used in animation software.
			CO5	Design and test the animation in web.
		XAM305 MOTION GRAPHICS	CO1	Define and describe the scope of the motion graphics industry.
			CO2	Demonstrate unique characteristics motion graphics as conveyed by design principles such as form, legibility and context.
			CO3	Manipulate the symbols and text to animate, and identify and tested the animated symbols and text.
			CO4	Know about the action script used in animation software.
			CO5	Design and test the animation in web.
		XUM306 DISASTER MANAGEMENT	CO1	Understand and Recognize the concepts of disaster
			CO2	Recognize and describe the causes and effects of disaster

			CO3 Describe the various approaches of risk reduction CO4 Demonstrate the inter-relationship between disaster and development CO5 Discuss hazard and vulnerability profile of India and respond to drills related to relief
	IV	XAM01 IMAGE EDITING SKILLS	CO1 Identify and describe the concept & objectives of Editing and software tools available. CO2 Create new images using various effective tools using software packages. CO3 Develop their Knowledge and skills in image editing. CO4 Renovate the damaged images files and export the files in various formats. CO5 Create GIF animation, Business card, Advertisement Banner, Poster Presentation Banner.
		XAM402 COMPOSITING TECHNIQUES	CO1 Recognize the basic concepts of logical effects. CO2 Select the various techniques to create an effective scene. CO3 Examine various color correction and image optimization. CO4 Classify the various unreal effects. CO5 Analyze a right motion tracking tools to produce an effective scene.
		XAM403 BASICS OF CLAY MODELING	CO1 Recognize how the study of clay relates to animation disciplines. CO2 Relate knowledge of the character design in clay materials and process. CO3 Interpret design principles in their individual projects. CO4 Establish using clay modeling to build basic shapes. CO5 Apply techniques for working in stop motion animation.
		XAM404 FUNDAMENTALS OF CINIMATOGRAPHY	CO1 Describe and Express basic concepts in photography. CO2 Identify and Interpret fundamentals of cinematography. CO3 Compose and Formulate various photographs and videos CO4 Identify and Explain the responsibilities of crew members in a camera department.

			CO5	Initiate and Organize a screen play and shoot a short film.
	V	XAM501 WEB DESIGN	CO1	Recognize the significance of Web Technology.
			CO2	Express the knowledge on HTML, CSS and JavaScript in Web Design.
			CO3	Employ the understanding of the Client side scripts and actively participate in teams for the creation of web pages.
			CO4	Utilize the web designing tools effectively in the real world applications.
			CO5	Design and Establish the Website.
		XAM502A 3D MODELLING	CO1	Understand the definition of Computer Based Animation and Modeling. Experiment with the geometrical 2D and 3D shapes.
			CO2	Understand and Apply 2D modeling in simple objects with lines and connect with compound objects.
			CO3	Design 3D modeling with 3d objects.
			CO4	Identify different types of lighting and cameras and Apply in real world application.
			CO5	Creating and Applying standard materials, adding material details with maps, creating compound materials.
		XAM502A MOTION CAPTURING	CO1	Recognize the importance of Mocap.
			CO2	Demonstrate the 3D character.
			CO3	Analyze the retargeting and skeletal editing.
			CO4	Formulate the composing and decomposing motions.
			CO5	Organize the hand and facial motion capture.
		XAM503A SCRIPT WRITING STORY BOARD DESIGNING	CO1	Recognize the significance of Script writing.
			CO2	Express the different ways of Story preparation in Script.
			CO3	Employ the understanding of the Writing skills in Story board designing.
			CO4	Utilize the various advertising methods effectively in making the realistic shooting spot.
			CO5	Design and Draw the story board writing using different types of subjects.
		XAM503B RIGGING, LIGHTING & RENDERING	CO1	Describe and Express basic concepts in Rigging
			CO2	Identify and Interpret animating neck and head.

			<p>CO3 Compose and Formulate various lighting techniques.</p> <p>CO4 Identify and Explain the various camera techniques.</p> <p>CO5 Initiate and Organize rendering for output.</p>
		XAM504 MEDIA TECHNOLOGIES	<p>CO1 Recognize the concept of media production and the process and technically know-how.</p> <p>CO2 Illustrate and communicate ideas in the form of production in various media.</p> <p>CO3 Create and communicate ideas visually in the form of media.</p> <p>CO4 Understand the basic of production in print, radio, television and internet media.</p> <p>CO5 Examine the basic knowledge about media production.</p>
		XAM601 DIGITAL TELEVISION PRODUCTION	<p>CO1 Recognize about the digital media.</p> <p>CO2 Summarize the shooting progress</p> <p>CO3 Identify the editing and sharing in movies.</p> <p>CO4 Implementing the advanced in movies.</p> <p>CO5 Experimenting the movie maker tools to create the quality in movies.</p>
		XAM602 3D ANIMATION	<p>CO1 Recognize the significance of 3D animation basics.</p> <p>CO2 Observe and Express the knowledge on using different modeling techniques in designing 3D animation.</p> <p>CO3 Listen and Employ the animated objects and manipulate rigging the objects.</p> <p>CO4 Utilize texturing methods to improve the designing character for the realistic applications.</p> <p>CO5 Design and Establish the lighting, shadow and camera for shading the surface and improve the performance by using dynamics.</p>
		XAM603A FILM MAKING	<p>CO1 Observe the basics of Animation and Perceive the process of Film Making.</p> <p>CO2 Interpret the knowledge on Pre Production activity.</p> <p>CO3 Employ the understanding of Production activity</p> <p>CO4 Utilize the awareness of Post Production activity and Achieve the good quality in the Pre Production, Production and Post Production of Film Making.</p>

			CO5	Contribute more actions in Designing the Animated Movie.
		XAM603B ROTOSCOPING	CO1	Describe and Express basic concepts in Rotoscoping.
			CO2	Identify and Interpret Key framing Technique.
			CO3	Compose and Formulate various Object mode transforms
			CO4	Identify and Explain the Tracking and Roto methods
			CO5	Control and maintain the network management and Middleware services
		XAM604A GAMES DEVELOPMENT	CO1	Identify the basic principles, concepts and process of gaming
			CO2	Identify all the components of a game and their functions.
			CO3	Demonstrate their competency by building game using Blender and Python
			CO4	Explain the basic of production process for the game
			CO5	Formulate with the concepts, tools and techniques for working in game design and development
		XAM604B TEXTURING AND SHADING	CO1	Recognize the significance of Light colour.
			CO2	Express the different ways light types for shading
			CO3	Employ the understanding of the lights and shadows.
			CO4	Utilize the various texturing methods.
			CO5	Design and Draw the 3D Projections

3.a. B.Sc (Computer Science) – Program Outcome

At the time of graduation, competency of the student is measured through the attainment of programme outcomes. The quantification of programme outcomes attainment is measured through the assessment of established course outcomes for each course.

Graduates of the B.Sc. Computer Science programme will have attained the ability to

PROGRAMME OUTCOMES	
PO 1	Identify and analyze the acquainted or unacquainted real time issues and afford solution using the necessary computing, mathematical and basic science skill set.
PO 2	Design and develop algorithms for providing an appropriate solution to gratify the industrial and social needs.
PO 3	Express ideas and thoughts effectively to the team members and customers through written and oral communication.
PO 4	Work jointly with different team members in order to complete the agreed work in time.
PO 5	Inspire and guide the team members using management skills to achieve the target in an efficient and smooth way.
PO 6	Provide a remarkable impact on the society by contributing resolutions to social issues with the awareness of ethical responsibility by discriminating ethical & unethical behaviors and understanding human, professional values & responsibilities.
PO 7	Utilize computer literacy in the learning and working places and self-adapt with the changing environment by participating in learning activities throughout the life.
PROGRAMME SPECIFIC OUTCOME	
PSO1	Provide the professional user friendly interface with the help of state-of-the-art tools and Technologies.
PSO2	Design the interactive & responsive web based and mobile applications.

3.b. B.Sc (Computer Science) – Course Outcome

S.NO	SEM	COURSE CODE AND NAME	COS
1	I	XGL101 COMMUNICATION SKILLS IN ENGLISH	<p>CO1 Explain the process of communication and its types</p> <p>CO2 Recall various sounds and use it in proper context</p> <p>CO3 Organise meeting events and recording it constructively</p> <p>CO4 Adapt methods of framing questions and using punctuations</p> <p>CO5 Demonstrate the basic skills at the time of interview and presentations</p>
		XGL10A / XGL10B ARIVIAL TAMIL / COMPREHENSIVE ENGLISH	<p>CO1 Recognize(milahsk; fhZjy;) gy;NtW mwptpay; Jiw rhu;ej El;gq;fs;> fiyr; nrhy;yhf;f cj;jpfs; Nghd;wtw;iwj; jkpo;nkhop %yk; mwpe;Jnfhs;sy;.</p> <p>CO2 Choose (njupTnra;jy;) tlkhop Ntu;r; nrhw;fs;> Gtpapay;> epytpay; gw;wpg; goe;jkpo; ,yf;fpaq;fs; %yk; mwpe;Jnfhs;sy;.</p> <p>CO3 Describe (tpsf;Fjy;) njhy;fhg;gpak; %yk; mwptpay; nra;jpfisczu;jy;.</p> <p>CO4 Apply (gad;gLj;Jy;) gy;NtW fy;tpj; Jiw rhu;ej gpupTfs;> gy;NtW fy;tpj; Jiw rhu;ej gpupTfs; Fwpj;J njspTngwy;.</p> <p>CO5 Analyze (gFj;jy;)mwptpay; rpWfijfspd; Njhw;wk; kw;Wk; tsu;r;rp epiy ehlfq;fspd; gq;F Fwpj;J njspTngWjy;.</p>
		XBC103 COMPUTER FUNDAMENTALS	<p>CO1 Recognize the importance of computer system, application and practice in Libre Office (FOSS) Writer.</p> <p>CO2 Identify and define basic terms and concepts in computer hardware and peripheral devices and Libre Office (FOSS) Impress.</p> <p>CO3 Establish the relationship between hardware and software. Arrange data and Apply formula in Libre Office (FOSS) Calc.</p> <p>CO4 Identify the IO devices. Design database using Libre Office (FOSS) Base.</p> <p>CO5 Identify flowchart component and apply in program and design a project using Libre Office (FOSS).</p>

		XBC104	ALGEBRA, CALCULUS & ANALYTICAL GEOMETRY	CO1	Evaluate the derivatives of given functions
				CO2	Calculate the definite and indefinite integrals using various techniques.
				CO3	Apply basic operations on matrices to find the inverse of a matrix
				CO4	Solve problems using Binomial, exponential and logarithmic series expansions.
				CO5	Calculate the distance between two points and explain section formulae, slope form and intercept form.
		XBC105	PROBLEM SOLVING USING C	CO1	Recognize the importance of the Structured Programming.
				CO2	Identify the needs of problem solving concepts.
				CO3	Demonstrate the usage of memory management and BeAware of the utilization of the dynamics memory allocation concepts in the real time application.
				CO4	Illustrate the concept of sorting & searching and Contribute more in the team work towards application development.
				CO5	Develop and Establish the application software in C language.
		XUM106	HUMAN ETHICS, VALUES, RIGHTS, AND GENDER EQUALITY	CO1	Relate and Interpret the human ethics and human relationships
				CO2	Explain and Apply gender issues, equality and violence against women
				CO3	Classify and Develop the identify of human rights and their violations
				CO4	Classifyand Dissect necessity of human rights and report on violations.
				CO5	List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
	II	XGL201	ENGLISH FOR EFFECTIVE COMMUNICATION	CO1	Ability to identify the features of a technical project report and Knowledge on the linguistic competence to write a technical report

			<p>CO2 Ability to integrate both technical COURSE skill and language skill to write a project.</p> <p>CO3 Confidence to present a project in 10 to 15 minutes</p> <p>CO4 The learner identifies and absorbs the pronunciation of sounds in English Language and learns how to mark the stress in a word and in a sentence properly</p> <p>CO5 The program enables the speaker speaks clearly and fluently with confidence and it trains the learner to listen actively and critically.</p>
		<p>XES 202</p> <p>ENVIRONMENTAL STUDIES</p>	<p>CO1 Describe the significance of natural resources and explain anthropogenic impacts.</p> <p>CO2 Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.</p> <p>CO3 Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon</p> <p>CO4 Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development.</p> <p>CO5 the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.</p>
		<p>XBC203 PROGRAMMING IN C++</p>	<p>CO1 Recognize the importance of object oriented programming</p> <p>CO2 Memorize the knowledge of data abstraction, encapsulation and inheritance.</p> <p>CO3 Develop the solution to the Complex problems.</p> <p>CO4 Implement good programming design methods for program development.</p> <p>CO5 Recognize the consequence of exception handling.</p>
		<p>XBC204 DISCRETE MATHEMATICS</p>	<p>CO1 Define the properties and laws of sets, relations and functions and Apply the operation of the sets using venn Diagram.</p>

			<p>CO2 Apply the concepts of logic and to find the normal forms. Explain the tautologies and Contradiction.</p> <p>CO3 Apply the counting principle permutation and combination and to solve the problem. Explain the pigeonhole principle.</p> <p>CO4 Explain the types of lattices and to show lattices as partially ordered sets.</p> <p>CO5 Apply the properties of semi groups and groups and Explain any set with binary operation as a semigroup and group with examples.</p>
		XBC205 COMPUTER ARCHITECTURE	<p>CO1 Recognize the operation of functional units of a computer</p> <p>CO2 Describe the computational operation of hardware units associated with a computing device.</p> <p>CO3 Demonstrate the operation of processing unit.</p> <p>CO4 Compare the performance of different types of memory</p> <p>CO5 Recognize the operation of interfacing devices.</p>
		XBC206 DIGITAL ELECTRONICS	<p>CO1 Know the numerical values in various number systems and perform number conversions between different number systems.</p> <p>CO2 Demonstrate the operation of logic gates, Boolean algebra including algebraic manipulation/simplification, application of DeMorgan's theorems and Karnaugh map reduction method.</p> <p>CO3 Identify, Analyze and Design combinational circuits</p> <p>CO4 Analyze and Design sequential digital circuits like flip-flops, registers, counters</p> <p>CO5 Explain the architecture of the Intel 8085 microprocessor for its various applications and Understand 8085 instruction set and develop simple programmes and practice</p>

III	XBC301	MULTIMEDIA SYSTEMS	<p>CO1 Identify and describe the Multimedia components, various html tags, Image editing open source software tools</p> <p>CO2 Create webpage with necessary image document (text) and animation and practice in HTML.</p> <p>CO3 Gain a working knowledge and develop their skills in editing and altering photographs.</p> <p>CO4 Students can renovate the damaged photos. And export the files with various formats and printing devices.</p> <p>CO5 Students can draw and develop short clips and banners with animation using flash and create Audio files. Using html image editing and 2D animation software, can develop and deploy a complete web site in internet.</p>
	XBC302	OPERATING SYSTEM	<p>CO1 Identifying the functional architecture of an operating system.</p> <p>CO2 Ability to explain the best CPU scheduling algorithms and Calculate scheduling problems</p> <p>CO3 Ability to express various memory management techniques and calculate paging problems.</p> <p>CO4 Indicate the importance of file system various Operating Systems.</p> <p>CO5 Classify functionality I/O system of an operating system</p>
	XBC303	PROGRAMMING IN JAVA	<p>CO1 Recognize the importance of the Object Oriented Programming.</p> <p>CO2 Identify and Achieve the Java Programming concepts and the relationships among them.</p> <p>CO3 Illustrate and practice the usage of Arrays, Interface and Packages and also BeAwareof the utilization of the concepts in the real time application.</p> <p>CO4 Demonstrate the concept of Multithreaded Programming and Exception Handling and Contribute more in the team work towards application development.</p> <p>CO5 Develop andMaintain the Java application software.</p>
	XBC304	ALLIED PHYSICS	<p>CO1 State the basics of laser and distinguish the various laser systems and identify various optical fiber and source and detector.</p>

			CO2 Recall the semiconductor fundamentals and Explaincharacterization and applications. CO3 Know the basics of operational amplifier and Constructvarious oscillators Explain various applications CO4 Understand the digital and gate principles distinguish Boolean algebra from algebra. CO5 Know the basics of IC's understandthe fabrication methods of IC's
		XUM306 DISASTER MANAGEMENT	CO1 Understand and Recognizethe concepts of disaster CO2 Recognize and describe the causes and effects of disaster CO3 Describethe various approaches of risk reduction CO4 Demonstrate the inter-relationship between disaster and development CO5 Discuss hazard and vulnerability profile of India and respond to drills related to relief
		MINOR R PROGRAMMING COURSE	CO1 Recognize the significance of R CO2 Express the knowledge on events and functions of R CO3 Employ the understanding of the R and Establish a application programme on their own and actively participate in the teams for designing various projects
	IV	XBC401 OPEN SOURCE SOFTWARE	CO1 Recognize the terminologies and licensing factors of Open Source Software CO2 Express the significance of Open Source Software CO3 Employ the understanding of Open Source Software and actively participate in teams for the development of open source software projects CO4 Utilize the open source tools effectively in the real world applications. CO5 Design the Open Source Web applications

		XBC402 DATA STRUCTURES AND ALGORITHMS	CO1 Explains the concept of data structures and analysis of algorithms CO2 Choose the linear and non linear data structures CO3 Apply advance C programming techniques such as pointers, dynamic memory allocation, structures to developing solutions for particular problems CO4 Analyse, evaluate appropriate abstract data types and algorithm techniques to solve particular problems CO5 Build an application using algorithm design techniques
		XBC403 COMPUTER NETWORKS	CO1 Recognize the importance of computer networks and explain the network models, media, layering. CO2 Describe the functionalities of layer and indicate the various network connecting devices. CO3 Demonstrate the unicast and multicast routing. CO4 Match and Show the protocol for real time applications. CO5 Analyze the protocols of application layer and Design a simple networks.
		XBC404 . NET TECHNOLOGIES	CO1 Recognize the basics of .net frame work CO2 Express and relate decision and iteration control structures to implement programs CO3 Predict and Create database connection and manipulate the data source CO4 Choose and Apply controls and reproduce well-structured .NET applications CO5 Construct and demonstrate various real-world applications in ASP.NET with C#
		XBC405A PRINCIPLES OF MANAGEMENT	CO1 Recognize the significance of Management Principle. CO2 Express the understanding of the concept of planning the events in organization.

			<p>CO3 Employ the understanding of the various scheduling activities and actively participate in terms for the organizing of various events in organization.</p> <p>CO4 Utilize the directing effectively in the real world class room management.</p> <p>CO5 Design and Establish the principles of management concept in day to day activities.</p>
		XBC405B TOTAL QUALITY MANAGEMENT	<p>CO1 List and Explain the basic concepts of total quality concepts and its limitations.</p> <p>CO2 Analyze and Explain the Customer satisfaction, Employee involvement, supplier selection and appraise the performance by TQM principle.</p> <p>CO3 Explain and Apply the Statistical Process Control Tools.</p> <p>CO4 Select and Explain the different TQM tools and their significance</p> <p>CO5 Explain the importance aspects of different quality systems.</p>
		XBC405C E-COMMERCE	<p>CO1 Recognize and Discuss the scope of e-commerce</p> <p>CO2 Sketch and Develop various Business strategies</p> <p>CO3 Survey and Identify the importance and future of e market and EDI</p> <p>CO4 Justify and Explain the usage of Internet in e-commerce and various types of e-commerce</p> <p>CO5 Practice and Perform Various on line transactions</p>
		MINOR COURSE PYTHON PROGRAMMING	<p>CO1 Recognize the significance of Python</p> <p>CO2 Express the knowledge on events and functions of Python</p> <p>CO3 Employ the understanding of the Python and Establish a application programme on their own and actively participate in the teams for designing various projects</p>

V	XBC501	SOFTWARE ENGINEERING	CO1 Recognize the significance of entire Software Engineering process. CO2 Express the functionalities of Cost Estimation and Requirement Specification Techniques. CO3 Describe the concepts and guidelines of Software Design, Coding, Testing and Maintenance. CO4 Actively Participate in Choosing the appropriate techniques and methods for the real time applications as a team. CO5 Analyze the techniques used in the various stages of Software Engineering.
	XBC502	DATA BASE MANAGEMENT SYSTEM	CO1 Recognize and Express the fundamentals of Data Base Management System and Relational database system CO2 Recognize and Explain the Transaction Management and Storage implementation techniques CO3 Sketch and show the Relational data base design for the real time application. CO4 Analyze and Apply proper Relational data base queries CO5 Design and Construct an application with suitable form design and data base
	XBC503	DATA WAREHOUSING AND DATAMINING	CO1 Analyze Multidimensional Intelligent model from typical system CO2 Evaluate various mining techniques on complex data objects CO3 Understand Data Mining processes using Open Source Data Mining tool. CO4 Choose the appropriate techniques and algorithms for extracting data CO5 Recognize the knowledge of data mining, data preprocessing and data warehousing
	XBC504	FUNDAMENTALS OF STATISTICS	CO1 CO1: Explain the statistical data in the form of table, diagram and graph. CO2 CO2: Find the measures of central tendency and measures of dispersion and skewness for the given data. CO3 CO3: Evaluate correlation coefficient using Karl Pearson's and find the regression line for the given data. CO4 CO4: Solve the problem in the time series using the method of seasonal variation and find the interpolation using Newtons and Lagranges method.

			CO5	Find the index number using aggregative, relative and cost of living index number method. Define the sampling technique and Apply the concept of test of significance for t, f and chi-square.
		XBC505A COMPUTER GRAPHICS	CO1	State the basics of graphics and identify how they can be used in computer.
			CO2	Recall and distinguish the various 2-D Geometrical transforms and their applications.
			CO3	Explain the basic elements of 3-D Object representation, and identify various 3D transformation techniques
			CO4	Know about visible surface detection methods
			CO5	Construct various computer animation methods and choose animation for an application.
		XBC505B DIGITAL IMAGE PROCESSING	CO1	Understand image formation and the role human visual system plays in perception of gray and color image data.
			CO2	Use of various applications of image processing in industry, medicine, and defense.
			CO3	Relate the signal processing algorithms and techniques in image enhancement and image restoration.
			CO4	Acquire an appreciation for the image processing issues and techniques and be able to apply these techniques to real world problems.
			CO5	Study independent study and analysis of image processing problems and techniques.
		XBC505C GAME PROGRAMMING	CO1	Describe the concepts of Game design and development.
			CO2	Explain the processes, and use mechanics for game development.
			CO3	Express the Core architectures of Game Programming.
			CO4	Use Game programming platforms, frame works and engines.
			CO5	Create interactive Games.
		MINOR COURSE ANGULAR JS	CO1	Recognizethe fundamentals and techniques of Angular JS.
			CO2	Express the knowledge on Invoking, MVC, Validation, Communication over http, cookies and file upload in Angular JS

	VI	XBC601	CLOUD COMPUTING	CO1	Recognize the importance of cloud computing behind all communications and day to day life activities.
				CO2	Express the functionalities of each cloud services and aware of the various cloud service providers
				CO3	Employ the understanding of the various scheduling activities and actively participate in terms for the creation of various cloud services.
				CO4	Utilize the cloud services tools effectively in the real world applications.
				CO5	Design and Establish the cloud services and cloud storage
		XBC602	WEB TECHNOLOGIES	CO1	Recognize the significance of Web Technology.
				CO2	Express the knowledge on HTML, CSS and JavaScript and PHP in Web Design.
				CO3	Employ the understanding of the Client and Server side scripts and actively participate in teams for the creation of static and dynamic web pages.
				CO4	Utilize the web designing tools effectively in the real world applications.
				CO5	Design and Establish the Website or Web based Software.
		XBC603	ETHICAL HACKING	CO1	Recognize the significance of HACKING.
				CO2	Express the knowledge on information gathering and post scanning techniques
				CO3	Employ the understanding of the vulnerability assessment participate in teams for the network sniffing
				CO4	Utilize the exploitation technique effectively in the real world applications.
				CO5	Design and Establish the wireless & web hacking.
		XBC604A	INTERNET OF THINGS	CO1	Identify the components of IOT and learn the basic issues, policy and challenges in the Internet
				CO2	Design the portable device , program the sensors and microcontrollers
				CO3	Perceive the significance of building the software agents in the real time environments
				CO4	Formulate and Establish the cloud based communication through wifi/ Bluetooth
				CO5	Combine the needed internet resources and implement in the business model

		XBC604B CLIENT SERVER COMPUTING	CO1 Understand the basics of client server computing CO2 Identify Client server architecture, elements and components of computer system. Analysis the performance of computer and efficiency of internal elements. CO3 Analyzethe Database connectivity and support required for Client server system CO4 Recognizethe application of client server computing using Visual C++. CO5 Associatewith Multiple document interface.
		XBC604C ARTIFICIAL INTELLIGENCE	CO1 Identify problems that are amenable to solution by AI methods CO2 Identify appropriate AI methods to solve a given problem. CO3 Apply the given problem in the language/framework of different AI methods. CO4 Implementbasic AI algorithms. CO5 Designand carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusions that the evaluation supports.
		XBC605A SOFTWARE TESTING AND QUALITY ASSURANCE	CO1 Recognize the software quality assurance plan CO2 Demonstrate the software Testing concepts. CO3 Analyze the different testing strategies and methods for test case design. CO4 Identify the levels of testing and management. CO5 Describe various test process.
		XBC605B SYSTEM ANALYSIS AND DESIGN	CO1 Define data information and system CO2 To explain the role of information system CO3 To understand the prototypes CO4 To express the elements of design CO5 To design the computer output
		XBC605C MANAGEMENT INFORMATION SYSTEM	CO1 Recognize the fundamentals of Information Systems CO2 Identify the impact of information systems in organizations CO3 RepresentIT infrastructure and database approach CO4 GeneralizeTelecommunications and Networking in Today's Business World CO5 Choose the suitable Business and Technology for E-Commerce

Programme and Course Outcomes of
DEPARTMENT OF CHEMISTRY

Programmes offered:

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

B.Sc - Chemistry

PROGRAMME OUTCOME (PO)	
PO1	Understand how scientific and mathematical knowledge continually evolve and that is Course to change.
PO2	Identify and apply universal chemical laws to the problem.
PO3	Communicate effectively (written /oral) and work effectively as an individual or team.
PO4	Understand the impact and ethics of scientific discoveries on influencing society locally and globally.
PO5	Work effectively in bringing multidisciplinary ideas to diverse professional environment.
PO6	Find, collect and assess scientific-based information - its relevance and reliability.
PO7	Design and perform experiments and thereby analyze and interpret data.
PO8	Use techniques, tools and skills necessary for emerging technologies.

COs

S.NO	SEMESTER	COURSE CODE & NAME	COs
I	I	XGL101 COMMUNICATION SKILLS IN ENGLISH	<ol style="list-style-type: none"> 1. Explain the process of communication and its types. 2. Recall various sounds and use it improper context. 3. Organise meeting events and recording it constructively. 4. Adapt methods of framing questions and using punctuations. 5. Demonstrate the basic skills at the time of interview and presentations
2		XMG 103 ALGEBRA, TRIGONOMETRY AND TRANSFORM	<ol style="list-style-type: none"> 1. Find the roots of the polynomials equations with real coefficients. Explain the transformation of equation and to solve the reciprocal equation using Newton's method. 2. Find eigen values and eigen vectors of the matrices and Apply Cayley Hamilton theorem to find the inverse of a matrix. 3. Expand the trigonometric functions, hyperbolic and inverse hyperbolic functions and to find the series of trigonometric functions. 4. Find the Laplace transforms and inverse Laplace transforms of standard functions and to find the Laplace transforms of $tf(t)$, $f(t)/t$ and derivatives. 5. Apply Laplace transforms to solve the differential equations of first and second order and to find Fourier series of a functions.
3		XCY104 FUNDAMENTAL CONCEPTS OF CHEMISTRY	<ol style="list-style-type: none"> 1. Explain the principle of atomic structure and basics of quantum mechanisim. 2. Describe the periodic properties of various elements. 3. Interpret IUPAC nomenclature of compounds. 4. Describe the physical properties of dipole moment, polarizability and magnetic properties. 5. Apply and Identify the various analytical methods for quantitative analysis.
4		XCY105 INORGANIC CHEMISTRY I	<ol style="list-style-type: none"> 1. Recall and Explain the basic concepts of ionic bonding; Display the shapes of simple inorganic molecules using VSEPR theory

			<ol style="list-style-type: none"> Summarize and Report extraction, properties and uses of I A and IIA group s-block elements. Explain the extraction and purification process of various metals and Interpret their physical and chemical properties. Describe the concept of acids and bases and the application of various concepts. Identify the various radioactive process and their consequences.
5		XUM 106 HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY	<ol style="list-style-type: none"> Relate and Interpret the human ethics and humanrelationships. Explain and Apply gender issues, equality andviolence against women. Classify and Develop the identify of women issuesand challenges. Classifyand Dissect human rights and report on violations.List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
6		XCY107 VOLUMETRIC ANALYSIS PRACTICAL I	<ol style="list-style-type: none"> Identify the various Metals in the solution. Estimate the amount of acids using volumetric method. Estimate the amount of bases using volumetric method.
7	II	XGL201 ENGLISH FOR EFFECTIVE COMMUNICATION	<ol style="list-style-type: none"> Define and Describe how to make effective speeches academically and in social situations. Identify the forms of language used in different speeches and how to listen actively and critically. Produce the proper tone of language required in writing and speaking in Business communication. Initializing Values, Display knowledge on grammar and other linguistic features in writing various forms of business communication. Comprehend and prepare how to write business reports, minutes, Proposals etc.
8		XES 202ENVIRONMENTAL STUDIES	<ol style="list-style-type: none"> Describe the significance of natural resources and explain anthropogenic impacts.

			<ol style="list-style-type: none"> 2. Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance. 3. Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon. 4. Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development. 5. Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.
9		XMG203 CALCULUS AND DIFFERENTIAL EQUATIONS	<ol style="list-style-type: none"> 1. Compute radius of curvature, centre of curvature and circle of curvature. Change the order of integration and to compute the double integral. Apply double to find the area between curves. 2. Use Beta and Gamma function computing the multiple integrals and explain the relation between them. 3. Solve the linear homogeneous and non-homogeneous differential equation with constant and variable coefficients. 4. Define general, complete and particular solutions and to solve standard forms of partial differential equations. 5. Compute gradient, divergence and curl of vectors. Apply theorem to evaluate line, surface and volume integral.
10		XCY204 ORGANIC CHEMISTRY I	<ol style="list-style-type: none"> 1. Explain the preparation, properties and applications of alkenes, alkynes and their derivatives. 2. Describe the preparation with mechanism, properties and applications of alcohols, ethers and their derivatives. Estimate hydroxy and alkoxy groups. 3. Explain the preparation with mechanism, properties and naming reactions of aldehydes, ketones & carboxylic acid and their derivatives. 4. Describe the concepts of covalent bonding and explain the structure of hybridization. 5. Apply and Identify the various stereo chemical concepts.

11		XCY205 PHYSICAL CHEMISTRY I	<ol style="list-style-type: none"> 1. Classify the types of Molecular velocity of gases and kinetic theory of gases; Derivevanderwaals equation of real gases. 2. Apply and Identify the structure and properties of solid state. 3. Apply and Identify the structure and properties of liquid crystals and colloids. 4. Describe the concepts of colloidal state and explain the types of Emulsions. 5. Identify the principles of chemical equilibrium and explain the theory behind the catalysis.
12		XCY 206 VOLUMETRIC ANALYSIS PRACTICAL-II	<ol style="list-style-type: none"> 1. Identify the various Metals in the solution. 2. Estimate the amount of metal ions using volumetric method by using various internal and external indicators. 3. Estimate the amount of metal ions in terms of complex by complex metric titrations using volumetric method.
13	III	XCY301 WATER QUALITY ANALYSIS	<ol style="list-style-type: none"> 1. Ensure the quantity and quality of water with respect to standards and their relation to public health. 2. Identify the sources of water and illustrate the water transport and distribution 3. Classify the cycles of decomposition of sewage and Examine the characteristics of sewage 4. Describe the function and principles of various water and waste water treatment units. 5. Select the disposal methods for sewage and classify the different treatment methods for sludge.
14		XPG302 FUNDAMENTAL PHYSICS	<ol style="list-style-type: none"> 1. Recall and Explain the basic principle simple harmonic motion and circular motion. 2. Understand the properties of sound, reverberation time and methods of production of ultrasonic waves. 3. Understand and determine Young's modulus, rigidity modulus, viscosity and explain surface tension and excess pressure inside a drop. 4. Recall the basic concepts and basic laws of thermal physics and determine the thermal conductivity of a bad conductor and solar constant.

			4. Acquire knowledge on interference, diffraction; be able to determine wavelength of mercury source; understand LASER action and production; propagation of fibre optics.
45		XCY303 INORGANIC CHEMISTRY II	<ol style="list-style-type: none"> 1. Explain the various compounds of halogens and carbon. 2. Describe the properties structure of per acids. 3. Recognize the general characteristics and properties of transition elements. 4. Identify the general characteristics and properties of Lanthanides and Actinides. 5. Apply and Identify the various properties and bonding of organo metallic compounds.
16		XCY304 ORGANIC CHEMISTRY II	<ol style="list-style-type: none"> 1. Explain the principle of atomic structure and its substitution reaction. 2. Describe the phenol, ethers and aryl halides reactions with some naming reactions. 3. Identify the compounds of amines and diazonium salts. 4. Recognise the various structures of amino acids, peptides and proteins. 5. Describe the general properties of carbohydrates.
17		XPG 305 FUNDAMENTAL PHYSICS PRACTICAL	<ol style="list-style-type: none"> 1. Recall the usage of laboratory instruments and measure the Young's modulus of Non – uniform pendulum. 2. Explain and demonstrate the behavior of rigidity modulus of a wire. 3. Manipulate and measure the thickness of a thin wire using Air wedge. 4. Compare and explain the Calibration of voltmeter 5. Describe the Band gap of the semiconductor.
18		XUM306 DISASTER MANAGEMENT	<ol style="list-style-type: none"> 1. Understanding the concepts of application of types of disaster preparedness. 2. Infer the end conditions Discuss the failures 3. Understanding of importance of seismic waves occurring globally.

			<ol style="list-style-type: none"> 4. Estimate Disaster and mitigation problems. 5. Keen knowledge on essentials of risk reduction.
19		XCY307 SEMIMICRO INORGANIC QUALITATIVE ANALYSIS PRACTICAL III	<ol style="list-style-type: none"> 1. Ability to Identify the ions in a given Inorganic mixture. 2. Analyse the individual cautions and anions present in a given mixture and explain the characteristic properties of cations. 3. Use the principle behind the analysis of ions.
4.	IV	XCY401 PHARMACEUTICAL CHEMISTRY	<ol style="list-style-type: none"> 1. Explain the basic concepts and aims of pharmaceutical chemistry 2. Identify the role of drugs and its preparation. 3. Describe the antibiotics role pharmaceuticals in our life. 4. Recognise fermentation aerobic and anaerobic fermentation in daily process. 5. Describe the important medicinal plant and its actions.
20		XCY402 MODERN PHYSICS	<ol style="list-style-type: none"> 1. Define, explain Atom models and Demonstrate Franck and Hertz method; discuss the phenomenon of Excitation and ionization potentials. 2. Acquire solid knowledge of crystal Analyze number of atoms, atomic radius coordination number in crystal structure and determine d spacing in cubic lattice using Miller indices. 3. Understand elementary particle, explain radioactive decay and fission, fusion. 4. Identify the basics of electric field, magnetic field, explain Ampere's circuital law and Faraday's law. 5. Understand the fundamental phenomena in electronics and describe the working principle and application of IC's.
21		XCY403 PHYSICAL CHEMISTRY II	<ol style="list-style-type: none"> 1. Explain the principle thermodynamics and its laws applications. 2. Apply the rate and its half-life for the chemical reactions. 3. Describe the various concepts and laws of solutions. 4. Identify the various component system and its equilibrium.

			5. Describe the basic concepts in electro chemistry and application of conductance and for finding the emf of the cell.
22		XCY404 INORGANIC CHEMISTRY III	<ol style="list-style-type: none"> 1. Identify the stability of complexes and its isomerism. 2. Describe the various bonding and theories of metal and ligands. 3. Apply the concept of stability in metal carbonyls and understand the principle of complex metric titrations. 4. Identify the role of alkali, alkaline earth and transition metals in bio inorganic chemistry. 5. Describe the properties and applications of silicones and zeolites.
23		XPH405 MODERN PHYSICS PRACTICAL	<ol style="list-style-type: none"> 1. Recall the usage of laboratory instruments and measure the young's modules of uniform bending. 2. Explain and demonstrate the thermal conductivity of bad conductor. 3. Manipulate and measure resistance and specific resistance of a wire. 4. Compare and explain the calibration of ammeter. 5. Describe the characteristics of the semi conductor diode.
24		XCY406 INORGANIC QUANTITATIVE ANALYSIS PRACTICAL IV	<ol style="list-style-type: none"> 1. Ability to Identify the various inorganic complexes. 2. Analyse the quantity of individual metal present in a given mixture and explain the characteristic properties of the complexes. 3. Use the principle behind the gravimetric analysis.
25		XCY501 CLINICAL CHEMISTRY	<ol style="list-style-type: none"> 1. Identify the mechanism of different types of metabolism. 2. Explain the important concepts of various techniques used in clinical chemistry. 3. Analyse the various molecular entities known as vitamins and nutrition values. 4. Interpret the methods of testing of various organs of body and the diagnostic roles of related enzymes. 5. Illustrate the various methods for cardiac profile, glucose and cholesterol estimation.

26		XCY502A PHYTOCHEMISTRY	<ol style="list-style-type: none"> 1. Identify new biologically important molecular components from natural origin. 2. Explain various steps in isolation and separation of plant extracts from natural sources. 3. Analyse the various molecular entities in the plant extracts using various spectral and solvent extraction methods. 4. Interpret the mode of action of various drugs extracted from herbals. 5. Illustrate the structure- functional activities of various herbs to make attempt to cure challengeable disease.
27		XCY502B FORENSIC SCIENCE	<ol style="list-style-type: none"> 1. Identify the methods of analyzing trace amounts of petroleum products in crime scene evidence. 2. Explain the method of searching, collecting, preserving and analyzing arson evidence 3. Analyse the various types of explosives, including the synthesis and characterization of representative analogs and the techniques of locating hidden explosives. 4. Interpret the importance of chromatographic and spectroscopic techniques in processing crime scene evidence. 5. Illustrate the significance of microscopy in visualizing trace evidence and comparing it with control samples.
28		XCY503A ANALYTICAL METHODS IN CHEMISTRY	<ol style="list-style-type: none"> 1. Identify the concepts of qualitative and quantitative analysis and also to find out the errors, accuracy and precision in data analysis. 2. Explain the principles and methods of analyzing chemical compounds with the help of various spectroscopies. 3. Analyse the various types of thermal methods of analysis including TGA, DTA, DSC etc. 4. Interpret the importance of electro analytical techniques in analysis of different parameters of chemical compounds and solutions. 5. Illustrate the significance of separation techniques in visualizing trace elements and comparing it with control samples.

29		XCY503B AGRICULTURAL CHEMISTRY	<ol style="list-style-type: none"> 1. Identify the chemical composition and soils of the earth's crust. 2. Explain the concept of soil fertility, soil productivity and application of various types of fertilizers 3. Analyse the various types of radioisotopes in soil and plants. 4. Interpret the importance of remote sensing and GIS techniques in agriculture. 5. Illustrate the significance of Analysis of soil extracts, nutrients, plants extracts and irrigation waters and interpretation of results.
30		XCY504A COMPUTER APPLICATIONS IN CHEMISTRY	<ol style="list-style-type: none"> 1. Identify the components and formats of computer operations. 2. Explain the elements, operators, programming of basic language. 3. Analyse the various types of Numerical methods for roots of equations and simultaneous equation. 4. Interpret the importance of remote sensing and GIS techniques in agriculture. 5. Illustrate the significance of molecular modeling and data handling.
31		XCY504B PROGRAMMING IN C	<ol style="list-style-type: none"> 1. Identify simple applications in C using basic constructs 2. Explain the design and implement applications using arrays and strings 3. Analyse the development and implementation applications in C using functions and pointers 4. Interpret the importance of structures in developing applications in C. 5. Illustrate the designing of applications using sequential and random access file processing.
32		XCY505 ORGANIC QUALITATIVE ANALYSIS PRACTICAL VA	<ol style="list-style-type: none"> 1. Identify the monofunctional groups in various types of organic compound. 2. Estimate the extra elements in a combination of two or more organic compounds. 3. Estimate the R_f value by separating the mixtures of organic compounds by chromatography and effect of different parameters on amino acids and carbohydrates.

33		XCY506 PHYSICAL CHEMISTRY PRACTICAL VB	<ol style="list-style-type: none"> 1. Identify the surface tension of liquid or a detergent solution. 2. Estimate the viscosity of liquid and its variation with respect to concentration of a solute. 3. Estimate the kinetics of different reactions using Initial rate method and Integrated rate method.
34		XCY601 RENEWABLE ENERGY	<ol style="list-style-type: none"> 1. Describe the reserves of renewable energy and demand of energy needs. methodologies / technologies for effective utilization of renewable energy sources. 2. Explain the methodology to harness solar energy and its applications. 3. Examine the potential of wind energy and its techniques. 4. Recognize the significance of bio energy generation. 5. Interpret the effective technology of various renewable energy resources.
35		XCY602A INDUSTRIAL CHEMISTRY	<ol style="list-style-type: none"> 1. Describe the utilization of the raw materials in chemical industry. 2. Explain the manufacturing process of cement, ceramics, glass and fertilizers. 3. Recognize the technologies used in small scale chemical industries. 4. Interpret the various toxic chemicals used in agro industries and synthesis of sugar 5. Examine the various pollutants and gain awareness about industrial pollution.
36		XCY602B MATERIAL CHEMISTRY	<ol style="list-style-type: none"> 1. Explain the basic concept of Structure of matter and their various properties. 2. Recall the laws and rules in the diffusion and phase behavior of materials. 3. Recognize the significance of mechanical and electrical properties of materials. 4. Describe the importance of magnetic, optical and thermal properties of materials. 5. Interpret the various techniques used in the characterization of materials.
37		XCY603B POLYMER CHEMISTRY	<ol style="list-style-type: none"> 1. Explain the chemistry of polymerization. 2. Describe the preparation of individual polymers. 3. Interpret their physical properties of polymers and explain the molecular weight and size of polymers.

			<ol style="list-style-type: none"> 4. Recognize the polymerization techniques and Classify the uses of polymers. 5. Summarize the processing of polymers.
38		XCY604 ORGANIC QUALITATIVE ANALYSIS PRACTICAL VI	<ol style="list-style-type: none"> 1. Identify the various Metals in the present in the given organic mixture and analyses the respective groups. 2. Estimate the amount of acids using volumetric method the fundamentals of group separation and chemical reaction takes place in the confirmation test. 3. Estimate the amount of bases using volumetric method and Interpret the results and differentiate the various groups and cations/ aniond present in the mixture.
39		XCY605 PHYSICAL CHEMISTRY PRACTICAL VIA	<ol style="list-style-type: none"> 1. Determine the molecular weight and critical solution temperature. 2. Estimate relative strength of acids and partial coefficient. 3. Interpret the electrochemistry and thermo chemistry titrations and examine the complex metric titration.

M.Sc Chemistry (Regulation 2018)

PROGRAMME OUTCOME (PO)	
PO1	Understand how scientific and mathematical knowledge continually evolve and that is Course to change.
PO2	Identify and apply universal chemical laws to the problem.
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PO4	Understand the impact and ethics of scientific discoveries on influencing society locally and globally.
PO5	Work effectively in bringing multidisciplinary ideas to diverse professional environment.
PO6	Find, collect and assess scientific-based information - its relevance and liability.
PO7	Design and perform experiments and thereby analyse and interpret data.
PO8	Use techniques, tools and skills necessary for emerging technologies.

COs

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	YCY101 ORGANICCHEMISTRY I	<ol style="list-style-type: none">1. Recognize the various basic concepts of aromaticity.2. Identify the oxidation and reducing reagents for organic synthesis.3. Describe and give examples of stereochemistry of organic compounds.4. Recognize the effect of light in organic reactions and understand the mechanism of photochemistry.5. Recall and explain the mechanism of per cyclic reactions.
2		YCY102 INORGANIC CHEMISTRY I	<ol style="list-style-type: none">1. Describe the basic concepts of main group elements.2. Explain the reactions of coordination compounds and estimate the physical constants of the reactions.3. Summarize the theories and bonding nature of coordination compounds.4. Identify and understand the reaction mechanism of four and six coordinated compounds.5. Rewrite the basic concepts of photochemistry and its applications to coordinated compounds.
3		YCY103 PHYSICALCHEMISTRY I	<ol style="list-style-type: none">1. Identify the basic concept of Electrochemistry and related laws.2. Describe the theories of classical mechanics and quantum mechanics of a microscopic particles and predict the energy of the particles.3. Recognize the various theories of chemical kinetics of reactions.4. Explain the fundamentals of thermodynamic and Label the various thermodynamic parameters.5. Generalized the photo physical properties of Chemical reactions.
4		YCY104 INORGANIC CHEMISTRY PRACTICALI	<ol style="list-style-type: none">1. Recognize the chemical reaction takes place in the separation of inorganic mixture and in the colorimetric experiment and relate the results.2. Identify the various cations present in the given mixture and estimate the amount of metal ion present in the whole of the given solution by calorimetrically.

			3. Interpret the results and labels the various specific metal ions present in the given solution.
5		YCY105 PHYSICAL CHEMISTRY PRACTICAL I	<ol style="list-style-type: none"> 1. Describe the definition and significance of physical parameters like rate constant, activation energy, order and various laws and also relate the results. 2. Estimate the physical parameters of the reactions and explain the relation between these parameters. 3. Interpret the results and recognize the relation of physical parameters and its significance in the reaction.SS
6	II	YCY201 INORGANIC CHEMISTRY II	<ol style="list-style-type: none"> 1. Recall and Explain the basic concepts of structure and bonding of organo metallic compounds; Display the geometries of organo metallic molecules using 18 electron rule. 2. Summarize and Report reaction mechanism of inorganic and organo metallic compounds. 3. Explain the physical and chemical properties of carbenes and Interpret the mechanism of their chemical reactions. 4. Describe the principles of bioinorganic Chemistry and the application of various concepts. 5. Identify the various metalloenzymes/ metalloporphyrins and their chemical properties.
7		YCY202 PHYSICAL CHEMISTRY II	<ol style="list-style-type: none"> 1. Explain the various symmetry elements and symmetry operations 2. Describe the physical aspects of molecular spectroscopy and interaction of electromagnetic radiation with monoatomic and diatomic molecules. 3. Interpret third law of thermodynamics and thermodynamic properties of real gases 4. Describe the principle of dynamics of electron transfer and electro deposition of metals. 5. Apply and Identify the various concepts of adsorption and free energy reaction at inter phase.
8		YCY203 INORGANIC PRACTICAL II	<ol style="list-style-type: none"> 1. Identify the various Metals ions in the solution using volumetric method.

			<ol style="list-style-type: none"> 2. Estimate the amount of Metal ions present in solution using gravimetric method. 3. Synthesis of various inorganic compounds.
9		YCY204 PHYSICAL PRACTICAL II	<ol style="list-style-type: none"> 1. Identify the strength of various types of solutions using conductometric method. 2. Estimate the dissociation constants of acids using conductometric method. 3. Estimate the dissociation constants, solubility and activity coefficients of various ions using potentiometric method.
10		YCY205A SOLID STATE CHEMISTRY I A	<ol style="list-style-type: none"> 1. Explain the concepts of crystal structure and basics of crystal engineering of organic solids. 2. Summarize and Report the chemical properties of Metallo organic frameworks and their applications. 3. Interpret various methods for preparation and crystallization of solids. 4. Describe the magnetic and optical properties of inorganic solids. 5. Apply and Identify the various concepts of solid state chemistry with respect to organic solids.
11		YEC205B SUPRAMOLECULAR CHEMISTRY IB	<ol style="list-style-type: none"> 1. Recall and Explain the basic concepts of supramolecular chemistry; Display the synthons based interactions and polymorphism. 2. Summarize and Report the chemical properties of Metallo organic frameworks and their applications. 3. Explain the concepts of co-receptor molecules and multiple recognition. 4. Describe the reactivity of supramolecular compounds and the mechanism of catalysis. 5. Identify the applications of various supramolecular compounds.
12		YCY301 ORGANIC CHEMISTRY II	<ol style="list-style-type: none"> 1. Recall and summarize the nucleophilic substitution reactions of aliphatic and aromatic compounds. 2. Outline the reaction mechanism of electrophilic substitution reactions and

			<p>explain the structure and orientation of the substituted products.</p> <ol style="list-style-type: none"> Identify the reagents of various rearrangement reaction and illustrate the mechanism of the addition and elimination reactions. Recognize and Interpret the preparation and properties of various heterocyclic compounds Understand and Examine the structural components of various of natural products.
13		YCY302 PHYSICAL METHODS IN CHEMISTRY I	<ol style="list-style-type: none"> Explain the basic principles of molecular spectroscopy. Relate the fundamentals of NMR spectroscopy and interpret the NMR spectra of organic compounds. Explain the principles of UV, and IR spectroscopy & Identify the IR and UV active organic compounds Apply the techniques of ESR, ORD and Mass spectroscopy of organic compounds. Examine the X-ray, electron, neutron diffractions of simple compounds.
14		YCY303 ORGANIC CHEMISTRY PRACTICAL I	<ol style="list-style-type: none"> Interpret the individual organic components present in the given organic mixture. Estimate the melting point/boiling point of the synthesized compounds /individual component present in the mixture. Predict the nature of functional group present in the given mixture.
15		YEC304A PHARMACEUTICAL CHEMISTRY	<ol style="list-style-type: none"> Recall the various terminology of pharmaceutical chemistry. Outline the structural aspects of antibiotics and relate their functions.. Illustrate the biological activities of analgesic and antipyretics. Summarize the activities of anaesthetics and local anaesthetics. Inference the various concepts of clinical chemistry.
16		YCY304B ELECTRO-ORGANIC CHEMISTRY	<ol style="list-style-type: none"> Describe the basic concepts of electron transfer reactions and also the fundamentals aspects of electrochemical methods.

			<ol style="list-style-type: none"> 2. Illustrate the structure and activity of enzymes and cofactors. 3. Identify the properties of lipids and nucleic acids. 4. Summarize the concept of bioenergetics. 5. Compare the principles of lead and analogue synthesis.
17		YCY305 ANALYTICAL CHEMISTRY	<ol style="list-style-type: none"> 1. Describe the basic principle of instrumental Methods. 2. Classify the various types of analytical error and show their significance. 3. Inspect the application of various techniques in chromatography. 4. Illustrate the principles and instrumentation of thermo analytical and fluorescence techniques. 5. 5.Examine the concept of electro analytical techniques.
18		YCY401 PHYSICAL METHODS IN CHEMISTRY-II	<ol style="list-style-type: none"> 1. Recall and Explain the electronic spectroscopy of metal complexes. 2. 2.Interpret the IR and Raman spectra of inorganic compounds 3. 3.Identify the chemical environment of NMR active nuclei present in the inorganic compounds 4. Analyze EPR, and magnetic properties the mechanism of metal complexes. 5. Compare the Mossbauer spectra of iron and tin compounds.
19		YCY402 ORGANIC CHEMISTRY PRACTICAL-II	<ol style="list-style-type: none"> 1. Identify the various functional groups presenting mixture of two components. 2. Predict the organic component presenting the mixture by pilot separation, bulk separation. 3. Experiments with various reagents and identify the components.
20		YEC403A GREENCHEMISTRY	<ol style="list-style-type: none"> 1. Recall and Explain the concepts of green chemistry and their principles. 2. Summarize and Report the addition and condensation reactions along with their applications. 3. Explain the oxidation-reduction reactions and Identify the mechanism of these chemical reactions. 4. Categorize the various types of the polymers

			5. Examine the principles of nuclear chemistry
21		YEC403B INDUSTRIAL CHEMISTRY	<ol style="list-style-type: none"> 1. Illustrate the basic ideas of an industry and industrial wastes. 2. Rephrase and Report the preparation and properties of petroleum and petrochemicals. 3. Identify the role and functions of portland cement. 4. List the various process involved in the paper Industry. 5. Outline the preparation and mode of action of soaps, detergents and perfumes.
22		YEC404A SELECTED TOPICS IN CHEMISTRY	<ol style="list-style-type: none"> 1. Rephrase the quantum chemical approach to chemical bonding. 2. Compare the role of various reagents used in organic synthesis. 3. Apply the retro-synthetic approach in the synthesis of complex organic molecules. 4. Categorize the types of polymer reactions. 5. Illustrate the principles of nuclear chemistry.
23		YEC404B CHEMISTRY OF NANOSCIENCE AND NANOTECHNOLOGY	<ol style="list-style-type: none"> 1. Outline the synthetic methods of nanomaterials. 2. Compare the properties and characterization of nanomaterials. 3. Predict the reactions of nanoparticles 4. Classify the applications of carbon clusters and nanostructures. 5. List the role and significance of nanoparticles in nanodevice.

**Programme and Course Outcomes of
DEPARTMENT OF COMMERCE**

Programmes offered:

S.No.	Programme Name	PO and CO
1	B.Com (Hons)	Yes
2	B.Com	Yes
3	M.Com	Yes

1. B.Com (Hons)

PROGRAMME OUTCOME (PO)	
PO1	Knowledge of Business and Commerce
PO2	Knowledge and ability to pursue professional programmes, namely, CA, CMA, ACS etc.
PO3	Ability to identify problems and collect relevant data
PO4	Ability to understand and use modern tools and technologies.
PO5	Understanding the impact of commercial activities on environment and sustainability.
PO6	Apply ethical principles in business and commerce
PO7	Ability to effectively communicate in business environment.
PO8	Ability to perform effectively as a leader as well as a member of a team
PO9	Ability to engage in lifelong learning

B.Com (Hons) - Course Outcomes

S.NO	SEMESTER	COURSE CODE AND NAME	COURSE OUTCOMES
1	I	XGL101-COMMUNICATION SKILLS IN ENGLISH	CO1: Cog: K: Choose and identify different styles to various forms of public speaking skills and presentation skills. CO2: Cog: K,U: Understand and identify the proper tone of language required in writing and speaking. CO3: Psy: A: Adapting the speech structures and developing the speech outline. CO4: Aff: R: Ability to communicate and develop presentation skills. CO5: Psy: R:Calibrates the speaker to face the audience without any anxiety.
2	I	XCO102 - FINANCIAL ACCOUNTING	CO1: Cog: U, Acquiretheoretical knowledge on accounting and preparation of final accounting CO2: Cog: Ap, Preparebank reconciliation statement and to identifyand rectify errors. CO3: Cog: Ap, Calculate depreciation on fixed assets CO4: Cog: An: Compare and contrast and solve single entry to double entry system. CO5: Cog: Ap, Prepareaccounts for Non-Profit Organizations.
3	I	XCO103-MANAGEMENT PRINCIPLES AND APPLICATIONS	CO1: Cog: (U),(Eva), Summarize the nature, process and importance of business management.Compare and contrast the contributions of Indian and InternationalManagementThinkers. CO2: Cog: (U), Discuss the process and types of planning and decision making. CO3: Cog: (An),(U) Distinguish the concepts of authority,responsibility and accountability, centralization and decentralization; and Organization structure. Explain the process of staffing. CO4: Aff: (Val), Defined the significance of motivation citing the theories of Maslow, Herzberg, McGregor, OuchiandDavid McClelland CO5: Aff: (Org), Display different leadership style appropriate to the situation and communicate effectively. CO6: Cog: (U), (Creating), Explain the strategies of effective managerial control system. Propose a model to carryout the process of change management.

4	I	XCO104-GENERAL ECONOMICS	<p>CO1:Cog:(Un) Explain micro, macro and other economic systems.</p> <p>CO2:Cog:(An)Analyze the cost concepts through cost curves.</p> <p>CO3:Cog:(An)Distinguish different types of markets.</p> <p>CO4:Cog:(An)Understand Indian Tax structure, their composition and shares in Indian budget.</p> <p>CO5:Cog:(Un)SummarizeLiberalization, Privatization & Globalization and Balance of Payments</p>
5	I	XCO105-BUSINESS LAWS	<p>CO1: Cog: U, Psy (Com), Explainessentials of Contract, performance and breach of Contract under Indian Contract Act 1872.</p> <p>CO2: Cog: U, Psy (Com), Interpret necessary formalities of contract of sale and rights of unpaid seller under the Sale of Goods Act 1930.</p> <p>CO3: Cog: U, Illustrate the objectives of Consumer Protection Act and jurisdiction of Consumer Protection Councils</p> <p>CO4: Cog: Ana, Differentiate between LLP and Partnership, LLP and Company under The Limited Liability Partnership Act, 2008.</p> <p>CO5: Cog: U, Summarize the Information Technology Act, 2000.</p>
6	I	XUM106- HUMAN ETHICS, VALUES, RIGHTS, AND GENDER EQUALITY	<p>CO1:Cog:(Rem),(Un) Relate and Interpret the human ethics and human relationships.</p> <p>CO2:(Un),(Ap) Explain and Apply gender issues, equality and violence against women.</p> <p>CO3:Cog:(An), Aff: (Re) Classify and Develop the identify of human rights and their violations .CO4: Cog:(Un),Cog:(An) ClassifyandDissect necessity of human rights and report on violations.</p> <p>CO5:Cog:(Rem), Cog:(Res) List and respond to family values, universal brotherhood, fight against corruption by common man and good governance</p>
7	II	XGL201-ENGLISH FOR EFFECTIVE COMMUNICATION	<p>CO1: Cog: C: Ability to identify the features of a technical project report and Knowledge on the linguistic competence to write a technical report</p> <p>CO2: Cog: Syn: Ability to integrate both technical COURSE skill and language skill to write a project.</p>

			<p>CO3: Aff: (Res):Confidence to present a project in 10 to 15 minutes</p> <p>CO4: Cog: C The learner identifies and absorbs the pronunciation of sounds in English Language and learns how to mark the stress in a word and in a sentence properly`</p> <p>CO5: Psy: P: The program enables the speaker speaks clearly and fluently with confidence and it trains the learner to listen actively and critically</p>
8	II	XES202- ENVIRONMENTAL STUDIES	<p>CO1. Cog: (R and U);Describe the significance of natural resources and explain anthropogenic impacts.</p> <p>CO2.Cog: U ;Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.</p> <p>CO3. Cog: R, Aff: Receiving; identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon</p> <p>CO4. Cog: (U & Anal): Explain the socio-economic, policy dynamics andpractice the control measures of global issues for sustainable development.</p> <p>CO5. Cog: (U & App): Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.</p>
09	II	XCO204-ADVANCED FINANCIAL ACCOUNTING	<p>CO1: Cog: U, Describe the special transactions such as consignment and joint venture.basis.</p> <p>CO2: Cog (Ap): Psy (Set): Prepare accounting for inland branches and departmental accounts</p> <p>CO3: Cog: (Ap) ,Prepare accounting for dissolution for partnership firm.</p> <p>CO4:Cog: (An), Compare and contrast the hire purchase and installment purchase system</p> <p>CO5: Cog (Ap): Psy (Set): Prepare cash book, bank book, ledger accounts, trial balance, Profit and loss account, Balance Sheetusing Tally package.</p>
11	II	XCO205-CORPORATE LAWS	<p>CO1: Cog: Ap, understand the provisions of Administration of Company Law registration and formation of a company</p>

			<p>CO2: Cog: Ap, Analyze various documents require for formation and to sustain a company</p> <p>CO3:Cog: Ap, Understand the duties and responsibilities of directors and Key managerial personnel and various kinds of meetings</p> <p>CO4: Cog: Ap, Apply the Provisions relating to payment of Dividend and audit the books of records of a company</p> <p>CO5: Cog:Ap, understand the Concept and modes of Winding Up</p>
12	II	XCO206- OFFICE AUTOMATION	<p>CO1.Cog:Understandthe usage and applications of computers in Business</p> <p>CO2. Cog, Ap Apply the dynamics of Preparing Power Point Presentations</p> <p>CO3.Cog: R Adopt the procedures utilized in Spreadsheet and its Business Applications.</p> <p>CO4.Cog: R Find Models and methods of generally used Spreadsheet functions</p> <p>CO5.Cog:R Explain Security issues and measures</p>
13	III	XMS301-BUSINESS MATHEMATICS & STATISTICS	<p>CO1.Cog: R Find inverse of a matrix through determinant method.</p> <p>CO2. Cog, Ap Apply the Rules of differentiation</p> <p>CO3.Cog: R Find Simple and compound interest. Rates of interest.</p> <p>CO4.Cog: R Find Central Tendency and Standard deviation</p> <p>CO5.Cog:RFind correlation and regression coefficients</p>
14	III	XCO302-ADVANCED CORPORATE ACCOUNTING	<p>CO1: Cog: Ap, Apply the provisions of Companies Act for issue, forfeiture and reissue of shares.</p> <p>CO2: Cog: Ap, Prepare final accounts of corporate entities.</p> <p>CO3:Cog: Ap, Construct consolidated balance sheet of amalgamated company (merger and purchase method).</p> <p>CO4: Cog: Ap, Construct consolidated balance sheet of holding company.</p> <p>CO5: Cog:Ap, Make use of relevant schedules (New Format) to prepare final statement of accounts of banking company.</p>
15	III	XCO303- INCOME TAX AND TAX PLANNING-I	<p>CO1: Cog: U, Define the important definitions under Section 2, 2 (7), 2(9), 2 (14), 2(24), 2(31), 3 of Income Tax Act.</p>

			<p>CO2: Cog: Ap, Make use of Sec 15, 16 and 17 of Income Tax Act provisions relating to computation of salary income of an individual.</p> <p>CO3: Cog: Ap, Make use of Income tax Act to compute taxable income from house property under Sec 23 to 27 of Income Tax Act.</p> <p>CO4: Cog: Ap, Make use of Income Tax Act to assess taxable income from capital gain.</p> <p>CO5: Cog: U, Explain tax planning related to salaries and property income.</p>
16	III	XCO304-E-COMMERCE & E-GOVERNANCE	<p>CO1.Cog:Understandthe usage and applications of e-commerce business models CO2. Cog, Ap, Apply the dynamics of world wide web and internet</p> <p>CO3.Cog: R Adopt the procedures utilized in Security and Encryption.</p> <p>CO4.Cog: R Find Models and methods of e-payment systems</p> <p>CO5.Cog:RPropound On-line Business Transactions and its applications</p>
17	III	XUM306-DISASTER MANAGEMENT	<p>CO1.Cog: Application :Understanding the concepts of application of types of disaster preparedness C(Application)</p> <p>CO2. Cog: Analyses: Infer the end conditions &Discuss the failures due to disaster. C(Analyze)</p> <p>CO3.Cog: Analyses: understanding of importance of seismic waves occurring globally C(Analyze)</p> <p>CO4. Cog: Application: Estimate Disaster and mitigation problems. C(Application)</p> <p>CO5. Cog: Application: Keen knowledge on essentials of risk reduction</p>
18	IV	XCO401-INCOME TAX AND TAX PLANNING-II	<p>CO1: Cog: Ap, Make use of Sec 29 to 37 provisions under Income Tax Act to ascertain taxable income from business or profession.</p> <p>CO2: Cog: Ap, Apply Sec 56 to 59 provisions under Income Tax Act to calculate taxable income from residuary sources and clubbing (Sec 60 to 62&64) and set off and carry forward losses. (Sec 70 - 80)</p> <p>CO3: Cog: Ap, Computation of Gross Total Income by using Sec 10 to 13, Sec 86, Sec 80C, 80CCC, 80CCD, 80CCE, 80CCD,80CCG,80DD, 80DDB, 80E,80G provisions under Income Tax</p>

			<p>Act.</p> <p>CO4: Cog: Ap, Make use of provisions under Income tax Act to compute taxable income of individual, firms and association of persons.</p> <p>CO5: Cog: Ap, Identify taxable income of companies by using Income tax Act.</p>
19	IV	XCO402-HUMAN RESOURCE MANAGEMENT	<p>CO1: Cog: U, Explain the importance of human resources in an organization.</p> <p>CO2: Cog: U, Outline the dimensions; job analysis and job description and procedure for recruitment and selection.</p> <p>CO3: Cog: U, Aff (Set) Describe identifying the training need, implementation, monitoring and assessment procedures of training</p> <p>CO4: Cog: (U), Understanding the importance of Performance appraisal system.</p> <p>CO5: Cog: U, State the significance of compensation for employee and grievance redresses.</p>
20	IV	XCO403-FINANCIAL MANAGEMENT	<p>CO1: Cog: U, Explain time value, risk, and return concepts.</p> <p>CO2: Cog: Ap, Apply techniques for estimating the cost of capital and understand sources of finance.</p> <p>CO3: Cog: Ap, Construct the management corporate leverage and capital structure.</p> <p>CO4: Cog: Ap, Identify Working capital requirement.</p> <p>CO5: Cog: U, Apply Long term investment decisions.</p>
21	IV	XCO404-ENTREPRENEURSHIP FOR MODERN BUSINESS	<p>CO1: Cog, U, Explain factors stimulating entrepreneurship and obstacles in entrepreneurial growth</p> <p>CO2: Cog, U, Explain contemporary role models in Indian business</p> <p>CO3: Cog, U, Explain role of Public and private system of stimulation</p> <p>CO4: Cog, U, Understand the Significance of writing the business plan/ project proposal.</p> <p>CO5: Cog, U, Describe the possibilities of Mobilising resources for start-up.</p>
22	IV	XCO405-GST MODELS	<p>CO1: Cog(U): Explain the dual GST Model.</p> <p>CO2: Cog(U): Summarize the Input Tax Credit and Payment of Tax.</p>

23	V	XCO501- PRACTICAL COST ACCOUNTING	<p>CO1: Cog: Ap, Understanding various elements of cost and costing techniques of valuation of cost .</p> <p>CO2: Cog: U, Outline the procedure for purchase of material, storing and issue of materials and valuation of materials.</p> <p>CO3: Cog: Ap, Calculate earnings of Workers under different methods.</p> <p>CO4: Cog, Psy: Ap, Set, Choose basis for allocation and apportionment factory indirect costs and absorption of overheads.</p> <p>CO5: Cog: Ap, Application costing techniques for contract work and process industry.</p>
24	V	XCO502A-BANKING LAW AND PRACTICE	<p>CO1: Cog: U, Explain the structure, functions and modern banking services.</p> <p>CO2: Cog: U, Outline bank deposits, lending and role of RBI in credit control.</p> <p>CO3: Cog: U, Summarize bank management and negotiable instruments.</p> <p>CO4: Cog: U, Explain the banker and customer's relationship under Banking Regulation Act.</p> <p>CO5: Cog: U, Summarize the role of paying banker and collecting banker.</p>
25	V	XCO502B-INVESTMENT AND PORTFOLIO MANAGEMENT	<p>CO1: Cog: U, Summarize the basic principles of investment</p> <p>CO2: Cog: U, Explain the important types of securities and the methods of its valuation</p> <p>CO3: Cog: U, Describe the Approaches to Equity Analysis</p> <p>CO4: Cog: U, Explain the importance Portfolio Risk and Return</p> <p>CO5: Cog: U, Explain the importance of Investor Protection</p>
26	V	XCO502C-INDIAN ECONOMY, PERFORMANCE AND POLICIES	<p>CO1: Cog: U, Explain the problems of poverty, unemployment and inflation in India</p> <p>CO2: Cog: U, Outline the importance of agriculture and industry in India</p> <p>CO3: Cog: U, Summarize Planning of Indian economy</p> <p>CO4: Cog: U, Interpret monetary and fiscal policies</p> <p>CO5: Cog: U, Explain Balance of Payments & the global markets.</p>

27	V	XCO503A-CORPORATE TAX PLANNING	<p>CO1: Cog: U, Explain the Corporate tax structure in India.</p> <p>CO2: Cog: U, OutlineTax planning with reference to financial management decision.</p> <p>CO3: Cog: U, SummarizeTax planning with reference to specific management decisions.</p> <p>CO4: Cog: U, Explain the Special provisions relating to non-residents.</p> <p>CO5: Cog: U, Summarizethetax Planning with reference to Business Restructuring.</p>
28	V	XCO503B-ADVERTISING	<p>CO1: Cog: U, Summarizeto familiarize the students with the basic concepts, tools and techniques of advertising used in marketing.</p> <p>CO2: Cog:U, ExplainMajor media types and their characteristics</p> <p>CO3: Cog:U, Demonstrate and Preparing ads for different media</p> <p>CO4: Cog (U): Psy (Set), Outline the Evaluation of communication and sales effects</p> <p>CO5: Cog:U, Explain the methods of selection of suitable advertising agency.</p>
29	V	XCO503C-MARKETING PRACTICES	<p>CO1: Cog: U, Summarize the concept of marketing, marketing mix, marketing environment and micro and macro marketing</p> <p>CO2: Cog:U, Explain the meaning of product, product planning and development, product life cycle and branding</p> <p>CO3: Cog:U, Demonstratethe concept of pricing and factors affecting pricing</p> <p>CO4: Cog (U): Psy (Set), Outline the elements of promotional mix and CRM</p> <p>CO5: Cog:U, Explain channels of distribution and supply chain management.</p>
30	V	XCO504-INTERNSHIP TRAINING	<p>CO1: Cog (U) Relate classroom theory with workplace practice</p> <p>CO2: Affective (Respond) Comply with Factory discipline, management and business practices.</p> <p>CO3: Affective (Value) demonstrates teamwork and time management.</p> <p>CO4:Psychomotor (Perception, Set) Describe and Display hands-on experience on practical skills obtained during the programme.</p>

			CO5: Cog (E) Summarize the tasks and activities done by technical documents and oral presentations.
31	V	XCO505-PERT & CPM	CO1: Cog(U): Construction of Network and obtaining Critical Path. CO2: Cog(U): Determine of Floats.
32	VI	XCO601-PRINCIPLES AND PRACTICES OF AUDITING	CO1: Cog, U, Explain the types of audit and objectives of audit. CO2: Cog, U, Summarize audit planning and conduct of audit. CO3: Cog, U, Explain Vouching of Trading Transaction and Verification & Valuation of Assets & Liabilities CO4: Cog, U, Explain the Qualification, Rights, Duties, and Liabilities. Professional Ethics of an auditor CO5: Cog, U, Summarize audit report as per CARO rules and Latest Trends in Auditing Information System.
33	VI	XCO602A-FINANCIAL MARKETS AND FINANCIAL SERVICES	CO1: Cog: U, Summarize Financial system and economic development CO2: Cog: U, Outline Money market and Capital Markets-functions CO3: Cog: U Explain Functions of Depository and non-depository institutions in India CO4: Cog, U: Describe Role of Non-banking financial companies CO5: Cog, U: Describe the Regulatory framework relating to merchant banking in India
34	VI	XCO602B-ACCOUNTING FOR DECISION MAKING	CO1: Cog (Ap): Psy(Set): Make use of ratio analysis and interpret it. CO2: Cog (Ap): Construct cash flow statement as per AS 3 CO3: Cog (Ap): Utilize Marginal costing technique for decision making. CO4: Cog (Ap): Construct cash budget. CO5: Cog (An): Application of standard costing technique to analyze variance in Material, Labour, overhead and Sales cost.
35	VI	XCO602C-INTERNATIONAL BUSINESS	CO1: Cog: U, Summarize Globalisation and its importance in world economy. CO2: Cog: U, Outline tariff and non-tariff measures CO3: Cog: U Explain Powers and Functions of

			<p>International Organizations and Arrangements</p> <p>CO4: Cog, U: Describe Role of IT in international business</p> <p>CO5: Cog, U: Describe the Measures for promoting foreign investments into India</p>
36	VI	XCO603A-BUSINESS RESEARCH METHODS	<p>CO1: Cog: U, Summarize Meaning of research, Scope of Business Research and Purpose of Research.</p> <p>CO2: Cog: U, Outline Selection of Basic Research Methods</p> <p>CO3: Cog: U Explain the application of Measurement Scales</p> <p>CO4: Cog, U: Describe Tests concerning means and proportions</p> <p>CO5: Cog, U: Summarize the consequences of effective Report Preparation</p>
37	VI	XCO603B-CONSUMER AFFAIRS AND CUSTOMER CARE	<p>CO1: Cog: U, Understand the Conceptual Framework Consumer and Markets.</p> <p>CO2: Cog: U, Describe Organizational set-up under the Consumer Protection Act</p> <p>CO3: Cog: U Explain Procedure for filing and hearing of a complaint</p> <p>CO4: Cog, U: Describe various Industry Regulators and Consumer Complaint Redress Mechanism</p> <p>CO5: Cog, U: Enlighten Formation of consumer organizations and their role in consumer protection</p>
38	VI	XCO603C-INDUSTRIAL RELATIONS AND LABOUR LAWS	<p>CO1: Cog: U, Describe the Concept of Industrial Relations</p> <p>CO2: Cog: U, Outline the Factors Affecting Growth of Trade Unions in India</p> <p>CO3: Cog: U, Classify different types of Collective Bargaining and Workers' Participation in Management</p> <p>CO4: Cog: U, Explain strategies of Discipline and Grievance Redressal</p> <p>CO5: Cog: U, Describe the Powers and Duties of Industrial Dispute Authorities</p>
39	VI	XCO605-CYBER LAWS	<p>CO1: Cog(U): Discuss the Category and types of Cyber Crimes</p> <p>CO2: Cog(U): Explain the Provisions relate to Cyber Law under IT Act 2000</p>

2. B.Com

PROGRAMME OUTCOME (PO)	
PO1	Knowledge of Business and Commerce
PO2	Knowledge and ability to pursue higher education.
PO3	Ability to identify problems and collect relevant data
PO4	Ability to understand and use modern tools and technologies.
PO5	Understanding the impact of commercial activities on environment and sustainability.
PO6	Apply ethical principles in business and commerce
PO7	Ability to effectively communicate in business environment.
PO8	Ability to perform effectively as a leader as well as a member of a team
PO9	Ability to engage in lifelong learning

B.Com –Course Outcomes

S.NO	SEMESTER	COURSE CODE & NAME	COURSE OUTCOMES
1	I	XGL101- COMMUNICATION SKILLS IN ENGLISH	CO1: Cog: K: Choose and identify different styles to various forms of public speaking skills and presentation skills. CO2:Cog: K,U: Understand and identify the proper tone of language required in writin and speaking. CO3: Psy: A: Adapting the speech structures and developing the speech outline. CO4: Aff: R: Ability to communicate and develop presentation skills. CO5: Psy: R: Calibrates the speaker to face the audience without any anxiety.
2	I	XCG102-FUNDAMENTALS OF FINANCIAL ACCOUNTING	CO1: Cog:AP, Prepare financial statements in accordance with Generally Accepted Accounting Principles. CO2: Cog:AP, Prepare Bank Reconciliation Statement and to identify and rectify errors. CO3:Cog:An,Compare, Contrast and solve single entry to double entry system. CO4:Cog:AP,Calculate account current, average due date and insurance claims. CO5:Cog:AP,Calculate depreciation on fixed assets.
3	I	XCG103-BUSINESS ORGANISATION AND MANAGEMENT	CO1: Cog: (U), (Eva), Summarise the nature, process and importance and forms business organisation. CO2: Cog: (U), Discuss the process and size of business units and plant location. CO3: Cog: (An), (U) Summarise the nature, process of business management as well as Compare and contrast the contributions of Indian and International Management Thinkers. CO4: Cog: (U),Discuss the process and types of planning and decision making and organising. CO5: Cog: (U), (Creating), Aff: (Val), Explain the strategies of effective managerial control system, coordination and Defend the significance of motivation citing the theories of Maslow, Herzberg, McGregor, Ouchi and David McClelland.

4	I	XCG104-BUSINESS ECONOMICS	<p>CO1:Cog. (U):Discuss the basics concepts, scope and importance of micro and macro economics.</p> <p>CO2: Cog: (An) Analyze the law of demand and supply.</p> <p>CO3: Cog (E), (An)Analyze the law of Diminishing Marginal Utility, Equip marginal Utility, Indifference Curve Law of Variable Proportion and Laws of Returns to Scale.</p> <p>CO4: Cog (Cre), Aff (Res)Formulate different product pricing based on the different markets condition and illustrate different markets.</p> <p>CO5: Cog (Und), Aff (Valuing) Summarize the nature and principles of Public Expenditure and Public Finance and criticize the basic problems in the national income.</p>
5	I	XCG105-PRINCIPLES OF MARKETING	<p>CO1: Cog: U, Summarize the concept of marketing, marketing mix, marketing environment and micro and macro marketing.</p> <p>CO2: Cog: U, Explain the meaning of product, product planning and development, product life cycle and branding.</p> <p>CO3: Cog: U, Demonstrate the concept of pricing and factors affecting pricing.</p> <p>CO4:Cog (U): Aff (Res), Compile the elements of promotional mix and CRM.</p> <p>CO5:Cog: U, Explain channels of distribution and Recent trends in Marketing.</p>
6	I	XUM106-HUMAN ETHICS, VALUES, RIGHTS, AND GENDER EQUALITY	<p>CO1:Cog:(Rem),(Un) Relate and Interpret the human ethics and human relationships.</p> <p>CO2:(Un),(Ap) Explain and Apply gender issues, equality and violence against women.</p> <p>CO3:Cog:(An), Aff: (Re) Classify and Develop the identify of human rights and their violations.</p> <p>CO4: Cog:(Un),Cog:(An) Classify and Dissect necessity of human rights and report on violations.</p> <p>CO5:Cog:(Rem), Cog:(Res) List and respond to family values, universal brotherhood, fight against corruption by common man and good governance</p>

7	II	XGL201- ENGLISH FOR EFFECTIVE COMMUNICATION	<p>CO1: Cog: C: Ability to identify the features of a technical project report and Knowledge on the linguistic competence to write a technical report</p> <p>CO2:Cog: Syn: Ability to integrate both technical COURSE skill and language skill to write a project.</p> <p>CO3:Aff: (Res): Confidence to present a project in 10 to 15 minutes</p> <p>CO4:Cog: C The learner identifies and absorbs the pronunciation of sounds in English Language and learns how to mark the stress in a word and in a sentence properly`</p> <p>CO5:Psy: P: The program enables the speaker speaks clearly and fluently with confidence and it trains the learner to listen actively and critically.</p>
8	II	XES202- ENVIRONMENTAL STUDIES	<p>CO1.Cog: (R and U); Describe the significance of natural resources and explain anthropogenic impacts.</p> <p>CO2.Cog: U; Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.</p> <p>CO3.Cog: R, Aff: Receiving; identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon</p> <p>CO4. Cog: (U & Anal): Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development.</p> <p>CO5. Cog: (U & App): Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.</p>
9	II	XCG204- COMMERCIAL LAW	<p>CO1: Cog: U, Explain essentials of Contract, performance and breach of Contract under Indian Contract Act 1872.</p> <p>CO2: Cog: U, Interpret necessary formalities of contract of sale and rights of unpaid seller under the Sale of Goods Act 1930.</p> <p>CO3: Cog: U, Illustrate the objectives of Consumer Protection Act and jurisdiction of Consumer Protection Councils</p>

			<p>CO4: Cog: U, Explain the essentials of partnership, rights and duties of partners under Partnership Act 1932.</p> <p>CO5: Cog: U, Summarize the effects of dishonour of negotiable instruments under Negotiable Instruments Act 1881.</p>
10	II	XCG205- CORPORATE ACCOUNTING	<p>CO1: Cog: Ap, Students would able to Apply the provisions of Companies Act for issue of shares at Par, Premium and Discount, Forfeiture and Reissue of Shares.</p> <p>CO2: Cog: Ap, Students would able to Apply various methods of valuation of goodwill and Shares</p> <p>CO3: Cog: Ap, Students would able to Apply Construct Consolidated balance sheet after Amalgamation</p> <p>CO4: Cog: Ap, Students would able to Make use of relevant schedules (New Format)of Banking company accounts to prepare the Profit and Loss Account and Balance Sheet.</p> <p>CO5: Cog: Ap, Students would able to Make use of relevant schedules (New Format) to prepare final statement of accounts of Insurance company.</p>
11	III	XMS301- BUSINESS MATHEMATICS & STATISTICS	<p>CO1.Cog: R Find inverse of a matrix through determinant method.</p> <p>CO2. Cog, AApply the Rules of differentiation.</p> <p>CO3.Cog: R FindSimple and compound interest.</p> <p>CO4.Cog: R Find Central Tendency and Standard deviation</p> <p>CO5.Cog:RFind correlation and regression coefficients</p>
12	III	XCG302- DIRECT TAX LAWS	<p>CO1: Cog: U, Definethe important definitions under Section 2, 2 (7), 2(9), 2 (14), 2(24), 2(31), 3 of Income Tax Act.</p> <p>CO2: Cog: Ap, Make use ofSec15, 16 and 17 of Income Tax Actprovisions relating to computation of salary income of an individual.</p> <p>CO3: Cog: Ap, Make use of Income tax Act to compute taxable income from house property under Sec 23 to 27 of Income</p>

			<p>Tax Act.</p> <p>CO4: Cog: Ap, Make use of Income Tax Act to assess taxable income from Other sources.</p> <p>CO5: Cog: U, Explain tax planning related to salaries and property income</p>
13	III	XCG303- COMPUTER APPLICATIONS IN BUSINESS	<p>CO1.Cog:Understandthe usage and applications of computers in Busin</p> <p>CO2. Cog, ApApplythe dynamics of Preparing Power Point Presentations</p> <p>CO3.Cog: RAdopt the procedures utilized in Spreadsheet and its Business Applications.</p> <p>CO4.Cog: RFindModels and methods of generally used Spreadsheet functions</p> <p>CO5.Cog:RExplainSecurity issues and measures</p>
14	III	XCG304A- HUMAN RESOURCE DEVELOPMENT	<p>CO1: Cog: U, Explain the importance of human resource in an organisation</p> <p>CO2: Cog: U, Outline the dimensions; job analysis and job description and procedure for recruitment and selection.</p> <p>CO3: Cog: U, Aff (Set) Describe, identify the training need, implementation, monitoring and assessment procedures of training.</p> <p>CO4: Cog: U, Understanding the importance of performance appraisal system</p> <p>CO5: Cog: U, State the significance of compensation for employee and grievance redressel.</p>
15	III	XCG304B- BUSINESS CORRESPONDENCE AND REPORT WRITING	<p>CO1: Cog (U): Aff (Res) Discuss the objectives process, functions and importance of business letters. Comply the rules and write business letters.</p> <p>CO2: Cog (Ap), Aff (Res) Write letters of enquiry, replies, orders, cancellation, complaints, claim and adjustments. Conform the points to be considered while writing these letters.</p> <p>CO3: Cog (Ap), Psy (Imi), Write circulars, sales and collection letters in the appropriate format. Display the techniques to use mail merge in sending circular letters.</p> <p>CO4: Cog (U): Aff (Res), Differentiate business correspondence with agencies, banks and insurance</p>

			<p>companies. Conform the points to be considered while writing these letters.</p> <p>CO5: Cog (Cre), Psy(Imi), Formulate appealing curriculum vitae to apply for a job. Illustrate the techniques to send curriculum vitae through E-Mail.</p>
16	III	XUM306- DISASTER MANAGEMENT	<p>CO1.Cog: Application :Understanding the concepts of application of types of disaster preparedness C(Application)</p> <p>CO2. Cog: Analyses: Infer the end conditions & Discuss the failures due to disaster. C(Analyze)</p> <p>CO3.Cog: Analyses: understanding of importance of seismic waves occurring globally C(Analyze)</p> <p>CO4.Cog: Application: Estimate Disaster and mitigation problems. C(Application)</p> <p>CO5.Cog: Application: Keen knowledge on essentials of risk reduction</p>
17	IV	XCG401- COMPANY LAW	<p>CO1: Cog: U, Explain the nature of company and procedure for formation of Company as per Indian Companies Act (Amendment 2013).</p> <p>CO2:Cog: U, Compare and contrast Memorandum of Association and Articles of Association.</p> <p>CO3: Cog: U, Summarize the Rights and liabilities of company shareholders.</p> <p>CO4: Cog: U, Describe powers and duties of company directors and procedure for convening statutory and other meetings.</p> <p>CO5: Cog U, Explain circumstances and the procedure for winding up of the company</p>
18	IV	XCG402- FUNDAMENTALS OF COST ACCOUNTING	<p>CO1: Cog: Ap, Understand various elements of cost and costing techniques of valuation of cost and Construct a cost sheet and preparation of quotations for submission.</p> <p>CO2: Cog: U, Outline the procedure for purchase, storing, issue and valuation of materials.</p> <p>CO3: Cog: Ap, Calculate earnings of Workers under different methods.</p> <p>CO4: Cog, Psy: Ap, Set, Choose basis for allocation and apportionment factory indirect costs and absorption of overheads.</p> <p>CO5: Cog: Ap, Apply costing techniques for contract work</p>

19	IV	XCG403- E- COMMERCE	<p>CO1: Cog, U, Classify and compare the e-commerce business models.</p> <p>CO2: Cog, U, Discuss the security and encryption to protect the networks.</p> <p>CO3: Cog, U, Describe the IT & Cyber Crimes Act 2000.</p> <p>CO4: Cog, U. Explain the models of e payment.</p> <p>CO5: Cog, U, Describe different types on line business transactions</p>
20	IV	XCG404A- FUNDAMENTALS OF FINANCIAL MANAGEMENT	<p>CO1: Cog: U, Explain time value, risk, and return concepts.</p> <p>CO2: Cog: Ap, Apply techniques for estimating the cost of capital and understand sources of finance.</p> <p>CO3: Cog: Ap, Construct the management corporate leverage and capital structure.</p> <p>CO4: Cog: Ap, Identify Working capital requirement.</p> <p>CO5: Cog: U, Interpret the dividend policies and theories.</p>
21	IV	XCG404B- INVESTMENT MANAGEMENT	<p>CO1: Cog: U, Summarize the basic objective of investment and its sources.</p> <p>CO2: Cog: U, Explain the important types of risks involved.</p> <p>CO3: Cog: U, Describe the forms of investment</p> <p>CO4: Cog: U, Explain the importance of time value of money</p> <p>CO5: Cog: U, Explain the importance of primary and secondary markets</p>
22	IV	XCG405-GST MODELS	<p>CO1: Cog(U): Explain the dual GST Model.</p> <p>CO2: Cog(U): Summarize the Input Tax Credit and Payment of Tax.</p>
23	V	XCG501- FINANCIAL ACCOUNTING PACKAGES – TALLY PRACTICAL	<p>CO1: Cog, U, Outline types of accounting, Journal, Ledger, trial balance.</p> <p>CO2: Cog, Ap, Create Company and preparation of final accounts.</p> <p>CO3: Cog, Ap, Construct types of voucher and trial balance.</p>

			<p>CO4: Cog, An, Illustrates the stock items and stock group.</p> <p>CO5: Aff, Org, Compare purchase and sales order processing</p>
24	V	XCG502- ENTREPRENEURSHIP	<p>CO1: Cog, U, Explain factors stimulating entrepreneurship and obstacles in entrepreneurial growth.</p> <p>CO2: Cog, App, Identify problems and strategies for rural entrepreneurship development</p> <p>CO3: Cog, U, Explain role of SIDCO, SIDBI and DIC and problems of MSME.</p> <p>CO4: Cog, U, Describe Government Policy of Entrepreneurship Development.</p> <p>CO5: Cog, U, Explain Feasibility and Viability analysis in Project management.</p>
25	V	XCG503A- BANKING AND INSURANCE	<p>CO1: Cog: U, Explain functions of banking and banker customer relationship.</p> <p>CO2: Cog: U, Summarize the different forms of cheques and duties of paying banker.</p> <p>CO3: Cog: U, Describe principles of sound lending.</p> <p>CO4: Cog, U, Summarize the importance of internet banking.</p> <p>CO5: Cog, U, Explain the concept of insurance</p>
26	V	XCG503B- CORPORATE TAX PLANNING	<p>CO1: Cog: U, Explain the Corporate tax structure in India.</p> <p>CO2: Cog: U, Outline Tax planning for new business entrants.</p> <p>CO3: Cog: U, Summarize Tax planning with reference to specific management decisions.</p> <p>CO4: Cog: U, Explain the Special provisions relating to non-residents.</p> <p>CO5: Cog: U, Summarize the tax planning with reference to Business Restructuring</p>

27	V	XCG504A- INTERNATIONAL BUSINESS	<p>CO1: Cog: U, Summarize Globalization and its importance in world economy.</p> <p>CO2: Cog: U, Outline tariff and non-tariff measures</p> <p>CO3: Cog: U Explain Powers and Functions of International Organizations and Arrangements</p> <p>CO4:Cog, U: Describe Role of IT in international business</p> <p>CO5:Cog, U: Describe the Measures for promoting foreign investments into India</p>
28	V	XCG504B- OFFICE MANAGEMENT & SECRETARIAL PRACTICE	<p>CO1:Cog: U, Explain functions and importance of office and office manager.</p> <p>CO2: Cog: U, Summarize the different forms of stationery used in office.</p> <p>CO3: Cog:U, Describe office mechanization with merits and demerits.</p> <p>CO4: Cog, U, Summarize the modes of payment.</p> <p>CO5: Cog, U, Explain the role of secretary in office.</p>
29	V	XCG505- PERT & CPM	<p>CO1: Cog(U): Construction of Network and obtaining Critical Path.</p> <p>CO2: Cog(U): Determine of Floats.</p>
30	VI	XCG601- MANAGEMENT ACCOUNTING	<p>CO1: Cog (Ap): Make use of ratio analysis and interpret it.</p> <p>CO2: Cog (Ap): Construct cash flow statements as per AS3.</p> <p>CO3: Cog (Ap): Utilize budgetary controlling technique for decision making.</p> <p>CO4: Cog (An): Application of standard costing techniques and marginal costing.</p> <p>CO5: Cog (Ap): Make use of various techniques of capital budgeting for decision making.</p>

31	VI	XCG602- AUDITING PRACTICES	<p>CO1: Cog, U, Explain the types of audit and objectives of audit.</p> <p>CO2: Cog, U, Summarize audit planning and conduct of audit.</p> <p>CO3: Cog, U, Explain Vouching of Trading Transaction and Verification & Valuation of Assets & Liabilities</p> <p>CO4: Cog, U, Explain the Qualification, Rights, Duties, and Liabilities. Professional Ethics of company auditor</p> <p>CO5: Cog, U, Summarize preparation of audit report as per CARO rules and Latest Trends in Auditing Information System.</p>
32	VI	XCG603- PERSONAL SELLING AND SALESMANSHIP	<p>CO1:Cog: R, Definition and meaning of personal selling and salesmanship.</p> <p>CO2:Cog: U, Demonstrate the buying motives.</p> <p>CO3: Cog: U, Explain the selling process.</p> <p>CO4:Cog: U, Demonstration and presentation of sales report.</p> <p>CO5:Cog: U, Explain the duties and responsibilities of sales manager.</p>
33	VI	XCG604- CYBER LAWS	<p>CO1:Cog(U): Discuss the Category and types of Cyber Crimes</p> <p>CO2:Cog(U): Explain the Provisions relate to Cyber Law under IT Act 2000</p>

3. M.Com

PROGRAMME OUTCOME (PO)	
PO1	Knowledge of Business and Commerce
PO2	Knowledge and ability to pursue professional programmes, namely, M.Phil, Ph.Detc.,
PO3	Ability to identify problems and collect relevant data.
PO4	Ability to understand and use modern tools and technologies.
PO5	Understanding the impact of commercial activities on environment and sustainability.
PO6	Apply ethical principles in business and commerce.
PO7	Ability to effectively communicate in business environment.
PO8	Ability to perform effectively as a leader as well as a member of a team.
PO9	Ability to engage in lifelong learning

M.Com - Course Outcomes

S.NO	SEMESTER	COURSE CODE & NAME	COURSE OUTCOMES
1	I	YCO101- MANAGERIAL ECONOMICS	<p>CO1:Cog: (U), Aff: (R) Understanding the concepts of Managerial Economics.</p> <p>CO2:Cog: (U), Aff: (R) Explain price elasticity of demand and forecasting for new products.</p> <p>CO3: Cog: (U), Aff: (R) Classify the cost and compare the output relationship in the Short and long run-Learning.</p> <p>CO4: Cog: (U), Aff: (R) Difference between perfect and monopolistic competition.</p> <p>CO5:Cog: (U), Aff: (R) Discuss about National Income and Business Cycle.</p>
2	I	YCO102 - BUSINESS ETHICS, CORPORATE SOCIAL RESPONSIBILITY AND GOVERNANCE	<p>CO1: Cog: (U), Aff: (R) Explain the factors affecting business ethics and corporate moral excellence.</p> <p>CO2: Cog: (U), Aff: (R) Discuss the Ethical issues in Operation and Purchase Management.</p> <p>CO3:Cog: (U), Aff: (R) Examine the Ethical issues in Marketing Strategy and consumerism.</p> <p>CO4: Cog: (U), Aff: (R) Describe the Ethical issues in Accounting Professional conduct of accountants; ethics and financial statements.</p> <p>CO5: Cog: (U), Aff: (R) Elaborate Corporate Social Responsibility (CSR).</p>
3	I	YCO103-LOGISTICS AND SUPPLY CHAIN MANAGEMENT	<p>CO1:Cog: (U), Aff: (R) Explain the Logistic operations in the business.</p> <p>CO2:Cog: (U), Aff: (R) Describe the Transportation Economics and Pricing in logistic.</p> <p>CO3:Cog: (U), Aff: (R) Explain the international logistic and supply chain management.</p> <p>CO4:Cog: (U), Aff: (R) Explain the international insurance in logistic management.</p> <p>CO5:Cog: (U), Aff: (R) Explain the air transportation and international customs.</p>

4	I	YCO104- ADVANCED CORPORATE ACCOUNTING	<p>CO1: Cog: (U), Aff: (R) Understanding the Accounting treatment as per AS 14.</p> <p>CO2:Cog: (Ap), Aff: (R) Compute Consolidated Balance Sheet As per AS 21.</p> <p>CO3:Cog: (Ap), Aff: (R)the final accounts and balance sheet for insurance and banking companies.</p> <p>CO4:Cog: (Ap), Aff: (R)Prepare Hotel and Hospital Accounting.</p> <p>CO5:Cog: (U), Aff: (R) Summaries the Human Resource Accounting and International Accounting Standards.</p>
5	I	YCO105-FINANCIAL MANAGEMENT AND POLICY	<p>CO1: Cog: (U), Aff: (R) Explain objectives Financial decision making and types of financial decisions.</p> <p>CO2: Cog: (Ap), Aff: (R), Make use of Capital budgeting techniques to solve problems.</p> <p>CO3: Cog: (Ap), Aff: (R), Compute Optimal capital structure and cost of capital using various theories.</p> <p>CO4: Cog: (U), Aff: (R),Explain various theories of dividend policy.</p> <p>CO5: Cog: (U), Aff: (R), Estimate of working capital requirement.</p>
6	I(CEIA)	YCOE106A- INSURANCE MANAGEMENT	<p>CO1: Cog: (U), Aff: (R) Understanding the Principles of Insurance and new Amendment Act 2015.</p> <p>CO2: Cog: (U), Aff: (R)Explain the nature of insurance contract.</p> <p>CO3:Cog: (U), Aff: (R)Classify the Insurance and explain its features.</p> <p>CO4:Cog: (U), Aff: (R)Summarizes the rural insurance schemes in India.</p> <p>CO5:Cog: (U), Aff: (R)Elaborate the functions of IRDA.</p>
	I(CEIB)	YCOE106B- INDIAN FINANCIAL SYSTEM IN MODERN BANKING	<p>CO1:Cog: (U), Aff: (R)Understand the role of Indian financial system.</p> <p>CO2: Cog: (U), Aff: (R)Explain the concept of e- banking.</p> <p>CO3: Cog: (U), Aff: (R)Interpret the mobile banking system.</p> <p>CO4:Cog: (U), Aff: (R)Summarise the features of ATM.</p>

			CO5: Cog: (U), Aff: (R)Explain and summarise the key features of Indian financial network.
7	II	YCO201 - STRATEGIC MANAGEMENT	<p>CO1:Cog: (U), Aff: (R)Understand the internal and external business environment.</p> <p>CO2: Cog: (U), Aff: (R)Explain, Outline the fundamentals of strategic management.</p> <p>CO3: Cog: (U), Aff: (R Explain, Describe and identify the strategic management process and formulating, implementing and evaluating strategic planning in practice.</p> <p>CO4: Cog: (U), Aff: (R)Discuss corporate strategy implementation and functional strategies and describe Horizontal and vertical integrations.</p> <p>CO5: Cog: (U), Aff: (R)Explain respond to shifts in competitive advantages and Analyze change management.</p>
8	II	YCO202 – CORPORATE LAWS	<p>CO1: Cog: (U), Aff: (App)Understand the Difference between Companies Act, 2013 and Companies Act, 1956</p> <p>CO2: Cog: (U), Aff: (R)Analyze Regulation of Scheduled Industries, Registration and Licensing.</p> <p>CO3: Cog: (U), Aff: (R)Understand the Regulation and Management of Foreign Exchange.</p> <p>CO4: Cog: (U), Aff: (App)Describe the Provisions relating to Powers of Central Government to Control, effect, seizure and confiscation according to The Essential Commodities Act, 1955.</p> <p>CO5: Cog: (U), Aff: (R)Understand the Compliance regarding discharges causing pollution, Penalties and Offences(Prevention and Control of Pollution) Act, 1981.</p>
9	II	YCO203 - ADVERTISEMENT AND SALES PROMOTION	<p>CO1: Cog: (U), Aff: (R)Discuss the Role of Advertising in Marketing Mix and Positioning.</p> <p>CO2: Cog: (U), Aff: (R)Describe the procedures for Selection of Advertising Agency and measure the effectiveness Advertising Agency.</p>

			<p>CO3: Cog: (U), Aff: (R) Explain the Criteria for Selection of apt Media and various Types of Media and Channels.</p> <p>CO4: Cog: (U), Aff: (R) Demonstration the Tools and Techniques of Consumer Sales Promotion.</p> <p>CO5: Cog: (U), Aff: (R) Explain the sales planning process, Forecasting, Determining sales territories, Sales quota and Sales Budget.</p>
10	II	YCO204 – ADVANCED COST AND MANAGEMENT ACCOUNTING	<p>CO1: Cog: (U), Aff: (R) Understand various elements of cost and costing techniques. Analyze the methods of inventory control and pricing.</p> <p>CO2: Cog: (U), Aff: (R) Outline the procedure for purchase of material, storing and issue of materials and valuation of materials.</p> <p>CO3: Cog: (U), Aff: (R) Calculate Process costing .</p> <p>CO4: Cog: (U), Aff: (R) Understand the Tools and Techniques of Ratio analysis. Calculate marginal costing and cost-volume profit analysis.</p> <p>CO5: Cog: (U), Aff: (R) Application Budget administration techniques.</p>
11	II	YCO205 – INCOME TAX THEORY LAW AND PRACTICE	<p>CO1: Cog: (U), Aff: (R) Determine the Residential Status of an Individual.</p> <p>CO2: Cog: (U), Aff: (R) Make use of Section 15 to 17 and Section 23 to 27 of income tax Act Provisions relating to computation of Salary income of an Individual and income from house property.</p> <p>CO3: Cog: (U), Aff: (R) Compute the taxable Profits and Gains of Business or Profession.</p> <p>CO4: Cog: (U), Aff: (R) Describe deduction from Gross Total Income and Calculate Tax Liability.</p> <p>CO5: Cog: (U), Aff: (R) Explain Assessment procedure and Tax Deducted at Source (TDS)</p>
12	II(CE2A)	YCOE206 A – ORGANIZATIONAL BEHAVIOUR	<p>CO1: Cog: (U), Aff: (R) Understanding the organisational behaviour.</p> <p>CO2: Cog: (U), Aff: (Re) Outline Factors influencing perception and Theories of Learning.</p>

			<p>CO3: Cog: (U), Aff: (App) Describe the Theories of Personality, Causes and Effects of Stress.</p> <p>CO4: Cog: (U), Aff: (Re) Understanding Leadership Theories and styles, Theories of Motivation.</p> <p>CO5: Cog: (U), Aff: (Re) State about Organisation Development, OD Process and Techniques, Organisation Culture.</p>
	II(CE2B)	YCOE206B – ADVANCED MANAGERIAL COMMUNICATION	<p>CO1: Cog: (U), Aff: (R) Explain, Describe and identify the communication Process and Communication structure in organization</p> <p>CO2: Cog: (U), Aff: (R) Explain, Outline Modes of Oral Communication, Principles of effective writing and Approaching the writing process systematically</p> <p>CO3: Cog: (U), Aff: (R) Identify Letter about importing goods – Exporting with a letter of credit, Analyze Letter about documents against payment, against acceptance</p> <p>CO4: Cog: (U), Aff: (R) Discuss, Describe and Explain Preparing reports, short and long reports Writing Proposals: Structure & preparation</p> <p>CO5: Cog: (U), Aff: (R) Explain, Discuss and State Writing managerial documents</p>
13	III	YCO301 – INDIRECT TAXES	<p>CO1: Cog: (U), Aff: (R) Understand the basic concepts of GST.</p> <p>CO2: Cog: (U), Aff: (R) Explain the input tax credit.</p> <p>CO3: Cog: (App), Aff: (R) Apply and classify the types of customs duty.</p> <p>CO4: Cog: (U), Aff: (R) Explain the valuation of import and export Procedure.</p> <p>CO5: Cog: (U), Aff: (R) Summarise the other aspects of GST.</p>
14	III	YCO302 – RESEARCH METHODOLOGY	<p>CO1: Cog: (U), Aff: (R) Understand the basic concepts of research.</p> <p>CO2: Cog: (U), Aff: (R) Explain and Construct the research design and hypothesis</p>

			<p>CO3: Cog: (U), Aff: (R) Classify the types of sampling techniques</p> <p>CO4: Cog: (App), Aff: (R) Apply statistical tools for analysis.</p> <p>CO5: Cog: (U), Aff: (R) Summarise, explain the types of research report and analyse the layout of reports.</p>
15	III	YCO303 – SERVICE MARKETING	<p>CO1: Cog: (U), Aff: (R) Understand the significance of service marketing.</p> <p>CO2: Cog: (U), Aff: (R) Classify the different concepts of service marketing.</p> <p>CO3: Cog: (U), Aff: (R) Explain the service marketing mix.</p> <p>CO4: Cog: (U), Aff: (R) Interpret customer focused service marketing.</p> <p>CO5: Cog: (U), Aff: (R) Apply and Summarise, the other concepts of specific service marketing.</p>
16	III	YCO304 – OPERATIONS RESEARCH	<p>CO1: Cog: (App), Aff: (R) Solve Linear programming problems using simplex method</p> <p>CO2: Cog: (App), Aff: (R) Solve transportation and assignment problems</p> <p>CO3: Cog: (App), Aff: (R) Construction of Network and obtaining critical path</p> <p>CO4: Cog: (U), Aff: (R) Calculate optimum safety stock and reorder level.</p> <p>CO5: Cog: (App), Aff: (R) Solve problems using Queuing models.</p>
17	III(CE3A)	YCOE305A – BRAND MANAGEMENT	<p>CO1: Cog: (U), Aff: (R) Explain the Brand Hierarchy, Brand Personality, Brand Image, Brand Identity.</p> <p>CO2: Cog: (U), Aff: (R) Describe the Value addition from Branding and Brand-customer Relationships</p> <p>CO3: Cog: (U), Aff: (R) Discuss Brand Portfolio and Brand Assessment through Research.</p> <p>CO4: Cog: (U), Aff: (R) Explain Brand Identify, Position, Image and Personality Assessment.</p> <p>CO5: Cog: (U), Aff: (R) Explain the Branding in Different Sectors</p>

	III(CE3B)	YCOE305B – EXPORT AND IMPORT BUSINESS	<p>CO1: Cog: (U), Aff: (R) Explain the Theories of foreign trade.</p> <p>CO2: Cog: (U), Aff: (R) Summarises the Commercial Policy Instruments.</p> <p>CO3: Cog: (U), Aff: (R) Describe the Export Promotion and Institutional set up.</p> <p>CO4: Cog: (U), Aff: (R) Explain the Role of different Export Promotion bodies.</p> <p>CO5: Cog: (U), Aff: (R) Explain the International institutions and agreement.</p>
18	III(CE4A)	YCOE306 A – INFORMATION SYSTEMS CONTROL AND AUDIT	<p>CO1: Cog: (U), Aff: (R) Explain the role of information within business and various types of information systems</p> <p>CO2: Cog: (U), Aff: (R) Describe the Approaches of MIS Development</p> <p>CO3: Cog: (U), Aff: (R) Explain the Systems Audit and Management Functions</p> <p>CO4: Cog: (U), Aff: (R) Explain the Important terms under Information Technology Legislation</p> <p>CO5: Cog: (U), Aff: (R) Explain the Applications of Internet and Internet Protocols.</p>
	III(CE4B)	YCOE306B – ENTERPRISE RESOURCE PLANNING	<p>CO1: Cog: (U), Aff: (R) Explain the Enterprise an Overview.</p> <p>CO2: Cog: (U), Aff: (R) Describe the Risks of ERP.</p> <p>CO3: Cog: (U), Aff: (R) Discuss the ERP and Related Technologies.</p> <p>CO4: Cog: (U), Aff: (R) Explain the Functional Modules of ERP Software.</p> <p>CO5: Cog: (U), Aff: (R) Explain the implementation and Challenges of ERP.</p>
19	IV	YCO401 – SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT	<p>CO1: Cog: (U), Aff: (R) Understanding various Classification of investment, Investment alternatives, Types of risk</p> <p>CO2: Cog: (U), Aff: (R) Outline equity valuation and induce valuation techniques.</p> <p>CO3: Cog: (U), Aff: (R) Comprehend the derivatives and strategies of future market.</p>

			<p>CO4: Cog: (App), Aff: (R) Apply Portfolio management methods.</p> <p>CO5: Cog: (U), Aff: (R) Explain the fundamental analysis of portfolio management.</p>
20	IV	YCO402 – HUMAN RESOURCE MANAGEMENT	<p>CO1: Cog: (U), Aff: (R) Explain Functions HRM, HR Policies in organizations</p> <p>CO2: Cog: (U), Aff: (R) Outline the types of performances appraisal, Executive Compensation, Fringe benefits</p> <p>CO3: Cog: (U), Aff: (R) Describe training need and Career planning and development</p> <p>CO4: Cog: (U), Aff: (App) Understanding the importance of Performance appraisal system.</p> <p>CO5: Cog: (U), Aff: (R) State about Labour Turnover, significance of Quality of Work Life ,Stress Management</p>
21	IV	YCO403 – TOTAL QUALITY MANAGEMENT	<p>CO1: Cog: (U), Aff: (R) Explain the Dimensions of product and service quality and Describe the Contributions of Deming, Juran and Crosby.</p> <p>CO2: Cog: (U), Aff: (R) Describe TQM principles.</p> <p>CO3: Cog: (U), Aff: (R) Explain the TQM tools and techniques.</p> <p>CO4: Cog: (U), Aff: (R) Describe Quality Function Development (QFD) and TPM</p> <p>CO5: Cog: (U), Aff: (R) Explain the elements in 9001-2015 Quality System and 14001</p>
22	IV(CE5A)	YCOE404A – ACCOUNTING THEORY AND FINANCIAL REPORTING	<p>CO1: Cog: (U), Aff: (R) Explain the Indian Accounting Standards and GAAP</p> <p>CO2: Cog: (U), Aff: (R) Compare Standard Setting in India, USA and U.K.</p> <p>CO3: Cog: (U), Aff: (R) Explain the Nature and Objectives; Benefits of financial reporting.</p> <p>CO4: Cog: (U), Aff: (R) Describe the issues in Corporate Financial Reporting with reference to Accounting for Changing Prices</p> <p>CO5: Cog: (U), Aff: (R) Explain the interim reporting.</p>

	IV(CE5B)	YCOE404B – ENTREPRENEURIAL DEVELOPMENT PROGRAMME	<p>CO1: Cog: (U), Aff: (R) Explain the functions, types and phases of EDP.</p> <p>CO2: Cog: (U), Aff: (R) Discuss the project formulation and evaluation.</p> <p>CO3: Cog: (U), Aff: (R) Explain the Institutions in the development of entrepreneurs.</p> <p>CO4: Cog: (U), Aff: (R) Describe the Institutional finance to entrepreneurs: IFCI, SFC, TIIC, LIC and GIC, SIPCOT.</p> <p>CO5: Cog: (U), Aff: (R) Explain the Role of entrepreneur in export promotion and import substitution</p>
23	IV	YCO405 - PROJECT	<p>CO1: Cog: (U), Aff: (R) Relate research applications in commerce with workplace practice</p> <p>CO2: Cog: (U), Aff: (R), (Va) Comply with organization discipline, management and business practices</p> <p>CO3: Cog: (U), Aff: (R), (Res) Demonstrates team work and time management, work culture</p> <p>CO4: Cog: (U), Aff: (Va); Psy (Per) (Set) Describe and Display hands-on experience on practical skills obtained during the programme.</p> <p>CO5: Cog: (U), Aff: (Va) Summarize the tasks and activities done by technical documents and oral presentations.</p>

Programme Outcomes(PO) and Course Outcomes (CO) of
DEPARTMENT OF ENGLISH& FOREIGN LANGUAGES

Programmes Offered:

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

B.A. English

PROGRAMME OUTCOME (PO)	
PO1	Understand how literature and language go hand in hand in understanding social and cultural context
PO2	Identify and apply world criticism in literature.
PO3	Communicate effectively (written /oral) and work effectively as an individual or team.
PO4	Understand the impact and ethics of scientific discoveries on influencing society locally and globally.
PO5	Work effectively in bringing multidisciplinary ideas to diverse professional environment.
PO6	Find, collect and assess diverse information - its relevance and reliability.
PO7	Design and perform criticisms and thereby analyze with contemporary situations
PO8	Use techniques, tools and skills necessary for emerging technology.

COs

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	XGL101 COMMUNICATION SKILLS IN ENGLISH	<ol style="list-style-type: none"> 1. Explain the process of communication and its types 2. Recall various sounds and use it in proper context 3. Organize meeting events and recording it constructively 4. Adapt methods of framing questions and using punctuations 5. Demonstrate the basic skills at the time of interview and presentations
2	I	XEN102 POETRY – I	<ol style="list-style-type: none"> 1. Recognize the period of the poets and their works 2. Analyze the poetic nature in a constructive way of approach 3. Interpret the literary forms according to the lines 4. Relate the forms of poems with classics 5. Classify the distinctions between modern and classics
		XEN103 PROSE – I	<ol style="list-style-type: none"> 1. Recognize the period of the prose writers and their works 2. Analyze the prose works in a constructive way of approach 3. Interpret the prose forms according to the context 4. Relate the styles and forms of prose writings 5. Classify the distinctions between modern and classics
		XEN104 SOCIAL HISTORY OF ENGLAND	<ol style="list-style-type: none"> 1. Recognize the period of the social history 2. Analyze the colonizers approach 3. Interpret the age of Queen Ann and Industrial Revolution 4. Relate the war of independence with other nations 5. Classify the historical events happened in different context
		XEN105 INTRODUCTION TO LITERARY FORMS	<ol style="list-style-type: none"> 1. The Epic - The Ode - The Sonnet - The Elegy 2. The Novel - The Short Story – Biography - Autobiography 3. The Dramatic Art - Tragedy – Comedy - Tragi-Comedy

			<ol style="list-style-type: none"> 4. Image, Symbol, Simile, Metaphor, Personification, Paradox, Oxymoron, Exaggeration, Alliteration, Rhyme, Rhythm, Dramatic monologue, Character, Plot, Flashback, Chorus, Aside, Soliloquy 5. Hamartia, Denouement, One-act play, Farce, Melodrama, Epilogue, Anecdote, Irony, Allegory, Genre, Parable, Fable, Myth, Pathos, Poetic Justice, Satire, Theme
		XUM106 HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY	<ol style="list-style-type: none"> 1. Relate and Interpret the human ethics and human relationships 2. Explain and Apply gender issues, equality and violence against women 3. Classify various women challenges and Develop rules against women related issues 4. Classify and Dissect necessity of human rights and report on violations. 5. List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
	II	XGL201 ENGLISH FOR EFFECTIVE COMMUNICATION	<ol style="list-style-type: none"> 1. Explain the process of listening and its characteristics 2. Practicing the types of speeches 3. Recognize the basic expressions and using it effectively 4. Construct the means of writing contents to media 5. Employing various techniques in preparing communication letters
		XEN204 POETRY – II (NON BRITISH LIT)	<ol style="list-style-type: none"> 1. Recognize the period of the classical poetry 2. Analyze the poets contemporaries 3. Interpret the age of poets 4. Relate the theme with social relevance 5. Classify the historical events happened in different context
		XEN205 PROSE – II (NON BRITISH LIT)	<ol style="list-style-type: none"> 1. Recognize the period of the prose writers and their works 2. Analyze the prose works in a constructive way of approach 3. Interpret the prose forms according to the context 4. Relate the styles and forms of prose writings 5. Classify the distinctions between modern and classics

	III	XEN301 PROFESSIONAL WRITING	<ol style="list-style-type: none"> 1. Recognize the usage of letter writing 2. Analyze the techniques of report writing 3. Interpret the formats of report 4. Relate the criticisms with relevant news 5. Classify the distinctions between CV and resume
		XEN302 INTRODUCTION TO PHONETICS	<ol style="list-style-type: none"> 1. Recognize the speech sounds 2. Analyze the classifications of sounds 3. Interpret the stress and intonation 4. Relate the relations between syntax and semantics 5. Classify the transcriptions
		XEN303 DRAMA – I (BRITISH LIT)	<ol style="list-style-type: none"> 1. Explain the types of drama 2. Recall various periods of theatre 3. Organize dramatic periods constructively 4. Adapt the techniques of modern writers 5. Demonstrate the relation between classic and modern
		XEN304 HISTORY OF ENGLISH LITERATURE – I	<ol style="list-style-type: none"> 1. Recognize periods of literature 2. Analyze the classifications of ages 3. Interpret the literary developments 4. Relate the social background 5. Classify the periods according to the writers
	IV	XEN401 PRINCIPLES OF LITERARY CRITICISM I	<ol style="list-style-type: none"> 1. Explain the types of criticism 2. Recall various schools of criticism 3. Organize critics and theories constructively 4. Adapt the theory and criticism 5. Demonstrate the relation between theory and criticism
		XEN402 DRAMA – II (NON BRITISH LIT)	<ol style="list-style-type: none"> 1. Explain the types of drama 2. Recall various periods of theatre 3. Organize dramatic periods constructively 4. Adapt the techniques of modern writers 5. Demonstrate the relation between classic and modern
		XEN403 FICTION – I (BRITISH)	<ol style="list-style-type: none"> 1. Recognize periods of novelists 2. Analyze the classifications of ages

			<ol style="list-style-type: none"> Interpret the novel developments Relate the social background Classify the periods according to the writers
		XEN404 HISTORY OF ENGLISH LITERATURE – II	<ol style="list-style-type: none"> Recognize periods of literature Analyze the classifications of ages Interpret the literary developments Relate the social background Classify the periods according to the writers
	V	XEN501 PRINCIPLES OF LITERARY CRITICISM – II	<ol style="list-style-type: none"> Explain the types of criticism Recall various schools of criticism Organize critics and theories constructively Adapt the theory and criticism Demonstrate the relation between theory and criticism
		XEN502 FICTION – II (NON BRITISH LIT)	<ol style="list-style-type: none"> Recognize periods of novelists Analyze the classifications of ages Interpret the novel developments Relate the social background Classify the periods according to the writers
		XEN503 INTRODUCTION TO JOURNALISM AND MASS COMMUNICATION	<ol style="list-style-type: none"> Explain the types of journalism Recall various types of mass communication Organize the aspects of communication Adapt the theory of journalism Demonstrate the social aspects
		XEN504 COMMONWEALTH LITERATURES	<ol style="list-style-type: none"> Explain the types of literatures Recall various commonwealth literatures Organize critics and theories Adapt the theory and criticism Demonstrate the significant writers
	VI	XEN601 PRINCIPLES OF TRANSLATION	<ol style="list-style-type: none"> Explain the types of translation Recall various methods of criticism Organize critics and theories Adapt the theory and translation Demonstrate the methods of translation

		XEN602 INDIAN WRITING IN ENGLISH	<ol style="list-style-type: none"> 1. Recognize periods of novelists 2. Analyze the classifications of ages 3. Interpret the novel developments 4. Relate the social background 5. Classify the periods according to the writers
		XEN603 WOMEN STUDIES	<ol style="list-style-type: none"> 1. Recognize periods of writers 2. Analyze the classifications of ages 3. Interpret the developments 4. Relate the social background 5. Classify the periods according to the writers
		XEN604 AMERICAN LITERATURE	<ol style="list-style-type: none"> 1. Explain the social back ground 2. Recall the war of Independence 3. Organize authors constructively 4. Adapt the theory and criticism 5. Demonstrate the cultural aspects of American literature

2. M.A. English

PROGRAMME OUTCOME (PO)	
PO1	Ability to apply critical appreciation and analysis to literary pieces.
PO2	Inculcate ability to write correct, effective and forceful sentences, paragraphs and essays (Grammar & Discourse).
PO3	Get trained in the paralinguistic features such as tone, accent, rhythm, volume, pitch etc.
PO4	Expose to the histrionics of Drama and Role play.
PO5	Understand various genres of literatures, and to interpret and analyse effectively
PO6	Ability to apply the modern theories to the appreciation of literary pieces.
PO7	Developing research skills

SL. NO	SEMESTER	COURSE CODE & NAME	COS
1.	I	YEG101 CHAUCER TO MILTON	<ol style="list-style-type: none"> 1. Understand the ages and their literary developments 2. Recall the works of the authors with relevant context 3. Organize the works constructively 4. Adapt the literariness 5. Demonstrate the basic characteristics of the age
2.	I	YEG102 AUGUSTAN AGE TO ROMANTIC AGE	<ol style="list-style-type: none"> 1. Recognize the period of the poets and their works 2. Analyze the poetic nature in a constructive way of approach 3. Interpret the literary forms according to the lines 4. Relate the forms of poems with classics 5. Classify the distinctions between modern and classics
3.		YEG103 SHAKESPEARE	<ol style="list-style-type: none"> 1. Recognize the period of the prose writers and their works 2. Analyze the prose works in a constructive way of approach 3. Interpret the prose forms according to the context 4. Relate the styles and forms of prose writings 5. Classify the distinctions between modern and classics
4.	I	YEG104 INDIAN WRITING IN ENGLISH	<ol style="list-style-type: none"> 1. Recognize the period of the social history 2. Analyze the colonizers approach 3. Interpret the age of Queen Ann and Industrial Revolution 4. Relate the war of independence with other nations 5. Classify the historical events happened in different context
5.	I	YEG105 GRAMMAR & DISCOURSE	<ol style="list-style-type: none"> 1. Explain the process of writing and its characteristics 2. Practicing the types of discourse 3. Recognize the basic grammar rules and using it effectively 4. Construct the means of writing 5. Employing various grammar techniques in writing

6.	II	YEG201 VICTORIAN AGE	<ol style="list-style-type: none"> 1. Understand the age and its characteristics 2. Analyzing the age and its literary works 3. Recognize the writers and analyze critically 4. Construct the means of writing 5. Employing the social relevance
7.	II	YEG202 MODERN BRITISH LITERATURE	<ol style="list-style-type: none"> 1. Recognize the period of the Modern British Literature 2. Analyze the writers and their contemporaries 3. Interpret the age of literature 4. Relate the theme with social relevance 5. Classify the historical events happened in different context
8.	II	YEG203 AMERICAN LITERATURE	<ol style="list-style-type: none"> 1. Recognize the period of American Literature 2. Interpret the prose writers and their works 3. Relate the styles and forms of writings 4. Classify the distinctions between modern and classics
9.	II	YEG204 INTRODUCTION TO PHONETICS	<ol style="list-style-type: none"> 1. Relate and Interpret the sounds with relevant usage 2. Explain and Apply the sounds 3. Classify the types of sounds 4. Classify the variations 5. List out the phonemic chart for better understanding
10.	II	YEG205 HISTORY & STRUCTURE OF ENGLISH LANGUAGE	<ol style="list-style-type: none"> 1. Explain the types of English language 2. Recall various methods of usages 3. Organize the methods and adaptations of English language 4. Adapt the theory and structure 5. Demonstrate the methods of language usage
11.	III	YEG301 POST COLONIAL LITERATURE	<ol style="list-style-type: none"> 1. Recognize the social context of Post colonial literature 2. Analyze the period with social relevance 3. Interpret the writers and their works 4. Relate the criticisms with relevant context 5. Classify the distinctions between colonial and post colonial

12.	III	YEG302 INTRODUCTION TO COMPARATIVE LITERATURE	<ol style="list-style-type: none"> 1. Understand the history of Comparative literature 2. Analyze the types of CL 3. Interpret the theories of CL 4. Relate the types of CL with other literatures 5. Classify the comparative writers
13.	III	YEG303 JOURNALISM AND MASS COMMUNICATION	<ol style="list-style-type: none"> 1. Explain the basis of JMC 2. Recall various characteristics of JMC 3. Organize the theories of JMC 4. Adapt the techniques used in media 5. Demonstrate the significance of JMC
14.	III	YEG304 ENGLISH LANGUAGE TEACHING	<ol style="list-style-type: none"> 1. Recognize the characteristics of ELT 2. Analyze the aspects of teaching ELT 3. Interpret the language developments 4. Relate the social background in teaching language 5. Classify the various methods used in using visual aids
15.	III	YEG305 RESEARCH METHODOLOGY	<ol style="list-style-type: none"> 1. Recognize research methodologies 2. Analyze the types of research methodologies 3. Understand the formatting methods 4. Relate the textual relevance 5. Understand the effective usage of formats
16.	IV	YEG401 WORLD CLASSICS IN TRANSLATION	<ol style="list-style-type: none"> 1. Explain the types of translation 2. Recall various translation methods 3. Organize translation methods constructively 4. Adapt the theory and criticism of translation 5. Demonstrate the relation between Source language and Target Language
17.	IV	YEG402 INTRODUCTION TO TRANSLATION STUDIES	<ol style="list-style-type: none"> 1. Understand the basics of translation 2. Recognize the characteristics of TS 3. Understand the translation techniques 4. Adapt the techniques of modern writers 5. Demonstrate the works
18.	IV	YEG403 MODERN LITERARY THEORY & CRITICISM	<ol style="list-style-type: none"> 1. Recognize periods of theorists 2. Analyze the classifications of ages 3. Interpret the literary theory and its usages

			<ul style="list-style-type: none"> 4. Relate the social background 5. Classify the theories and criticism according to the writers
19.	IV	YEG404 INTRODUCTION TO PSYCHOLINGUISTICS	<ul style="list-style-type: none"> 1. Recognize the nature of psycholinguists 2. Analyze and classify the nature of linguistics 3. Interpret the social context 4. Relate the implementations 5. Classify the nature of psycholinguistics
20.	IV	YEG405 PROJECT	<ul style="list-style-type: none"> 1. Explain the methods of research 2. Recall the types of research 3. Organize the chapters 4. Adapt the theory and criticism 5. Present the content in the format

Programme Outcomes (PO) and Course Outcomes (CO) of

DEPARTMENT OF EDUCATION

Programmes Offered:

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

1. a. B.Sc.B.Ed Programme Outcomes

PROGRAMME OUTCOME	
PO1	Develop good command of the subject matter to impart both theoretical and practical knowledge of Mathematics, Computer Science, Physics and Chemistry in upper primary and secondary level education.
PO2	Tech in accordance with the philosophical, sociological and psychological foundations of education to give best support to students learning.
PO3	Effective use of innovative teaching methods, appropriate teaching aids and assessment tools.
PO4	Create, select and apply appropriate ICT techniques material and modern information tools such as internet, e – resources for content delivery, analysis, testing and evaluation.
PO5	Engage in purposeful professional development focused on professional goals. Ability to pursue post-graduation in Education and their discipline.
PO6	Develop language proficiency and communicate effectively as a teacher in the teaching learning activities and as a leader in various activities of the school and society.
PO7	Relate subject matter with social milieu and develop critical thinking, professional ethics and service attitude to contribute for the upliftment of the society. Identify issues such as gender, women empowerment, environment etc.
PO8	Demonstrate leadership qualities in classroom management and school administration
PO9	Undertake productive research to solve problems faced by the students and teachers in the professional life.
PO10	Be receptive and View knowledge generations on continuously evolving process of reflective learning.
PROGRAMME SPECIFIC OUTCOMES	
PSO1	Promote competencies skills needed for an effective science and mathematics teacher and act as agent of social change.

1. b. Course Outcomes

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	XBE101 TAMIL -I	<ol style="list-style-type: none"> gy;NtW ftpQu;fspd; tho;f;if tuyhw;iwAk; mtu;fsJ gilg;GfisAk; mwpe;Jnfhs;sy;. ehty;fs; gw;wpAk; gilg;ghsu;fspd; jpwd;fs; gw;wpAk; czu;e;Jnfhs;sy;. rpWfijapd; mikg;gpId njupe;Jnfhs;Sjy;. ftpij> ciueil Mfpa ,yf;fpa tif Fwpj;J njspTngWjy;. tOcr;nrhy;> kuGr;nrhy; mfutupirg; gl;bay; Mfpatw;iw njupe;Jnfhs;Sjy;.
2		XBE102 ENGLISH - I	<ol style="list-style-type: none"> Generalizes the basics of grammar, vocabulary, spelling, punctuation and speech. Applies the concept of grammar in the situations and Workplace Categorizes the structure of essay writing Interprets the text and comprehends meaning Develop the societal Skill
3		XBE103H HOLISTIC EDUCATION	<ol style="list-style-type: none"> Defines the concepts of health education Outlines the modern concepts of physical education Adapts the skills to perform during practices Reproduce the various forms of yogasanam
4		XBE104 INTRODUCTION TO COMPUTERS	<ol style="list-style-type: none"> Summaries the uses of computer applications in various field Define and describe the fundamental concepts of digital computer Explain the different types of Operating systems List out various computer networks and differentiatethem Identify the uses of internet and tell about the uses ofinternet
5		XBE105 UNDERSTANDING	<ol style="list-style-type: none"> Recognize the basic concepts of education

		EDUCATION AND ITS PERSPECTIVE	<ol style="list-style-type: none"> Compares the thinkers of Indian and western on education field Explain the socio – cultural context of education Justify the concepts of values Distinguish the problems and opportunities in Indian education society.
6		XBE106 DIFFERENTIAL CALCULUS AND TRIGONOMETRY	<ol style="list-style-type: none"> Apply basic differentiation rules to various functions and Understand the concept of maxima and minima. Understand the meaning of radius of curvatures and able to find the RCs for the conics in Cartesian and polar forms Able to understand the concepts of properties of the complex number and solve the trigonometric expansions Recognise the relation between the circular and hyperbolic functions. Remembering the concepts of logarithm of complex number and valuing trigonometric series
7		XBE107 PROPERTIES OF MATTER AND SOUND	<ol style="list-style-type: none"> Identify the principles of elasticity, derive expression for twisting couple and determine rigidity modulus of a wire Develop Knowledge on bending of beams, its properties and application Define surface tension, recall the concepts of low pressure and explain the methods of production of low pressure. Understand flow of liquid, viscosity and identify its applications. Describe the production, propagation, perception & analysis of acoustical wave.
8		XBEC108 GENERAL CHEMISTRY - I	<ol style="list-style-type: none"> Identify the various families of elements and describe the periodic properties like periodic trends, extraction preparation and properties of p- Block elements and their

			<p>compounds.</p> <ol style="list-style-type: none"> 2. Explain the behavior and chemical properties of compounds of p- Block elements and Nobel gases. 3. Illustrate the various haloalkanes compounds and Describe the mechanism of nucleophile and electrophonic substitution reactions. 4. Describe the stereochemistry of molecules and Discuss the properties related to their conformations. 5. Identify and Relate the structure and properties of solid state, liquid crystals and colloids
9		XBES108 PROGRAMMING IN C	<ol style="list-style-type: none"> 1. Identify and explain the data types in C and basic arithmetic operators in C 2. Explain the different looping statement and choose appropriate C statement 3. Understand the concepts of functions and procedures 4. Recognizes the uses of arrays 5. Explain the function concept in C and choose function to write C Programme.
10		XBE109 PHYSICS PRACTICAL - I	<ol style="list-style-type: none"> 1. Use laboratory techniques such as accuracy of measurements and determination of modulus of material. 2. Explain and give the characteristics of semiconductor devices. 3. Gain knowledge and identify the various laws of thermal, viscous and surface tension. 4. Manipulate the optical, electrical and heat properties with excellent application knowledge. 5. Use basic knowledge to find resistance material.
11		XBEC110 VOLUMETRIC	<ol style="list-style-type: none"> 1. Identify the various Metals in the solution.

		ANALYSIS LAB – I	<ol style="list-style-type: none"> 2. Estimate the amount of acids using volumetric method. 3. Estimate the amount of bases using volumetric method. 4. Identify the various Metals in the solution. 5. Estimate the amount of acids using volumetric method.
12		XBES110 PROGRAMMING IN C LAB	<ol style="list-style-type: none"> 1. Ability to write C programmes for simple problems and construct flow chart for real time problems. 2. Demonstrate the use of various C statements. Write C Programmes with arrays 3. Use the concept of pointers to write programmes
13	II	XBE201 TAMIL - II	<ol style="list-style-type: none"> 1. rpw;wpyf;fpaq;fspd; rpwg;Gf;fisj; njupe;Jnfhs;sy;. 2. ,ilf;fhy ,yf;fpaj;jpidAk;>rka ,yf;fpaj;jpidAk; eilKiwapy; gad;gLj;Jjy;. 3. cyh kw;Wk; Kf;\$lw;gs;S ,yf;fpaq;fspd; top kf;fl;gz;Gzu;jy;. 4. Gjpd ,yf;fpatuyhw;wpy; njspTngwy;. 5. jkpopyf;fz xw;Wg;gpiofis ePf;Fk; toptif mwpjy; kw;Wk; fiyr; nrhy;yhf;fk; Fwpj;J njspTngwy;.
14		XBE202 ENGLISH - II	<ol style="list-style-type: none"> 1. Creates new content of the writing and meaning 2. Paraphrases the speeches and interprets the principles of speakers 3. Prepares letters with modern style of writing 4. Interprets the meaning and understands the poems
15		XBE203E ENVIRONMENTAL EDUCATION	<ol style="list-style-type: none"> 1. appreciate the need for protection and conservation of living and non-living environmental resources and sustainable development 2. Understand the harmful effects of

			<p>environmental pollution and preventive measures.</p> <p>3. Distinguishes the environment and Human Health.</p>
16		XBE204 SOFTWARE PACKAGES - LAB	<p>1. Apply the concept of windows and identifies the command</p> <p>2. Apply the concept of MS-Word and identifies the command</p> <p>3. Apply the concept of MS-Excel and identifies the command</p> <p>4. Apply the concept of MS Powerpoint and identifies the command</p>
17		XBE205 EDUCATIONAL PSYCHOLOGY – UNDERSTANDING THE LEARNER	<p>1. Explain the concepts learning, remembering and forgetting transfer of learning and evaluate the theories of learning in various learning situations.</p> <p>2. Explain the theories of motivation and evaluate role of rewards and punishments, success and failure, cooperation and competition, level of aspiration and achievement motivation in an individual's development.</p> <p>3. Examine the various ways of providing education and methods of prevention and treatment of exceptional children</p> <p>4. Discuss the importance of mental health and hygiene and guidance and counselling.</p> <p>5. Evaluate the personality and its applications</p>
18		XBE206 ALGEBRA AND NUMERICAL ANALYSIS	<p>1. Explain the concept of Theory of Equations and apply it for solving the problems Forming equations with the given roots and all types of Descarte's rule.</p> <p>2. Explain an algebraic or transcendental equation and Solve using a Newton Raphson Method, Bisection method, Gaussian Elimination method, Gauss Jacobi iterative methods.</p> <p>3. Follows the appropriate numerical methods for solving problems</p> <p>4. Apply Finite differences methods to approximate and interpolate a polynomial function.</p> <p>5. Perform Finite differences methods to</p>

			<p>solve a polynomial function using Newton's forward & backward difference interpolation formulae, Lagrange's interpolating polynomial and Divided differences.</p>
			<p>6. Explain the use of interpolation methods and numerical differentiation to Find the first, second order derivatives and integration problems using Trapezoidal rule & Simpson's 1/3 and 3/8 rules.</p>
19		XBEC207 MECHANICS AND RELATIVITY	<ol style="list-style-type: none"> 1. Find the notions of slope and inclination of lines, including angles between lines, parallel lines, and perpendicular lines and skew lines. 2. Apply the relationship between equations in two variables and graphs in the plane and use the equations to find pertinent information such as points of intersection, and intercepts. 3. Decide when it is appropriate to use the method known as integration by parts 4. Apply the formula for integration by parts to definite and indefinite integrals 5. Acquire the beta and gamma function
20		XBEC208 GENERAL CHEMISTRY - II	<ol style="list-style-type: none"> 1. Recall and Explain the basic concepts of ionic bonding; Display the shapes of simple inorganic molecules using VSEPR theory 2. Summarize and Report extraction, properties and uses of I A and IIA group s-block elements. 3. Discuss the preparation, properties of alkenes, alkynes and dienes and Apply the mechanism of elimination, electrophilic and free radical addition reactions; 4. Classify the types of polymerization reactions and polymers uses. 5. Describe the preparation and properties of benzene and benzenoid compounds; 6. Analyze the mechanism of aromatic electrophilic substitution reactions. 7. Classify the types of Molecular velocity of gases and its properties; Derive Vander walls equation of real gases.
21		XBES208 DATA STRUCTURES AND ALGORITHMS	<ol style="list-style-type: none"> 1. Recognize the concept of different data structure and relate them. Able to discuss about the various applications of stack and queues 2. Summarize the nonlinear data structures

			<p>and explain the various operations with them.</p> <ol style="list-style-type: none"> 3. Able to present different traversal concepts of tree and graph. 4. explain the various sorting methods and illustrate with examplesable to solve simple problems in sorting concepts 5. Rewrite the concepts of Greedy algorithm and able to give an example 6. Able to follow the greedy algorithm applications 7. Able to explain the back tracking method.Acknowledge the concept of backtracking algorithm with 8-queens problem and graph coloring
22		XBE209 PHYSICS PRACTICAL - II	<ol style="list-style-type: none"> 1. Use laboratory techniques such as accuracy of measurements and determination of modulus of material. 2. Explain and give the characteristics of semiconductor devices. 3. Gain knowledge and identify the various laws of thermal, viscous and surface tension. 4. Manipulate the optical, electrical and heat properties with excellent application knowledge. 5. Use basic knowledge to find resistance material.
23		XBEC210 VOLUMETRIC ANALYSIS LAB – II	<ol style="list-style-type: none"> 1. Identify the various Metals in the solution 2. Explain and understand the law and principle of volumetric analysis 3. Describe the various types of volumetric titration and Apply in their applications
24		XBES210 DATA STRUCTURES USING C LAB	<ol style="list-style-type: none"> 1. Apply C programmes for basic data structures like arrays and ordered list and demonstrate programme for stack and queue operations 2. Implementing C programming skill to linked lists and show some examples 3. Explain the search and sorting techniques.

25	III	XBE301	TAMIL - III	<ol style="list-style-type: none"> 1. ,ul;ilf; fhg;gpaq;fs; Fwpj;J Gupe;Jnfhs;sy;. 2. fhg;gpaq;fs; (lk;ngUk;> IQ;rpW) Fwpj;J njspTngwy;. 3. ehlf ,yf;fpaj;jpd; eak; kw;Wk; ebf;Fk; Mw;wy; Nghd;wtw;iw tsu;j;jy;. 4. Xyp NtWghLfs; gw;wp Gupe;Jnfhs;sy;. 5. nkhop ngau;g;gpd; mtrpak; Fwpj;Jk;> fUj;Jr; rpijahky; RUf;fp vOJk; jpwidAk; czu;e;Jnfhs;sy;.
26		XBE302	ENGLISH - III	<ol style="list-style-type: none"> 1. Creates new content of the writing and meaning 2. Reproduces the sounds and imitates the pronunciations 3. Interprets the meaning and understands the meaning 4. Analyze the time and content of writing and writer
27		XBE303	THEATRE, ART AND HERITAGE CRAFT TRADITIONS	<ol style="list-style-type: none"> 1. Calibrates the proficiency in coordination performance 2. Explaining the meaning of concepts of aesthetics 3. Reproduces the skills of visual arts and crafts
28		XBEC304	PROGRAMMING IN C (FOR MPC GROUP STUDENTS)	<ol style="list-style-type: none"> 1. Outline the basics of C Language 2. Identify the basic operators / statements in C 3. Describe the concepts of arrays and functions 4. Demonstrate the statements with simple C programme
29		XBES304	VISUAL PROGRAMMING (FOR CSMP GROUP STUDENTS)	<ol style="list-style-type: none"> 1. Recognise the basics of window programming 2. Reproduce the window controls 3. Identify the VB Commmands 4. Demonstrate the VB Basic tools with simple VB applications

30		XBE305	EDUCATIONAL PSYCHOLOGY – UNDERSTANDING THE LEARNING PROCESS	<ol style="list-style-type: none"> 1. Explain the concepts learning, remembering and forgetting transfer of learning and evaluate the theories of learning in various learning situations. 2. Explain the theories of motivation and evaluate role of rewards and punishments, success and failure, cooperation and competition, level of aspiration and achievement motivation in an individual's development. 3. Examine the various ways of providing education and methods of prevention and treatment of exceptional children 4. Discuss the importance of mental health and hygiene and guidance and counselling.
31		XBE306	ANALYTICAL GEOMETRY (3D) AND INTEGRAL CALCULUS	<ol style="list-style-type: none"> 1. Solve algebraic and transcendental equations and to find eigen values of a matrix by power method 2. Interpret and approximate the data using interpolation methods 3. Solve the numerical differentiation and integration and to apply the Trapezoidal and Simpson's rules. 4. Solve the first order and second order differential equations using single step and multistep methods. 5. Apply finite difference methods to solve two-point linear boundary value problems and to solve one dimensional heat-flow equation and wave equation.
32		XBE307	HEAT AND THERMO DYNAMICS	<ol style="list-style-type: none"> 1. Recall C_p and C_v and basic concepts of specific heat and Explain various theories 2. Explain the nature of heat and heat transmission and Distinguish mono- di- triatomic gases 3. List the laws of thermodynamics and Explain latent heat and entropy 4. Define Coefficient of Thermal Conductivity, Determine thermal conductivity of bad conductor and Discuss the various laws for heat flow 5. Analyze statistical equilibrium, explain various distribution laws and Compare the three statistics

33		XBEC308	GENERAL CHEMISTRY - III	<ol style="list-style-type: none"> 1. Identify the various families of elements and describe the periodic properties like periodic trends, extraction preparation and properties of p- Block elements and their compounds. 2. Explain the behavior and chemical properties of compounds of p- Block elements and Nobel gases. 3. Illustrate the various haloalkanes compounds and Describe the mechanism of nucleophile and electrophonic substitution reactions. 4. Describe the stereochemistry of molecules and Discuss the properties related to their conformations. 5. Identify and Relate the structure and properties of solid state, liquid crystals and colloids
34		XBES308	OBJECT ORIENTED PROGRAMMING WITH C++ AND JAVA	<ol style="list-style-type: none"> 1. Recognise and identify the basics of OOPS concept 2. Reproduce the concepts of Functions in C++ 3. Describe the concepts of constructor and destructor 4. Discuss the concepts of inheritance 5. Reproduce and Describe the java features
35		XBEC309	PHYSICS PRACTICAL - III	<ol style="list-style-type: none"> 1. Use laboratory techniques such as accuracy of measurements and determination of unknown frequencies. 2. Explain and give the characteristics of various semiconductor devices. 3. Gain knowledge and identify the various laws of thermo dynamics 4. Manipulate the electrical properties with excellent application knowledge. 5. Use basic knowledge of electronics to construct power supply
36		XBEC310	SEMIMICRO INORGANIC QUALITATIVE ANALYSIS (ANIONS) LAB	<ol style="list-style-type: none"> 1. Identify the various cations and anions present in the given inorganic mixture and analyses the respective groups. 2. Explain the fundamentals of group separation and chemical reaction takes place in the confirmation test. 3. Predict the results and differentiate the various groups and cations/ anion present in the mixture.

37		XBES310 PROGRAMMING IN C++ AND JAVA LAB	<ol style="list-style-type: none"> 1. Ability to implement C++ concept for simple problems and construct flow chart for real time problems. 2. Demonstrate the use of various C++ commands 3. And Write C++ programmes for simple applications with functions 4. Use the concept of OOPs concept with Java
38		XBES311 PRACTICUM AND SCHOOL INTERNSHIP – I	<ol style="list-style-type: none"> 1. To familiarize student teachers with classroom processes and skills employed in teaching-learning process 2. To familiarize the student teachers to school environment, its structure, functions and processes. 3. To provide field experience of assessment practices including record maintenance followed in schools at secondary level. 4. To Develop the skills in organizing the physical education programmes in schools and to plan the activities required for organizing physical education meets and events. 5. To Acquire knowledge about recreation, health and safety education
39	IV	XBE401 TAMIL - IV	<ol style="list-style-type: none"> 1. gz;ila ,yf;fpaq;fspd; gz;G eyd;fis mwpjy;. 2. vl;Lj;njhif gj;Jg;ghl;L> jpUf;Fws; mwf;fUj;Jf;fis mwpe;J mjd;gb top elj;Jjy; 3. Kr;r;q;fk; kw;Wk; rq;ffhyk;> rq;f kUtpa fhy ,yf;fpa tuyhw;wpid ca;j;Jzu;jy;. 4. jkpo;r; nrk;nkhopr; rpwg;Gf;fis mwpe;JVw;Wf; nfhs;sy;. 5. khztu;fspd; gy;NtW gilg;ghf;fj;jpwd; fisAk; ,jopay; Jiwap; GyikAk; tsu;j;jy;.
40		XBE402 ENGLISH - IV	<ol style="list-style-type: none"> 1. Recognizes the difference in understanding tense especially for speaking and writings 2. Analyzes the various states of interpersonal communication 3. Identifies the types of conflicts and adjusts

			<p>according to situations</p> <p>4. Responds to the groups and improves all skills</p>
41		XBE403 SOCIAL ENGINEERING	<p>1. Identify the origin of caste and race</p> <p>2. Listen the anti-caste struggles in modern India and react with modern Indian movement.</p> <p>3. Distinguishes the gender inequalities</p>
42		XBE404 INTRODUCTION TO MATLAB	<p>1. Understand the concept of MATLAB</p> <p>2. Acquire the knowledge and analysis the concept of MATLAB</p> <p>3. Acquire the function and concepts of MATLAB</p>
43		XBE405 ASSESSMENT OF LEARNING	<p>1. Identify the assessment system and evaluation pattern and their role in teaching learning process</p> <p>2. Integrate the assessment task and tools to assess learner's competence and construct the performance with blooms taxonomy.</p> <p>3. Initiates the skill of constructing an achievement test scoring and grading procedures</p> <p>4. Analyze the interpretation and differentiate the report of the students performance</p>
44		XBE406 VECTOR CALCULUS AND FOURIER SERIES.	<p>1. Explain the concept of vector differential operators and apply it for solving the problems</p> <p>2. Estimate the line integral, surface and volume Integrals, Listen and take part in solving the problems on line, surface and volume integrals.</p> <p>3. Apply Green's, Stokes and Divergence theorems to solve the problems Perform Green's, Stokes and Divergence theorems to the vector field</p> <p>4. Explain the basic concept and periodic function of ourier series for the given function. Apply the concepts to solve the problems in even, odd and periodic functions problems.</p>
			5. Interpret to approximate a given function

			by a combination of simple cos and sin Functions to solve the problems.
45		XBE407 OPTICS AND SPECTROSCOPY	<ol style="list-style-type: none"> 1. Define, explain and demonstrate the propagation of light in prism & lens; discuss the phenomenon of lens aberration. 2. Acquire solid knowledge of interference; Analyze reflection and transmission of optic wave in thin film (air wedge) and determine wavelength of light using Michelson's interferometer. 3. Identify the basics of polarization, production and detection of polarized light, explain wave plate and polarimeter
46		XBEC408 GENERAL CHEMISTRY - IV	<ol style="list-style-type: none"> 1. Explain the periodic trends, extraction, preparation and properties of d- block elements and their compounds 2. Describe the periodic properties of f-block elements 3. Describe the principles and properties of organo metallic compounds. 4. Understand the chemistry of alcohols, phenols and ether 5. Apply and Identify the principles of chemical kinetics and catalysis.
47		XBES408 COMPUTER GRAPHICS	<ol style="list-style-type: none"> 1. Recognize the display devices and their classifications and describe about their functions Able to discuss about the various Graphics Software 2. Explain the procedure to draw the basic elements of computer graphics like line segment and circle and discuss about the attributes of line segments Able to write algorithm for filling a region covered with closed boundary 3. Able to discuss the various graphics transformation on two dimensional and explain the different clippings. Able to implement simple transformations. Able to perform composite transformation. 4. Summarize the different viewing methods. Respond for the basic transformations 5. Able to explain and classify the different projections. Acknowledge the different visible surface detection methods of 3D objects
48		XBE409 PHYSICS	<ol style="list-style-type: none"> 1. Use laboratory techniques such as

		PRACTICAL - IV	<p>accuracy of light experiments.</p> <ol style="list-style-type: none"> 2. Explain and Study the thickness of materials. 3. Gain knowledge and identify the various laws of light. 4. Manipulate the optical, electrical and heat properties with excellent application knowledge. 5. Use basic knowledge to find resistance material.
49		XBEC410 SEMI MICRO INORGANIC QUALITATIVE ANALYSIS (CATIONS) LAB	<ol style="list-style-type: none"> 1. Identify the various cations present in the given inorganic mixture and analyses the respective groups. 2. Explain the fundamentals of group separation and chemical reaction takes place in the confirmation test. 3. Predict the results and differentiate the various groups and cations/ anion present in the mixture.
50		XBES410 COMPUTER GRAPHICS LAB	<ol style="list-style-type: none"> 1. Apply C programmes for basic elements of computer graphics and demonstrate programme for line segment and circle 2. Implementing C programming skill to graphics transformations and show some examples 3. Explain the clipping algorithms with basic elements
51		XBE411 PRACTICUM AND SCHOOL INTERNSHIP-II	<ol style="list-style-type: none"> 1. To familiarize student teachers with classroom processes and skills employed in teaching-learning process 2. To familiarize the student teachers to school environment, its structure, functions and processes. 3. To provide field experience of assessment practices including record maintenance followed in schools at secondary level. 4. To Develop the skills in organizing the physical education programmes in schools and to plan the activities required for organizing physical education meets and events.
52	V	XBE501 SOFT SKILL	<ol style="list-style-type: none"> 1. Compare the importance of soft skill,

		DEVELOPMENT AND PEACE EDUCATION	<p>communication skill, and self esteem</p> <ol style="list-style-type: none"> 2. Discovering the interpersonal skills 3. Evaluate the societal skills and provide awareness on cultural development 4. Grasps the knowledge of peace education
53		XBE502 BASICS OF E – LEARNING EDUCATION	<ol style="list-style-type: none"> 1. Define the basic knowledge about the principles and usage of e – learning in Education. 2. Relate the significance of e - learning 3. Identify the different tools of multimedia in developing e - content.
54		XBE503 TEACHING APPROACHES AND STRATEGIES	<ol style="list-style-type: none"> 1. Identify the basic principles of teaching 2. Relating the models of teaching with its characteristics 3. Describe the types of teaching and its methods 4. Explain the effectiveness of teaching aids with Educational Technology
55		XBE504A PEDAGOGY OF MATHEMATICS - I	<ol style="list-style-type: none"> 1. Understanding the characteristics of Mathematical language and its role in Science 2. Identify the aims and objectives of teaching mathematics for secondary schools 3. Applying the strategies for mathematical learning and elaborate the attainment and uses of concepts 4. Trace the generalization of teaching mathematics & analyze the strategies involved in teaching mathematics 5. Utilize the additional resources for learning mathematics and determine the recreational followed in mathematics
56		XBE504B PEDAGOGY OF PHYSICS- I	<ol style="list-style-type: none"> 1. Construct the teaching objectives and prepare the lesson plan, unit plan and course plan. 2. Analyze the nature and scope of teaching physical science 3. Demonstrate the learning approaches in physical science & construct the concept mapping tools of learning 4. Explain the teachers role in learning physical science

57		XBEC504	PEDAGOGY OF CHEMISTRY - I	<ol style="list-style-type: none"> 1. Recognize and identify the importance of teaching computer science 2. Reproduce the concepts of Bloom's taxonomy 3. Classify the different computer aided instruction methods 4. Identify the resources for computer science teaching 5. Follows the lab planning and managing concepts
58		XBES504	PEDAGOGY OF COMPUTER SCIENCE - I	<ol style="list-style-type: none"> 1. critically analyze the curriculum/evaluation practices of teaching of Chemistry in school to bring about changes in future to promote better pedagogy 2. Comprehends the objectives of teaching and planning the skills in learning 3. Analyze the effective transaction and evaluation in teaching chemistry 4. Evaluate the essential of the laboratory professional development of a chemistry teacher
59		XBE505	SEQUENCES AND SERIES	<ol style="list-style-type: none"> 1. Quote and understand the definition of a limit of sequence or a function and the corresponding theorem 2. Define and Explain Infinite series, convergence, divergence and oscillation of a series and necessary condition of a series. 3. Apply the basic tests for convergence of infinite series 4. Demonstrate an understanding of Cauchy's condensation root test. 5. Understand and be able to use Wilson's theorem, Fermat's little theorem and Lagrange's theorem.
60		XBE506	ELECTRICITY AND MAGNETISM	<ol style="list-style-type: none"> 1. To study Coulomb's law and Gauss theorem and its applications and also the principle and types of capacitors 2. To understand the principle of Magneto statics, magnetic effects of electric current and their applications. 3. To understand the Kirchhoff's law, Wheatstone's bridge and their applications 4. To study Seebeck effect, Peltier effect and Thomson effect and their applications 5. To understand the principle of electromagnetic induction and ac circuits

61		XBEC507	INORGANIC CHEMISTRY - I	<ol style="list-style-type: none"> 1. Recall and Explain the basic concepts of coordination chemistry; Display the shape and coordination modes of molecules using various theories. 2. Summarize and Discuss the stability of octahedral and square planar complexes. 3. Discuss and Report the various applications of coordination compounds in quantitative analysis. 4. Describe the various packing arrangements of atoms and Analyze the type of semiconductors 5. Classify the types of organometallic compounds and Summarize their preparation and applications
62		XBES507	DATABASE MANAGEMENT SYSTEMS	<ol style="list-style-type: none"> 1. Recall and Explain the basic concepts of coordination chemistry; Display the shape and coordination modes of molecules using various theories. 2. Summarize and Discuss the stability of octahedral and square planar complexes. 3. Discuss and Report the various applications of coordination compounds in quantitative analysis. 4. Describe the various packing arrangements of atoms and Analyze the type of semiconductors 5. Classify the types of organometallic compounds and Summarize their preparation and applications
63		XBE508	PHYSICS PRACTICAL - V	<ol style="list-style-type: none"> 1. Use laboratory techniques such as accuracy of measurements and determination of modulus of material. 2. Explain and give the characteristics of semiconductor devices. 3. Gain knowledge and identify the various laws of thermal, viscous and surface tension. 4. Manipulate the optical, electrical and heat properties with excellent application knowledge. 5. Use basic knowledge to find resistance material.
64		XBEC509	GRAVIMETRIC ANALYSIS LAB	<ol style="list-style-type: none"> 1. Recall and Explain the basic concepts of coordination chemistry; Display the shape and coordination modes of molecules using various theories.

			<ol style="list-style-type: none"> 2. Summarize and Discuss the stability of octahedral and square planar complexes. 3. Discuss and Report the various applications of coordination compounds in quantitative analysis.
65		XBES509 RDBMS LAB	<ol style="list-style-type: none"> 1. Ability to implement RDBMS concept for simple problems and construct flow chart for real time problems. 2. Demonstrate the use of various SQL commands 3. And Write SQL queries 4. Use the concept of SQL Tables
66		XBE510 PRACTICUM AND SCHOOL INTERNSHIP-III	<ol style="list-style-type: none"> 1. Understand the different strategies and approaches used in teaching based on the nature of content and the skills to be developed. 2. To analyze action research outcomes, and apply action research in the classroom as a regular practice. 3. To provide field experience of assessment practices including record maintenance followed in schools at secondary level.
67	VI	XBE601 INDIAN CONSTITUTIONS AND HUMAN RIGHTS	<ol style="list-style-type: none"> 1. Know the importance, preamble and salient features of Indian constitution 2. Appreciate the significance of fundamental rights, duties and directive principles of state policy 3. Develop an understanding of the strength of the union government 4. Know the meaning, significance, the growing advocacy of human rights.
68		XBE602 INTRODUCTION TO LATEX	<ol style="list-style-type: none"> 1. Acquired knowledge to create Latex document 2. Acquired skill to create the documents with mathematical expressions and equations 3. Apply the skill to prepare a structured document
69		XBE603 SECONDARY EDUCATION IN INDIA – STATUS, CHALLENGES AND STRATEGIES	<ol style="list-style-type: none"> 1. Tell the development of education in India 2. Compare the various development of educational after independence 3. Categories the polices of secondary education

			<ol style="list-style-type: none"> Justify the statues of secondary education Compares the quality of education and its performance
70		XBE604A PEDAGOGY OF MATHEMATICS – II	<ol style="list-style-type: none"> Understanding of mathematical proof in the context of secondary school mathematics Understanding of nature, importance and strategies of problem-solving Ability to teach proof of theorem and solution of problem to develop relevant skills. Ability to evaluate understanding of proof of a theorem and problem-solving skills. Ability to construct of appropriate test items.
71		XBE604B PEDAGOGY OF PHYSICS- II	<ol style="list-style-type: none"> identify themes in physical science for which community can be used as a learning resource conduct physical science related activities through science clubs, science fairs, science exhibitions during school attachment Familiarize with different types of curricular projects in physical science, their purpose and themes. Become aware of various professional organizations and professional development programs in physical science Understand the technology of teaching physical science and give them practice in the use of audio visual aids
72		XBEC604 PEDAGOGY OF CHEMISTRY - II	<ol style="list-style-type: none"> Understand to develop the content for school curriculum Develop the method of teaching chemistry Analyze the assessment and evaluation in learning chemistry Develop the resources available for teaching chemistry Apply the teaching and learning process resources for chemistry subject

73		XBES604	PEDAGOGY OF COMPUTER SCIENCE - II	<ol style="list-style-type: none"> 1. Recognize and identify the importance of planning the computer science curriculum 2. Reproduce the contents of XII and XI standard CS text book and summaries the content organizing methods 3. Classify the computer science text books 4. Generalize the class room interaction methods 5. Demonstrate the skills of teaching computer science
74		XBE605	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	<ol style="list-style-type: none"> 1. Be able to solve homogeneous second-order equations. 2. Know a general method for constructing solutions to homogeneous and non-homogeneous linear constant- coefficient of second-order equations. 3. Apply the knowledge of differential equations in order to solve engineering problems. 4. Develop an understanding of the core ideas and concepts of Ordinary Differential Equations. 5. Understand the concept of Laplace transforms and inverse Laplace transforms.
75		XBE606	ATOMIC AND SOLID STATE PHYSICS	<ol style="list-style-type: none"> 1. Understand the atom models and their importance. 2. Apply the fine structure of spectral line, select ion rules and Zeeman Effect. 3. Analyze the production of x-rays, diffraction of x-rays, Mosley's law, Bragg's law and Compton's effect and their verification 4. Develop the photo electricity, photo electric emission, Plank's constant, photo electric cell and it's applications 5. Describe the fundamentals of crystal structure Bravais lattice, Miller indices and its determinate ion for various crystal structure.
76		XBEC607	ORGANIC CHEMISTRY - I	<ol style="list-style-type: none"> 1. To understand the preparation, properties and uses of carbonyl compounds 2. To understand the preparation, properties and uses of carboxylic acids

			<ol style="list-style-type: none"> 3. To acquaint students with the knowledge of Nitrogen compounds 4. To acquaint students with the knowledge of Hetero cyclic compounds 5. To acquaint students with the knowledge of Industrial Organic chemistry
77		XBES607 OPERATING SYSTEMS	<ol style="list-style-type: none"> 1. Recognise the process management 2. Reproduce the process synchronization and identify the deadlock methods 3. Describe the concepts of memory management 4. Discuss the virtual memory and file system 5. Reproduce and Describe the basics of I/O interface concepts
78		XBE608 PHYSICS PRACTICAL - VI	<ol style="list-style-type: none"> 1. Use laboratory techniques such as accuracy of measurements and determination of modulus of material. 2. Explain and give the characteristics of semiconductor devices. 3. Gain knowledge and identify the various laws of thermal, viscous and surface tension. 4. Manipulate the optical, electrical and heat properties with excellent application knowledge. 5. Use basic knowledge to find resistance material.
79		XBEC609 ORGANIC QUALITATIVE ANALYSIS AND ORGANIC PREPARATION LAB	<ol style="list-style-type: none"> 1. Identify the various functional group present in the given organic compound. 2. Explain the structure of functional groups and reaction between the reactants. 3. Interpret the chemical changes in the reaction of organic compounds.
80		XBES609 OPERATING SYSTEMS LAB	<ol style="list-style-type: none"> 1. Ability to write C programmes for simple problems and construct flow chart for real time problems. 2. Demonstrate the use of various C statements. Write C Programmes with arrays 3. Use the concept of pointers to write programmes

81		XBE610 PRACTICUM AND SCHOOL INTERNSHIP - IV	<ol style="list-style-type: none"> 1. Develop skills of using various techniques and methods of teaching as well as different media. 2. The student teachers will diagnose the learning difficulties of students and provide remedial instruction. 3. To provide field experience of assessment practices including record maintenance and report cards followed in schools at elementary and secondary levels.
82	VII	XBE701 EDUCATIONAL INNOVATION AND MANAGEMENT	<ol style="list-style-type: none"> 1. Acquire knowledge about the terms used in educational innovations. 2. To understand the innovative experiments practiced in schools. 3. Understand the process and principles of educational management. 4. Explain and develop the various areas of educational management. 5. Develop the principles of educational planning and organization.
83		XBE702 ALGEBRA	<ol style="list-style-type: none"> 1. Identify and describe fundamental algebraic structures such as groups, rings and fields. 2. Identify algebraic substructures such as Normal subgroups and Quotient groups 3. identify and describe relations between algebraic structures, such as homeomorphisms and group actions 4. Understand the concept and basic structure of vector spaces, explain the concept of dimension, and apply the dimension theorem (for the sum of two subspaces). 5. Elucidate the null space, row space and column space of a matrix, apply the rank-nullity theorem.
84		XBE703 REAL ANALYSIS	<ol style="list-style-type: none"> 1. Understand the Order completeness property 2. Understand the concept of continuity and be familiar with the statements and some proofs of the standard results about continuous real functions. 3. Understand the concept of the differentiability of a real valued function. 4. Expand the power series 5. Apply the Riemann integration and fundamental theorem of calculus.

85		XBE704	BASIC ELECTRONICS	<ol style="list-style-type: none"> 1. To study PN junction diode, Zener diode LED, full wave rectifier filters, regulated power supply- Zener regulator, photo diode 2. To study transistors construction and working, parameters, static characteristics, transistor biasing 3. To study special devices FET, JFET, MOSFET, SCR, UJT Construction and working 4. To study Amplifiers, Class A and B power amplifier, feedback principle, and Oscillators Hartley and Colpitts oscillators. 5. To understand the modulation factors Amplitude modulation Frequency modulation and phase modulation and detectors.
86		XBE705	WAVE MECHANICS AND NUCLEAR PHYSICS	<ol style="list-style-type: none"> 1. To study the dual nature of matter, De Broglie concept, Davisson and Germer experiment Uncertainty y principle. 2. To study basic of quantum mechanics, Eigen values Schrodinger equation 3. To study the properties nuclei binding energy and nuclear model 4. To study the particle accelerator radioactivity of alpha, beta and gamma rays, half-life period 5. To study the nuclear reaction, fission, fusion nuclear reactor.
87		XBEC706	PHYSICAL CHEMISTRY - I	<ol style="list-style-type: none"> 1. Recall the definition and first law of thermodynamic constants and terminology. 2. Summarize and Discuss the second law of thermodynamic and related conditions for spontaneity 3. Discuss the significance of third law of thermodynamics 4. Interpret the types of solution, concentration terms and identify the properties of solutions. 5. Describe the significance of phase rule
88		XBES706	COMPUTER NETWORKS	<ol style="list-style-type: none"> 1. Recognize the OSI Models 2. Describe the concepts of IPV4 and IPV6Reproduce the LAN Architecture

			<ol style="list-style-type: none"> 3. Discuss the TCP concepts 4. Reproduce and Describe the basics of DNS 5. Recognize the OSI Models
89		XBEC707 ORGANIC CHEMISTRY - II	<ol style="list-style-type: none"> 1. To develop an understanding the chemistry of carbohydrates. 2. To develop an understanding the chemistry of proteins and vitamins. 3. To understand the chemistry of alkaloids & terpenes 4. To acquaint students with mechanism of molecular rearrangements. 5. To appreciate the application of UV, VIS, IR and NMR spectroscopy in explaining the structure of organic molecules
90		XBES707 WEB TECHNOLOGY	<ol style="list-style-type: none"> 1. Recognize the VB Script and HTML concept 2. Reproduce the java script fundamentals 3. Describe the concepts of Objects in HTML 4. Discuss the basics of ASP.Net 5. Reproduce and Describe concept of IP address security
91		XBE708 PHYSICS PRACTICAL - VII	<ol style="list-style-type: none"> 1. Use this laboratory techniques, To know the logic measurements and determination of subtraction of real number. 2. Explain and give the characteristics of oscillator and amplifier. 3. Gain knowledge and identify the various oscillator and multivibrator. 4. Manipulate the optical, electrical and heat properties with excellent application knowledge. 5. Use basic knowledge to construct voltage doublers and tripler
92		XBEC709 PHYSICAL CHEMISTRY LAB - I	<ol style="list-style-type: none"> 1. Recall various physical parameters of chemical reactions and identify its significances. 2. Understand and Analyze the various physical constants and explain the effects of such constant on the properties of molecules/compounds. 3. Interpret the impacts of changes in the values of the constants.

93		XBES709 WEB TECHNOLOGY LAB	<ol style="list-style-type: none"> 1. Analyze a web page and identify its elements and attributes using html tags. 2. Build dynamic web pages using JavaScript (client side programming) 3. Students are able to develop a dynamic webpage by the use of java script.
94		XBE710 PRACTICUM AND SCHOOL INTERNSHIP - V	<ol style="list-style-type: none"> 1. To provide the student teachers with the field experience of getting attached to a school for a long duration and develop professional skills of teaching, participate in various day to day functions of schools, and in organizing various activities. 2. To develop skills of using various techniques and methods of teaching as well as different media and use different instructional strategies and learning experiences. 3. Acquaint in preparation of instructional materials. 4. To plan and develop lesson plans in the respective subject areas of specialization and manage time, materials and your students' behaviors for effective learning. 5. Understand the role of planning, preparation and transaction in the teaching learning process. 6. Understand the different strategies and approaches used in teaching based on the nature of content and the skills to be developed. 7. Analyse the assessment tools and techniques employed with respect to their purpose, learner friendly, and quality. 8. Develop the ability to apply the knowledge provided by Educational Psychology to classroom problems of various kinds. 9. Understand the intra and inter individual differences in the learners and their Implications for organizing educational programmes. 10. Acquire the skills of understanding the needs of all the learners in the classroom and meeting their needs. 11. To construct suitable evaluation tools to assess the learning achievement and analysis and interpret the scores in the meaningful way.

95	VIII	XBE801	STATISTICS AND OPERATIONS RESEARCH	<ol style="list-style-type: none"> 1. Understand the concepts of probability distributions and distribution functions. 2. Understand the concept of Binomial, Poisson and normal distribution 3. Applying simplex method. 4. Examine the degeneracy in transportation and assignment problem 5. Applying the PERT/CPM for project scheduling.
96		XBE802	COMPLEX ANALYSIS	<ol style="list-style-type: none"> 1. Understand, interpret and use the basic concepts: complex number, analytic function, harmonic functions. 2. Understand the significance of bilinear transformation 3. Evaluate integrals along a path in the complex plane and understand the statement of Cauchy's Theorem and Cauchy's integral formula 4. Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues. 5. Use the Cauchy Residue Theorem to evaluate integrals.
97		XBE803	DIGITAL ELECTRONICS	<ol style="list-style-type: none"> 1. Define the number systems and to simplify Boolean expression using the methods of Boolean algebra and Karnaugh map. 2. Develop the fixed function combinational logical circuits and their implementation. 3. Assess the fundamentals and applications of sequential logic circuits 4. Understand the operational amplifier and its parameter and its applications.
98		XBE804	MICROPROCESSOR AND MICROCONTROLLER	<ol style="list-style-type: none"> 1. To study the basic concepts of digital computer, evolution microprocessors, semiconductor memories RAM and ROM 2. To study the architecture and instruction set of an eight bit 8085 microprocessor 3. To write assembly language programs for an 8085 microprocessor. 4. To study Structure of C language, operators, library function 5. To study various input and output statements while do else statements

99		XBEC805	PHYSICAL CHEMISTRY - II	<ol style="list-style-type: none"> 1. Recall and relate the role of electrolytes in electrical methods and its applications 2. Summarize and Discuss the working principles of various electrochemical cells and its applications 3. Illustrate the principle of photochemistry and symmetry operation of molecules through group theory 4. Apply the fundamental principles of spectroscopy and Identify the selection rules of IR and UV spectroscopy techniques. 5. Recall the principles and related physical constant of NMR and Rama spectroscopy.
100		XBES805	SOFTWARE ENGINEERING	<ol style="list-style-type: none"> 1. Recognize and identify different process models 2. Generalize the software project management 3. Classify the design models 4. Discuss the various s/w testing methods 5. Reproduce and Describe the S/W quality measure concepts
101		XBEC806	ANALYTICAL CHEMISTRY	<ol style="list-style-type: none"> 1. To develop an understanding the basics of analytical chemistry 2. To understand the principles of quantitative analysis 3. To acquire skills in gravimetric techniques 4. To understand the principles of colorimetry and spectrophotometry 5. To under the principles of chromatography techniques
102		XBES806	DATA MINING	<ol style="list-style-type: none"> 1. Recognize the basics of data mining concepts 2. Outline about the data processing 3. Describe the concepts data ware house architecture 4. Discuss the data mining methods 5. Reproduce and Describe the data mining applications

103		XBE807	PHYSICS PRACTICAL - VIII	<ol style="list-style-type: none"> 1. Explain and simplify equation using K map. 2. Use laboratory techniques and getting knowledge about FF 3. Gain knowledge of counters 4. Getting excellent application knowledge. 5. Use basic knowledge of electronics and run microprocessors.
104		XBEC808	PHYSICAL CHEMISTRY LAB - II	<ol style="list-style-type: none"> 1. Recall various laws related to rate and electrolysis and identify its significances. 2. Understand and Analyze the various chemical reaction both electrical and nonelectrical methods. 3. Interpret the values and verify the laws/estimate the amount of a given compound.
105		XBES808	SOFTWARE DEVELOPMENT LAB (MINI PROJECT)	
PROFESSIONAL ELECTIVES GROUP – I				
106	VIII	XBE809A	CURRICULUM AND SCHOOL	<ol style="list-style-type: none"> 1. Understand the meaning of curriculum and its associated concepts 2. Understand the influences of the knowledge categories, social, cultural, economic and the technological aspects in shaping the present school curriculum and the text books 3. Identify various learning sites and resources operating as curriculum supports in the system 4. Analyze the multiple roles of schools in implementation of curriculum 5. Discuss the roles and responsibilities of curriculum stakeholders
107		XBE809B	INCLUSIVE EDUCATION	<ol style="list-style-type: none"> 1. Describe the various perspective in inclusive education 2. Comprehends the policies related to the convention, 3. Identify the features of systems and structure of schools 4. Explaining the effective learning environments

108		XBE809C	GUIDANCE AND COUNSELING IN SCHOOL	<ol style="list-style-type: none"> 1. Outline the basis and concepts of Counselling 2. Describes the various testing methods and achievement 3. Identifies the significance of guidance in schools 4. Comprehends the various resources for guidance and counseling in schools.
PROFESSIONAL ELECTIVES GROUP – II				
109	VIII	XBE810A	DISCRETE MATHEMATICS	<ol style="list-style-type: none"> 1. Perform operations on discrete structures such as sets, functions, relations, and Lattices. 2. Analyze and verify operations associated with sets and Functions 3. Construct the Principal conjunctive and disjunctive normal forms 4. demonstrate the ability to solve problems using counting techniques and combinatorics 5. Create and analyze graphs and trees.
110		XBE810B	ELECTRICAL APPLIANCES AND RENEWABLE ENERGY SOURCES	<ol style="list-style-type: none"> 1. To study the different electric components like resistance inductance, transformer and their functions of Electrical power unit 2. To understand the distribution symbols and electrical connections used in electrical wiring. 3. To understand short circuit, overloading, fuses 4. To understand inverter, UPS, generator motor circuit breaker. 5. To understand the function of bulb, fan, iron box, microwave oven, stabilizer and fridge.
111		XBE810C	POLYMER CHEMISTRY	<ol style="list-style-type: none"> 1. Develop an understanding of basic principles of polymers 2. Understand the properties and reactions of polymers. 3. Understand the various applications of polymer 4. Understand the chemistry of biopolymers. 5. Acquired knowledge in commercial polymers

112		XBE810D	FOOD CHEMISTRY	<ol style="list-style-type: none"> 1. Relate the structure and estimation of standard values of edible oils 2. Discuss the basic impact of beverages towards society 3. Summarize the types and nature of food additives 4. Identify the causes of food toxicity 5. Recall the consequences of Food adulteration
113		XBE810E	MATERIAL CHEMISTRY AND NANO TECHNOLOGY	<ol style="list-style-type: none"> 1. To develop an understanding of properties and industrial application of special materials 2. To understand the basics of nano-materials and their application 3. To understand the basics of nano technology
114		XBE810F	C # AND . NET FRAMEWORK	<ol style="list-style-type: none"> 1. Acquire knowledge about C# 2. Understand the concepts of web based application development 3. Apply the development of .NET 4. Design the web based development of .NET application 5. Describe the CLR and the .NET framework of the programming
115		XBE810G	UNDERSTANDIN G PHP	<ol style="list-style-type: none"> 1. Acquire the concepts and basic knowledge of PHP. 2. Understand the decision and loops on PHP 3. Understand the functions and concepts of PHP. 4. Acquire the knowledge of array functions 5. Understanding the file and directory in PHP

2. a. B.Ed - FT: PROGRAMME OUTCOMES

PROGRAMME OUTCOME	
PO1	Apply the knowledge of creative thinking in education fundamentals and concepts of teaching and learning process
PO2	Identify and review the problems related to classroom management and school environment
PO3	To solve the problem faced by the students in and outside the classroom
PO4	understand, analyze and appreciate the roles of a teacher in shaping Indian society
PO5	understand the nature, purpose and philosophy of secondary (including HS) education in India in the context of contemporary related issues and problems
PO6	understand professional responsibilities, competencies, commitments and performances of the teacher in the Indian Context
PO7	acquaint with the professional skills and communication to perform better teaching in the classrooms
PO8	Apply and develop professional excellence of the secondary and higher secondary teachers
PO9	Demonstrate the skills and improve the knowledge of various procedure and techniques of evaluation and their classroom application.
PO10	Recognize the need for undertaking Action Research and use innovative practice in their teaching job.
PO11	Desire for lifelong learning. With the help of ICT
PO12	Appreciation of the role of the teacher in the prevailing socio – cultural and political system in general and educational system in particular

2. b. Course Outcomes

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	BED101 PERSPECTIVE IN EDUCATION	<ol style="list-style-type: none"> 1. Describe the meaning and state the Concept of education 2. Review the scope of Indian and western philosopher of education 3. Assess the socio cultural context on education 4. Realize the significance and importance of social values and the teacher views on education 5. Identify the issues related on professionalism. 6. Discuss the drop outs and stagnation on education system. 7. Assess the equalization of educational opportunities in the society. 8. Improve the quality of education at the secondary school level.
2	I	BED102 UNDERSTANDING THE LEARNER AND LEARNING PROCESS - I	<ol style="list-style-type: none"> 1. Describe the meaning and state the branches of Psychology 2. Review the scope and importance of Educational Psychology to a teacher. 3. Assess the growth and development of a learner 4. Realize the significance of growth and development in the learning process. 5. Identify the needs and problems of an adolescent student. 6. Discuss the process of Physical and Cognitive development. 7. Differentiate illusion from hallucination 8. Assess the students' intelligence using various intelligence tests. 9. Identify the students with creativity using various techniques 10. Motivate the students using rewards and punishments 11. Improve the learning process using group dynamics

3	I	BED103TA TEACHING OF TAMIL (GENERAL TAMIL)	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Tamil 2. Review the curriculum and syllabus of Tamil at secondary level. 3. Describe prepare achievement test in Tamil Secondary level. 4. Acquaint with different strategies for teaching Tamil in Secondary level. 5. Conduct pedagogical analysis of content for teaching Tamil in the classroom. 6. Identify the acquire competence in preparing tools of evaluation in Tamil learning. 7. Illustrate the method for middleware technologies 8. Implement acquire skills of analyzing text book in Tamil. 9. Identify understand the role of Tamil Teachers to manage controversial issues in Tamil. 10. Apply prepare lesson plans in Tamil for instructional purposes. 11. acquaint with Action Research in Tamil
4	I	BED104TA TEACHING OF TAMIL (SPECIAL TAMIL)	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Tamil 2. Review the curriculum and syllabus of Tamil at higher secondary level. 3. Describe prepare achievement test in Tamil Secondary and Higher Secondary level. 4. Acquaint with different strategies for teaching Tamil Secondary and Higher Secondary level. 5. Conduct pedagogical analysis of content for teaching Tamil in the classroom. 6. Identify the acquire competence in preparing tools of evaluation in Tamil learning. 7. Illustrate the method for middleware technologies 8. Implement acquire skills of analyzing text book in Tamil.

			9. Identify understand the role of Tamil Teachers to manage controversial issues in Tamil. 10. Apply prepare lesson plans in Tamil for instructional purposes. 11. acquaint with Action Research in Tamil
5		BED103EN GENERAL ENGLISH	1. Understand the role of English in India in the right perspective and the rationale for learning English as a second language 2. familiarized with the various aspects of the B.Ed. programme with special reference to the nature of the language skills to be developed and evaluation 3. acquire knowledge of the current trends in the teaching of English 4. Develop the familiarized techniques of oral preparation and practice of language items.
6		BED104EN SPECIAL ENGLISH	1. Acquire knowledge of the sound system of English and to familiarize them with the appropriate terminology, to describe the sounds in English. 2. Understand the connections of English speech and to acquire good pronunciation and fluency of speech. 3. Develop the syllabi related to high School and higher Secondary classes. 4. Acquire a working knowledge of the grammatical terminology and grammatical system in English. 5. Develop the ability to write in an appropriate manner for a particular purpose with a particular audience in mind.
7		BED103MA TEACHING OF MATHEMATICS - I	1. Understands the historical developments in Mathematics leading to the Modern Mathematics. 2. Develops cognizance of the meaning and nature of Mathematics. 3. Understands the Learning theories and their implications in Mathematics Education.

			<ol style="list-style-type: none"> 4. Imbibe the values of teaching Mathematics in its various dimensions. 5. Supplement and extend the competencies in Secondary Level Mathematics content. 6. Develops knowledge and skill of applying various instructional approaches in teaching mathematics. 7. Acquires knowledge and skill of applying different evaluation techniques in Mathematics Education. 8. Develops appreciation for the need and preparation of diagnostic and achievement tests.
8		BED104MA TEACHING OF MATHEMATICS - II	<ol style="list-style-type: none"> 1. Develop cognizance and understanding of principles of curriculum construction. 2. Develop competency in evaluating mathematics curriculum for secondary level. 3. Understand the psychology of teaching and learning mathematics. 4. Apply the models of teaching in teaching mathematics. 5. Understand the pedagogical analysis in mathematics. 6. The process of research in mathematics education.
9		BED103PS TEACHING OF PHYSICAL SCIENCE	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Physical Science. 2. Review the curriculum and syllabus of Physical Science at Secondary level. 3. Describe prepare achievement test in Physical Science Secondary level. 4. Acquaint with different strategies for teaching Physical Science at Secondary level. 5. Conduct pedagogical analysis of content for teaching Physical Science in the classroom. 6. Identify the acquire competence in preparing tools of evaluation in Physical Science learning.

			<ol style="list-style-type: none"> 7. Illustrate the method for middleware technologies 8. Implement acquire skills of analyzing text book in Physical Science. 9. Identify understand the role of Physical Science teachers to manage controversial issues in Physical Science 10. Apply prepare lesson plans in Physical Science for instructional purposes. 11. acquaint with Action Research in Physical Science
10		BED104PS TEACHING OF PHYSICAL SCIENCE	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Physical Science 2. Review the curriculum and syllabus of Physical Science at higher Secondary level. 3. Describe prepare achievement test in Physical Science at higher Secondary level. 4. Acquaint with different strategies for teaching Physical Science at higher Secondary level. 5. Conduct pedagogical analysis of content for teaching Physical Science in the classroom. 6. Identify the acquire competence in preparing tools of evaluation in Physical Science learning. 7. Illustrate the method for middleware technologies 8. Implement acquire skills of analyzing text book in Physical Science. 9. Identify understand the role of Physical Science teachers to manage controversial issues in Physical Science 10. Apply prepare lesson plans in Physical Science for instructional purposes. 11. acquaint with Action Research in Physical Science

11		BED103BS TEACHING OF BIOLOGICAL SCIENCE	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Biological Science 2. Review the curriculum and syllabus of Biological Science at Secondary level. 3. Describe prepare achievement test in Biological Science Secondary level. 4. Acquaint with different strategies for teaching Biological Science at Secondary level. 5. Conduct pedagogical analysis of content for teaching Biological Science in the classroom. 6. Identify the acquire competence in preparing tools of evaluation in Biological Science learning. 7. Illustrate the method for middleware technologies 8. Implement acquire skills of analyzing text book in Biological Science. 9. Identify understand the role of Biological Science teachers to manage controversial issues in Biological Science 10. Apply prepare lesson plans in Biological Science for instructional purposes. 11. acquaint with Action Research in Biological Science
12		BED104BS TEACHING OF BIOLOGICAL SCIENCE	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Biological Science 2. Review the curriculum and syllabus of Biological Science at Secondary level. 3. Describe prepare achievement test in Biological Science Secondary level. 4. Acquaint with different strategies for teaching Biological Science at Secondary level. 5. Conduct pedagogical analysis of content for teaching Biological Science in the classroom. 6. Identify the acquire competence in preparing tools of evaluation in Biological Science learning.

			<ol style="list-style-type: none"> 7. Illustrate the method for middleware technologies 8. Implement acquire skills of analyzing text book in Biological Science. 9. Identify understand the role of Biological Science teachers to manage controversial issues in Biological Science 10. Apply prepare lesson plans in Biological Science for instructional purposes. 11. acquaint with Action Research in Biological Science
13	I	BED103CS COMPUTER SCIENCE - I	<ol style="list-style-type: none"> 1. appreciate teaching of computer science as a separate discipline 2. acquire knowledge on developments of computer, its hardware, software technologies 3. acquaint with aims and objectives of teaching computer science 4. acquire skills relating to microteaching effectively 5. understand the need of lesson plan and unit plan 6. Familiarize with the various methods employed for the teaching of computer science. 7. identify, design and apply the various audio-visual and mass media aids in teaching of computer science 8. analyze secondary and higher secondary school computer science curriculum and help them to plan learning activities 9. identify the importance of textbook, laboratory , assignment , review and library 10. develop skills in evaluation and in constructing tests in computer science education
14		BED104CS COMPUTER SCIENCE - II	<ol style="list-style-type: none"> 1. Describe the meaning scope and relevance of technology in computer science education 2. Describe the need for ICT and ET mediated computer education

			<ol style="list-style-type: none"> Identify the challenges in integrating ICT in school computer education Develop instructional modules for online learning and text materials for multimedia presentation Identify , compare and evaluate web sites for any given topic Consider ethical issues involved while using e-sources, develop question bank, maintain students assessment records and analyze students Acquire knowledge on latest trends in Information Technology and assessment techniques. Analyze the scope and challenges of e-governance in educational planning and administration
15		BED103HI HISTORY I	<ol style="list-style-type: none"> Acquire knowledge of the nature, scope, structure and concepts of history. Understand the dimensions, classification, geographical foundation of history and its relation with other social science – subject Realize and appreciate indispensable values of teaching history. Develop effective teaching skills. Perceive effective competency in the preparation of lesson and unit plan. Practice the different teaching - learning strategies. Understand the principles of curriculum construction. Get familiarized with the various learning resources for their professional effectiveness. Understand the various methods of evaluating the classroom teaching.
16		BED104HI HISTORY II	<ol style="list-style-type: none"> Acquire knowledge of contribution of eminent Historians to the Development of History. Develop the critical thinking in Curriculum Construction. Develop effective skill in programmed teaching and model of teaching.

			<ol style="list-style-type: none"> 4. Attain optimum professional growth. 5. Adopt Action Research Procedure to maintain optimum class room climate.
17		BED103GE GEOGRAPHY I	<ol style="list-style-type: none"> 1. understand and appreciate the objectives of teaching Geography 2. acquire adequate knowledge of contents in Geography 3. read and interpret maps, graphs and weather charts 4. organize co-curricular activities in Geography 5. develop different skills in using computer 6. acquire knowledge on the current trends in Geography Curriculum 7. critically evaluate the text books 8. provide practical experience in making and using software materials 9. practice the different methods and Techniques of Teaching Geography
18		BED104GE GEOGRAPHY II	<ol style="list-style-type: none"> 1. Develop the ability to prepare & use appropriate instructional techniques. 2. Get familiarize with recent trends in education as applied in Geography. 3. Analyze present day problems in a geographical perspective. 4. Understand the different techniques in class room teaching. 5. Get awareness about the trends of research in Geography. 6. Understand different models of teaching and their implications in Geography. 7. plan the instructional strategies catering to individual differences
19		BED103CA COMMERCE AND ACCOUNTANCY EDUCATION – I	<ol style="list-style-type: none"> 1. acquire knowledge of the terms and concepts used in the pedagogical analysis of Commerce and Accountancy 2. Understand lesson planning and evaluation aspects in teaching Commerce and Accountancy

			<ol style="list-style-type: none"> 3. Apply the knowledge in analyzing higher secondary Commerce and Accountancy contents in terms of the techniques and aids for the purpose of teaching Commerce and Accountancy 4. Develop skills in the preparation of lesson plan and construction of evaluation tools using the suitable techniques 5. Develop interests in learning recent developments in Commerce and Accountancy 6. Develop a desirable positive attitude towards the teaching of Commerce and Accountancy
20		BED104CA COMMERCE AND ACCOUNTANCY EDUCATION – II	<ol style="list-style-type: none"> 1. Acquire knowledge of the terms and concepts used in various methods and techniques of teaching Commerce and Accountancy 2. Understand the different types of curriculum, classroom management techniques and technology in and of Education to teach Commerce and Accountancy 3. Develop skills in preparing curriculum, and using the suitable techniques in test construction 4. Develop interests in knowing the recent development in the teaching methodology, and technological developments in Commerce and Accountancy 5. Develop a desirable positive attitude towards the teaching of Commerce and Accountancy
21		BED103EC ECONOMICS I	<ol style="list-style-type: none"> 1. understand the value of discipline of Economics 2. acquire knowledge of the nature, scope and development of economics 3. acquire awareness about economic problems and their impact on political, social, and cultural trends in Economics 4. understand the need for implementing the methods of catering to individual differences in Economics teaching

			<ol style="list-style-type: none"> 5. acquire skills relating to planning lessons and presenting them effectively 6. develop the ability to prepare and use effectively the audio and video 7. understand the principles of curriculum construction and organization of subject matter 8. understand the various evaluation techniques of Assessing the Economic s teachers
22		BED104EC ECONOMICS II	<ol style="list-style-type: none"> 1. Understand the Economic problems facing India. 2. Understand the Economical and civic realities. 3. Understand the achievement of planning. 4. Develop interest in adopting modern method technologies of teaching. 5. develop competence in the preparation of programmed learning materials, (Economics textbooks and Workbooks) 6. understand the various methods of evaluating the classroom teaching 7. Recognize the special problems in teaching Economics in rural schools. 8. know the latest developments in subject Economics
23		BED105 ASSESSMENT OF LEARNING I	<ol style="list-style-type: none"> 1. Understand the nature of assessment and evaluation and their role in teaching-learning process. 2. Understand the importance of assessment in continuous and comprehensive manner 3. Develop assessment tasks and tools to assess learner's competence and performance 4. Acquire skill of constructing an achievement test 5. Devise marking, scoring and grading procedures 6. Devise ways of reporting on student performance 7. Analyze, manage and interpret assessment data.

			8. Develop the habit of reflecting-on and self-critiquing to improve performance.
24		BED106 HOLISTIC EDUCATION	<ol style="list-style-type: none"> 1. Introduce the student teacher with the concept of holistic health. 2. Understand the various dimensions and determinants of health. 3. Acquaint them to school health program and its importance. 4. Understand the need and importance of Physical Education. 5. Acquaint them to allied areas in Physical Education. 6. Sensitize the student teacher towards physical fitness and its importance. 7. Make them aware of the benefits of physical fitness and activities for its development. 8. Help them acquire the skills for assessment of physical fitness. 9. Introduce them to the philosophical bases of Yoga. 10. Motivate them to resort to physical activity for the fitness development. 11. Understand the procedure of health related fitness evaluation
25		BED107 PEACE AND VALUE EDUCATION	<ol style="list-style-type: none"> 1. Understand the concept of peace and value education. 2. Understand the dynamics of transformation of violence into peace 3. Realize the significance of Values in Self-development. 4. Familiarize the nature of conflicts and their resolutions. 5. Imbibe the knowledge, attitudes and skills needed to achieve and sustain a global culture of peace and values. 6. Adopt peace and value education in the curriculum.
26	II	BED201 EDUCATIONAL AND SOCIALIZATION	1. become aware of the process of socialization at home and school that act as shaping factors in identity formation of the school – going child (in Indian contexts):

			<ol style="list-style-type: none"> reflects critically on factors that shape identity formation and influence sense of self of the growing 'student' as well as 'teacher' in school as well as in out of school situations; begin to understand the process that have shaped, continue to shape one's own sense of identity as 'student' and a 'person' located in multiple social contexts and roles. begin to become critically aware of "self and identity" and 'free' oneself through self-understanding, from tendencies that lead to crystallizing and limiting of one's identity as a teacher and a human being; and Reflect on one's aspirations and possibilities in order to develop a growing sense of agency as a 'teacher', a 'professional', as well as a 'human being'.
27		BED202 EDUCATIONAL PSYCHOLOGY: UNDERSTANDING THE LEARNING	<ol style="list-style-type: none"> At the end of the course, the student-teachers will be able to Acquire the knowledge of the process of social, emotional and moral development Acquire the knowledge of personality and its assessment Understand the process of learning and the factors influencing learning. Get acquainted with psychological principles and techniques to facilitate learning Identify exceptional children and teach them accordingly.
28		BED203TA TEACHING OF TAMIL -I	<ol style="list-style-type: none"> Describe understand the foundation of teaching Tamil Review the curriculum and syllabus of Tamil at secondary level. Describe prepare achievement test in Tamil Secondary level. Acquaint with different strategies for teaching Tamil in Secondary level. Conduct pedagogical analysis of content for teaching Tamil in the classroom.

			6. Identify the acquire competence in preparing tools of evaluation in Tamil learning. 7. Illustrate the method for middleware technologies 8. Implement acquire skills of analyzing text book in Tamil. 9. Identify understand the role of Tamil Teachers to manage controversial issues in Tamil. 10. Apply prepare lesson plans in Tamil for instructional purposes. 11. acquaint with Action Research in Tamil
29		BED204TA TEACHING OF TAMIL -II	1. Describe understand the foundation of teaching Tamil 2. Review the curriculum and syllabus of Tamil at secondary level. 3. Describe prepare achievement test in Tamil Secondary level. 4. Acquaint with different strategies for teaching Tamil in Secondary level. 5. Conduct pedagogical analysis of content for teaching Tamil in the classroom. 6. Identify the acquire competence in preparing tools of evaluation in Tamil learning.
30		BED203EN TEACHING OF ENGLISH I	1. Get Familiarized with different resources in teaching of English 2. Understand the technology of teaching English and to use audio visual aids. 3. Organize content and learning experiences. 4. Develop skills on perfect usage of LSRW skills. 5. Obtain knowledge on the mechanics of Reading and Writing. 6. Understand the various evaluation techniques of assessing the English teachers.
31		BED204EN TEACHING OF ENGLISH II	1. Develop skills on the classroom management techniques and usage of instructional materials.

			<ol style="list-style-type: none"> 2. Understand the usage of English for various purposes. 3. Get familiarized with Reference and Study skills. 4. Understand the usage of different types of composition. 5. Develop a desirable positive attitude towards the teaching of English.
32		BED203MA TEACHING OF MATHEMATICS - I	<ol style="list-style-type: none"> 1. Sensitize the school content in Mathematics. 2. Explore in teaching and learning of Mathematics. 3. Develop ability to construct school Mathematics curriculum. 4. Know different approaches and strategies in teaching and learning of mathematical concepts. 5. Know the utility of various learning resources. 6. Construct appropriate assessment tools for evaluating mathematics learning. 7. Acquire various teaching skills. 8. Acquire competence in teaching mathematics and structuring lesson plans.
33		BED204MA TEACHING OF MATHEMATICS – II	<ol style="list-style-type: none"> 1. Know the importance of psychology of learning mathematics. 2. Acquire the models of teaching mathematics. 3. Know the importance of pedagogical analysis in teaching and learning of Mathematics. 4. Understand the various research and defects in the present day teaching of and their application. 5. Develop knowledge and skill in application of examination and malpractice adaptation of examination.
34		BED203PS TEACHING OF PHYSICAL SCIENCE – I	<ol style="list-style-type: none"> 1. acquire knowledge of the nature of physical science for determining aims and strategies of teaching – learning 2. understand the nature and scope of Physical Science

			<ol style="list-style-type: none"> understand the principles of curriculum construction and organization of subject matter understand the technology of teaching Physical Science and give them practice in the use of audio visual aids understand the techniques of evaluating Science teaching and to construct achievement test to evaluate the progress of pupils develop a theoretical and practical understanding of the various methods and techniques of teaching Physical Science and the importance of self-learning devices understand the criteria in selecting a good textbook and to evaluate a Science textbook
35		BED204PS TEACHING OF PHYSICAL SCIENCE - II	<ol style="list-style-type: none"> acquire the knowledge about the objectives in teaching physical science understand the core of science understand the concept of curriculum of physical science identify the role of physical science teacher identify the system for mastery learning develop effective classroom climate relate physical science to everyday life design physical science laboratory frame co-curricular activities evaluate the use of cooperative and collaborative learning analyses the techniques of teaching
36		BED203BS TEACHING OF BIOLOGICAL SCIENCE - I	<ol style="list-style-type: none"> To understand the nature and scope of Biological Science. To understand the impact of Biological Science today. To plan for effective instruction in the teaching of Biological Science. To use appropriate instructional system in Biological Science education. To use mass media to maximize curriculum transaction. To use educational software and online material.

37		BED204BS TEACHING OF BIOLOGICAL SCIENCE – II	<ol style="list-style-type: none"> 1. To understand the nature and scope of Biological Science. 2. To understand the impact of Biological Science today. 3. To plan for effective instruction in the teaching of Biological Science. 4. To use appropriate instructional system in Biological Science education. 5. To use mass media to maximize curriculum transaction. 6. To use educational software and online material.
38		BED203HI TEACHING OF HISTORY – I	<ol style="list-style-type: none"> 1. acquire knowledge of the nature, scope, structure and concept of History 2. understand the dimensions, classifications, geographical foundation of history and its relations with other social science-subjects; 3. realize and appreciate values of teaching history; 4. develop effective teaching skills; 5. perceive effective competency in the preparation of lesson and unit plans; 6. practice the different teaching-learning strategies; 7. understand the principles of curriculum construction; 8. get familiarize with the various learning resources for professional effectiveness;
39		BED204HI TEACHING OF HISTORY II	<ol style="list-style-type: none"> 1. acquire knowledge of contribution of eminent historians to the development of history 2. a knowledge about Indian historiography; 3. explore learning in history; 4. develop ability to construct school history curriculum; 5. Imbibe the qualities of history teacher; 6. ability to organize history laboratory in the school; 7. know the importance of co-curricular activities in history;

			<ol style="list-style-type: none"> 8. apply the educational innovation in teaching learning process; 9. understand the basic concepts of system approach; 10. acquire the knowledge on co-operative and collaborative learning;
40		BED203GE TEACHING OF GEOGRAPHY I	<ol style="list-style-type: none"> 1. understand and appreciate the objectives of Teaching Geography 2. acquire adequate knowledge of Contents in Geography 3. read and interpret maps, graphs and weather charts 4. organize co-curricular activities in Geography 5. develop different skills in using computer for Teaching Geography 6. acquire knowledge on the current trends in Geography Curriculum 7. critically evaluate the text books in Geography 8. provide practical experience in making and using software materials 9. practice the different methods and Techniques of Teaching Geography
41		BED204GE TEACHING OF GEOGRAPHY II	<ol style="list-style-type: none"> 1. Understand the basic Principles of Geography 2. Acquaint themselves with Geography curriculum at the higher secondary stage 3. Acquaint themselves with new developments in Geography 4. Understand the nature and scope of Geography.
42		BED203CA TEACHING OF COMMERCE AND ACCOUNTANCY I	<ol style="list-style-type: none"> 1. Acquire knowledge in micro teaching procedure and micro teaching skills to teach Commerce and Accountancy 2. Develop the ability to plan and design various types of lesson in commerce 3. Understand the various instructional approaches and their application in teaching commerce

			<ol style="list-style-type: none"> Understand the various instructional materials and their application in teaching commerce and Construct and use instructional material Apply knowledge to do statistical calculations and interpret the results. Develop a desirable positive attitude towards the teaching of Commerce and Accountancy
43		BED204CA TEACHING OF COMMERCE AND ACCOUNTANCY II	<ol style="list-style-type: none"> Acquire knowledge of interdisciplinary nature of commerce and accountancy. Understand the pedagogical analysis of commerce Evaluate the individual differences existing among the learners for effective teaching of commerce and accountancy Acquaint the qualities and professional growth of commerce teacher and help them in acquiring the same Develop a desirable positive attitude towards the teaching of Commerce and Accountancy.
44		BED203EC TEACHING OF ECONOMICS - I	<ol style="list-style-type: none"> To acquire knowledge on various concepts of Economics. Understand the meaning and nature of Economics. Develop interest on the aim and objectives of teaching and learning Economics. Understand the different concepts of Economics. Create positive attitude on the curriculum of Economics. Develop knowledge on various strategies in teaching and learning Economics.
45		BED204EC TEACHING OF ECONOMICS II	<ol style="list-style-type: none"> Acquire knowledge on professional development of teacher. understand classroom climate for teaching and learning economics Develops skill in lifelong learning. applies skill on the problems of teaching economics

			<ol style="list-style-type: none"> 5. Develop interest in service programme. 6. Develop positive attitude on the textbook of Economics. 7. Appreciate the role of various educational organizations.
46		BED2005E AM EDUCATIONAL ADMINISTRATION AND MANAGEMENT	<ol style="list-style-type: none"> 1. acquire knowledge of the terms used in educational administration and management 2. understand the role of head master and his/her duties 3. develop the mode of inspection and supervision of function 4. know the role of teacher in decision making 5. develop the skills in employing and developing new educational administration and management 6. develop interest in the educational administration and management techniques 7. understand the development and management of resources 8. develop appropriate skills for planning, decision making and leadership qualities 9. apply the principles of classroom management and leadership styles 10. promote total quality management in education
47		BED205VE VALUE EDUCATION	<ol style="list-style-type: none"> 1. Understand the concept of value education. 2. Realize the significance of Values in Self-development. 3. Familiarize the nature of conflicts and their resolutions. 4. Imbibe the knowledge, attitudes and skills needed to achieve and sustain a global culture of values. 5. Adopt value education in the curriculum. 6. Understand the self and principle of living.

48		BED205GC GUIDANCE AND COUNSELLING	<ol style="list-style-type: none"> 1. list out the principles underlying guidance 2. elucidate the need of guidance and counselling in schools 3. describe the different services in the school guidance programme 4. understand the various therapies in counselling 5. acquire the skills necessary to administer and interpret standardized tools 6. know the qualities required for a good counsellor 7. understand the various types of counselling 8. understand the group guidance and counseling 9. describe the various testing devices in guidance 10. understand the guidance for exceptional children
49		BED205EVE ENVIRONMENTAL EDUCATION	<ol style="list-style-type: none"> 1. To develop understanding of environmental problems, issues and concerns. 2. To appreciate the need for protection and conservation of living and non-living environmental resources and sustainable development. 3. To understand the harmful effects of environmental pollution and preventive measures. 4. To understand the impact of population growth on environment and Human Health. 5. To understand the governmental and non-governmental initiatives to protect and conserve the environment. 6. To develop rational thinking abilities for participatory environmental management.
50	III	BED301 INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR ENRICHING TEACHING AND LEARNING	<ol style="list-style-type: none"> 1. Explain the concept of educational technology 2. Explain the concept of ICT in education 3. Appreciate the influence of ICT for improving the professional competencies

			<ol style="list-style-type: none"> 4. Comprehend communicative skills and effective classroom interaction 5. Use different approaches of ICT integration in education 6. Appreciate the application of E-learning in education 7. Explain the instructional strategies in instructional strategies and models 8. Explain the fundamentals of the operating systems and application software 9. Use internet for effective classroom teaching and maintain the ethical values 10. Utilize the ICT for professional development of teachers
51		BED302 TEACHING APPROACHES AND STRATEGIES	<ol style="list-style-type: none"> 1. Demonstrate his/her understanding of the role of a teacher at different phases of instruction 2. Write instructional objectives teaching of a topic 3. Demonstrate his/her understanding of different skills and their role in effective teaching 4. Use instructional skills effectively
52		BED303TA TEACHING OF TAMIL -I	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Tamil 2. Review the curriculum and syllabus of Tamil at secondary level. 3. Describe prepare achievement test in Tamil Secondary level. 4. acquaint with Action Research in Tamil
53		BED304TA TEACHING OF TAMIL -II	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Tamil 2. Review the curriculum and syllabus of Tamil at secondary level. 3. Describe prepare achievement test in Tamil Secondary level. 4. Acquaint with different strategies for teaching Tamil in Secondary level. 5. Conduct pedagogical analysis of content for teaching Tamil in the classroom. 6. Identify the acquire competence in preparing tools of evaluation in Tamil learning.

54		BED303EN TEACHING OF GENERAL ENGLISH - I	<ol style="list-style-type: none"> 1. Understand the nature, scope and importance of the subject. 2. State the objectives of the subject. 3. Explain and use different approaches, methods and techniques of teaching learning of subject. 4. Explain and understand the structure of subject 5. Explain the concept and types of curriculum and syllabus. 6. Explain the importance and use of core elements, values and life skills. 7. Analyze the text book and content. 8. Analyze the various resources in teaching learning of the subject. 9. Understand qualities of a good teacher. 10. Analyze and evaluate the new trends of current issues in the subject.
55		BED304EN TEACHING OF SPECIAL ENGLISH - II	<ol style="list-style-type: none"> 1. Develop such competencies and skills in the student-teacher 2. Refresh and enrich his/her knowledge of English grammar and vocabulary. 3. Realize the value of English after completion of the course 4. Comprehend and adopt various methods and techniques of evaluations in English. 5. Prepare and use different kinds of instructional materials for teaching English 6. Understand and detect the causes of difficulties faced by the students in learning a foreign language and suggest remedial measures. 7. To formulate instructional objectives in terms of observable terminal behaviors of learners. 8. Develop such competencies and skills in the student-teacher
56		BED303MA TEACHING OF MATHEMATICS - I	<ol style="list-style-type: none"> 1. Develop appreciation for the need and preparation of diagnostic and achievement tests. 2. Develop the appropriate statistics in mathematics.

			<ol style="list-style-type: none"> 3. Know the history and contributions of mathematicians. 4. Know different techniques of teaching mathematics. 5. Construct appropriate assessment tools for evaluating mathematics learning. 6. Acquire various ICT knowledge of mathematics teaching. 7. Know the learning recourses in mathematics. 8. Know the utility of various learning resources.
57		BED304MA TEACHING OF MATHEMATICS - II	<ol style="list-style-type: none"> 1. Arouse interest in teaching of mathematics. 2. Know the classroom teaching, skills and competences. 3. Acquires recent development in the field of Mathematics. 4. Know the importance of co-curricular activities in mathematics. 5. Apply the educational innovation in teaching learning process. 6. Understand the basic concepts of system approach. 7. Explore in learning Mathematics.
58		BED303PS TEACHING OF PHYSICAL SCIENCE - I	<ol style="list-style-type: none"> 1. To understand the nature of Science and science education. 2. To understand Approaches, Methods & Techniques of Teaching Science. 3. To familiarize the theoretical bases of different approaches in physical science teaching. 4. To familiarize with the methods and techniques for implementing constructivism in the classroom. 5. To update on the present practices of learning and instruction practiced in the state schools of Tamilnadu. 6. To familiarize with Resources for teaching/learning Science. 7. To understand the organizing and maintaining of library and laboratory in Science. 8. To appreciate the systematic method of science -The scientific method.

59		BED304PS TEACHING OF PHYSICAL SCIENCE - II	<ol style="list-style-type: none"> 1. To understand the nature and scope of Physical Science. 2. To understand the impact of Physical Science today. 3. To plan for effective instruction in the teaching of Physical Science. 4. To use appropriate instructional system in Physical Science education. 5. To use mass media to maximize curriculum transaction. 6. To use educational software and online material.
60		BED303BS TEACHING OF BIOLOGICAL SCIENCE - I	<ol style="list-style-type: none"> 1. To understand the nature and scope of Biological Science. 2. To understand the impact of Biological Science today. 3. To plan for effective instruction in the teaching of Biological Science. 4. To use appropriate instructional system in Biological Science education. 5. To use mass media to maximize curriculum transaction. 6. To use educational software and online material.
61		BED304BS TEACHING OF BIOLOGICAL SCIENCE -II	<ol style="list-style-type: none"> 1. To understand the nature and scope of Biological Science. 2. To understand the impact of Biological Science today. 3. To plan for effective instruction in the teaching of Biological Science. 4. To use appropriate instructional system in Biological Science education. 5. To use mass media to maximize curriculum transaction. 6. To use educational software and online material.
62		BED303CS TEACHING OF COMPUTER SCIENCE - I	<ol style="list-style-type: none"> 1. Familiarize with the various methods that can be employed for the teaching of computer science. 2. Understand the principles of curriculum construction. 3. Acquire skills to learn from websites

			<ol style="list-style-type: none"> 1. Acquire skills of applying ms office tool in teaching 2. Develop skills in evaluation of text books in computer science 3. Develop knowledge in computer science library, assignments
63		BED304CS TEACHING OF COMPUTER SCIENCE - II	<ol style="list-style-type: none"> 1. Acquire knowledge in uniting instruction programme 2. Understand the need for methods of evaluating the class room teaching behavior. 3. Acquire knowledge on computer software and growing capability of computer technology. 4. Acquire knowledge on latest trends in Information Technology and assessment techniques. 5. Acquire skills in using computer for exceptional children
64		BED303HI TEACHING OF HISTORY I	<ol style="list-style-type: none"> 1. To enable student teachers to revise the knowledge of all Branches of Geography subject at a school level. 2. To enable the student teachers to understand the interdependence and interrelationship among the various concepts and processes in Geography Subject. 3. To enable student teachers to acquire the skills related to map and instruments in Geography. 4. To develop a technique of observation and reporting of Geographical phenomenon among student teacher. 5. To create interest of Geography subject among student teachers.
65		BED304HI TEACHING OF HISTORY – II	<ol style="list-style-type: none"> 1. understand the basic Principles of Geography 2. acquaint themselves with Geography curriculum at the higher secondary stage 3. acquaint themselves with new developments in Geography 4. Understand the nature and scope of Geography.

66		BED303GE TEACHING OF GEOGRAPHY I	<ol style="list-style-type: none"> 1. To enable student teachers to revise the knowledge of all Branches of Geography subject at a school level. 2. To enable the student teachers to understand the interdependence and interrelationship among the various concepts and processes in Geography Subject. 3. To enable student teachers to acquire the skills related to map and instruments in Geography. 4. To develop a technique of observation and reporting of Geographical phenomenon among student teacher. 5. To create interest of Geography subject among student teachers.
67		BED304GE TEACHING OF GEOGRAPHY-II	<ol style="list-style-type: none"> 1. understand the basic Principles of Geography 2. acquaint themselves with Geography curriculum at the higher secondary stage 3. acquaint themselves with new developments in Geography 4. Understand the nature and scope of Geography.
68		BED303CA TEACHING OF COMMERCE AND ACCOUNTANCY – I	<ol style="list-style-type: none"> 1. Acquire knowledge to construct appropriate episode to appreciate lifelong learning. 2. Understand the recent developments in commerce. 3. Apply the knowledge in analyzing Commercial Issues related to Indian Economy. 4. Appreciate the role of Educational organizations. 5. Apply the most appropriate learning experience using media. 6. Develop a desirable positive attitude towards the teaching of Commerce and Accountancy
69		BED304CA TEACHING OF COMMERCE AND ACCOUNTANCY – II	<ol style="list-style-type: none"> 1. Grasp the significance of innovation in commerce teaching and apply them. 2. Understand the need and importance commerce library.

			<ol style="list-style-type: none"> 3. Understand the role of Commerce department in the school system 4. Acquire the necessary skills and experience in teaching skill subjects. 5. Acquire the necessary skills and experience in teaching book keeping.
70		BED303EC TEACHING OF ECONOMICS – I	<ol style="list-style-type: none"> 1. Understand the principles of curriculum construction and organization of subject matter in Economics. 2. Understand the modern electronic technology used in teaching. 3. Understand the how education enters into the rural areas and its implementation. 4. Know the qualities of good teachers in economics. 5. Know the various resources followed in teaching economics. 6. Understand the various techniques of assessing the Economics' Teacher. 7. Develop the ability to prepare and use effectively the audio and video.
71		BED304EC TEACHING OF ECONOMICS – II	<ol style="list-style-type: none"> 1. Develop the classroom management system. 2. Know the instructional materials used in commerce and accountancy. 3. Get knowledge of community resources and its activity. 4. Know the teaching and learning of community resources in Commerce. 5. Understand the professional growth and development of teachers by qualitative knowledge. 6. Develop competence in the preparation of programmed learning materials, (Economics textbooks and Workbooks)
72		BED305BE BASICS OF E-LEARNING	<ol style="list-style-type: none"> 1. Develop basic knowledge about the principles and usage of e – learning in Education. 2. Understand the what, why and how of e – learning. 3. Familiarize with different media and methods currently employed for instruction.

			4. Apply different tools of multimedia creation for e- content development
73		BED305EI M EDUCATIONAL INNOVATION AND MANAGEMENT	<ol style="list-style-type: none"> 1. Acquire knowledge about the terms used in educational innovations. 2. To understand the innovative experiments practiced in schools. 3. Understand the process and principles of educational management. 4. To understand the principles of educational planning and organization. 5. Acquire knowledge about educational management resources.
74		BED305IC H INDIAN CONSTITUTION AND HUMAN RIGHTS	<ol style="list-style-type: none"> 1. Know the importance, preamble and salient features of Indian constitution 2. Appreciate the significance of fundamental rights, duties and directive principles of state policy 3. Develop an understanding of the strength of the union government 4. Know the meaning, significance, the growing advocacy of human rights.
75		BED401 CURRICULUM AND SCHOOL	<ol style="list-style-type: none"> 1. Understand the meaning of curriculum and its associated concepts 2. Understand the influences of the knowledge categories, social, cultural, economic and the technological aspects in shaping the present school curriculum and the text books 3. Identify various learning sites and resources operating as curriculum supports in the system 4. Analyze the multiple roles of schools in implementation of curriculum 5. Discuss the roles and responsibilities of curriculum stakeholders 6. Reflect upon the role of teachers in operationalizing the curriculum 7. Analyze the elements, organization, scope, various perspectives, needs, priorities, curriculum concerns, changes in the pedagogical approaches, sequence, evaluation schemes and other reforms in the documents of National curriculum frame works

			<ol style="list-style-type: none"> 8. Explore the school facilities, infrastructure and resources as curricular supports. 9. Analyze the curricular materials with reference to NCF's recommendations and insights into school pedagogy 10. Develop an image of oneself as a curriculum informant, designer, agent, and evaluator
76		BED402 CONTEMPORARY INDIA AND EDUCATION	<ol style="list-style-type: none"> 1. Understand and Contextualize ideals of the Constitution of India; 2. Appreciate humanistic agenda of the Constitution on India; 3. Value and recognize the role of education in realizing the ideals of the Constitution; 4. Develop critical awareness about the issues of education that are coming in the way of realization of the values of the Constitution; 5. Understanding and develop positive attitudes towards various forms of exclusion; 6. Appreciate the need for education for Peace; 7. Reflects on the issues of secondary school stage education
77		BED403TA TEACHING OF TAMIL -I	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Tamil 2. Review the curriculum and syllabus of Tamil at secondary level. 3. Describe prepare achievement test in Tamil Secondary level. 4. acquaint with Action Research in Tamil
78		BED404TA TEACHING OF TAMIL -II	<ol style="list-style-type: none"> 1. Describe understand the foundation of teaching Tamil 2. Review the curriculum and syllabus of Tamil at secondary level. 3. Describe prepare achievement test in Tamil Secondary level. 4. Acquaint with different strategies for teaching Tamil in Secondary level.

79		BED403EN TEACHING OF GENERAL ENGLISH - I	<ol style="list-style-type: none"> 1. Conduct pedagogical analysis of content for teaching Tamil in the classroom. 2. understand the different roles of language 3. Understanding the importance of home language, school language and the role of mother tongue in education. 4. understand different skills of English language 5. identify different Methods, Approaches and Techniques needed for teaching different skills of ELT in the Indian context 6. improve their ability in planning a lesson in Prose, Poetry and Supplementary Reader 7. develop integrated skills in ELT 8. prepare different activities and tasks for learners
80		BED404EN TEACHING OF SPECIAL ENGLISH - II	<ol style="list-style-type: none"> 1. get acquaintance with skills of communication for classroom teaching 2. develop creativity among learners 3. use multilingualism as a strategy in the classroom situation 4. understand the basics of English grammar 5. develop the skills of presentation of vocabulary 6. get acquaintance with different sounds in English and use correct pronunciation in the classroom teaching 7. understand constructivist approach to language teaching and learning 8. assess and Evaluate the student skills of language learning
81		BED403MA TEACHING OF MATHEMATICS - I	<ol style="list-style-type: none"> 1. Explore the learners in mathematics learning. 2. Know the individual difference in mathematics teaching. 3. Develop knowledge and skill in application of Educational Technology.

			<ol style="list-style-type: none"> 4. Develop the skill of preparing software materials for technology-based teaching. 5. Utilize in classroom teaching through skills and competences of teaching. 6. Know the teacher profession in school context and professional ethics of teachers.
82		BED404MA TEACHING OF MATHEMATICS - II	<ol style="list-style-type: none"> 1. Acquire knowledge of the terms used in system approach. 2. Understand innovations in schools and teaching- learning process. 3. Apply the computer and e-resources in mathematics education in school practices 4. Develop skills in employing and developing Vedic mathematics. and 5. Develop interest in the recreational mathematics. 6. Develop desirable and positive attitude towards mathematics education.
83		BED403PS TEACHING OF PHYSICAL SCIENCE - I	<ol style="list-style-type: none"> 1. Analyze the content of physical science into concepts, facts, rules and principles 2. Understand the principles of curriculum construction and organization of subject matter 3. Demonstrate understanding of the concept, principles and bases of curriculum construction, organization 4. Analyze the curriculum as reflected in text-book and other curricular materials 5. Understand the basic models of teaching physical science
84		BED404PS TEACHING OF PHYSICAL SCIENCE - II	<ol style="list-style-type: none"> 1. Understand the psychological basis of modern trends in teaching science and new techniques of teaching science 2. Critically analyses curricula and textbooks in physical science at the higher secondary level

			<ol style="list-style-type: none"> Analyze learning difficulties and to develop instructional materials for slow learners, children with learning difficulties and to prepare enrichment material for gifted learners Design and organize a physical science laboratory
85		BED403BS TEACHING OF BIOLOGICAL SCIENCE - I	<ol style="list-style-type: none"> To understand the nature and scope of Biological Science. To understand the impact of Biological Science today. To plan for effective instruction in the teaching of Biological Science. To use appropriate instructional system in Biological Science education. To use mass media to maximize curriculum transaction. To use educational software and online material.
86		BED404BS TEACHING OF BIOLOGICAL SCIENCE - II	<ol style="list-style-type: none"> To understand the nature and scope of Biological Science. To understand the impact of Biological Science today. To plan for effective instruction in the teaching of Biological Science. To use appropriate instructional system in Biological Science education. To use mass media to maximize curriculum transaction.
87		BED403CS TEACHING OF COMPUTER SCIENCE - I	<ol style="list-style-type: none"> Understand about the various types of Operating System. Acquire skill to use different OS Know the different number system Understand the various problem solving techniques
88		BED404CS TEACHING OF COMPUTER SCIENCE - II	<ol style="list-style-type: none"> Acquire knowledge on the programming methodologies. Acquire skill to handle the database Know about Boolean algebra Acquire skill to solve Boolean algebra problems Understand the different network terminologies

89		BED403HI TEACHING OF HISTORY - I	<ol style="list-style-type: none"> 1. Develop an understanding of the epistemology of the History's and its evolution and emergence in a social political context. 2. Articulate the meaning and importance of History its interdisciplinary nature as a subject. 3. To appreciate the role of indigenous and critical pedagogy in teaching of History. 4. To understand the crucial role of textbooks and new initiatives in this area 5. To appreciate the importance of weaving of indigenous, practical, tacit and community knowledge in the teaching of History. 6. To understand the significant constructivist and experiential pedagogies in teaching of History. 7. Appreciate the critical role of the teacher in teaching of History.
90		BED404HI TEACHING OF HISTORY - II	<ol style="list-style-type: none"> 1. Know the content of school social science subjects 2. develop the fundamental cultural and social values in school curriculum 3. comprehend the philosophical and psychological principles related to school curriculum 4. acquire the aims and objectives of teaching political science 5. learn interaction analysis in handling social science for an effective classroom 6. equip themselves with the current technological teaching aids and support 7. acquaint themselves with sound subject, pedagogical knowledge
91		BED403GE TEACHING OF GEOGRAPHY - I	<ol style="list-style-type: none"> 1. Develop an understanding of the epistemology of the Geography's and its evolution and emergence in a social political context. 2. Articulate the meaning and importance of Geography its interdisciplinary nature as a subject.

			<ol style="list-style-type: none"> 3. To appreciate the role of indigenous and critical pedagogy in teaching of Geography. 4. To understand the crucial role of textbooks and new initiatives in this area 5. To appreciate the importance of weaving of indigenous, practical, tacit and community knowledge in the teaching of Geography. 6. To understand the significant constructivist and experiential pedagogies in teaching of Geography. 7. Appreciate the critical role of the teacher in teaching of Geography.
92		BED404GE TEACHING OF GEOGRAPHY - II	<ol style="list-style-type: none"> 1. Know the content of school social science subjects 2. develop the fundamental cultural and social values in school curriculum 3. comprehend the philosophical and psychological principles related to school curriculum 4. acquire the aims and objectives of teaching political science 5. learn interaction analysis in handling social science for an effective classroom 6. equip themselves with the current technological teaching aids and support 7. acquaint themselves with sound subject, pedagogical knowledge
93		BED403CA TEACHING OF COMMERCE AND ACCOUNTANCY - I	<ol style="list-style-type: none"> 1. Acquire knowledge and develop interest in knowing the recent development in the teaching 2. Evaluate the text book of Commerce and websites. 3. Apply the knowledge in using ICT Integrated Commerce Education. 4. Understand and apply steps in action research 5. Develop skill in conducting research in the field of commerce education 6. Develop a desirable positive attitude towards the teaching of Commerce and Accountancy

94		BED404CA TEACHING OF COMMERCE AND ACCOUNTANCY - II	<ol style="list-style-type: none"> 1. Acquire knowledge of Constructivist classroom climate 2. Understand the various problems of commerce teaching 3. Develop skills in addressing the needs of special children in Commerce. 4. Understand Consumer Protection Act and develop skills to getting benefitted from this Act. 5. Develop a desirable positive attitude towards E-commerce
95		BED403EC TEACHING OF ECONOMICS - I	<ol style="list-style-type: none"> 1. Develop an understanding of the epistemology of the Economics and its evolution and emergence in a social political context. 2. Articulate the meaning and importance of Economics its interdisciplinary nature as a subject. 3. To appreciate the role of indigenous and critical pedagogy in teaching of Economics. 4. To understand the crucial role of textbooks and new initiatives in this area 5. To appreciate the importance of weaving of indigenous, practical, tacit and community knowledge in the teaching of Economics. 6. To understand the significant constructivist and experiential pedagogies in teaching of Economics. 7. Appreciate the critical role of the teacher in teaching of Economics.
96		BED404EC TEACHING OF ECONOMICS - II	<ol style="list-style-type: none"> 1. Acquire knowledge on professional development of teacher. 2. understand classroom climate for teaching and learning economics 3. Develops skill in lifelong learning. 4. applies skill on the problems of teaching economics 5. Develop interest in service programme. 6. Develop positive attitude on the textbook of Economics. 7. Appreciate the role of various educational organizations.

97		BED405 ASSESSMENT OF LEARNING - II	<ol style="list-style-type: none"> 1. Understand the nature of assessment and evaluation and their role in teaching-learning process. 2. Understand the importance of assessment in continuous and comprehensive manner 3. Develop assessment tasks and tools to assess learner's competence and performance 4. Acquire skill of constructing an achievement test 5. Devise marking, scoring and grading procedures, 6. Devise ways of reporting on student performance 7. Analyze, manage and interpret assessment data. 8. Develop the habit of reflecting-on and self-critiquing to improve performance.
98		BED406 GENDER ISSUES	<ol style="list-style-type: none"> 1. understand the gender related issues 2. Develop sociological perspectives about the impact of culture. Tradition, Socialization, division of labour on gender aspects 3. create an awareness about the impact of gender on Education 4. understand the dynamics of gender perspectives and sensitization 5. create the knowledge regarding equality and its relationship to women education 6. know hindrances in achieving cent % literacy, continuing education, course preferences etc. 7. provide the knowledge about legal provisions related to Women's Rights and Education 8. know the Trends in girls Education and Women empowerment 9. know Benefits of Women / Girls Education 10. Estimate the level of change in the Status.

Programme and Course Outcomes of
DEPARTMENT OF MATHEMATICS

Programmes offered:

S.No.	Programme Name	PO and CO
1	B.Sc (Mathematics)	Yes
2	M.Sc (Mathematics)	Yes

1.a. B.Sc. (Mathematics) –

PROGRAM OUTCOMES	
PO 1	The Graduates will be able to demonstrate competency in Algebra, Analysis, Geometry and other related Mathematical fields.
PO 2	The Graduates will be able to write and explain mathematical proofs using proper terminology and logical structures.
PO 3	The Graduates will be able to apply relevant algebraic, geometric and computational methods in problem solving.
PO 4	The Graduates will be able to formulate mathematical problems and apply mathematical principles in a variety of contexts related to Science, technology, business and industry and illustrate the solutions using symbolic or numeric or graphical methods.
PO 5	The Graduates will be able to produce and deliver effective written and oral presentation of mathematical material and ideas.
PO 6	The Graduates will be able to work effectively as a team as well as individuals.
PO 7	The Graduates will be able to read and understand mathematics research articles published in journals.
PO 8	The Graduates will be able to demonstrate awareness of ethical and environmental issues related to science, research and work.
PO 9	The Graduates will be able to recognize the need for independent and lifelong learning as an important asset and to practice it.

1.b. COs of B.Sc Mathematics

TYPE	COURSE CODE	COURSE NAME	COURSE OUTCOMES
AECC 1	XGL101	COMMUNICATION SKILLS IN ENGLISH	<ol style="list-style-type: none"> 1. Explain the process of communication and its types. 2. Recall various sounds and use it in proper context. 3. Organise meeting events and recording it constructively. 4. Adapt methods of framing questions and using punctuations. 5. Demonstrate the basic skills at the time of interview and presentations.
LAN	XGL102A	ARIVIYAL TAMIL	<ol style="list-style-type: none"> 1. Recognize (milahsk; fhZjy;) gy;NtW mwptpay; Jiw rhu;ej El;gq;fs;> fiyr; nrhy;yhf;f cj;jpfs; Nghd;wtw;iwj; jkpo;nkhop %yk; mwpe;Jnfhs;sy;. 2. Choose (njupTnra;jy;) tlnkhop Ntu;r;nrhw;fs;> Gtpapay;> epytpay; gw;wpg; goe;jkpo; ,yf;fpaq;fs; %yk; mwpe;Jnfhs;sy;. 3. Describe (tpsf;Fjy;) njhy;fhg;gpak; %yk; mwptpay; nra;jpfisczu;jy;. 4. Apply (gad;gLj;Jjy;) gy;NtW fy;tpj; Jiw rhu;ej gpupTfs; >gy;NtW fy;tpj; Jiw rhu;ej gpupTfs; Fwpj;J njspTngwy;. 5. Analyze (gFj;jy;) mwptpay; rpWfijfspd; Njhw;wk; kw;Wk; tsu;r;rp epiy ehlfq;fspd; gq;F Fwpj;J njspT ngWjy;.
CC 1	XPG103	FUNDAMENTAL PHYSICS	<ol style="list-style-type: none"> 1. Recall and Explain the basic principle simple harmonic motion and circular motion. 2. Understand the properties of sound, reverberation time and methods of production of ultrasonic waves. 3. Understand and determine Young's modulus, rigidity modulus, viscosity and explain surface tension and excess pressure inside a drop. 4. Recall the basic concepts and basic laws of thermal physics and determine the thermal conductivity of a bad conductor and solar constant. 5. Acquire knowledge on interference, diffraction; be able to determine wavelength of mercury source; understand LASER action and production; propagation of fibre optics.
CC 2	XMT104	FOUNDATION COURSE IN	<ol style="list-style-type: none"> 1. Define and Apply fundamental theorem of algebra to find the relation between roots and

(DSC 2A)		MATHEMATICS	<p>coefficients.</p> <ol style="list-style-type: none"> 2. Explain the transformation of equation and to solve the reciprocal equation using Newton's method. 3. Expand the trigonometric functions and to find the series of trigonometric functions by apply the related properties to Solve the problems. 4. Explain hyperbolic and inverse hyperbolic functions and to find the logarithm of the complex numbers. 5. Explain Summations of trigonometric series and apply properties to find their related problems.
CC 3 (DSC 3A)	XMT105	DIFFERENTIAL CALCULUS & INTEGRAL CALCULUS	<ol style="list-style-type: none"> 1. Apply the basics of differentiation. 2. Find Evolutes in Cartesian Coordinates. 3. State Rolle's theorem, Mean Value theorems, 4. Taylor's theorem with Lagrange's and Cauchy's forms of remainder, Taylor's series and to find Maxima and Minima. 5. Find the definite integrals using integration by parts and reduction formula. 6. Find integration by changing order of integration using double integrals.
HUMAN 1	XUM106	HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY	<ol style="list-style-type: none"> 1. Relate and Interpret the human ethics and human relationships. 2. Explain and Apply gender issues, equality and violence against women. 3. Classify and Develop the identify of women issues and challenges. 4. Classify and Dissect human rights and report on violations. 5. List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
CC 1 lab	XPG107	FUNDAMENTAL PHYSICS LAB	<ol style="list-style-type: none"> 1. Recall the usage of laboratory instruments and measure the Young's modulus of Non – uniform pending. 2. Explain and demonstrate the behavior of rigidity modulus of a wire. 3. Manipulate and measure the thickness of a thin wire using Air wedge. 4. Compare and explain the Calibration of voltmeter. 5. Describe the Band gap of the semiconductor
AECC 3	XCGE201	SPEECH AND BUSINESS	<ol style="list-style-type: none"> 1. Define and describe how to make effective speeches academically and in social

		COMMUNICATION	<p>situations.</p> <ol style="list-style-type: none"> Identify the forms of language used in different speeches and how to listen actively and critically. Ability to incorporate the modern style of writing in Business Communication. Produce the proper tone of language required in writing business communication. Apply discourse features in business communication, propriety and exactness in language.
AECC 2	XES202	ENVIRONMENTAL STUDIES	<ol style="list-style-type: none"> Describe the significance of natural resources and explain anthropogenic impacts. Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance. Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon. Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development. Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.
CC-4 Allied-2	XMT203	MODERN PHYSICS	<ol style="list-style-type: none"> Define, explain Atom models and demonstrate Franck and Hertz method; discuss the phenomenon of Excitation and ionization potentials.
CC-5 (DSC 5B)	XMT204	CALCULUS	<ol style="list-style-type: none"> Find the radius and centre of curvature, evolutes and to apply successive differentiation and Leibnitz theorem. Explain properties of definite integrals, integration by parts, Reduction formulae and Bernoulli's formula. Evaluate double integral both in Cartesian and polar coordinates. Explain and evaluate Beta and Gamma integrals and their relations Find Jacobian, change of variable in the case of two variables and three variables, Transformation from Cartesian to polar coordinates.
CC-6 (DSC 6B)	XMT205	SEQUENCES & SERIES	<ol style="list-style-type: none"> Explain Bounded Sequences, Monotonic Sequences, Convergent Sequence, Divergent Sequences, Oscillating sequences. Explain Behavior of Monotonic functions.

			<ol style="list-style-type: none"> 3. Explain subsequences , limit points and Cauchy sequences. 4. Apply comparison test to infinite series to test the convergence and to Explain Cauchy's general principal of convergence. 5. Apply D Alembert's ratio test, Cauchy's root test to test convergence and to test the Alternating Series and Absolute Convergence of the series.
GE 1	OE	*OPEN ELECTIVE	
CC4 Allied-1 Lab	XMT206	FUNDAMENTAL PHYSICS (PRACTICAL-I)	
SEC	XMT301	LOGIC AND SETS	<ol style="list-style-type: none"> 1. Define and Explain Statements and Notations, Connectives, Statements formula and truth tables-Conditional and biconditional, Well formed formulae-Equivalence of formulae and Normal forms. 2. Define and Explain Theory of inference for a statement calculus, rules of inference, related problems and Indirect method of proof. 3. Define and Explain Predicate Calculus, The statement functions, variables and quantifiers predicate formulae, free and bounded variables and the universe of discourse. 4. Define and ExplainThe rule of sum and product – permutation – combination of binomial theorem – Multinomial theorem. 5. Define and ExplainMathematical Induction, The pigeon hole principle and The principle of inclusive and exclusive Derangements.
CC 7	XMT302	PROGRAMMING IN C	<ol style="list-style-type: none"> 1. Explain Constants, Variables, Data types , Operator and 2. Expressions. 3. Explain Input and Output operations, Decision Making and Branching, Decision making and Looping. 4. Explain Character Arrays and Strings and User defined 5. Functions. 6. Explain and Apply Structures and unions, Pointers and File management in C. 7. Apply Dynamic memory allocation, Linked lists, Preprocessors and Programming Guide lines.
CC 8	XMT303	REAL ANALYSIS	<ol style="list-style-type: none"> 1. Explain The field axioms, Field properties, Order in R, Absolute value, Completeness ,

(DSC 2C)			<p>Representation of Real numbers on a straight line , Intervals , Countable and Uncountable sets.</p> <ol style="list-style-type: none"> Define and Explain Open sets, Closed sets, Limit points of a set and Closure of a set. Define and Explain Limits, Continuous functions, Types of discontinuities, Algebra of Continuous functions and Boundedness of continuous functions. Define and Explain Derivability and continuity, Algebra of derivatives, Inverse function theorem for derivatives and Darboux's theorem. State and Explain conditions for integrability, properties of integrable functions, continuity and derivability of integral functions, Mean value theorems, the fundamental theorem of Calculus and the first mean value theorem.
CC 9 (DSC 3C)	XMT304	ANALYTICAL GEOMETRY 3D	<ol style="list-style-type: none"> Find coordinates in space, direction cosines of a line , angle between line and to explain angle between planes and distance of a plane from a point. Find line of intersection of planes, coplanar lines, skew lines, Shortest distance between skew lines. Explain section of sphere by plane-tangent planes , condition of tangency and system of spheres generated by two spheres. Explain and to find the equation of surface, cone, intersection of straight line and quadric cone , tangent plane and normal. Explain the condition for plane to touch the quadric cone, condition that the cone has three mutually perpendicular generators and condition for the plane to touch the conicoid.
GE 1		*OPEN ELECTIVE	
CC 7 lab	XMT305	PROGRAMMING IN C – PRACTICAL	<ol style="list-style-type: none"> Apply Constants, Variables, Data types , Operator and Expressions to write simple programmes Apply Input and Output operations, Decision to write simple programmes. Apply Character Arrays and Strings and User defined Functions to write simple programmes. Apply Structures and unions, Pointers and File management in C to write simple programmes. Apply Dynamic memory allocation, Linked lists, Preprocessors and Programming Guide

				lines to write simple programmes.
UMAN 2	XUM306	DISASTER MANAGEMENT		<ol style="list-style-type: none"> 1. Understanding the concepts of application of types of disaster preparedness. 2. Infer the end conditions & Discuss the failures due to disaster. 3. Understanding of importance of seismic waves occurring globally. 4. Estimate Disaster and mitigation problems. 5. Keen knowledge on essentials of risk reduction
SEC 2	XMT401	THEORY OF EQUATIONS		<ol style="list-style-type: none"> 1. Explain Graphical representation of a polynomials, maximum and minimum values of a polynomials. 2. Apply General properties of equations, Descarte's rule of signs positive and negative rule to find the Relation between the roots and the coefficients of equations. 3. Define and Explain Sets, subsets, Set operations, the laws of set theory and Venn diagrams. Examples of finite and infinite sets. 4. Define and Explain with Examples 5. Finite sets and counting principle. Empty set, properties of empty set. Standard set operations. Classes of sets. Power set of a set. 6. Solve reciprocal and binomial equations, and to find algebraic solutions of the cubic and biquadratic with Properties of the derived functions.
CC 10	XMT402	INTRODUCTION TO MATLAB		<ol style="list-style-type: none"> 1. Apply Variables, assignment, statements, expressions, characters, encoding, vectors and matrices. 2. Explain about creating row vectors and column vectors , dimensions in using functions with vectors and matrices. 3. Apply Matlab Scripts, Input and Output, scripts with input and output, user defined functions in simple applications. 4. Apply Selection Statement, relational expressions, SWITCH statement, menu function, looping, FOR loop, nested FOR loop, WHILE loop. 5. Apply String manipulations, creating string variable, operations on strings, fundamentals of arrays, structure and file operations with simple applications.
CC 11 (DSC 2D)	XMT403	VECTOR CALCULUS AND FOURIER SERIES		<ol style="list-style-type: none"> 1. Find Gradient of a vector, Directional derivative, divergence & curl of a vector,

			<p>solenoidal & irrotational vector functions, Laplacian double operator and to solve simple problems.</p> <ol style="list-style-type: none"> Find vector integration ,tangential line integral, conservative force field, scalar potential, work done by a force, Normal surface integral, Volume integral and to solve simple problems. Use Gauss Divergence Theorem, Stoke's Theorem, Green's Theorem and to solve Simple problems & Verification of the theorems for simple problems. Explain Fourier Series expansion of periodic functions with Period 2π Make Use of odd & even functions in Fourier Series. Explain Half-range Fourier cosine Series & sine series, Change of interval & Combination of series.
CC 12 (DSC 3D)	XMT404	ALGEBRA	<ol style="list-style-type: none"> Define groups, abelian and non-abelian groups with examples and to explain integer under addition and multiplication modulo n. Explain Cyclic groups from number systems, complex roots of unity, circle group, the general linear group $GL_n(n, \mathbb{R})$, groups of symmetries of (i) an isosceles triangle, (ii) an equilateral triangle, (iii) a rectangle, and (iv) a square, the permutation group $Sym(n)$, Group of quaternions. Explain Subgroups, cyclic subgroups, the concept of a subgroup generated by a subset and the commutator subgroup of group, examples of subgroups including the center of a group. State and Explain Cosets, Index of subgroup, Lagrange's theorem, order of an element, Normal subgroups, Quotient groups. Define and Explain rings, commutative and non-commutative rings with rings from number systems, \mathbb{Z}_n the ring of integers modulo n, rings of matrices, polynomial rings, and rings of continuous functions.
GE 2		*OPEN ELECTIVE	
CC 10 Lab	XMT405	INTRODUCTION TO MATLAB - PRACTICAL	<ol style="list-style-type: none"> Apply Variables, assignment, statements, expressions, characters, encoding, vectors and matrices. Explain about creating row vectors and column vectors , dimensions in using functions with vectors and matrices. Apply Matlab Scripts, Input and Output, scripts with input and output, user defined

			<p>functions in simple applications.</p> <ol style="list-style-type: none"> 4. Apply Selection Statement, relational expressions, SWITCH statement, menu function, looping, FOR loop, nested FOR loop, WHILE loop. 5. Apply String manipulations, creating string variable operations on strings, fundamentals of arrays, structure and file operations with simple applications.
SEC 3		XMT501	<p>PROBABILITY AND STATISTICS</p> <ol style="list-style-type: none"> 1. Define and Explain Sample space, probability axioms, real random variables (discrete and continuous), cumulative distribution function, and probability mass/density functions. 2. Define and Explain Mathematical expectation, moments, moment generating function, characteristic function. 3. Define and Explain Discrete distributions: uniform, binomial, Poisson, continuous distributions: uniform, normal, exponential. 4. Define and Explain Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions. 5. Define and Explain Expectation of function of two random variables, conditional expectations, and independent random variables.
DSE 1A		XMT502B	<p>DISCRETE MATHEMATICS</p> <ol style="list-style-type: none"> 1. Define and Apply truth tables and the rules of propositional and predicate calculus. 2. Apply the following methods direct proof, indirect proof, and proof by contradiction, and case analysis to formulate short proofs. 3. Solve linear recurrence relation with constant coefficients, non homogeneous recurrence relations and non homogeneous recurrence relations using methods of generating functions. 4. Explain Basic theorems on Boolean Algebra, Duality principle Boolean. functions. 5. Apply Boolean algebra, Logic gates and circuits combinatorial circuits, Boolean expression and karnaugh map.
DSE 2A		XMT503A	<p>NUMERICAL METHODS</p> <ol style="list-style-type: none"> 1. Explain and Solve Algorithms, Convergence, Bisection method, False position method, Fixed point iteration method, Newton's method. 2. Solve system of linear equations using iterative methods Gauss-Jacobi, Gauss-Seidel

				<p>and SOR iterative methods.</p> <ol style="list-style-type: none"> 3. Explain Lagrange and Newton interpolation: linear and higher order, finite difference operators. 4. Apply forward difference, backward difference and central Difference to find Numerical differentiation: 5. Solve Integration using trapezoidal rule, Simpson's rule, and Euler's method.
DSE 3A	XMT504 A	LINEAR ALGEBRA		<ol style="list-style-type: none"> 1. Define and Explain vector spaces, subspaces, linear transformation, and span of a set with examples. 2. Define Linear Independence, Basis and Dimension and to find Rank and Nullity. 3. Explain matrix of a linear transformation, Inner product space and to Define with examples orthogonality, Gram Schmidt orthogonalisation process and orthogonal complement. 4. Define Algebra of Matrices, Types of Matrices and to find the inverse of a matrix and Rank of a matrix. 5. Explain Characteristic equation and Cayley - Hamilton theorem and to find Eigen values and Eigen vectors.
GE 3		*OPEN ELECTIVE		
SEC 4	XMT601	GRAPH THEORY		<ol style="list-style-type: none"> 1. Define and Explain The Konigsberg Bridge Problem, Graphs and subgraphs, Degrees, Subgraphs, and Isomorphism. , independent sets and coverings. 2. Define and Explain Matrices, Operations on Graphs, Walks, Trails and Paths, Connectedness and Components and Eulerian Graphs. 3. Define and Explain Hamiltonian Graphs, Characterization of Trees and Centre of a Tree. 4. Define and Explain Planarity, Properties and Characterization of Planar Graphs. 5. Define and Explain Directed Graphs, Basic Properties, Some Applications, Connector Problem, Kruskal's algorithm , Shortest Path Problem and Dijkstra's algorithm.
DSE 4B	XMT602 A	COMPLEX ANALYSIS		<ol style="list-style-type: none"> 1. Use CR Equations in cartesian and polar co-ordinates to find analytic function and to Explain Harmonic function Properties and applications. 2. Explain Conformal mappings - Linear and Non-linear transformations and to Apply cross

			<p>ratio to construct Bilinear transformations.</p> <ol style="list-style-type: none"> Solve the integral using Cauchy's integral theorem, Cauchy's integral formula and to Explain Liouville's theorem, Maximum modulus theorem and to apply them in simple problems. Using Taylor's series and Laurent's series Expansion of functions in Power series and to explain types of singularities. Apply Cauchy residue theorem to Solve Integration of functions of the type involving $\cos x$, $\sin x$.
DSE 1B	XMT602B	NUMBER THEORY	<ol style="list-style-type: none"> Define and Explain Euclid's Division Lemma, Divisibility, The Linear Diophantine Equation, The Fundamental Theorem of Arithmetic. Define and Explain Permutations and Combinations, Fermat's Little Theorem, Wilson's Theorem, Generating Functions. Define and Explain Basic Properties of Congruences Residue Systems. Linear Congruences, The Theorems of Fermat and Wilson Revisited. Define and Explain The Chinese Remainder Theorem, Polynomial Congruences and Combinational Study of $F(n)$. Define and Explain Formulae for $d(n)$ and $s(n)$ – Multiplicative Arithmetic Function – The Mobius Inversion Formula.
DSE 2B	XMT603A	LINEAR PROGRAMMING	<ol style="list-style-type: none"> Find Graphical Solution, Solve LPP using Simplex Method, Big M Method and Two Phase Method. Solve Linear Programming problem Formulation of Primal, Dual Pairs, Duality and Simplex Method. Solve Transportation Problems, finding initial basic feasible solution using North West Corner Rule and Vogel's approximation method, Solve unbalanced Transportation Problems, Assignment Problems and Routing Problems. Solve sequencing Problems, Problems with 'n' jobs and 'k' machines, Problems with 'n' jobs and 2 machines, Problems with 2 jobs and k machines and Problems with 2 jobs and 3 Machines. Solve Game Theory problems Two persons Zero sum games, maximin and minimax principle, Games without saddle points, Mixed strategies,

				using Graphical method and Dominance property.
DSE 2B	XMT603B	STOCHASTIC PROCESSES	<ol style="list-style-type: none"> 1. Find and Solve Generating function, Laplace transforms, Laplace transforms of a probability distribution function,- Difference equations, Differential difference equations . 2. Define and Explain with Examples Stochastic Process, Notion, Specification, Stationary Process, Markov Chains, and Higher transition probabilities. 3. Define and Explain Classification of states and chains, Determination of higher transition probabilities, Stability of Markov system, and Limiting behaviour. 4. Define and Explain Poisson Process and related distributions, Generalization of Poisson Process, Birth and death process. 5. Define and Explain Stochastic Process in queuing and reliability, queuing systems, M/M/1 models, Birth and death process in queuing theory, Multi channel models and Bulk Queues. 	
DSE 3B	XMT604	PROJECT WORK		

2a. M.Sc. (Mathematics) –

PROGRAM OUTCOMES	
PO 1	The Graduates will be able to demonstrate competency in Algebra, Analysis, Geometry and other related Mathematical fields.
PO 2	The Graduates will be able to write and explain mathematical proofs using proper terminology and logical structures.
PO 3	The Graduates will be able to apply relevant algebraic, geometric and computational methods in problem solving.
PO 4	The Graduates will be able to formulate mathematical problems and apply mathematical principles in a variety of contexts related to Science, technology, business and industry and illustrate the solutions using symbolic or numeric or graphical methods.
PO 5	The Graduates will be able to produce and deliver effective written and oral presentation of mathematical material and ideas.
PO 6	The Graduates will be able to work effectively as a team as well as individuals.
PO 7	The Graduates will be able to read and understand mathematics research articles published in journals.
PO 8	The Graduates will be able to demonstrate awareness of ethical and environmental issues related to science, research and work.
PO 9	The Graduates will be able to recognize the need for independent and lifelong learning as an important asset and to practice it.

2b. M.SC MATHEMATICS – COs

SL NO.	COURSE CODE & NAME		COURSE OUTCOMES
1.	YMA 101	GROUPS AND RINGS	<ol style="list-style-type: none"> 1. Define and Explain Subgroups, Normal subgroups and Quotient Groups, Lagrange's Theorem. 2. Define and Explain Homomorphism Theorems, Isomorphism Theorems, Automorphisms Theorems, Cayley's theorem. 3. Permutation groups, Another Counting principle. 4. Define and Explain Sylow's Theorems and their simple applications, Direct Products: External and Internal, Finite Abelian Groups. 5. Define and Explain Rings, Subrings, Ideals, Factor Rings, Homomorphism and Integral Domains. Maximal and prime ideals. The field of Quotients of an integral domain. 6. Define and Explain Euclidean Ring, A Particular Euclidean Ring, Polynomial Ring, and Polynomial over the Rational Field, Polynomial Rings over Commutative Rings.
2.	YMA 102	ANALYSIS-I	<ol style="list-style-type: none"> 1. Define and Explain the Real and Complex Number Systems 2. Define and Explain Basic Topology. 3. Define and Explain convergence of sequences and series 4. Define and Explain Continuity of functions 5. Define and Explain the derivative of a real function, the Continuity of Derivatives, Derivatives of Higher Order, and Taylor's Theorem.
3.	YMA 103	DIFFERENTIAL EQUATIONS	<ol style="list-style-type: none"> 1. Find The general solution of the homogeneous equations using various methods. 2. Solve the homogeneous linear system with constant coefficients and special functions. 3. Find the critical points and stability for linear systems by 4. Liapounov's direct method. 5. Solve First order linear partial differential equations using various methods. 6. Solve initial and boundary value problems.

4.	YMA 104	DISCRETE MATHEMATICS	<ol style="list-style-type: none"> 1. Define and Explain Basic logical operations. 2. Define and Explain the theory of inference for the statement Calculus. 3. Solve Recurrence Relations using Generating Functions. 4. Define and Explain Lattices and Boolean Algebra. 5. Define and Explain Grammar and Languages.
5.	YMA1E1	GRAPH THEORY	<ol style="list-style-type: none"> 1. Define and Explain Graphs, subgraphs and trees. 2. Define and Explain Connectivity - Blocks - Euler tours - Hamilton Cycles. 3. Define and Explain Matchings and Coverings in Bipartite Graphs, Edge Chromatic Number and Vizing's Theorem. 4. Define and Explain independent sets and cliques, vertex colorings. 5. Define and Explain Plane and planar Graphs, Dual graphs, Euler's Formula, The Five-Color Theorem and the Four- Color Conjecture- Applications.
6.	YMA1E2	CODING THEORY	<ol style="list-style-type: none"> 1. Define and Explain Error detection, Correction and decoding 2. Define and Explain Linear codes 3. Define and Explain Linear codes Bounds in coding 4. Theory 5. Define and Explain Cyclic codes: Definitions – Generator polynomials – Generator matrix and parity check matrix – Decoding of Cyclic codes 6. Define and Explain Special cyclic codes
7.	YMA1E3	MATHEMATICAL LOGIC	<ol style="list-style-type: none"> 1. Define and Explain Syntax of First-Order Logic, Semantics of First-Order Languages, Structures of First-Order Languages . 2. Define and Explain Propositional Logic and Tautology 3. Define and Explain Consistency and Completeness and Extensions by definition of first order theories 4. Define and Explain Embeddings and Isomorphisms Compactness theorem, Categoricity and Complete Theories 5. Define and Explain Recursive functions, 6. Arithmatization of first order theories and Godel's first Incompleteness theorem.

8.	YMA 201	LINEAR ALGEBRA	<ol style="list-style-type: none"> 1. Define and Explain Elementary Basic Concepts- Linear Independence and Bases. 2. Define and Explain Dual Spaces- Inner Product Space- Modules. 3. Solve the Algebra of Linear Transformations to find characteristics roots. 4. Define and Explain Canonical Forms, Triangular form, Nilpotent Transformations, Jordan Form and Rational Canonical form. 5. Define and Explain Trace and Transpose, Determinants, Hermitian, Unitary and Normal Transformations, Real Quadratic forms.
9.	YMA 202	ANALYSIS-II	<ol style="list-style-type: none"> 1. Define and Explain Existence, Properties of the Integral, Integration and Differentiation. 2. Define and Explain Uniform convergence and Continuity. 3. Define and Explain Uniform convergence and Integration and Differentiation. 4. Define and Explain Set functions, Construction of Lebesgue Measures, Measurable function, Simple functions in measure. 5. Define and Explain Integration Comparison with the Riemann 6. Integral, Integration of Complex functions, Functions of class
10.	YMA203	INTEGRAL EQUATIONS, CALCULUS OF VARIATIONS AND TRANSFORMS	<ol style="list-style-type: none"> 1. Define and Explain Calculus of variations, Maxima and Minima, the simplest case, Natural boundary and transition conditions, variational notation 2. Define and Explain Fourier sine and cosine transforms - Properties Convolution - Solving integral equations - Finite Fourier transform 3. : Define and Explain Hankel Transform: Definition – Inverse formula – Some important results for Bessel function – Linearity property 4. Define and Explain Linear Integral Equations - Definition, Regularity conditions – special kind of kernels –eigen values and eigen functions – convolution Integral 5. Define and Explain Volterra Integral equation – examples – some results about the resolvent kernel. Classical Fredholm Theory.

11.	YMA 204	OPERATIONS RESEARCH	<ol style="list-style-type: none"> 1. Define and Explain Decision theory in detail. 2. Explain and solve problems in PERT and CPM 3. Explain deterministic inventory control models and probabilistic Inventory Control Models and solve problems by using the methods: 4. Explain Essential Features of Queueing System, Classification of Queueing Models and find solution of Queueing Models. 5. Explain replacement and maintenance models and solve problems by using these methods.
12.	YMA2E1	ALGEBRAIC NUMBER THEORY	<ol style="list-style-type: none"> 1. Define and Explain Primes, Congruences, Fermat's, Euler's and Wilson's Theorems 2. Define and Explain Techniques of numerical calculations – 3. Public key cryptography – Prime power Moduli – Primitive roots and Power Residues 4. Define and Explain Number theory from an Algebraic Viewpoint, The Legendre symbol (a/r) where r is an odd prime – Quadratic Reciprocity– The Jacobi Symbol (P/q) where q is an odd positive integer. 5. Define and Explain Equivalence and Reduction of Binary Quadratic Forms, Sums of three squares, Arithmetic Functions – The Mobius Inversion Formula – Recurrence Functions – Combinatorial number theory 6. Define and Explain Diophantine Equations, The equation $ax+by=c$ Simultaneous Linear Diophantine Equations, Pythagorean Triangles
13.	YMA2E2	DATA STRUCTURES AND ALGORITHMS	<ol style="list-style-type: none"> 1. Understand and apply linear data structures 2. Understand and apply nonlinear data structures 3. Understand and apply sorting techniques 4. Understand and apply graph algorithms 5. Design different algorithm techniques.
14.	YMA2E3	FUZZY SETS AND FUZZY LOGIC	<ol style="list-style-type: none"> 1. Define and Explain basic definitions of Crisp sets, the notion of fuzzy sets and basic concepts of fuzzy sets. 2. Define and Explain operation on Fuzzy Sets. 3. Define and Explain Fuzzy Relations 4. Define and Explain Classical Logic.

15.	YMA 301	FIELD THEORY	<ol style="list-style-type: none"> 1. Define and Explain Extension fields – Finite Extension – Algebraic Extension - Transcendence of e. 2. Define and Explain Roots of Polynomials.- Remainder Theorem – Splitting field - More about roots. 3. Define and Explain Elements of Galois Theory- Fixed field – Normal extension- Fundamental Theorem. 4. Define and Explain Solvability by radicals – Solvable group – Galois group over the rational. 5. Define and Explain Finite fields - Wedderburn's theorem on finite division rings – A Theorem of Frobenius.
16.	YMA 302	TOPOLOGY	<ol style="list-style-type: none"> 1. Define and Explain Topological Spaces 2. Define and Explain Continuous Functions 3. Define and Explain Connectedness 4. Define and Explain Compactness 5. Define and Explain Countability and Separation Axiom
17.	YMA303	AUTOMATA THEORY	<ol style="list-style-type: none"> 1. Define and Explain Strings, Alphabets and Languages 2. Define and Explain Regular expressions and Properties of Regular sets. 3. Define and Explain Context Free grammars 4. Define and Explain Pushdown Automata & properties of Context free languages 5. Define and Explain Turing Machine and Chomski hierarchy.
18.	YMA 304	MATHEMATICAL STATISTICS	<ol style="list-style-type: none"> 1. Define and Explain Estimation Theory. 2. Explain and solve Tests based on normal, t and f distributions for testing of means, variance and proportions – Analysis of $r \times c$ tables – Goodness of fit 3. Explain and solve Correlation And Regression. 4. Explain and solve Design of Experiments 5. Explain and solve Statistical Quality Control by \bar{X}, R charts, p, c and np charts.
19.	YMA3E1	DATA ANALYSIS USING SPSS	<ol style="list-style-type: none"> 1. Define and Explain Starting SPSS, SPSS Main Menus, Working with the Data Editor, Importing and Exporting data, Plotting of Charts using Bar and Pie diagram. 2. Define and Explain measures of central tendencies and measures of dispersion using SPSS

			<ol style="list-style-type: none"> Define and Explain Type I and Type II error, Basics of one sample t-test, independent sample t-test and paired t-test using SPSS Define and Explain One way ANOVA, two way ANOVA and Chi-square test using SPSS Define and Explain correlation and regression using SPSS
20.	YMA3E2	NUMERICAL METHODS	<ol style="list-style-type: none"> Find the solution by using Bisection method-Newton-Raphson Method-Curve fitting straight line and parabola. Solve Simultaneous Linear Equations. Find the value of $y = f(x)$ using interpolation formula. Find the first and second derivative of $f(x)$ and to find the value of integrals using numerical methods. Solve ordinary differential equations by using various methods.
21.	YMA3E3	COMMUTATIVE ALGEBRA	<ol style="list-style-type: none"> Define and Explain special algebraic structures and their properties. Define and Explain proficient in the theory of Modules Define and Explain the methods of decomposition of rings. Define and Explain Chain conditions – Primary decomposition in Noetherian rings. Define and Explain Artin rings – Discrete valuation rings – Dedekind domains – Fractional ideals
22.	YMA401	COMPLEX ANALYSIS	<ol style="list-style-type: none"> Define and Explain Line Integrals- Rectifiable arc – Line integrals as functions of arc- Cauchy's Theorem for rectangle- Cauchy's Theorem for disc Define and Explain Integral Formula – Higher derivatives – Removable singularities – Taylor's theorem – Zeros and Poles – The Local Mapping – The Maximum Principle. Define and Explain The General Statement of Cauchy's Theorem – Proof of Cauchy's Theorem – Locally Exact Differentials – Multiply Connected Regions. Define and Explain The Residue Theorem – The Argument Principle – Evaluation of Definite Integrals – The Mean – value property – Poisson's formula- Schwarz's Theorem – The Reflection Principle.

			6. Define and Explain Weierstrass's Theorem – The Taylor Series – The Laurent Series – Partial Fractions- Jensen's Formula – Hadamard's Theorem
23.	YMA402	FUNCTIONAL ANALYSIS	<ol style="list-style-type: none"> 1. Define and Explain Normed Spaces – Continued of Linear Maps – Hahn – Banach Theorems. 2. Define and Explain Banach Spaces – Uniform Boundedness Principle – Closed Graph and Open Mapping Theorems. 3. Define and Explain Bounded Inverse Theorem – Spectrum of a Bounded Operator. 4. Define and Explain Inner Product Spaces – Orthonormal Sets – Projection and Riesz Representation Theorems. 5. Define and Explain Bounded Operators and adjoint, Normal , Unitary and Self-adjoint Operators.
24.	YMA403	MATHEMATICAL MODELING	<ol style="list-style-type: none"> 1. Define and Explain Specification of Stochastic processes, Stationary processes, Markov Chains with examples 2. Define and Explain Classification of states and chains. 3. Define and Explain Markov processes with Discrete state space. 4. Define and Explain Queuing system 5. Define and Explain Auto-correlation functions, cross- correlation functions and their properties

Programme Outcomes (PO) and Course Outcomes (CO) of
DEPARTMENT OF MANAGEMENT STUDIES

Programmes Offered:

S.No.	Programme Name	PO and CO
1	MBA	Yes
2	BBA	Yes

1. Master of Business Administration (MBA)

PROGRAMME OUTCOME (PO)	
PO1	Knowledge of management theory to solve problems of industry and society.
PO2	Knowledge of the latest tools and technologies in their chosen area of specialization.
PO3	Understand the local and global business environment and formulate business strategies.
PO4	Communicate effectively with the stakeholders in industry and society.
PO5	Identify problems, collect relevant data, use appropriate techniques and tools to analyze the data and select the optimum solution. Use research based knowledge and research methods to solve problems.
PO6	Demonstrate leadership skills and manage projects by organizing tasks and delegating responsibility effectively. Function effectively as a leader and member of a team.
PO7	Apply ethical principles and social responsibility.
PO8	Demonstrate knowledge of and need for sustainable development.
PO9	Possess the ability to engage in lifelong learning.
PROGRAMME SPECIFIC OUTCOMES (PSOS):	
PSO1:	Demonstrate understanding of rural business management.
PSO2:	Demonstrate skills in statistical analysis of business research data.

Course Outcomes (COs):

S.NO	SEMESTER	COURSE CODE & NAME	COURSE OUTCOMES (COS)
1	I	YBA101 PRINCIPLES OF MANAGEMENT	<ol style="list-style-type: none">1. Illustrate the management concepts and integrate the management principles into management practices.2. Explain the role of Planning and its importance in an organization.3. Relate the nature of organizing and staffing in an organization.4. Interpret the ways to direct and managing people in an organization.5. Explain the process of controlling in an organization.
		YBA102 ORGANIZATIONAL BEHAVIOUR	<ol style="list-style-type: none">1. Explain the challenges and opportunities for OB and OB Model2. Understand the concept of Personality, Learning, Attitude, Value, Perception and Motivation3. Summarise the styles and theories of leadership and difference between a manager and a leader4. Understand the group formation, team building and communication5. Outline the organizational climate, culture, Job Satisfaction, Organizational Change, Stress and Work Life Balance.
		YBA103 ECONOMIC ANALYSIS AND BUSINESS ENVIRONMENT	<ol style="list-style-type: none">1. Define the fundamentals and principles of economics2. Explain the Law of Supply and Demand3. Analyse the economies and diseconomies of scale4. Define and Analyse market structure5. Define and Analyse the calculation of GDP and CPI6. Define and Analyse Fiscal and Monetary Policy
		YBA104 ACCOUNTING FOR MANAGERS	<ol style="list-style-type: none">1. Define the methodology of preparing Financial Statements2. Define the Ratio Analysis and Explain the Cash Flow statements3. Build Cost Sheet and variances4. Analyze Standard costing and marginal costing5. Define contemporary concepts of accounting in business

		YBA105 BUSINESS MATHEMATICS AND STATISTICS	<ol style="list-style-type: none"> 1. Solve problems in functions, differentiation, maxima and minima, and progressions 2. Apply matrix algebra to solve linear equations 3. Apply correlation and regression analysis to data 4. Solve problems using discrete and continuous probability distributions 5. Apply hypothesis testing to data
		YBA106 BUSINESS LEGISLATION FOR MANAGEMENT	<ol style="list-style-type: none"> 1. Understand the different legal terms in a contract 2. Outline the formation and legal relationship between partners 3. Understand the sale and transfer of ownership. 4. Define & analyze Negotiable Instruments and its importance 5. Understand the different terms in Companies Act
		YA107 BUSINESS ETHICS AND CORPORATE SOCIAL RESPONSIBILITIES	<ol style="list-style-type: none"> 1. Explain the ethical theories and various types of approaches 2. Outline the corporate social responsibilities and role in the society 3. Summarize the ethical issue involved in Human Resource Management and Marketing 4. Interpret the ethical issue with Finance and Accounting 5. Explain the ethical implication of Technology Transformation
		YBA108 BUSINESS COMMUNICATION	<ol style="list-style-type: none"> 1. Understand the communication process. 2. Identify the learn parts of a report. 3. Understand the procedure for conducting meetings. 4. Analyze how to search job, build own resume and job application letter. 5. Recognize various group discussion techniques; acquire interview skills and negotiating skills.
2.	II	YBA201 FINANCIAL MANAGEMENT	<ol style="list-style-type: none"> 1. Understanding the overview of Financial Management and Time value of Money. 2. Understanding capital budgeting techniques. 3. Understanding the capital structure and dividend policy 4. Understanding the sources of long term finance and basics of inventory management. 5. Understanding the sources of short term finance and basics of mergers and takeovers

		YBA202 HUMAN RESOURCE MANAGEMENT	<ol style="list-style-type: none"> 1. Learn the evolution of human resource management 2. Identify the demand forecasting of human resource required and hire right person for right place at right time 3. Identify the various recruitment practices and selection procedure 4. Analyze new perspectives in Training and executive development 5. Recognize the performance evaluation and learn how to handle grievance.
		YBA203 MARKETING MANAGEMENT	<ol style="list-style-type: none"> 1. Understand the concept of Marketing Management 2. Understand the Customer value & Market segment 3. Understand the Product strategy 4. Understand the Communicating value 5. Understand the concept of Competitive dynamics
		YBA204 PRODUCTION AND OPERATIONS MANAGEMENT	<ol style="list-style-type: none"> 1. Explain operations, productivity and the various steps in product design. 2. Explain the types of processes, process selection, capacity planning and facility layout. 3. Solve forecasting problems. 4. Explain aggregate planning and inventory control. 5. Explain material requirements planning, scheduling and lean production.
		YBA205 INFORMATION MANAGEMENT	<ol style="list-style-type: none"> 1. Understand the basic concept of Information system 2. Understand the system flow 3. Understand the concept of Data Base Management System 4. Understand the security system concept 5. Understand the new advancements in IT
		YBA206 BUSINESS RESEARCH METHODS	<ol style="list-style-type: none"> 1. Understand the process in business research projects 2. Define business problem 3. Analyzing of collected data to investigate the research problem 4. Designing of questionnaires for data collection 5. Interpret of data using statistical techniques

		YBA207 OPERATIONS RESEARCH	<ol style="list-style-type: none"> 1. Solve linear programming problems. 2. Solve transportation and assignment problems. 3. Solve replacement problems. 4. Solve queuing problems and machine sequencing problems. 5. Solve CPM and PERT problems.
		YBA208 ENTREPRENEURSHIP DEVELOPMENT	<ol style="list-style-type: none"> 1. Recognise the personal traits of an entrepreneur 2. Understand the environment that support entrepreneurial development 3. Develop the business plan based on feasibility 4. Describe the steps in establishing a small business 5. Understand the factors responsible for success/failure of a business
3.	III	YBA301 STRATEGIC MANAGEMENT	<ol style="list-style-type: none"> 1. Explain the steps in the strategic management process. 2. Analyze the external and internal environment of businesses. 3. Compare various business level strategies. 4. Compare various corporate level strategies. 5. Compare various international strategies.
		YBAE67 SUPPLY CHAIN AND LOGISTICS MANAGEMENT	<ol style="list-style-type: none"> 1. Explain supply chain management and the process view of supply chain 2. Explain supply chain strategy and the drivers of supply chain performance 3. Explain the various distribution network designs 4. Explain the various modes of transportation and transportation network designs 5. Explain the sourcing options and coordination in supply chains
		YBAE68 PRODUCT DESIGN	<ol style="list-style-type: none"> 1. Explain the product development process. 2. Explain the concept development process. 3. Explain the methods used for concept generation and selection. 4. Illustrate concept testing and prototyping methods. 5. Illustrate various types of intellectual property.

		YBAE69 QUALITY MANAGEMENT	<ol style="list-style-type: none"> 1. Summarize the principles and practices of Quality Management 2. Explain the continuous process of improvement 3. Summarize benchmarking 4. Outline the quality management systems 5. Explain statistical process control
		YBAE70 INVESTMENT MANAGEMENT	<ol style="list-style-type: none"> 1. Explain the overview of Capital Markets. 2. Define and Apply valuation Models for equity. 3. Analyse the nature of Bonds and Derivatives. 4. Explain and analyse the portfolio. 5. Explain the management of portfolio and analyse the performance.
		YBAE71 MERGERS AND ACQUISITIONS	<ol style="list-style-type: none"> 1. Outline the objectives and types of Merger. 2. Explain and generalize the de-merger. 3. Apply and Analyze the valuation models. 4. Compare the ratios related to valuation 5. Interpret the Taxation aspects in Merger and Acquisition
		YBAE72 BANKING AND INSURANCE MANAGEMENT	<ol style="list-style-type: none"> 1. Able to describe the Indian banking system evolution, its operations and E-banking system. 2. Able to summarize the concept of lending approaches and credit appraisal process. 3. Ability to use advances recovery methods & NPA management system with Government regulations. 4. Able to explain the various risks, and apply methods to handle risk. 5. Able to express the principles of Insurance and various types of insurance and in addition to Government regulatory bodies
		YBAE73 TRAINING AND DEVELOPMENT	<ol style="list-style-type: none"> 1. Know the importance of Training and Development. 2. Know different types of trainings 3. Understand the purpose of training program 4. Describe the training effectiveness and evaluation 5. Know to design a training program

	YBAE74 INDUSTRIAL RELATIONS AND LABOUR LAW	<ol style="list-style-type: none"> 1. Define the role of trade union in industrial relations 2. Define the various measures to prevent industrial disputes and Illustrate the settlement of Industrial disputes. 3. Illustrate Collective Bargaining in India 4. List the concept of Career Planning, need and importance for Quality of Work life and Summarise the Work-life Balancing initiatives of various companies in India. 5. Relate the concept of Quality Circle
	YBAE75 COMPENSATION MANAGEMENT	<ol style="list-style-type: none"> 1. Explain the concept of Compensation Management, its issues, components and Framework. 2. Outline the essentials of a sound wage and salary structure, methods of wage payment and Wage Policy in India 3. Classify job evaluation methods, advantage and its limitations. 4. Summarize wage incentive plan, its types and profit sharing. 5. Explain tax planning and emerging trends in compensation.
	YBAE76 RETAIL MANAGEMENT	<ol style="list-style-type: none"> 1. Ability to discuss the challenges and opportunities of retailing and explain the trends in global and Indian retailing 2. Ability to apply the knowledge of organized and unorganized formats, Emerging trends in retail formats and MNC's role in organized retail formats. 3. Ability to analyze the Choice of retail locations, Positioning of retail shops, Building retail store Image , Merchandizing and category management 4. Ability to engage in self-study to formulate, design, implement, analyze and demonstrate an Retail advertising and promotions, Online retail Emerging trends 5. Evaluate real and complex Understanding of Retail shopper behaviour and Shopper Profile Analysis
	YBAE77 CONSUMER BEHAVIOUR	<ol style="list-style-type: none"> 1. Explain the concept of consumer behavior. 2. Identify the internal influencing factor. 3. Identify the external influencing factor. 4. Analyze the purchase decision process. 5. Explain the concept of consumerism.

		YBAE78 INTEGRATED MARKETING COMMUNICATION	<ol style="list-style-type: none"> 1. Principle of Advertisement 2. Media Plan and advertisement. 3. Types of Sales Promotion. 4. Public Relation and its function 5. Types of Publicity.
		YBAE79 BUSINESS ANALYTICS	<ol style="list-style-type: none"> 1. Explain business analytics and its types. 2. Organize data and solve descriptive analytics problems 3. Solve regression, decision tree, forecasting and clustering problems 4. Solve prescriptive analytics problems using linear programming 5. Illustrate various applications of business analytics
		YBAE80 ENTERPRISE RESOURCE PLANNING	<ol style="list-style-type: none"> 1. Describe the Evolution, Risk and Benefits of ERP. 2. Know the Business Modules of ERP. 3. Know the relationship of ERP and Technologies 4. Know and Analyze the process of ERP Implementation 5. Analyze ERP Case Studies.
		YBAE81 E-BUSINESS	<ol style="list-style-type: none"> 1. Able to summarise the E-Business concepts, forms of e-business with the models in practise. 2. Able to apply the E-business knowledge in intra business operations. 3. Able to apply knowledge to E-Marketing 4. Able to use electronic payment system and security options in business 5. Able to outline E-business trends with reference to the Government norms.
		YBAE82 TECHNOLOGY APPRECIATION AND IPR	<ol style="list-style-type: none"> 1. Summarize the different kinds of IPR 2. Explain Patents and its elements 3. Outline nature of copyrights summarize the registration procedure 4. Explain concept of trademarks and its different kinds 5. Summarize the other forms of IPs

		YBAE83 ADVERTISEMENT MANAGEMENT FOR ENTREPRENEURS	<ol style="list-style-type: none"> 1. Ability to choose and advertising agency 2. Ability to set advertising objectives 3. Ability to explain the factors influencing attitude of buyers 4. Ability to frame an advertising budget 5. Ability to infer an innovative use of media in rural areas
		YBAE84 TECHNOLOGY AND INNOVATION MANAGEMENT	<ol style="list-style-type: none"> 1. States the concept and meaning of Technology and Innovation Management 2. List the issues and changes of Technology management 3. Outline the implementation of Technology and Innovation 4. Distinguish the Human Aspects and Social Issues in TIM 5. List the sustainability of technology
		YBAE85 BUSINESS PLAN PREPARATION FOR SMALL BUSINESS	<ol style="list-style-type: none"> 1. Outline the basics of small business 2. Explain need of a business plan 3. Summarizethe different sources of business plan process 4. Explaindifferent kinds of suitable ownerships for small business. 5. Outline the business plan components
		YBAE86 SMALL BUSINESS PROMOTION	<ol style="list-style-type: none"> 1. Explain the importance of small business organization. 2. Outline the market survey and opportunity for small business. 3. Identifya feasible location. 4. Explainthe intellectual property and the entrepreneurship patents. 5. Relate the small entrepreneurship in international business.
		YBAE87 BUSINESS REGULATION	<ol style="list-style-type: none"> 1. Ability to explain the legal framework and MSME act 2. Ability to infer the capital market entry and SEBI act 3. Ability to explain the acts related to environment and consumer protection 4. Ability to use knowledge about corporate social responsibilities towards society in ethical manner. 5. Ability to apply the competitive regulations in terms of IPR and IT usage.

4.	IV	YBA401 RURAL BUSINESS MANAGEMENT	<ol style="list-style-type: none"> 1. State the physical structure of rural area. 2. List the behavior of rural consumers 3. Recall the resources of rural area. 4. Label the product produce in rural area. 5. Outline the marketing research in rural area.
		YBA402 INTERNATIONAL BUSINESS MANAGEMENT	<ol style="list-style-type: none"> 1. Summarize an overview of International Business 2. Explain the role of WTO/GATT on International trade 3. Outline different forms of International business, its advantages and issues faced 4. Summarize production, marketing, financial and human resource management of global business 5. Explain the conflicts and ethical issues in International business
		YBA403 PROJECT MANAGEMENT	<ol style="list-style-type: none"> 1. Explain the various project selection methods and the required qualities of a project manager 2. Explain project planning and work break down structure 3. Develop network diagram for project scheduling 4. Explain the project control process and the tools used to track progress 5. Explain the types of project organization and their advantages
		YBA404 BUSINESS RESEARCH PROJECT	

2. Bachelor of Business Administration (BBA)

PROGRAMME OUTCOME (PO)	
PO1	Knowledge of management theory to solve problems of industry and society.
PO2	Knowledge of the latest tools and technologies in their chosen area of specialization.
PO3	Understand the local and global business environment and formulate competitive strategies.
PO4	Communicate effectively with the stakeholders in industry and society.
PO5	Identify problems, collect relevant data, use appropriate techniques and tools to analyze the data and select the optimum solution. Use research based knowledge and research methods to solve problems.
PO6	Demonstrate leadership skills and manage projects by organizing tasks and delegating responsibility effectively. Function effectively as a leader and member of a team.
PO7	Apply ethical principles and social responsibility.
PO8	Demonstrate knowledge of and need for sustainable development.
PO9	Possess the ability to engage in lifelong learning.

Course Outcomes (COs):

S.NO	SEMESTER	COURSE CODE & NAME	COURSE OUTCOMES (COS)
1	I	XGL101 COMMUNICATION SKILLS IN ENGLISH	1. Explain the process of communication and its types 2. Recall various sounds and use it in proper context 3. Organise meeting events and recording it constructively 4. Adapt methods of framing questions and using punctuations 5. Demonstrate the basic skills at the time of interview and presentations
2		XBA102 COMMUNICATION SKILLS IN ENGLISH	1. Understand the functions, qualities and skills of a manager 2. Understand the principles of planning and the concept of MBO 3. Understand the concept of recent trends in organizing and principles of directing. 4. Learn the motivational theories, leadership styles and communication flow in an organization 5. Understand the management control system and coordination
3		XBA103 FUNDAMENTALS OF ECONOMICS	1. Understand the nature, scope and objectives of a firm. 2. Understand the Law of Demand, Types of demand, demand forecasting and production function. 3. Learn the cost - output relationships and concept of pricing. 4. Learn the market classification and price determination 5. Understand the estimation of national income and trade cycle.
4		XBA104 FUNDAMENTALS OF COMPUTER - THEORY	1. Understand the concept of Computer technology 2. Understand Data Base structure 3. Understand Network Design. 4. Understand the Documentation work 5. Learn the concept of New trends of computer in business
5		XBA105 FUNDAMENTALS OF COMPUTER -LAB	1. Understand the concept of Computer technology. 2. Identify Data Base structure. 3. Organize the Presentation work 4. Organize the Documentation work 5. Practice the Internet and e-mail

6		XUM106 HUMAN ETHICS, VALUES, RIGHTS, AND GENDER EQUALITY	<ol style="list-style-type: none"> 1. Relate and Interpret the human ethics and human relationships 2. Explain and Apply gender issues, equality and violence against women 3. Classify and Develop the identify of women issues and challenges 4. Classify and Dissect human rights and report on violations. 5. List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
7	II	XGL201 ENGLISH FOR EFFECTIVE COMMUNICATION	<ol style="list-style-type: none"> 1. Explain the process of listening and its characteristics 2. Practicing the types of speeches 3. Recognize the basic expressions and using it effectively 4. Construct the means of writing contents to media 5. Employing various techniques in preparing communication letters
8		XES202 ENVIRONMENTAL SCIENCE	<ol style="list-style-type: none"> 1. Describe the significance of natural resources and explain anthropogenic impacts. 2. Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance. 3. Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon. 4. Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development. 5. Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.
9		XGL203A/ VANIKA TAMIL	<p>CO1: Cog: U. <i>Acquire the Knowledge</i> (அறிதல்) பண்டைய தமிழ்நாட்டு மக்களின் நாகரிகம் மற்றும் பண்பாடு போன்றவை பற்றி அறிந்து கொள்ளுதல்.</p> <p>CO2: Cog: Ap. <i>Discuss and Understanding</i> (புரிதல்) பண்டைய காலத் தமிழர்களின் வானிக முறைமைகளை அறிந்து கொள்ளல்.</p> <p>CO3: Cog: Ap. <i>Display</i> (கண்டுணர்தல்) பண்டைய காலத் தமிழர்களின் வாழ்வியல் சிந்தனைகள், அறவாழ்வு குறித்து அறிதல்.</p> <p>CO4 Cog: An: <i>Compare and Application</i> (பயன்படுத்துதல்) தற்கால தமிழர்களின் சமூக வாழ்வியல் நிலைகளை உணர்தல்.</p> <p>CO5: Cog: Ap. <i>Prepare</i> (தயார் செய்தல்/அ) உருவாக்குதல்) தற்கால வானியத்தில் வெளிநாட்டுத் தொடர்புகளின் நிலை பற்றி விளக்குதல்.</p>

		XGL203B / ENGLISH FOR EMPLOYABILITY	<ol style="list-style-type: none"> 1. Explain the process of preparing resume 2. Recall various techniques used in group discussions 3. Organising the etiquettes of Soft skills 4. Adapt methods of framing different mind mapping techniques 5. Demonstrate the basic communication skills through role play
10		XBA204 BUSINESS STATISTICS	<ol style="list-style-type: none"> 1. Explain the statistical data in the form of table, diagram and graph. 2. Find the measures of central tendency and measures of dispersion and skewness for the given data. 3. Evaluate correlation coefficient using Karl Pearson's and find the regression line for the given data. 4. Solve the problem in the time series using the method of seasonal variation and find the interpolation using Newtons and Lagranges method. 5. Find the index number using aggregative, relative and cost of living index number method. Define the sampling technique and Apply the concept of test of significance for t, f and chi-square.
11		XBA205 ORGANIZATIONAL BEHAVIOUR	<ol style="list-style-type: none"> 1. Understand the challenges and opportunities for OB and OB Model 2. Understand the concept of Personality, Attitude, Value and Perception 3. Understand the styles and theories of leadership and motivation 4. Understand the group formation, team building and communication 5. Understand the concept of managing changes and dealing with resistance to change
12		XBA206 BUSINESS LAW FOR MANAGERS	<ol style="list-style-type: none"> 1. Explain essentials of Contract, performance and breach of Contract under Indian Contract Act 1872 2. Interpret necessary formalities of contract of sale and rights of unpaid seller under the Sale of Goods Act 1930. 3. Illustrate the objectives of Consumer Protection Act and jurisdiction of Consumer Protection Councils 4. Explain the essentials of partnership, rights and duties of partners under Partnership Act 1932. 5. Summarize the effects of dishonor of negotiable instruments under Negotiable Instruments Act 1881.

13	III	XBA301 COMMERCIAL CORRESPONDENCE	<ol style="list-style-type: none"> 1. Summarize the process and barriers to Communication 2. Classify the structure and different kinds of business letters 3. Write circulars, adjustments and complaint letters in the appropriate format. 4. Explain the importance of sales and collection letter with sample 5. Summarize the different context in banking correspondence.
14		XBA302 FUNDAMENTALS OF FINANCIAL AND MANAGEMENT ACCOUNTING	<ol style="list-style-type: none"> 1. Explain the fundamentals and principles of accounting. 2. Outline the accounting transaction analysis 3. Build the Bank Reconciliation Statement and subsidiary books. 4. Construction of Balance Sheets 5. Explain the Double Entry System
15		XBA303 PRODUCTION AND OPERATIONS MANAGEMENT	<ol style="list-style-type: none"> 1. Explain & Describe the scope and significance of production 2. Summarize & Identify the work study and time study 3. Understand the production planning and control 4. Understand the quality control measures 5. Explain, Identify & Make Use the concept of Just in Time.
16		XBA304 MARKETING MANAGEMENT	<ol style="list-style-type: none"> 1. Explain the importance of market and marketing in an organization. 2. Infer the dimensions of market segmentation; consumer behavior 3. Explain the product planning and pricing methods 4. Show the importance & functions of marketing channels 5. State the significance of promotion mix.
17		XBA305 ENTREPRENEURSHIP DEVELOPMENT	<ol style="list-style-type: none"> 1. Understand the concept of Entrepreneurship 2. Understand the concept of Small Business 3. Explain how to establish business idea 4. Understand the concept of financial analysis 5. Understand the policy incentive for entrepreneurial growth, small-scale industrial policy

18		XBA306 DISASTER MANAGEMENT	<ol style="list-style-type: none"> 1. Understanding the concepts of application of types of disaster preparedness 2. Infer the end conditions & Discuss the failures due to disaster. 3. Understanding of importance of seismic waves occurring globally. 4. Estimate Disaster and mitigation problems. 5. Keen knowledge on essentials of risk reduction
19	IV	XBA401 OFFICE MANAGEMENT	<ol style="list-style-type: none"> 1. Define the qualities and functions of an Office Manager 2. List out the objectives of office environment 3. Summarize the types of filing and its advantages 4. Explain the importance of Indexing with its advantages 5. Outline the factors and components of MIS
20		XBA402 FINANCIAL MANAGEMENT	<ol style="list-style-type: none"> 1. Explain & Describe the importance of Financial Management Summarize Sources of Finance . 2. Summarize & Identify The cost of capital Compute The cost of Equity and Cost of Preference Shares. 3. Explain& Describe the significance of Leverages and summarize The dividend theories and policies 4. Explain& Describe Meaning and scope of Capital Structure and approaches 5. State the significance and Importance of Capital Budgeting Summarize the – Appraisal methods
21		XBA403 HUMAN RESOURCE MANAGEMENT	<ol style="list-style-type: none"> 1. Explain & Describe the managerial and operative functions 2. Summarize & Identify the Job Analysis and Job Evaluation 3. Outline the steps involved in Human Resource Planning 4. List the different sources of recruitment and Explain the selection process 5. Explain the concept, importance, methods of training and performance appraisal system
22		XBA404A INSURANCE MANAGEMENT	<ol style="list-style-type: none"> 1. Understand the concept of Insurance 2. Understand the concept of Life Insurance 3. Understand the concept of Marine Insurance 4. Understand the concept of Fire Insurance 5. Understand the concept of Motor insurance
23		XBA404B CUSTOMER	<ol style="list-style-type: none"> 1. Understand the concept of Relationship Marketing 2. Understand the evolution of CRM

		RELATIONSHIP MANAGEMENT	<ol style="list-style-type: none"> 3. Understand CRM in India 4. Understand the sales force management 5. Understand the database marketing
24		XBA405 HUMAN RESOURCE MANAGEMENT	<ol style="list-style-type: none"> 1. Explain & Describe the managerial and operative functions 2. Summarize & Identify the Job Analysis and Job Evaluation 3. Outline the steps involved in Human Resource Planning 4. List the different sources of recruitment and Explain the selection process 5. Explain the concept, importance, methods of training and performance appraisal system
25		INTRODUCTION TO MS EXCEL	<ol style="list-style-type: none"> 1. Practice the basic concepts of excel 2. Apply the functions in excel
26	V	XBA501 COMMUNICATION FOR MANAGERS	<ol style="list-style-type: none"> 1. Elucidate the communication process 2. Understand the presentation techniques 3. Explain the process of resume building 4. Show how to attend group discussion 5. Demonstrate various interview skills and practice mock interviews
27		XBA502 BUSINESS RESEARCH TECHNIQUES	<ol style="list-style-type: none"> 1. Understand how to define a research problem 2. Understand the concept of research design and sampling design 3. Explain the measurement and scaling techniques 4. Understand the various methods of data collection 5. Understand the techniques in report writing
28		XBA503 BUSINESS ORGANIZATION AND ENVIRONMENT	<ol style="list-style-type: none"> 1. Understand what is business and classifications of business 2. Understand preparation of partnership deed. 3. Understand formation of companies 4. Understand the political, economic and legal environment 5. Learn the concept of LPG
29		XBA504 ENTREPRENEURSHIP AND SMALL BUSINESS MANAGEMENT	<ol style="list-style-type: none"> 1. Understand the concept of Entrepreneurship 2. Understand the concept of Small Business 3. Explain how to establish business idea 4. Understand the concept of financial analysis 5. Understand the policy incentive for entrepreneurial growth, small-scale industrial policy

30		XBA505A ORGANIZATIONAL DEVELOPMENT	<ol style="list-style-type: none"> 1. Define the different models of OD 2. Explain the various OD intervention techniques 3. Explain the various Comprehensive OD intervention techniques 4. Outline the process of OD 5. Demonstrate group dynamics and effective team work.
31		XBA505B RETAIL MARKETING	<ol style="list-style-type: none"> 1. Understand the concept of retail 2. Understand the retail model 3. Explain the strategic planning in retailing 4. Understand the retail in India 5. Understand the Global Retail Markets
32		XBA506 BUSINESS PLAN	<ol style="list-style-type: none"> 1. Explain the business environment and idea generation 2. Outline the marketing feasibility. 3. Build the Feasibility plan 4. Construction of Business Plan 5. Explain the Project appraisal
33		INTERPERSONAL EFFECTIVENESS	<ol style="list-style-type: none"> 6. To understand themselves & understand the importance of interpersonal relationship 7. Develop good interpersonal relationship
34	VI	XBA601 EMPLOYABILITY AND CORPORATE SKILLS	<ol style="list-style-type: none"> 1. Learn the group discussion techniques 2. Learn the interview skills 3. Identify the time management techniques 4. Learn how to manage and overcome stress 5. Demonstrate decision making and negotiation skills
35		XBA602 BUSINESS PLAN	<ol style="list-style-type: none"> 1. Explain the business environment and idea generation 2. Outline the marketing feasibility. 3. Build the Feasibility plan 4. Construction of Business Plan 5. Explain the Project appraisal
36		XBA603A INDUSTRIAL RELATIONS AND LABOUR WELFARE	<ol style="list-style-type: none"> 1. Learn the basic concepts of Industrial relations 2. Understand how to prevent industrial dispute 3. Understand the concept of collective bargaining 4. Learn the grievance redressal procedure and disciplinary procedure 5. Understand the various welfare measures & employee health and safety.

37		XBA603B BEHAVIORAL FINANCE	<ol style="list-style-type: none"> 1. Explain & Describe the expected utility Summarize Mental accounting. 2. Summarize & Identify financial information processing 3. Explain& Describe the significance of Decisions and summarize The behavioral anomalies. 4. Explain& Describe neuroscience in investment planning. 5. State the significance and Importance of Group behavior Summarize the investment styles
38		XBA604A ADVERTISING AND SALES PROMOTION	<ol style="list-style-type: none"> 1. Explain the importance of advertising and media 2. Infer the dimensions of market segmentation; consumer behavior 3. Explain the product planning and pricing methods 4. Show the importance & functions of marketing channels 5. State the significance of promotion mix
39		XBA604B SUPPLY CHAIN MANAGEMENT	<ol style="list-style-type: none"> 1. Identify the importance of Supply Chain Management in an organization 2. Identify barriers to Supply Chain Management 3. Describe the process of Supply Chain Management 4. Describe the process of outsourcing in Supply Chain Management 5. State the performance measurement of Supply Chain Management
40		XBA605 BUSINESS RESEARCH PROJECT	
41		LIFE SKILLS FOR MANAGERS	<ol style="list-style-type: none"> 1. Students will be enlightened with personality development. 2. Understands how to manage work pressure and helps to create a stress free workplace.

Programme and Course Outcomes of

DEPARTMENT OF PHYSICS

Programmes offered:

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

1. a. B.Sc. (Physics) -

PROGRAMME OUTCOME (PO)	
PO1	Understand how scientific and mathematical knowledge continually evolve and that is subject to change.
PO2	Identify and apply universal physical laws to the problem.
PO3	Communicate effectively (written /oral) and work effectively as an individual or team.
PO4	Understand the impact and ethics of scientific discoveries on influencing society locally and globally.
PO5	Work effectively in bringing multidisciplinary ideas to diverse professional environment.
PO6	Find, collect and assess scientific
PO7	Design and perform experiments and thereby analyze and interpret data.
PO8	Use techniques, tools and skills necessary for emerging technologies

1. b. Course Outcomes of B.Sc Physics

S.NO	SEMESTER	COURSE CODE &NAME	COS
1	I	XGL101 COMMUNICATION SKILLS IN ENGLISH	<ol style="list-style-type: none"> 1. Explain the process of communication and its types 2. Recall various sounds and use it in proper context 3. Organise meeting events and recording it constructively 4. Adapt methods of framing questions and using punctuations 5. Demonstrate the basic skills at the time of interview and presentations
2.	I	XPH103 ALGEBRA, TRIGONOMETRY AND TRANSFORMS	<ol style="list-style-type: none"> 1. Find Polynomial Equations with real coefficients irrational roots, complex roots, symmetric functions of the roots and to Apply Newton's method to find a root approximately 2. Find Eigen Values and Eigen vectors, Apply Cayley-Hamilton theorem to find the inverse of a matrix. 3. Explain Expansion of Trigonometric series hyperbolic functions and inverse hyperbolic functions. 4. Find the Laplace and Inverse Laplace transforms of standard functions and derivatives 5. Apply the properties of Laplace transforms to solve differential equations of first and second order and to Find Fourier series of functions like $\sin x$, $\cos x$, x, x^2.
3.	I	XPH104 PROPERTIES OF MATTER AND SOUND	<ol style="list-style-type: none"> 1. Identify the principles of elasticity, derive expression for twisting couple and determine rigidity modulus of a wire 2. Develop Knowledge on bending of beams, its properties and application 3. Define surface tension, recall the concepts of low pressure and explain the methods of production of low pressure. 4. Understand flow of liquid, viscosity and identify its applications 5. Describe the production, propagation, perception & analysis of acoustical wave.

4.	I	XPH105 MECHANICS AND SPECIAL THEORY OF RELATIVITY	<ol style="list-style-type: none"> 1. Recall and Explain the basic principle of Projectile, impulse and direct and oblique impacts 2. Develop g and radius of gyration of various rigid bodies in terms of MI. 3. Relate the Newton's law of gravitation and Kepler's law and Infer the laws utilized in Satellites. 4. Recall the floatation laws and Construct models for pressure variations 5. Demonstrate relativity of space and time and Compare the variation of mass with velocity
5	I	XUM106 HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY	<ol style="list-style-type: none"> 1. Relate and Interpret the human ethics and human relationships 2. Explain and Apply gender issues, equality and violence against women 3. Classify various women challenges and Develop rules against women related issues 4. Classify and Dissect necessity of human rights and report on violations. 5. List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.
6.	I	XPH107 PHYSICS PRACTICAL –I	<ol style="list-style-type: none"> 1. Recall the usage of laboratory instruments and measure the thickness, breadth and volume 2. Explain and demonstrate the elastic behavior of the materials 3. Manipulate and measure the surface tension of various liquids 4. Compare and explain the coefficient of viscosity of various liquids 5. Describe the mechanical properties of material and identify the suitable material for usage
7.	II	XGL201 ENGLISH FOR EFFECTIVE COMMUNICATION	<ol style="list-style-type: none"> 1. Cog: R, Define and Describe how to make effective speeches academically and in social situations 2. Psy ,Identify the forms of language used in different speeches and how to listen actively and critically.

			<ol style="list-style-type: none"> 3. Cog: R,.Produce the proper tone of language required in writing and speaking in Business communication 4. Aff: Initializing Values, Display knowledge on grammar and other linguistic features in writing various forms of business communication 5. Cog: Appl, Comprehend and prepare how to write business reports, minutes, Proposals etc.
8.	II	XES202 ENVIRONMENTAL STUDIES	<ol style="list-style-type: none"> 1. Cog: (R and U) ;Describe the significance of natural resources and explain anthropogenic impacts. 2. Cog: U;Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance. 3. Cog: R, Aff: Receiving; Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon 4. Cog: (U & Anal) :Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development 5. Cog: (U & App): Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection.
9.	II	XMG203 CALCULUS AND DIFFERENTIAL EQUATIONS	<ol style="list-style-type: none"> 1. Compute radius of curvature, centre of curvature and circle of curvature. Change the order of integration and to compute the double integral. Apply double to find the area between curves. 2. Use Beta and Gamma function computing the multiple integrals and explain the relation between them. 3. Solve the linear homogeneous and non-homogeneous differential equation with constant and variable coefficients. 4. Define general, complete and particular solutions and to solve standard forms of partial differential equations. 5. Compute gradient, divergence and curl of vectors. Apply theorem to evaluate line, surface and volume integral.

10.	II	XPH204 ELECTRICITY AND MAGNETISM	<ol style="list-style-type: none"> 1. Cog: R, U, App; Recall, Understand and use the basic theorems of scalars and vectors 2. Cog: R, U, App; Identify and explain Gauss theorem and its applications and apply knowledge of the concepts of electrostatics 3. Cog: R, U, Ana.; Recall Biot-Savart's law, explain current passing through straight conductor, coil, solenoid and distinguish various properties of magnetic materials. 4. Cog: R, U; Define Faraday's law and Lenz's law and demonstrate mutual and self inductance of the coil. 5. Cog: R, App, E; Select the principle of magneto-statics, develop Maxwell's equation and explain EM wave propagation.
11.	II	XPH205 ATOMIC PHYSICS	<ol style="list-style-type: none"> 1. Cog., A: R, U, An, E; Recall Atomic structure, Compare various atom models, Distinguish various potentials and Explain special quantization and spectra of atom. 2. Cog: U, An; Demonstrate alkali spectra of atom, Compare LS & JJ couplings, Distinguish X-rays and Analyze various applications of X-ray. 3. Cog., A: U, E; Explain the dual nature of particles and uncertainty principle. 4. Cog: R, E; Define matter waves and wave amplitude and Explain Schrodinger equation for non-relativistic particles 5. Cog: U, E; Explain physical interpretation of wave function, probabilities, normalization and tunneling across a rectangular potential barrier.
12.	II	XPH206 PHYSICS PRACTICAL –II	<ol style="list-style-type: none"> 1. Cog: Ana; Aff: Rec.; Psy: Mech; Use laboratory techniques such as accuracy of measurements and data analysis 2. Cog: U; Aff: Rec.; Psy: Set, GR; Explain the concepts that are learnt in the lecture sessions and follow hands-on learning experience in the laboratory sessions 3. Cog: R; Aff: Rec.; Psy: Mech; Gain knowledge in the scientific methods and identify the process of measuring different Physical variables

			4. Cog: Ap; Aff: Rec, Org; Psy: Mech; Manipulate and complete all the experiments with excellent application knowledge.
13.	III	XPH301 PHYSICS WORKSHOP SKILLS	1. Cog: U, Ap; Relate SI and CGS units and Apply their knowledge in various measuring instruments. 2. Cog: Ap, An; Recall and Develop their knowledge to find welding defect & handling of various tools and Distinguish like metal, composites and alloy materials. 3. Cog: Ap; Apply their knowledge to handle multimeter and soldering to construct circuit. 4. Cog: U, Ap; Identify the diode, transistor and FET - ICs on PCB and Construct the regulated power supply and timer circuits. 5. Cog: U, C; Infer small mechanism of lever, break and gear and Adapt working principle of power generation system.
14.	III	XCG302 INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY I	1. Cog: (R) and (U) : Describe the key features, shapes and structures of coordination complexes and Understand the solid state chemistry. 2. Cog: (R): Describe and Recall the fundamental principles of organic chemistry that include chemical bonding, nomenclature, structural isomerism, stereochemistry, chemical reactions and mechanism. 3. Cog: (U) : Understand the structures and properties of carbohydrates and amino acids. 4. Cog: (U): Explain the kinetic molecular theory of gases and its properties and Use of phase rule. 5. Cog: (R): Relate the rate of formation of a product to the rate of disappearance of a reactant for the given experimental data and reaction stoichiometry.
15	III	XPH303 HEAT AND THERMODYNAMICS	1. Cog., A: R, U; Recall Cp and Cv and basic concepts of specific heat and Explain various theories. 2. Cog: An, E; Explain the nature of heat and heat transmission and Distinguish mono, dia, tri-atomic gases.

			<ol style="list-style-type: none"> 3. Cog., A: R, U, E; List the laws of thermodynamics and Explain latent heat and entropy 4. Cog: R,E,C; Define Coefficient of Thermal Conductivity, Determinethermal conductivity of bad conductor and Discuss the various laws for heat flow. 5. Cog: U, An, E, C; Analyze statistical equilibrium, explain various distribution laws and Compare the three statistics
16.	III	XPH304 BASIC ELECTRONICS	<ol style="list-style-type: none"> 1. Cog., A: R, Ap; Recall the function of PN junction diode, zener diode LED and Construct the full wave rectifier filters, regulated power supply- zener regulator, photo diode. 2. Cog: U, E; Demonstrate the transistor construction and working characteristics,Determinethe h-parameters. 3. Cog: U, E; Compare the FET and Transistorand Explain the characteristics & applications of special semiconductor devices. 4. Cog: U, C, E; ClassifyAmplifiers, Discuss the feedback principle for amplifier, Oscillators and Explain the Hartley and Collpitt's oscillators. 5. Cog: An., E; Distinguishthe modulations and Appraise the function of detectors.
17.	III	XUM306 DISASTER MANAGEMENT	<ol style="list-style-type: none"> 1. Understanding the concepts of application of types of disaster preparedness 2. Inferthe end conditions& discuss the failuresdue to disaster. 3. Understandingof importance of seismic waves occurring globally 4. Estimate Disaster and mitigation problems 5. Keen knowledgeon essentials of risk reduction
18.	III	XPH307 PHYSICS PRACTICAL –III	<ol style="list-style-type: none"> 1. Cog: Ana; Aff: Rec.; Psy: Mech; Use laboratory techniques such as accuracy of measurements and data analysis. 2. Cog: U; Aff: Rec.; Psy: Set, GR; Explain the concepts that are learnt in the lecture sessions and follow hands-on learning experience in the laboratory sessions.

			<p>3. Cog: R; Aff: Rec.; Psy: Mech; Gain knowledge in the scientific methods and identify the process of measuring different Physical variables</p> <p>4. Cog: Ap; Aff: Rec, Org; Psy: Mech; Manipulate and complete all the experiments with excellent application knowledge.</p>
19.	IV	XPH401 ELECTRICAL CIRCUIT NETWORK SKILLS	<p>1. Cog., A: R,U,An; Recall Basic Electricity Principles, Analyze electrical circuits and Distinguish single phase and three phase</p> <p>2. Cog., A: R,U,E,An; Recall symbols, Explain circuits and diagram, Distinguish capacitance, inductance and impedance</p> <p>3. Cog: R, An; Describe DC&AC power sources, Distinguish DC/AC Generator and motor.</p> <p>4. Cog., A: U, E; Classify all Solid-State Devices, Explain response of inductors and capacitors with sources. Describe how the electrical components are protected.</p> <p>5. Cog., A: An, C; Discuss about electrical wiring and Distinguish the types of wiring.</p>
20.	IV	XCG402 INORGANIC , ORGANIC AND PHYSICAL CHEMISTRY II	<p>1. Cog (U and App): Explain the ability to describe oxidation-reduction reactions using appropriate chemical equations, to identify oxidation and reduction, and to apply those concepts to electrochemical cells</p> <p>2. Cog: (U and R); Illustrate the nuclear reactions and describe the extraction of ores.</p> <p>3. Cog:(U); Illustrate the bonding and molecular orbital theory.</p> <p>4. Cog (R and Appl) & Aff: (Rece) :Describe the basic laws of thermodynamics and to apply those laws to chemical reactions.</p> <p>5. Cog (R and U) :Explain the structure of organic molecules using various spectral data and recognize the use of chemicals in industries and their impacts on environment.</p>
21.	IV	XPH403 WAVES AND OPTICS	<p>1. Cog.:R,U; Define super position principle and Relate the collinear and perpendicular harmonic oscillators.</p>

			<ol style="list-style-type: none"> Cog.: R,E; Recall transverse wave, List the types of waves and Explain Group velocity, phase velocity Cog.: R, Ap; What is interference and Identity various method to produce interference. Cog.: R, An; Define diffraction and Analyze diffraction effect. Cog.: U, An; Explain polarization and Distinguish the polarizer and analyser
22	IV	XPH404 DIGITAL ELECTRONICS	<ol style="list-style-type: none"> Cog.: Ap., An., C; Analyze various number systems and codes, Develop their knowledge to do arithmetic calculations and Discuss operation of all the gates. Cog.: U; Show the simplification of Boolean expression using the methods of Boolean algebra and Karnaugh map. Cog.:Ap; Solve the arithmetic calculations by a fixed function of combinational logical circuits and their implementation Cog.:Ap.,C; Develop the fundamentals flip flops, registers and counters, and Design the sequential logic circuits. Cog.:U; Demonstrate the Characteristics and Parameters of the operational amplifier and its parameter and Classify inverting- non inverting, Adder-subtractor, differentiator- integrator and comparators.
23	IV	XCG405 VOLUMETRIC AND QUALITATIVE ANALYSIS	<ol style="list-style-type: none"> Cog: (U) :Estimate the amount of hardness of water, ferrous sulphate, and copper using volumetric method. Cog: (U) :Estimate the amount of acid and oxalic acid using volumetric method. Cog (U) :Estimate the amount of strong acid by conducto-metric and pH-metric method. Cog: (R) and (Apply) : Use of qualitative analysis method and study of compounds like Carbohydrate Amide, Aldehyde , Ketone, Acid ,Amine and Phenol.
24	IV	XPH406 PHYSICS PRACTICAL –IV	<ol style="list-style-type: none"> Cog: Ana; Aff: Rec.; Psy: Mech; Use laboratory techniques such as accuracy of measurements and data analysis.

			<ol style="list-style-type: none"> 2. Cog: U; Aff: Rec.; Psy: Set, GR; Explain the concepts that are learnt in the lecture sessions and follow hands-on learning experience in the laboratory sessions. 3. Cog: R; Aff: Rec.; Psy: Mech; Gain knowledge in the scientific methods and identify the process of measuring different Physical variables 4. Cog: Ap; Aff: Rec, Org; Psy: Mech; Manipulate and complete all the experiments with excellent application knowledge.
25	V	XPH501 BASIC INSTRUMENTATION SKILLS	<ol style="list-style-type: none"> 1. Cog: R, U; Classify accuracy, precision, sensitivity, resolution range and Errors and Relate DC & AC voltage and current. 2. Cog: An; Distinguish conventional voltmeter & multimeter and electronically voltmeter & multimeter 3. Cog: U, C; Compare CRO & CRT and Explain operations and specification of CRO. 4. Cog: An; Analyze various type of generators and rectifiers. 5. Cog: U; Explain the principle and working of digital meter and Compare analog & digital meters.
26	V	XPH502A – SOLID STATE PHYSICS	<ol style="list-style-type: none"> 1. Cog: U, Ap; Demonstrate and apply knowledge of the crystal studies. 2. Cog: U, Ap, E; Explain and apply the definition of the Lattice vibrations and Phonons in lattice dynamics. 3. Cog: Ap; Apply knowledge of Dia, Para, Ferri and ferromagnetic materials. 4. Cog: Ap; Solve problems concerning the definition of the dielectric properties of materials 5. Cog: U, AP; Explain and apply the knowledge of energy bands of solids and their application to modern electrical devices.
27	V	XPH502B- SPECTROSCOPY	<ol style="list-style-type: none"> 1. Cog: U; Explain the atom through atomic spectra. 2. Cog: U; Extend their knowledge of bonding and anti bonding of MOs 3. Cog: Ap; Develop their knowledge about various spectra of molecules.

			<p>4. Cog: An; Analyze the Raman Spectroscopy and Electronic Spectroscopy of Molecules.</p> <p>5. Cog: U, C; Explain Basic principles of NMR & ESR and Discuss Classical and quantum mechanical description</p>
28	V	XPH503A NUCLEAR AND PARTICLE PHYSICS	<p>1. Cog: R,U; Recall the general properties of nucleus and Discuss the angular momentum and magnetic moment.</p> <p>2. Cog: R, U,E; List and Explain the various models of nuclear</p> <p>3. Cog :U, An; Distinguish and Demonstrate the various radioactivity decay of nucleus</p> <p>4. Cog: ApU, C; Classify the type of reaction and discuss the concepts</p> <p>5. Cog: U; Classify the elementary particles.</p>
29	V	XPH503B- PRINCIPLE OF MODERN PHYSICS	<p>1. Cog: R,Ap, C; Recall Planck's constant and knowledge about photons and Solve the problems of stability and instability of atoms.</p> <p>2. Cog: U,E; Infer the uncertainty principle and Estimate minimum energy of a confined particle using uncertainty principle</p> <p>3. Cog :U, E; Explain particle in box, energy eigenvalues and eigenfunctions, normalization and tunneling across a rectangular potential barrier.</p> <p>4. Cog: R,U; Recall Size and structure of atomic nucleus and Demonstrate nuclear force and binding energy</p> <p>5. Cog: R,U, E; Define radioactive decay, Mean life and half-life and Explain α decay, β decay and α emission.</p>
30	V	XPH504A MICROPROCESSOR AND C PROGRAMMING	<p>1. Cog: U; Explain the basic concepts of digital computer, evolution of microprocessors.</p> <p>2. Cog Ap; Develop their knowledge about the architecture and instruction set of an eight bit 8085 microprocessor.</p> <p>3. Cog: Ap; Organize assembly language to write programs for an 8085 microprocessor.</p> <p>4. Cog: U; Summarize Structure of C language, operators and library function</p> <p>5. Cog: Ap; Utilize various input, out statement, loop statements, while do else statements and basic functions for programme.</p>

31.	V	XPH504B - PROGRAMMING IN C	<ol style="list-style-type: none"> 1. Cog: U, E; Explain the fundamentals Character set and logical functions. 2. Cog: U, Ap; Demonstrate the data input output functions and operators and Apply in Simple C programs. 3. Cog: R; Relate the basic functions, definitions, prototypes, Passing arguments and Register variables. 4. Cog: An; Analyze Arrays, string and data structures of C program, 5. Cog: U, Ap; Extend the arrays of Pointers to function and operation and Apply its structures for C program
32	V	XPH505 PHYSICS PRACTICAL –V A	<ol style="list-style-type: none"> 1. Cog: Ana; Aff: Rec.; Psy: Mech; Use laboratory techniques such as accuracy of measurements and data analysis. 2. Cog: U; Aff: Rec.; Psy: Set, GR; Explain the concepts that are learnt in the lecture sessions and follow hands-on learning experience in the laboratory sessions. 3. Cog: R; Aff: Rec.; Psy: Mech; Gain knowledge in the scientific methods and identify the process of measuring different Physical variables 4. Cog: Ap; Aff: Rec, Org; Psy: Mech; Manipulate and complete all the experiments with excellent application knowledge.
33	V	XPH506 PHYSICS PRACTICAL –VB	<ol style="list-style-type: none"> 1. Cog: Ana; Aff: Rec.; Psy: Mech; Use laboratory techniques such as accuracy of measurements and data analysis. 2. Cog: U; Aff: Rec.; Psy: Set, GR; Explain the concepts that are learnt in the lecture sessions and follow hands-on learning experience in the laboratory sessions. 3. Cog: R; Aff: Rec.; Psy: Mech; Gain knowledge in the scientific methods and identify the process of measuring different Physical variables 4. Cog: Ap; Aff: Rec, Org; Psy: Mech; Manipulate and complete all the experiments with excellent application knowledge.
34	VI	XPH601 RENEWABLE ENERGY	<ol style="list-style-type: none"> 1. Cog: Ap; Identify the various alternate Sources of energy. 2. Cog: U; Explain Solar energy and applications of solar pond and solar energy, solar water heater, flat plate

			<p>collector, solar distillation, solar cooker, solar green houses, solar cell absorption air conditioning.</p> <ol style="list-style-type: none"> 3. Cog :U; Demonstrate the fundamentals of wind energy. 4. Cog: C; Discuss Ocean Energy and Tide energy technologies 5. Cog: U, R; Explain Geothermal Energy, Geothermal resources, geothermal technologies and Hydro energy, hydropower technologies and Relate the environmental impact.
35	VI	XPH602A- QUANTUM MECHANICS	<ol style="list-style-type: none"> 1. Cog: U,E; Recall the properties of wave function and Interpret the wave function probability and probability current densities in three dimensions. 2. Cog: U,E; Explain the time dependent Schrodinger equation and its influence. 3. Cog :Ap; Identify the continuity of wave function, boundary condition and emergence of energy levels and Applied in square well potential. 4. Cog: C; Discuss the time independent Schrodinger equation in spherical polar coordinates and Orbital angular momentum quantum numbers l and m; s, p, d,.. shell. 5. Cog: U; Explain electron spin and spin angular momentum and Electron Magnetic Moment and Magnetic Energy.
36	VI	XPH602B- MATERIAL SCIENCE	<ol style="list-style-type: none"> 1. Recall and distinguish various crystal structures 2. Know about the impacts of defects at the atomic and microstructure scales. 3. Describe the various Ceramic, Electrical & Electronic Materials. 4. Describe the basics of mechanical properties of material and identify how they can be tested. 5. Recognize and Describe various Magnetic Materials and Nano Materials.
37	VI	XPH603A EMBEDDED SYSTEM	<ol style="list-style-type: none"> 1. Cog: U; Demonstrate architecture of embedded system, classification and applications. 2. Cog: U,Ap ,E; Explain architecture of 8051, overview of 8051 family and apply 8051 assembly language programme.

			<ol style="list-style-type: none"> Cog : U; Summarize addressing modes, assembly language instructions, arithmetic & logic instructions for 8051. Cog: Ap; Utilize Assembly Language and Develop I/O port program for 8051. Cog: U, An; Examine the structure of embedded program and Show the embedded system design.
38	VI	XPH603B - NUMERICAL METHODS IN PHYSICS	<ol style="list-style-type: none"> Cog: E, Ap; Identify errors and Measure errors using General formula. Cog: R, E; Define various iteration method and Determine the false position using these method. Cog :R, Ap; Find the unequal intervals Applying various interpolation formula. Cog: U, Ap, E; Explain numerical differentiation and integration and Solve problems by Newton's forward, trapezoidal, Simpson's rule. Cog: U, AP; Explain n^{th} order ordinary differential equations and apply the knowledge to Solve the differential equation.
39.	VI	XPH604 PHYSICS PRACTICAL – VI A	<ol style="list-style-type: none"> Cog: Ana; Aff: Rec.; Psy: Mech; Use laboratory techniques such as accuracy of measurements and data analysis. Cog: U; Aff: Rec.; Psy: Set, GR; Explain the concepts that are learnt in the lecture sessions and follow hands-on learning experience in the laboratory sessions. Cog: R; Aff: Rec.; Psy: Mech; Gain knowledge in the scientific methods and identify the process of measuring different Physical variables Cog: Ap; Aff: Rec, Org; Psy: Mech; Manipulate and complete all the experiments with excellent application knowledge.
40	VI	XPH605 PHYSICS PRACTICAL – VI B	<ol style="list-style-type: none"> Cog: Ana; Aff: Rec.; Psy: Mech; Use laboratory techniques such as accuracy of measurements and data analysis. Cog: U; Aff: Rec.; Psy: Set, GR; Explain the concepts that are learnt in the lecture sessions and follow hands-on learning experience in the laboratory sessions. Cog: R; Aff: Rec.; Psy: Mech; Gain knowledge in the scientific methods and identify the process of measuring different Physical variables Cog: Ap; Aff: Rec, Org; Psy: Mech; Manipulate and complete all the experiments with excellent application knowledge.

2. a. M.Sc. Physics

PROGRAMME OUTCOME (PO)	
PO1	Understand how scientific and mathematical knowledge continually evolve and that is subject to change.
PO2	Identify and apply universal physical laws to the problem.
PO3	Communicate effectively (written /oral) and work effectively as an individual or team.
PO4	Understand the impact and ethics of scientific discoveries on influencing society locally and globally.
PO5	Work effectively in bringing multidisciplinary ideas to diverse professional environment.
PO6	Find, collect and assess scientific
PO7	Design and perform experiments and thereby analyse and interpret data.
PO8	Use techniques, tools and skills necessary for emerging technologies.

2.b. M.Sc Physics - Course Outcomes

S.NO	SEMESTER	COURSE CODE & NAME	COURSE OUTCOMES
1	I	YPH101 MATHEMATICAL PHYSICS	<ol style="list-style-type: none"> 1. Master the basic elements of complex mathematical analysis 2. Solve differential equations that are common in physical sciences 3. Apply group theory and integral transforms to solve mathematical problems of interest in physics
2.	I	YPH102 CLASSICAL DYNAMICS & RELATIVITY	<ol style="list-style-type: none"> 1. Know the difference between Newtonian mechanics and Analytic mechanics 2. Solve the mechanics problems using Lagrangian formalism, a different method from Newtonian mechanics 3. Understand the connection between classical mechanics and quantum mechanics from Hamiltonian formalism
3.	I	YPH103 BASIC ELECTRONICS	<ol style="list-style-type: none"> 1. Know the physical principles crucial to the functionality and operation of basic semiconductor devices. 2. Enrich their knowledge in Understanding the linear and non-linear applications of operational amplifiers
4.	I	YPH104 BASIC PRACTICAL (GENERAL & ELECTRONICS) – LAB	<ol style="list-style-type: none"> 1. Knowledge on the different experimental techniques. 2. Understand the basics of physics involved in experiments 3. Apply the concepts of physics and do the interpretation and acquire the result.
5.	I	YPH105A NUMERICAL METHODS IN PHYSICS	<ol style="list-style-type: none"> 1. Apply the basic concepts of numerical methods in relevant fields.
6	II	YPH201 STATISTICAL MECHANICS	<ol style="list-style-type: none"> 1. Basic knowledge of thermodynamic systems 2. Understand the basic idea about statistical distributions 3. Impart the knowledge about the phase transitions and potentials 4. Understand the applications of

			statistical laws
7.	II	YPH202 MECHANICS	QUANTUM
			<ol style="list-style-type: none"> 1. Explain the postulates of quantum mechanics. 2. Identification of features of certain exactly solvable systems. 3. Describe the time-independent and time-dependent perturbation theories. 4. Apply the perturbation theories to simple physical systems. 5. Describe the method of determining scattering cross-section. 6. Application of the Born approximation and partial wave analysis to simple systems. 7. State the features of relativistic quantum theory. 8. Determine the solution of a relativistic free Dirac particle.
8.	II	YPH203 ELECTROMAGNETIC THEORY	
			<ol style="list-style-type: none"> 1. Understand the basics of electromagnetism 2. Apply the concepts of Electrodynamics
9.	II	YPH204 GENERAL EXPERIMENTS – LAB	ADVANCED
			<ol style="list-style-type: none"> 1. Knowledge on the different experimental techniques. 2. Understand the basics of physics involved in experiments 3. Apply the concepts of physics and do the interpretation and acquire the result.
10.	III	YPH301 STATE PHYSICS	SOLID
			<ol style="list-style-type: none"> 1. Understand Basic concepts on properties of materials in solid state physics. 2. Phenomenon of superconductivity and its properties. 3. Apply Different techniques used for synthesis and fabrication of nanomaterials.
11.	III	YPH302 ELECTRONICS	SPECIAL
			<ol style="list-style-type: none"> 1. Apply the knowledge on the working of digital electronic devices. 2. Understand concepts of working

			model of microprocessors and microcontrollers
12.	III	YPH303 NUCLEAR AND PARTICLE PHYSICS	<ol style="list-style-type: none"> 1. Acquire basic knowledge about nuclear and particle physics 2. Develop the nuclear reactions and neutron physics. 3. Understand the nuclear fission and fusion reactions. 4. Impart the knowledge about the nuclear forces and elementary particles
13.	III	YPH304 ADVANCED ELECTRONICS LAB	<ol style="list-style-type: none"> 1. Apply the knowledge on the working of digital electronic devices. 2. Understand concepts of working model of microprocessors and microcontrollers
14.	III	YPH305A CRYSTAL GROWTH AND CHARACTERIZATION TECHNIQUES	<ol style="list-style-type: none"> 1. Understand and compare the various Crystal Growth techniques. 2. know the principle in the methods involved in the growth of crystal
13.	IV	YPH401 SPECTROSCOPY	<ol style="list-style-type: none"> 1. knowledge on the techniques and instrumentation of microwave spectroscopy 2. Understand the basics of NMR and other spectroscopic techniques 3. interpret spectra of the samples
14.	IV	YPH403 HIGH ENERGY PHYSICS	<ol style="list-style-type: none"> 1. Knowledge on the different experimental techniques. 2. Understand the basics of physics involved in experiments 3. apply the concepts of physics and do the interpretation and acquire the result.

Programme Outcomes(PO) and Course Outcomes(CO) of
DEPARTMENT OF POLITICAL SCIENCE

Programmes Offered:

Sl.No.	Programme Name	PO and CO
1	M.A. (2 Years)	Yes

PROGRAMME OUTCOME (PO)	
PO1	M.A., graduates should be able to demonstrate a scholarly attitude to knowledge and understanding within the context of a rapidly changing environment. They should have the ability to actively engage in the generation of innovative and relevant knowledge and understanding through involves the study of government, non-governmental systems and operations. They should be able to apply their knowledge commands an arsenal skills knowledge and experience that can be good use at all levels in a complex government.
PO2	Political science is a rewarding field to communicate with others. The role of political scientists studies the relations between the India and other countries. India & UNO, the institutions and political life of nations, and the decisions of the high court & the supreme court. Studying topics such as public opinion, political decision making and ideology. Political Science students became good citizen of India and social service minded persons.
PO3	Political Science majors acquire skills in data analysis and computer usage to hold a higher position in administration. Political science and social sciences to the problems at hand.
PO4	M.A., graduates should have ability to apply knowledge preparing reports and documents. Advisors to the constitutional posts as the President, the Governor. Political decision-making ideology and public policy.
PO5	Political Science students who can use their basic political training to make more informed policy decisions and administer programs more effectively and more imaginatively.
PO6	Political science graduates should be aware of environmentally and socially active: Should be critical and responsible members of local, national, international and professional communities. They should acquire a knowledge of environmental issues relating to their disciplines and enrich the environmental sustainability.
PO7	M.A., graduates should not have the partisan attitude apply ethical principles in administrative work profession in an appreciation of the historical and contemporary interface between non-Indigenous and Indigenous cultures in India and the ability to apply that to practice Knowledge of the administrative area.
PO8	Many graduates of Political science programs choose to become involved in print, television, or radio journalism, when they apply their expert understanding of political systems to create reports about consent events might cover elections, conduct interviews or attend Press conference.

PO9	M.A., graduates should nurture the habit of leadership quality. Team work spirit is the need of the hour.
PO10	M.A., graduates should have Ability to engage in lifelong learning and Understanding of the value of social service. Their work is social centric. So, they should have broader vision and mission about the society.
Programme Specific Outcomes (PSOs)	
PSO1	Graduate will be successfully employed in Central and State Administration.
PSO2	Graduates will pursue professional education.
PSO3	Graduates in cover elections, conducting interviews or attend press conferences.
PSO4	Graduates will be ethical and honest in their career and also a good citizen of India.

COs

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	YPS101 INTERNATIONAL POLITICS	<ol style="list-style-type: none"> 1. Understand the Meaning 2. Understand the Foreign Policy 3. Understand the Theories 4. Understand the Major issues 5. Understand the Globalization
		YPS102 INDIAN POLITICAL THOUGHT–I	<ol style="list-style-type: none"> 1. Understand the Ancient Indian Political Thought 2. Understand the Medieval Indian Political Thought 3. Understand the Moderates 4. Understand the Extremists 5. Understand the Modern Indian Political Thought
		YPS103 INDIAN ADMINISTRATION	<ol style="list-style-type: none"> 1. Understand the Evolution of Indian Administration 2. Understand the Philosophical and Constitutional Framework of Government 3. Understand the Public Sector Undertakings 4. Understand the Union Government and Administration 5. Understand the State Government and Administration
		YPS104 INDIAN GOVERNMENT AND POLITICS	<ol style="list-style-type: none"> 1. Understand the Introduction 2. Understand the Federalism 3. Understand the Judiciary 4. Understand the Statutory Institution 5. Understand the Party System
2	II	YPS201 GOVERNMENT AND POLITICS IN TAMILNADU	<ol style="list-style-type: none"> 1. Understand the Significance and Framework 2. Understand the Non-Brahmin Movement 3. Understand the Political parties 4. Understand the Centre-State Relations 5. Understand the Issues
		YPS202 WESTERN POLITICAL THOUGHT–II	<ol style="list-style-type: none"> 1. Understand the Classical Thought 2. Understand the Medieval Political Thought 3. Understand the Social Contractualists 4. Understand the Individualists 5. Understand the Dialectical Thinkers

		YPS203 INDIAN POLITICAL THOUGHT-II	<ol style="list-style-type: none"> 1. Understand the Ancient and Early Modern Political Thinkers 2. Understand the Moderate and Extremist Thinkers 3. Understand the Father of the Nation 4. Understand the Hindu and Muslim Political Thinkers 5. Understand the Socialists and Reformists
		YPS204 POLITICAL LEADERSHIP	<ol style="list-style-type: none"> 1. Understand the Introduction 2. Understand the Political Leadership Styles 3. Understand the Leadership Dynamics 4. Understand the Recruitment of Political Leadership 5. Understand the Political Leadership in India
3	III	YPS301 RESEARCH METHODOLOGY	<ol style="list-style-type: none"> 1. Understand the Introduction 2. Understand the Methods and Process 3. Understand the Research Design and Types of Research 4. Understand the Collection of data and Analysis 5. Understand the Research Report
		YPS302 MODERN POLITICAL ANALYSIS	<ol style="list-style-type: none"> 1. Understand the Introduction 2. Understand the Inter-Disciplinary Approaches 3. Understand the Political Culture 4. Understand the Models 5. Understand the Group theory
		YPS303 POLITICAL IDEOLOGIES	<ol style="list-style-type: none"> 1. Understand the Liberalism 2. Understand the Marxism 3. Understand the Nationalism and Gandhism 4. Understand the Fascism and Nazism 5. Understand the Other Major Ideologies
		YPS304 FOREIGN POLICY IN INDIA	<ol style="list-style-type: none"> 1. Understand the Meaning 2. Understand the Major Powers 3. Understand the Neighbours 4. Understand the Organizations 5. Understand the Globalization
4	IV	YPS401 LOCAL GOVERNMENT IN INDIA	<ol style="list-style-type: none"> 1. Understand the Introduction 2. Understand the Rural Local Bodies 3. Understand the Urban Local Bodies 4. Understand the Bureaucracy in Panchayat Raj 5. Understand the Significant issues in Local Government

		YPS402 DYNAMICS OF INDIAN DEMOCRACY	<ol style="list-style-type: none"> 1. Understand the Introduction 2. Understand the Federalism 3. Understand the Political Economy of India 4. Understand the Electoral and Party System 5. Understand the Issues
		YPS403 ADMINISTRATIVE THEORY	<ol style="list-style-type: none"> 1. Understand the Administrative Law 2. Understand the Comparative Public Administration 3. Understand the Development Dynamics 4. Understand the Personnel Administration 5. Understand the Techniques of Administrative Improvement
		YPS404 PROJECT & VIVA-VOCE	-

**Programme and Course Outcomes of
DEPARTMENT OF SOCIAL WORK**

Programmes Offered:

Sl.No.	Programme Name	PO and CO
1	MSW	Yes

PROGRAMME OUTCOME (PO)	
PO1	Ability to apply and transfer social work knowledge
PO2	Potentials to develop relationship and interaction with local
PO3	Think latterly and originally
PO4	Applying research knowledge and skills to understand
PO5	Create
PO6	Active involvements in environment and society with the ability to critically analyze the structure of society with specific attention to dimensions of power
PO7	Acquire professional and intellectual integrity
PO8	Practice social work intervention with effective communication and interpersonal skills by demonstrating advocacy
PO9	The ability to use knowledge of supervision to achieve highly skilled professional work
PO10	Understanding of the community
PO11	Integrate Knowledge and practice contributing to further knowledge development
PROGRAMME SPECIFIC OUTCOMES (PSOS)	
PSO1	Graduates will be able to utilize social work practice, theories and methods with individuals, families, groups and communities.
PSO2	Graduates will be progressing with specialized knowledge and skills needed to engaged in empirically supported and culturally competent social work practices

Course Outcomes (Cos)

S.NO	SEMESTER	COURSE CODE & NAME	COS
1	I	YSW101 INTRODUCTION TO SOCIETY AND SOCIAL WORK	<ol style="list-style-type: none"> 1. Acquire basic knowledge on professional Social Work 2. Understand the concepts ,different methods, programmes, tools and techniques of Social Work Practice 3. Acquiring abilities and skills, to critically analyze problems of individuals, Group and community 4. Establishing and sustaining a working relationship with individuals, Group and community to help them to function better to achieve their goals.
		YSW102 SOCIAL WORK WITH INDIVIDUALS	<ol style="list-style-type: none"> 1. Getting knowledge on social case work as a method of Social Work. Its place in Social Work practice. 2. Acquiring abilities to critically analyze problems of individuals 3. Understand the approaches, tools, techniques, skills, and process of Social Work Practice with individuals 4. Establishing and sustaining a working relationship with the client.
		YSW103 SOCIAL WORK WITH GROUPS	<ol style="list-style-type: none"> 1. Getting knowledge on social group work as a method of Social Work. 2. Understand the montages, programmes, tools and techniques of Social Work Practice with groups 3. Acquiring abilities and skills, to critically analyze problems of groups 4. Establishing and sustaining a working relationship with groups to help them to function better to achieve their goals.
		YSW104 SOCIAL WORK WITH COMMUNITIES AND RADICAL SOCIAL WORK	<ol style="list-style-type: none"> 1. Acquire basic knowledge on elements of community organization practice 2. Understand the concepts, different methods, programmes, tools and techniques of community organization practice and social action. 3. Acquiring abilities and skills, to critically analyze problems of communities. 4. Establishing and sustaining a working relationship with communities to help them to function better to achieve their goals.

2	II	YSW201 HUMAN GROWTH AND PERSONALITY DEVELOPMENT	<ol style="list-style-type: none"> 1. Understand the elements of individual's heritage and environmental influences in growth and development. 2. Enhance knowledge on growth and behavior at various stages in the life span: infancy, childhood, adolescence, youth, adulthood and old age. 3. Acquiring abilities and skills, to critically analyze human growth and development, Attitude, Perception, Motivation and Learning, Intelligence and Personality, Adjustment. 4. Sustaining attitudes conducive to participatory activities for civil society.
		YSW202 SOCIAL WORK RESEARCH AND STATISTICS	<ol style="list-style-type: none"> 1. Understand the scientific approach to human inquiry and Social Work research 2. Enhance knowledge on conceptualization of a research strategy and problem; writing a research proposal; developing tools for collecting data; use of sampling, strategies; data collection, processing, presentation, analysis and interpretation; and writing research report. 3. Acquiring abilities and skills, for use of library and documentation services for research. 4. Make informed assessment and judicious use and apply of research studies and findings towards the betterment of the society
		YSW203 SOCIAL POLICY AND WELFARE ADMINISTRATION	<ol style="list-style-type: none"> 1. Understand policies and procedures involved in establishing and maintaining human service organizations 2. Enhance knowledge on nature, structure and development of social welfare organizations and programmes in corporate, public and voluntary sectors in the context of Social Work profession. 3. Acquiring skills to network and participate in the management of resources - human, material and environmental. 4. Ability to analyze the practices and apply them in specific settings.
		YSW204 CORPORATE SOCIAL RESPONSIBILITY	<ol style="list-style-type: none"> 1. Provide students a historical back drop of CSR and its earlier version with the philosophy behind it 2. To develop an insight into present CSR strategies of model business organization.

			<ol style="list-style-type: none"> 3. To equip individuals with knowledge and skills undertaking Corporate Social Responsibility. 4. To train students in designing effective CSR strategy for the company in such a way that apart from meeting legal requirements, it will help the community in their development.
3	III Clinical Social Work- Elective	YSW301A COMMUNITY HEALTH	<ol style="list-style-type: none"> 1. Understanding the concept of Community Health and Healthcare Delivery systems. 2. Enhance knowledge on causes, prevention and treatment for major Communicable and Non-Communicable diseases. 3. Develop sensitivity towards the role of Social worker in health issues of School going Children, Occupational health issues, family planning and the importance of health education. 4. Identify the public health issues and needs facing the country and design social work interventions.
		YSW302A MENTAL HEALTH	<ol style="list-style-type: none"> 1. Understand the concept of Mental Health and Trace the historical development of medical social work in India and abroad. 2. Acquire knowledge about mental health problems among Children, Adolescents and Women. 3. Develop skills like interviewing, taking case history for psychiatric assessment, psycho social and multi dimensional assessment. 4. Develop ability for Social Workers to practice, apply and render rehabilitation services for mental handicapped.
		YSW303A MEDICAL SOCIAL WORK	<ol style="list-style-type: none"> 1. Understand the concept, role and functions of Medical Social work. 2. To acquire the knowledge with respect to the inter-disciplinary approach for the persons with psychological problems. 3. To enable the students to develop skills and techniques for effective social work practice in field of Health. 4. Identify the scope and apply the social work methods in different hospital settings

		YSW304A PSYCHIATRIC SOCIAL WORK	<ol style="list-style-type: none"> 1. Understand the concept, role and functions of Clinical Social work. 2. To acquire the knowledge with respect to therapeutic interventions in Psychiatric illness. 3. To enable the students to develop skills of Social Work intervention for Psychiatric illness. 4. Apply the social work methods and practice in different Psychiatric settings
	Development Management -Elective	YSW301B RURAL AND TRIBAL COMMUNITY DEVELOPMENT	<ol style="list-style-type: none"> 1. Understanding the characteristics and problems of Rural and Tribal Communities. 2. To acquire the knowledge about the contributions of Governmental and Non-Governmental Organization for rural and tribal development. 3. Develop skills in mobilizing and organizing the Tribal and Rural community 4. Gain Knowledge about the application of Social Work in Rural and Tribal Communities.
		YSW302B URBAN COMMUNITY DEVELOPMENT	<ol style="list-style-type: none"> 1. Understand Urban Social system and their problems and the change process in the community. 2. To gain knowledge on the issues and their implications in the urban communities. 3. To acquire the skills of intervention of community workers. 4. Gain Knowledge about the application of Social Work in urban social systems.
		YSW303B PROJECT MANAGEMENT	<ol style="list-style-type: none"> 1. To enable the students to understand the PRA techniques in formulating a project proposal and to impart skills in participatory project planning. 2. Develop a scientific research temperament in exploring the current trend emerging in the project preparation and implementation. 3. To Acquire a theoretical frame of project preparation and its various stages in implementation. 4. Gain Knowledge about the resource mobilization and apply that in fund raising.

		YSW304B DEVELOPMENT COMMUNICATION	<ol style="list-style-type: none"> 1. To provide the required knowledge to understand the importance of communication for effective social work practice. 2. To understand the importance and the role of media for effective communication. 3. To inculcate communication skills among social work trainees. 4. To understand the need and importance of developmental communication and apply in Social Work Practices.
	Human Resource Management -Elective	YSW301C HUMAN RESOURCE MANAGEMENT	<ol style="list-style-type: none"> 1. Understand the concept, function and the importance of HRM and HRD 2. To provide an in-depth knowledge on the process of Human Resource Development and Human Resource Management. 3. Develop managerial skills in different functional areas of management with practical focus on HRM. 4. Develop the competence to evolve the problem-solving approaches by applying conceptual and behavioral skills.
		YSW302C LABOUR WELFARE AND LABOUR LEGISLATION	<ol style="list-style-type: none"> 1. Understand the legal provisions relating to different industrial settings 2. Gain Knowledge about Labour legislation and Labour Welfare 3. Acquire the skills of working with organized sector. 4. Apply the knowledge of Social Work methods and approaches in different industrial settings.
		YSW303C ORGANIZATIONAL BEHAVIOUR	<ol style="list-style-type: none"> 1. To help the learner understand the value and worth of human resources in an organization. 2. To acquaint the students with the knowledge of theories and practices that govern human behavior at work 3. Acquire the skills required to analyze problems and develop a problem solving approach. 4. To understand the application of Transactional Analysis in several areas of employee management.

		YSW304C EMPLOYEE RELATION AND TRADE UNION	<ol style="list-style-type: none"> 1. To understand the basic concepts of industrial relation and industrial peace. 2. Enhance the knowledge on organisational performance, role and responsibility. 3. Develop the skills of interpersonal relationship as per organizational requirement. 4. To stimulate thinking on rationale behind the Laws and their enforcement.
		YSW105 SOCIAL WORK PRACTICUM-I YSW205 SOCIAL WORK PRACTICUM-II YSW305 SOCIAL WORK PRACTICUM-III YSW401 SOCIAL WORK PRACTICUM-IV YSW402 BLOCK PLACEMENT	<ol style="list-style-type: none"> 1. Getting knowledge on practical skills and roles of professional social worker 2. Observing the practice of various methods of social work profession 3. Enhance their skills in speaking, writing ,reporting , problem solving capacity 4. Develop sensitivity to practice professional ethics. 5. Inculcate the commitment of Working with sustain positive attitude, self-direction, growth and change
		YSW403 RESEARCH PROJECT WORK	<ol style="list-style-type: none"> 1. Understand the scientific approach to human inquiry and Social Work research 2. Enhance knowledge on conceptualization of a research strategy and problem; writing a research proposal; developing tools for collecting data; use of sampling, strategies; data collection, processing, presentation, analysis and interpretation; and writing research report. 3. Acquiring abilities and skills, for use of library and documentation services for research. 4. Make informed assessment and judicious use and apply of research studies and findings towards the betterment of the society.

Department Name: Architecture

Programme Name: B.Arch

Sl. No	POs/PSOs	Implementation
1.	PO3: Ability to diagnostic survey record and analyze, interpret, apply, and develop a proposal at the individual building and urban level.	The Courses “Site surveying and planning” and “Architectural design I – VII”, train the students in analytically approaching and exploring the societal problems. In “Architectural thesis”, students identify the need of the society on their own and after analyzing the issues will provide design solutions at a site level or urban level. This ability helps an individual to sustain in the local, national as well as global market.
2.	PO4: Ability to use traditional and digital media representational skills to analyze and convey essential design idea at each stage of the design process.	The courses “Computer Applications and Architectural graphics” inculcate the ability in using both the traditional and digital media tools, the most essential skills expected from any Architect. This increases the student’s competency in global level.
3.	PO6: Work collaboratively with teams of architects and various interdisciplinary design teams involved in the building industry, incorporating the financial implications, negotiating contracts, selecting service consultants.	The students work as a team for the courses “Architectural Design – II & VII”. As well the “Practical Training” offered for one full semester gives them the chance to work with team of senior Architects in the field and learn all the procedures in executing a project. This boost up the confidence level of students and make them sustain individually or in a team.
4.	PO 7. Ability to prepare technically clear drawings, writes outline estimation and specifications, and prepares models illustrating and clarifying the assembly of materials, systems, and components appropriate for a building design.	All the core courses focus on enhancing the ability of a student in preparing architectural drawings and models. Specifically the Courses “Estimation and Specification” and “Working Drawing” provides them with a sound knowledge and make the students more competent in the global level.
5.	PO8: Ability to design a sustainable built environment to provide healthful environments and reduce the environmental impacts.	Courses such as “Climate and Architecture”, “Environmental Sciences”, “Vernacular Architecture”, “Energy efficient Architecture” and “Materials & Technologies for Sustainable Architecture” make the students to understand the concepts, material and methods of achieving the sustainable built environment. An essential quality expected from any practicing Architect.
6.	PSO2: Understand the planning aspects from the macro to micro level and ability to develop a planning, urban design proposal	The Architectural design studio courses offered from second semester to ninth semesters are designed to achieve this ability among all the students, making them to stand in par with the global market.

Programme Name: M.Arch

Sl. No	POs/PSOs	Implementation
1.	PO3: Ability to use digital tools to simulate, analyze and convey essential design ideas at each stage of the design process.	The courses “Architectural design Studio” and “Digital design process” inculcate the ability in advanced digital media tools. the most essential skills expected from any Architect while doing researches. This increases the student’s competency in global level.
2.	PO7. Work collaboratively with teams of architects and various interdisciplinary design teams involved in the building industry, incorporating the financial implications, negotiating contracts, selecting service consultants.	The courses “Architectural Design studio – III” and “Building Management systems” allows them to work as a team and improve their managerial skills making them more competent in global level.
3.	PO8. Ability to design a sustainable built environment to provide healthful environments and reduce the environmental impacts.	Courses such as “Appropriate Materials and Technology for Sustainable Architecture”, “Advanced Studies in Regional and Vernacular Architecture”, “Sustainable Landscape Design”, and “Environment and Behavior” make the students to understand the concepts, material and methods of achieving the sustainable built environment. An essential quality expected from any practicing Architect.
4.	PSO2. Understand the planning aspects from the macro to micro level and ability to develop a planning, urban design proposal	The Architectural design studio, the core courses offered are designed to achieve this ability among all the students, making them to stand in par with the global market.

Department Name: Aerospace Engineering

Programme Name: B.Tech.

Sl. No	POs/PSOs	Implementation
1.	PO ₃ :Design and develop creative smart solutions for various applications.	Students' are doing their major project and come up solutions for various problems related to societal needs.
2.	PO ₅ :Utilize the most advanced modeling and Analysis software to design and Analyze fluid, structural, thermal, magnetic and aerospace related problems, which would save money, man power and time.	Growing demand for the Aerospace Engineers across the globe in the fields of Designing industry of Aerospace /Aviation sector, the students practicing their lab experiments using licensed CATIA, ANSYS software's.
3.	PO ₇ :Apply Engineering knowledge to develop innovative concepts for the business sustainability without exploiting the nature and the environment.	Course on "Entrepreneurship Development" is taught to the students. In that, they are motivated to prepare a Business plan on their own to develop some products under Make in India scheme.
4.	PO ₇ :Show Professional ethics & responsibility in profession without any compromise in the rules & practices of working environment.	Students are taught about the human ethics, values, gender equality through the course on "Human ethics, Values and Gender Equality". Also, they are motivated to take part in various national missions of Swachh Bharath,NSS,YRC,NCC etc.
5.	PO ₉ :Capable to work as individual and as a team wherever it is required and depending upon the situation to expose their skill & knowledge in the competitive world.	Our curricula has been designed and accommodate the various components such as Seminars, case Studies, Mini project works and presentations which enables the students to expose their skill & knowledge in the competitive world.
6.	PO ₁₁ :Manage finance, variable technical and non technical projects in different working environment.	In order implement managerial skill among the students a course on "Economics for engineers" is taught to them and through which they can learn about various finance, technical and non technical issues in their working environment.
7.	PSO ₂ :Analyze and apply aerodynamics and propulsion related aspects in Aerospace Engineering.	Students actively involved in designing and development of projects related to their core engineering.

Department Name: Biotechnology

Programme Name: B.Tech Biotechnology

Sl. No	POs/PSOs	Implementation
1.	PO3: An experience to develop a process that meets the specific needs of societal and environmental problems to draw meaningful conclusions.	World's man power, ecology are need in Biotechnology industry need competent personal. All courses including theory courses, IPT and Project works have provision for training the students in enhancing their skills in this fast growing national essence of requirement among humans, environment and energy.
2.	PO4: To draw conclusion in research based methods for value addition to existing products.	<p>The following topics of few sample of project work shows the research based for value addition to existing products.</p> <ol style="list-style-type: none">Development and enhancement of pullulan biopolymer.Isolation, Cloning and Sequencing of a defence related gene involved in the plant immune network, from black pepper (<i>Piper nigrum</i> L.).Maternal nutrition, DNA methylation, Fetalprogramming: using pomc gene as a modelStudies on the effect of attaching an epitope tag to the transcription machinery of RNA polymerase III in the budding yeast.
3.	PO7. An ability to update the modern techniques in biotechnological essential for protecting the environment and sustainable development.	The core courses of this programme will develop the skills of the students to compete on par with other nationals. These design courses help our country to have our own Intellectual Property in Biotechnology field. Courses on "Food Technology", "Environmental Engineering", "Nanobiotechnology", "Pharmaceutical Biotechnology", "Stem Cell Biotechnology", "Cancer Biology" and Project work Phase I & II are taught and carried out towards sustainable development.
4.	PO8. An ability to demonstrate themselves as morally responsible citizens by being aware of his/her roles, duties, professional and ethical responsibilities and rights.	Courses on "Economics for engineers", "Environmental Engineering", "Constitution of India", "Essence of Indian Traditional Knowledge", Human Ethics" are taught. The students also participate in other activities related to environment and sustainability through NSS, NCC, NSO, etc.,

Department Name: Civil Engineering

Programme Name: B.Tech Civil Engineering

Sl. No	POs/PSOs		Implementation
1.	PO 1	Apply the knowledge of mathematics, science, Engineering fundamentals and Civil Engineering principles to the solution of complex problems in Civil Engineering.	Civil engineer should have qualities like scientific attitude, imaginative and intuitive approach; She /he should have good analysis and decision power.
2.	PO 3	Design solutions for complex civil engineering problems and design system components or processes that meet the specified needs with appropriate considerations for the public health and safety and the cultural, societal and environmental conservations	It is concerned with planning, design and construction for environmental Control, development of natural resources, buildings, transportation facilities and other structures
3.	PO 4	An ability to plan, draw and design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	The main scope of civil engineering or the task of civil engineering is planning, designing, estimating, supervising construction, managing construction, execution, and maintenance of structures like building, roads, bridges, dams, etc.
4.	PO 5	An ability to work effectively as an individual and a team.	All courses including theory courses have a. Seminar b. Team project c. Presentation d. Case study
5.	PO 6	An ability to identify, formulate, and solve engineering problems.	Able to solve engineering problems, by using mathematical modelling, scientific principles and laboratory techniques using computer and information technology
6.	PO 10	A knowledge of contemporary issues relevant to engineering practice	Buildings are planned according to the fundamental principles of planning & bylaws of local municipal bodies.
7.	PO 12	An ability to use the techniques, skills, and modern engineering tools necessary for Engineering practice	Construction of power station, off shore oil rigs, ports, tunnels etc., come under category of advanced construction
	PSO 1	Capably plan, analyse and design the civil engineering structures.	Construction of dams, bridges, tunnels, ports, requires several advanced techniques of construction

Department Name: Electronics and Communication Engineering

Programme Name: B.Tech Electronics and Communication Engineering

Sl. No	POs/PSOs	Implementation
1.	PO3: Proficient to provide solutions to meet the specific needs of the public health, safety, environment and society.	<p>Mini Projects are provided for every lab course. These projects are of nation's interest. Examples of mini projects given are</p> <ul style="list-style-type: none">a. Remote Energy Monitoring system.b. Intelligent drone for agriculture <p>Similarly major projects related to implementation of this PO is carried out. Example project titles are</p> <ul style="list-style-type: none">a. Detection and Tracking of unauthorized Dronesb. Sound Bite technology for deaf and dumb
2.	PO4: Competent to conduct experiments, interpret the data and compare the performance and provide solutions for complex problems.	<p>Country's man power need in electronics industry need competent personal. All courses including theory courses have provision for training the students in enhancing their skills in this fast growing national job sector</p>
3.	PO6. Skillful to design Electronics and Communication products and validate by analysis and test for the benefit of the society towards safety and legal issues.	<p>The core courses of this programme will develop the skills of the students to compete on par with other nationals. These design courses help our country to have our own Intellectual Property.</p>
4.	PO 7. Efficient to develop a Electronics and Communication system or process to meet the economical growth, eco friendly environment and sustainability.	<p>Courses on "Economics for engineers", "Environmental Engineering" are taught. The students also participate in other activities related to environment and sustainability through NSS, NCC, NSO, etc.,</p>
5.	PO9. Masterful to lead the group activities or as a team member for best outputs.	<p>All courses including theory courses have</p> <ul style="list-style-type: none">a. Seminarb. Team projectc. Presentation <p>Curricula is designed to accommodate to National need for leaders in STEM is needed presently in India.</p>

Department Name: Nanotechnology Division/ Electronics and Communication Engineering

Programme Name: M.Tech Nanotechnology (Integrated)

S.No	POs/PSOs	Implementation
1.	PO4:To equip scientific and intellectual tools required to define and formulate research problems, and to detail the methodologies needed to address them	The core courses of this program will develop the skills of the students to compete at par with other nationals. These design courses help our country to have our own Intellectual Property.
2.	PO5:To equip the scientific and intellectual tools required to design and analyze key physics/chemical/biological/engineering processes related to nanotechnology	The core electives given in this programme is mainly focused on the societal need-based area such as Health/Environment/Electronics will develop the student to make the concepts and products using nanomaterials for global requirement
3.	PO8: To expose industrial designs and processes and to innovations in the nanotechnology industry	The laboratory courses, inplant training, mini projects and project will give the exposure to the students on industrial process and its need.
4.	PO10:To develop deep knowledge of standards and the nanotechnology commercial environments and standardisation processes and to be able to contribute to such processes through appreciation of their contexts, economic and regulatory drivers and limitations	The core courses on nanomaterial fabrication, property analysis, and nanotechnology on business management can deliver the entrepreneurial knowledge to the students on economy of nanoproducts, environmental safety and its utility for local and national level need.
5.	PO11:To provide knowledge and skills to allow for independent learning, individually and/or within a group.	All courses including theory courses have a. Seminar b. Team project c. Presentation Curricula is designed to accommodate to National need for leaders in STEM is needed presently in India.
6.	PO11:To equip on global understanding of the impacts and issues regarding nanotechnology and applications	The core courses and also the courses Nanotoxicology and health issues of nanotechnology etc will make the understanding on need and applications of nanomaterials in different areas and its limitation

Department Name: Electrical and Electronics Engineering

Programme Name: B.Tech Electrical and Electronics Engineering

Sl. No	POs/PSOs	Implementation
1.	PO3: Design solutions for complex Electrical and Electronics Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations	<p>All Lab courses have Mini Projects as a Assessment component. These projects focus on public health and safety and society at large keeping a clear goal on thenation's interest. Examples of mini projects given are</p> <ol style="list-style-type: none">1. Solar based Pesticide Sprayer for Agricultural Purposes2. Smart Home using IoT <p>Major projects ensure the implementation of this PO also. out. Example project titles are</p> <ol style="list-style-type: none">1. Air Pollution Level monitoring system based on IoT2. Energy Conservation Automatic Electricity Bill Predictor based on Daily Demand Enhanced by Android devices using IoT
2.	PO6.Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	All the core courses direct towards the skill development of the students enhancing the competitive spirit with consequent responsibilities and excel in the field of Electrical and Electronics Engineering.
3.	PO 7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	"Economics for engineers", "Environmental Engineering" offered in the programme focus on societal and environmental contexts. Other activities related to environment and sustainability are carried out through NSS, NCC, NSO, etc.
4.	PO9.Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Cross functional team-based projects involving multidisciplinary courses allow students to effectively bring out their individual knowledge based on the Curricula that is designed to accommodate to National needs.This enhances individual leadership qualities in STEM required.

Department Name: Mechanical Engineering

Programme Name: B.Tech Mechanical Engineering

Sl. No	POs/PSOs	Implementation
1.	PO3: An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability, and sustainability	<p>Courses like Economics for engineers, Environmental sciences, cyber security, Industrial safety, manufacturing processes will promote the societal needs and design the eco friendly system for the society.</p> <p>Mini Projects and major projects are provided during the courses. These projects are of nation's interest mainly on agricultural needs, social needs.</p>
2.	PO5: An ability to identify, formulate, and solve engineering problems	<p>Country's man power need in Mechanical industry need competent personal. All courses including theory courses have provision for training the students and solve the societal problems in addition to enhancing their skills in this fast growing national job sector.</p>
3.	PO6. An understanding of professional and ethical responsibility	<p>The courses like Entrepreneurship development, professional ethics and human values gives the moral responsibility for students to improve national, regional and global needs by practicing ethics and values towards society.</p>
4.	PO 8. Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	<p>Courses on "Economics for engineers", "Environmental Sciences" are taught. The students also participate in other activities related to environment and sustainability through NSS, NCC, NSO, etc.,</p>
5.	PO10. A knowledge of contemporary issues	<p>All courses including theory courses have</p> <ol style="list-style-type: none">SeminarCase StudyPresentation <p>Curricula is designed to accommodate. National need for leaders in STEM is needed presently in India.</p>

Department Name: Renewable Energy

Programme Name: M.Tech Renewable Energy

Sl. No	POs/PSOs	Implementation
1.	PO3: An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability, and sustainability	<p>Courses like Environmental engineering, energy auditing, Waste Management and energy recovery, sustainable development, etc., will promote the societal needs and design the eco friendly system for the society.</p> <p>Project works are provided during the courses. These projects are of nation's interest and make the impact on renewable energy resources like solar energy, environment, etc.,</p>
2.	PO5: An ability to identify, formulate, and solve engineering problems	<p>Country's man power need in Mechanical industry need competent personal. All courses including theory courses have provision for training the students and solve the societal problems in addition to enhancing their skills in this fast growing national job sector.</p>
3.	PO6. An understanding of professional and ethical responsibility	<p>The courses like Unit operations in Industries, Hydro power technology, Optimum utilization of heat and power, carbon sequestration and trading gives the moral responsibility for students towards environment to improve national, regional and global needs by practicing environmental ethics and values towards society.</p>
4.	PO 8. Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	<p>Courses on Disaster Management and value education, Constitutions of India are taught. These Courses make the major impact on regional, economical growth of an country.</p>
5.	PO10. A knowledge of contemporary issues	<p>All courses including theory courses have</p> <ul style="list-style-type: none">d. Seminare. Case Studyf. Presentation <p>A curriculum is designed to accommodate n national need for leaders in STEM are needed presently in India.</p>

Department Name: Computer Science and Engineering

Programme Name: B.Tech Computer Science

Sl. No	POs/PSOs	Implementation
1.	PO2: Ability to analyze a problem, interpret data, and define the computing system requirements which would be appropriate to the solution.	As a part of the curriculum students can undergo internships to implement the real time projects. This enhance their skills in the field.
2.	PO3: Ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.	The students implement the Projects .They can also extend their work in the latest or most advanced stage in the field of Information and Communication Technologies.
3.	PO5: Ability to use the computing techniques, skills, and modern system tools necessary for practice as a CSE professional	The curriculum and syllabi are updated frequently as per the requirements of the industry and they are taught with state of art facilities. Value added program and soft skill development program are conducted to improve the students skills
4.	PO8:Ability in an understanding of professional, ethical, legal, security and social issues and responsibilities	Students are taught ethics and human values courses to make the students ethically good and also they should have ability to solve the engineering problems at par with societal needs.
5.	PO9:Ability to function effectively on teams and individually to accomplish a common goal	All courses including theory courses have Seminar, Team project, and Presentation work. This will improve the team work among the students.

Department Name: Computer Science and Applications

Programme Name: BCA

Sl. No	POs/PSOs	Implementation
1.	PO 1 To apply fundamental knowledge of mathematics and Principles of Computing techniques to solve the problems in computer science and application areas.	The courses on “Statistical and Numerical Methods” and “Resource Management Technique” papers used by the students to analyze the hypothesis studies and complexity problems of the National Level.
2.	PO 2 To analyze a computing requirement and apply programming principles for providing effective solutions.	In the curriculum, for each programming paper blended with lab. One of the CA3 components of each programming paper having is Mini Project. The real time concepts are solved with the programming language.
3.	PO 3 To design an innovative interface method to bring the complete requirement and visualize the result for decision making.	The skill based courses “Data Analytics” gives the visualize result from the survey. From the analysis, the decision making process to be taken for the local needs.
4.	PO 5 To practice team communication, effective management and Interpersonal skill for the successful computing professional and entrepreneur.	To meet out the Global needs of the industry, the team communication, Interpersonal skills are imported like <ol style="list-style-type: none">1. Mini Project2. Group Discussion3. Interview Skills

Department Name: Computer Science and Applications

Programme Name: MCA

Sl. No	POs/PSOs	Implementation
1.	PO1 To apply fundamental knowledge of Mathematics and Principles of Computing technologies in the field of computing sciences and application areas	The courses “Mathematical Foundation”, “Statistical Computing” and “Operation Research” applied in the Computing Sciences and Application areas during the Practical Session.
2.	PO2 To analyze and apply Programming principles, and computer science theory in design and development of solution.	The concepts of all Core and Elective Courses are implemented in the programming courses and main project.
3.	PO6 Ability to work with technical, management, leadership and entrepreneurial skills.so as to deliver effective product within a time constraints	Lot of courses related to management, technical and entrepreneurial skills to meet out the Global needs of the industry, the team communication, Interpersonal skills are imparted like 1. Mini Project 2. Group Discussion 3. Seminar
4.	PO8 Ability to express enthusiasm for self-improvement through continuous professional development and life-long learning.	The counseling session, skill based training (Value Added Courses, Workshop,Seminars),Personality Development Programmes (Career Development Programmes) and Self Study Courses included in the curriculum to meet out the needs of the society, local, national and international level.

Department Name: Software Engineering

Programme Name: M.Sc (Software Engineering)

Sl. No	POs/PSOs	Implementation
1.	PO2 : Design, implement, verify, validate and maintain software systems to meet the desired needs of the society.	<p>Six months' Major project and Internship programme related to the implementation of developing the needs of society is carried out during X and VIII semesters respectively.</p> <p>Examples of such projects:</p> <ul style="list-style-type: none">a. IOT based air pollution monitoring systemb. Accident detection and smart rescuing system.
2.	PO4: Create, select and apply suitable state-of-the-art techniques, contemporary practices, modern development tool, software framework and programming language to solve complex software engineering problems.	The core courses of this programme enriches the software development skills of the students to solve the requirements of software applications of our country.
3.	PO7: communicate and make presentations effectively on complex software developmental activities to other software related personnel / society and being able to understand / write effective reports and prepare software documentation.	The course on Software communication and Documentation, Software Project Management English courses have provision for training the students in enhancing their communication and management skills in this fast growing national job sector
4.	PO8: apply the software development in interdisciplinary environments and recognize the need for independent and life-long learning to adapt to the technological transformation.	<p>The courses on Wireless Sensor Network, Internet of Things,</p> <p>Big Data Analytics enriches the skills of the students to incorporate the software in interdisciplinary environment to fulfil the National and Global needs.</p>

Department Name: Software Engineering

Programme Name: B.Sc(Animation and Multimedia)

Sl. No	POs/PSOs	Implementation
1	PO4: Recognize the impact of animation and multimedia solutions in the economical, societal and environmental perspective to exhibit the need for flexible adaptation.	All courses of this programme enriches the creativity and editing skills of the students to meet the requirements of animation projects of our country.
2.	PO7: Apply the technical knowledge in the interdisciplinary environments and recognize the need for independent and life-long learning to adapt to the technological transformation.	The courses on Visual Design, Audio And Video Editing, Motion Graphics, Fundamentals of cinematography, Motion Capturing enhances the skills of an animator, required everywhere from commercials to motion graphics, to special effects, animated videos, visual effects in movies etc.

Department Name: **Software Engineering**

Programme Name: **B.Sc (Computer Science)**

Sl. No	POs/PSOs	Implementation
1.	PO4: Work jointly with different team members in order to complete the agreed work in time.	The courses on Communication Skills in English, English for Effective Communication, Management Information System, Total Quality Management, Principles of Management improves the essential communication, management skills of the students to express their ideas and opinions effectively in a local or national level group setting.
2.	PO7: Utilize computer literacy in the learning and working places and self-adapt with the changing environment by participating in learning activities throughout the life.	The core courses of this programme enriches the software development skills of the students to solve the requirements of software applications of the society.

Department Name: Chemistry

Programme Name: B.Sc

Sl. No	POs/PSOs	Implementation
1.	PO1: Understand how scientific and mathematical knowledge continually evolve and that is subject to change.	Theoretical problem solving tutorials and laboratory experimental calculations are provided to stimulate their mathematical and scientific knowledge.
2.	PO2: Identify and apply universal Chemical law laws to the problem	Tutorials in each course, laboratory experiments and project based assignments are implemented.
3.	PO3: Communicate effectively (written/oral) and work effectively as an individual or team.	Ability enhancement compulsory courses (i) communication skills in English, (ii) English for effective communication, (iii) Team wise Mini projects, (iv) Group discussion and (v) seminar presentation are given to improve their communicative skills, decision making and leadership qualities.
4.	PO4: Understand the impact and ethics of scientific discoveries on influencing society locally and globally.	Human ethics, Values, Rights and Gender Equality & Disaster Management are provided to understand the scientific ethics, social issues and knowledge about plagiarism.
5.	PO5: Work effectively in bringing multidisciplinary ideas to diverse professional environment	Core elective papers, Open elective, Office automation and Animation Software minor courses in the course for multidisciplinary ideas are taught.
6.	PO6: Find, collect and assess scientific-based information – its relevance and reliability	The paper titled “Water Quality Analysis, Pharmaceutical Chemistry, Clinical Chemistry, Renewable Energy”, skill based laboratory experiments and mini project are given relevant to the scientific based information.
7.	PO7: Design and perform experiments and thereby analyze and interpret data	Practical and project work in the core courses of this programme will strengthen the skills of analysis and interpret the scientific data and results in the important scientific findings
8.	PO8: Use techniques, tools and skills necessary for emerging technologies.	All the practical courses involved both electrical and non-electrical experiments give exposure towards a variety of instruments and techniques.

Department Name: Chemistry

Programme Name: M.Sc

Sl. No	POs/PSOs	Implementation
1.	PO1: Understand how scientific and mathematical knowledge continually evolve and that is subject to change.	Theoretical problem solving tutorials and laboratory experimental calculations are provided to stimulate their mathematical and scientific knowledge.
2.	PO2: Identify and apply universal Chemical law laws to the problem	Tutorials in each course, laboratory experiments and project based assignments are implemented.
3.	PO3:Communicate effectively (written/oral) and work effectively as an individual or team.	Group discussion and seminar presentation are given to improve their communicative skills, Group Project will develop their ability to work as a team.
4.	PO4:Understand the impact and ethics of scientific discoveries on influencing society locally and globally.	Dissertation work in course will provide to understand the scientific ethics, social issues and knowledge about plagiarism.
5.	PO5:Work effectively in bringing multidisciplinary ideas to diverse professional environment	Supra molecular chemistry, Pharmaceutical chemistry in the course will bring knowledge in diverse field.
6.	PO6:Find, collect and assess scientific-based information – its relevance and reliability	Practical core papers enhance the skill based laboratory experiments and project are given relevant to the scientific based information.
7.	PO7:Design and perform experiments and thereby analyze and interpret data	Practical and project work in the core courses of this programme will strengthen the skills of analysis and interpret the scientific data and results in the important scientific findings
8.	PO8: Use techniques, tools and skills necessary for emerging technologies.	All the practical courses involved both electrical and non-electrical experiments give exposure towards a variety of instruments and techniques.

Department Name: Commerce

Programme Name: B.Com (Hons)

Sl. No	POs/PSOs	Implementation
1.	PO2: Knowledge and ability to pursue professional programmes, namely, CA, CMA, ACS etc	The courses of “General Economics, Business laws and Advanced Financial Accounting” forming a strong basis for pursuing professional programmes.
2.	PO4: Ability to understand and use modern tools and technologies	Models and methods of generally used Spreadsheet functions and its Business Applications are taught in Office Automation course.
3.	PO 7. Ability to effectively communicate in business environment.	Courses on “Entrepreneurship for Modern Business” “International Business” are taught in which the students are learning the global scenario of Business activities.
4.	PO8.Ability to perform effectively as a leader as well as a member of a team	<p>The students are learning “Human Resource Management” there they could understand the essentials of leadership and teamwork. All courses including theory courses have</p> <ul style="list-style-type: none">d. Seminare. Team projectf. Presentation <p>Curricula is designed to accommodate. National need for leaders is needed presently in India.</p>

Department Name: Commerce

Programme Name: B.Com

Sl. No	POs/PSOs	Implementation
1.	PO5: Understanding the impact of commercial activities on environment and sustainability	The courses Commercial laws and Company Laws the students are learning the legal and operating procedures of business entities thereby they can understand the national and global environmental scenarios of the corporate.
2.	PO6: Apply ethical principles in business and commerce	Business Ethics play a major role in modern business and can impact everything from brand reputation and public perception to <u>employee productivity</u> and overall profitability, in the courses Principles of marketing and Personal selling and Salesmanship the worldwide business practices are taught.
3.	PO8. Ability to perform effectively as a leader as well as a member of a team	<p>The students are learning “Human Resource Development” there they could understand the essentials of leadership and teamwork. All courses including theory courses have</p> <ul style="list-style-type: none">a. Seminarb. Team projectc. Presentation <p>Curricula is designed to accommodate. National need for leaders is needed presently in India.</p>

Department Name: Commerce

Programme Name: M.Com

Sl. No.	POs/PSOs	Implementation
1.	PO2 Knowledge and ability to pursue professional programmes, namely, M.Phil, Ph.Detc.,	Courses like Research Methodology, Project will able to impart the knowledge and ability to pursue professional programmes like, M.Phil., Ph.D etc.,
2.	PO4 Ability to understand and use modern tools and technologies.	Courses on Indian Financial System in modern banking will leads to understand the local, national and global scenario of in Banking and financial system of the country.
3.	PO5 Understanding the impact of commercial activities on environment and sustainability.	The core courses of this programme will develop the skill to perform the commercial activities by understanding the adverse effect of business on environment and sustainability.
4.	PO6 Apply ethical principles in business and commerce.	Courses on Business Ethics, Corporate Social Responsibility and Governance will results in application of ethical principles in business and commerce.

Department Name: Education

Programme Name: B.Sc.B.Ed

Sl. No	POs/PSOs	Implementation
1.	PO1:Develop good command of the subject matter to impart both theoretical and practical knowledge of Mathematics, Computer Science, Physics and Chemistry in upper primary and secondary level education.	The curriculum of the programme designed in such a way that to develop the skills of the students in Mathematics, Chemistry, Physics and Computer Science to compete on par with other national level students.
2.	PO2:Teaching in accordance with the philosophical, sociological and psychological foundations of education to give best support to students learning.	<ul style="list-style-type: none">• Field visits help the students to learn the methods adapted to teach special need Childs in our society.• Psychological lab experiments will focus to students gain concentration in both physically and mentally.• The course Guidance and Counselling will provide the knowledge to the students in the field of how to handle and guide the individuals in his global level.
3.	PO4:Create, select and apply appropriate ICT techniques material and modern information tools such as internet, e – resources for content delivery, analysis, testing and evaluation.	The course software package, MAT lab, Latex, etc., will help the students to create e-content or e-resources to deliver using ICT tools on par with global level.
4.	PO6:Develop language proficiency and communicate effectively as a teacher in the teaching learning activities and as a leader in various activities of the school and society.	The concept of mini teaching provide the confidence the students to handle the classes effective on par with national level job sector. The students to develop communication skills through the activities like, drama, etc.,
5.	PO7:Relate subject matter with social milieu and develop critical thinking, professional ethics and service attitude to contribute for the upliftment of the society. Identify issues such as gender, women empowerment, environment etc.	The courses like Social Engineering, Indian Constitution and Human Rights and Environmental Education will provide the students to know the social imbalance and overcome it gender equality,individual rights, women empowerment, environmental attitudes and etc.
6.	PO8:Demonstrate leadership qualities in classroom management and school administration.	To develop leadership qualities, Classroom management and School administration skills among the students, the activities Citizenship camp and School Internship Training.
7.	PO9:Undertake productive research to solve problems faced by the students and teachers in the professional life.	The components Action Research and Case Study through this the students to solve problems faced by the students in the professional and society.
8.	PSO1 :Promote competencies skills needed for an effective science and mathematics teacher and act as agent of social change.	To bring the competency skills for the science and mathematics teacher, the students asked create mathematics models and various scientific models bring community resources.

Department Name: English & Foreign Languages

Programme Name: B.A English

Sl. No	POs/PSOs	Implementation
1	PO-1: Understand how literature and language go hand in hand in understanding social and cultural context	The objective of this course will develop the students to understand the world literature.
2	PO-2: Identify and apply world criticism in literature.	Literary theory and criticism will enhance their understanding skills
3	PO-4: Understand the impact and ethics of scientific discoveries on influencing society locally and globally.	The course design helps to understand the world literature

Department Name: English & Foreign Languages

Programme Name: M.A English

Sl. No	POs/PSOs	Implementation
1.	PO3: Get trained in the paralinguistic features such as tone, accent, rhythm, volume, pitch etc.	The core courses of this programme will develop the language competencies of students to compete on par with other nationals in speaking.
2.	PO5: Understand various genres of literatures, and to interpret and analyse effectively	Courses including literature and theory will enhance their skills in this fast growing national job sector
3.	PO6: Ability to apply the modern theories to the appreciation of literary pieces.	The core courses of this programme will develop the skills of the students to compete on par with other nationals.

Department Name: Mathematics

Programme Name: B.Sc Mathematics

Sl. No	POs/PSOs	Implementation
1	PO1: The Graduates will be able to demonstrate competency in Algebra, Analysis, Geometry and other related Mathematical fields.	All theory courses will have seminars, assignments and open Book tests related to this PO
2	PO2: The Graduates will be able to write and explain mathematical proofs using proper terminology and logical structures.	All theory courses will have Assignment work related to this PO
3	PO6: The Graduates will be able to work effectively as a team as well as individuals.	All theory courses have <ul style="list-style-type: none">a. Seminarb. Team projectc. Presentation
4	PO8: The Graduates will be able to demonstrate awareness of ethical and environmental issues related to science, research and work.	The core courses of this programme will develop the skills of the students to compete on par with other nationals. These design courses help our country to have our own Intellectual Property.

Department Name: Mathematics

Programme Name: M.Sc Mathematics

Sl. No	POs/PSOs	Implementation
1.	PO1: The Graduates will be able to demonstrate competency in Algebra, Analysis, Geometry and other related Mathematical fields.	Major projects related to this PO is carried out.
2.	PO 2: The Graduates will be able to write and explain mathematical proofs using proper terminology and logical structures	All courses have seminar
3.	PO4: The Graduates will be able to formulate mathematical problems and apply mathematical principles in a variety of contexts related to Science, technology, business and industry and illustrate the solutions using symbolic or numeric or graphical methods.	A major projects and Interrelated projects may be carried out related to this PO.
4.	PO6:The Graduates will be able to work effectively as a team as well as individuals.	The projects will be carried out by inter relating some of the courses.
5.	PO7:The Graduates will be able to read and understand mathematics research articles published in journals.	Every courses have realtime presentation related to this PO
6.	PO8:The Graduates will be able to demonstrate awareness of ethical and environmental issues related to science, research and work.	The core courses of this programme will develop the skills of the students to compete on par with other nationals.

Department Name: Management Studies

Programme Name: MBA & BBA

Sl. No	POs/PSOs	Implementation
1	PO1:Knowledge of management theory to solve problems of industry and society.	<p>Case Study is provided to inculcate the problem solving capacity.</p> <p>a. Case Study about Amazon Case</p> <p>b. Case Study about Nike Case</p> <p>Real Time Evaluation for each courses are provided to understand the industry and societal problems</p> <p>a. A Day with the banker</p> <p>b. Rural Business Model development</p> <p>c. A Day with HR Manager</p> <p>Through Business Research Project solution to solve industry problem are given</p> <p>a. Research projects carried out in BHEL, NLC, ONGC, TNPL and various private sector organization.</p>
2	PO3:Understand the local and global business environment and formulate business strategies.	<p>To make the students industry ready and to understand the</p> <p>Strategic formulation for industries at local and global level, specialization related courses and Strategic Management, International Business Management courses are incorporated in curriculum.</p>
3	PO5:Identify problems, collect relevant data, use appropriate techniques and tools to analyze the data and select the optimum solution. Use research based knowledge and research methods to solve problems.	<p>Farmers, Agro Products and other local industry related problems in the society were identified through Business Research Project and appropriate solutions were suggested to them.</p>
4	PO7:Apply ethical principles and social responsibility.	<p>Business students are inculcated with the culture of business ethics through courses such as Business Ethics and corporate Social Responsibilities and mini project woks helps them to be socially responsible corporate executives.</p>

Department Name: Physics

Programme Name: B.Sc

Sl. No	POs/PSOs	Implementation
1.	PO1: Understand how scientific and mathematical knowledge continually evolve and that is subject to change.	Problem solving and laboratory experiments are given to develop their mathematical and scientific knowledge
2.	PO2: Identify and apply universal physical laws to the problem	The core course, laboratory experiments and mini-projects are given.
3.	PO3: Communicate effectively (written/oral) and work effectively as an individual or team.	Ability enhancement compulsory courses (i) communication skills in English, (ii) English for effective communication, (iii) Group discussion and (iv) seminar are given to improve their communicative skills.
4.	PO4 : understand the impact and ethics of scientific discoveries on influencing society locally and globally.	Human ethics, Values, Rights and Gender Equality & Disaster Management implemented.
5.	PO5: work effectively in bringing multidisciplinary ideas to diverse professional environment	Open elective, Office automation and Animation Software minor courses in the course for multidisciplinary ideas are taught.
6.	PO6: find, collect and assess scientific-based information – its relevance and reliability	The paper titled “Renewable energy” and project are given relevant to the scientific based information.
7.	PO7: design and perform experiments and thereby analyse and interpret data	Practicals in the core courses of this programme will develop the skills to analyze to interpret data.
8.	PO8: use techniques, tools and skills necessary for emerging technologies.	Courses on (i) Physics work shop skills, (ii) electrical circuit network skills, and (iii) basic instrumentation skills are taught.

Department Name: Political Science

Programme Name: M.A. Political Science

Sl. No	POs/PSOs	Implementation
1	PO1: M.A., graduates should be able to demonstrate a scholarly attitude to knowledge and understanding within the context of a rapidly changing environment. They should have the ability to actively engage in the generation of innovative and relevant knowledge and understanding through involves the study of government, non-governmental systems and operations. They should be able to apply their knowledge commands an arsenal skills knowledge and experience that can be good use at all levels in a complex government	1. National Eligibility Test (NET) 2. Seminar 3. Assignment
2	PO3: Political Science majors acquire skills in data analysis and computer usage to hold a higher position in administration. Political science and social sciences to the problems at hand.	1. Dissertation Work
3	PO5: Political Science students who can use their basic political training to make more informed policy decisions and administer programs more effectively and more imaginatively.	1. Political Awareness Programme
4	PO 7: M.A., graduates should not have the partisan attitude apply ethical principles in administrative work profession in an appreciation of the historical and contemporary interface between non-Indigenous and Indigenous cultures in India and the ability to apply that to practice Knowledge of the administrative area.	1. Union Public Service Commission 2. Tamil Nadu Public Service Commission 3. Other Competitive Exams

Department Name: Social Work

Programme Name: Master of Social Work

Sl. No	POs/PSOs	Implementation
1.	PO1: Ability to apply and transfer Social Work Knowledge, values and ethics across different fields of Social Work practices.	The core courses of this programme will develop the skills of the students to compete on par with other nationals. These design courses help our country to have our own Intellectual Property.
2.	PO2: Potentials to develop relationship and interaction with local, national and global communities, committed and accountable agents of social good through their roles as professionals and members of the community.	In the course of Social Work Practicum we trained the students tie up with Non-Governmental Organizations, Industries, Hospitals and Government projects regarding their essence of contribution and commitment in local, national and global communities.
3.	PO3: Think latterly and originally, conceptualize with the help of social work knowledge, theories, principles, concepts and practice - as to study, assess the needs and support to solve the problems of individuals, groups and communities in diverse settings, client groups and different geographic locations.	During Field Work, Social Work trainees with the guidance of trained professionals in the field solve the problems of individuals, groups and communities in diverse settings, client groups and different geographic locations which are documented.
4.	PO4: Applying research knowledge and skills to understand, evaluate, to develop, execute and disseminate research to explore complex and sensitive social issues and problems to achieve socially just outcomes.	Courses on “Social Work Research and Statistics” are taught. The students of Social Work also conduct Scientific research studies based on their specialization in order to find out and provide fruitful suggestion and recommendations for emerging, existing and present problem of communities at local, national and global level
5.	PO5: Create, select, learn and apply appropriate techniques, resources, understand the structure of society and transfer to them the knowledge on modern social work tools, and its usages.	All courses including theory courses is designed to accommodate the Social Work Students involving by <ul style="list-style-type: none">a. Seminarb. Case Studiesc. Group projectd. Field work Curriculum is designed to fulfill the needs of various communities in National level and Global level.

Sl. No	POs/PSOs	Implementation
6.	PO6: Active involvements in environment and society with the ability to critically analyze the structure of society with specific attention to dimensions of power, disadvantages and influence of class, gender, age, intellectual and physical ability, sexuality, race and ethnicity to enrich the environmental sustainability.	Course on “Social Work with communities and Radical Social Social Work” Social Work students are committed to sensitize the community with his updated skills and knowledge towards, environment sustainability and common social problems.
7.	PO7: Acquire professional and intellectual integrity, professional code of conduct, ethics of professional practices and an understanding of responsibility to contribute to the society towards sustainable development.	Students gaining knowledge on ethics, professional code of conduct from the faculty members and professionals in the field through Social Work Practicum
8.	PO8: Practice social work intervention with effective communication and interpersonal skills by demonstrating advocacy, negotiation and mediation at micro and macro levels of practice by presenting clear and coherent exportation of knowledge and ideas to variety of audience in both oral and written form.	Social Work trainees acquire knowledge theoretically in class rooms and practice their skills in the field with the help of trained professionals to sort out the problems of individuals, groups and communities during the course of the study.
9.	PO10: Understanding of the community, structure, resources and demonstrating skills to analyze the perceptions of community regarding their problems, needs and issues that create the ability to plan and execute projects manage efficiently considering economical and financial factors.	Observation visits, Rural/Tribal camps, Community organization programmes, Mini Projects are provided for every course. These projects are of nation's interest. Examples of mini projects given are c. Participate in Grama Sabha d. Study the community with all resources. e. Participate in Seminars, Conference and Symposium.
10.	PO11: Integrate Knowledge and practice contributing to further knowledge development, engagement as an active participant in learning advance knowledge, skills of Social work practice demonstrating commitment to lifelong learning	

3. Flow chart of curriculum design process for a programme

