

PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO)**BTECH CIVIL ENGGINERING (2018-19)****PROGRAMME OUTCOME**

PO1: Use the knowledge of mathematics and sciences to be applied in the field of Civil Engineering.

PO2: Identify and critically analyze problems related to Civil Engineering by using appropriate analytical tools and through literature review.

PO3: Investigate the identified problem, plan and perform experiment, case studies and practices and use the result, data from the literature, databases & relevant codes to solve identified engineering problems & provide valid conclusions.

PO4: Select and apply appropriate techniques, resources and modern tools in civil engineering activities & also understand the limitation.

PO5: Understand the need for sustainable development in the field civil engineering.

PO6: Understand norms of engineering and be committed to ethical and professional responsibilities of a Civil engineer.

PO7: Communicate effectively by giving and receiving clear instructions, through effective presentations with the civil engineering community and the society at large and be able to design documents and write effective reports.

PO8: Engage in life-long learning particularly in innovative and specialized technologies.

PO9: Communication: An ability to apply oral, written and graphical communication in both technical and non-technical environments and ability to use appropriate technical literature.

PO10: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

COURSE OUTCOME

SEMESTER	COURSE NAME	COURSE CODE	COURSE OUTCOME
	PHYSICS	KAS101	1. To solve the classical and wave mechanics problems 2. To develop the understanding of laws of thermodynamics and their application in various processes 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
	CHEMISTRY	KAS102	1. Use of different analytical instruments. 2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water. 3. Measure hardness of water. 4. Estimate the rate constant of reaction.
	MATHEMATICS -1	KAS103	1. Remember the concept of matrices and apply for solving linear simultaneous equations. 2. Understand the concept of limit, continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems . 3. Identify the application of partial differentiation and

			<p>apply for evaluating maxima, minima, series and Jacobians.</p> <p>4. Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.</p> <p>5. Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals</p>
SEM I	ELECTRICAL ENGINEERING	KEE101	<p>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</p> <p>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</p> <p>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</p> <p>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.</p> <p>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</p>
	PROGRAMMING FOR PROBLEM SOLVING	KCS101	<p>1. To develop simple algorithms for arithmetic and logical problems.</p> <p>2. To translate the algorithms to programs & execution (in C language).</p> <p>3. To implement conditional branching, iteration and</p>
	ENGINEERING GRAPHICS AND DESIGN	KCE101	<p>1: Understanding of the visual aspects of engineering design</p> <p>2: Understanding of engineering graphics standards and solid modelling</p> <p>3: Effective communication through graphics</p> <p>4: Applying modern engineering tools necessary for engineering practice</p>
	WORKSHOP PRACTICES	KWS101	<p>1. Study and practice on machine tools and their operations</p> <p>2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding</p> <p>3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping</p> <p>4. Welding and soldering operations</p> <p>5. Apply basic electrical engineering knowledge for house wiring practice</p>
	PHYSICS	KAS201	<p>1. To solve the classical and wave mechanics problems</p> <p>2. To develop the understanding of laws of thermodynamics and their application in various processes</p> <p>3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory</p>

SEM II

CHEMISTRY	KAS202	<ol style="list-style-type: none"> 1. Get an understanding of the theoretical principles understanding molecular structure, bonding and properties. 2. Know the fundamental concepts of determination of structure with various techniques. 3. Know the fundamental concepts of chemistry applicable in industrial processes.
MATHEMATICS -II	KAS203	<ol style="list-style-type: none"> 1. Understand the concept of differentiation and apply for solving differential equations. 2. Remember the concept of definite integral and apply for evaluating surface areas and volumes. 3. Understand the concept of convergence of sequence and series. Also evaluate Fourier series 4. Illustrate the working methods of complex functions and apply for finding analytic functions. 5. Apply the complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.
ELECTRICAL ENGINEERING	KEE201	<ol style="list-style-type: none"> 1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. 2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. 3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. 4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. 5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption
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ENGINEERING GRAPHICS AND DESIGN	KCE201	<ol style="list-style-type: none"> 1: Understanding of the visual aspects of engineering design 2: Understanding of engineering graphics standards and solid modelling 3: Effective communication through graphics 4: Applying modern engineering tools necessary for engineering practice 5: Applying computer-aided geometric design

WORKSHOP PRACTICES	KWS201	<ol style="list-style-type: none"> 1. Study and practice on machine tools and their operations 2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding 3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping 4. Welding and soldering operations 5. Apply basic electrical engineering knowledge for house wiring practice Text
PROFFESIONAL ENGLISH	KAS204	<ol style="list-style-type: none"> 1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking. 2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc. 3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing. 4. Students will be made to evaluate the correct & error-free writing by being well-versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses. 5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing inter-personal communication skills and positive attitude leading to their professional competence.
Building Materials & Construction	RCE 301	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the basic materials that are used in construction. 2 Implement and realize the uses of Paints, Plastics, Glass, and Ferrous materials. 3 Understand the concepts of building construction and processes involved in masonry structures. 4 Use doors and windows of various types. 5 Understand various types of fittings and principles of acoustics.

SEM III

Surveying	RCE 302	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Apply the principles of Surveying, and draw as per scale. 2 Understand the concept of Linear and angular measurement. 3 Plot the graph using contouring and the concept of leveling. 4 Implement the concept of traversing and triangulation using theodolite. 5 Analyze different types of curves and their elements.
Fluid Mechanics	RCE 303	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the basic concepts of fluids under static condition. 2 Identify the various types of flows. 3 Use the different instruments to measure the discharge and velocity of fluid. 4 Understand the behavior of flows under different flow conditions. 5 Calculate the dimensions of various units and effects of drag and lift.
Mechanics of Solids	RME 303	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the concepts of stress and strain. 2 Compute the stresses and deflections in beams. 3 Analyze the behavior of column, struts, and springs under various loading conditions. 4 Understand the concepts of cylinders and spheres. 5 Study the behavior of curved beams and unsymmetrical bending.
Universal Human Values	RVE 301	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the need and process of value education. 2 Understand the need of Harmony among human beings. 3 Realize the need of Harmony among family and society. 4 To visualize the nature and concept of co-existence 5 To implicate the concepts of Professional ethics.

	Mathematics III	RAS 301	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Solve the function of complex variables 2 To apply statistical techniques 3 To implement numerical techniques and interpolation methods. 4 Finding the solutions of ordinary differential equations. 5 To solve boundary value problems and numerical solution of partial differential equations.
SEM IV	Hydraulics & Hydraulic Machines	RCE 401	<ol style="list-style-type: none"> 1 Understand the concepts of open channel flow. 2 To know the behavior of gradually varied flow. 3 To study the behavior of rapidly varied flow. 4 To study and analyze the behavior of various types of pumps. 5 To study and analyze the behavior of various types of Turbines.
	Geoinformatics	RCE 402	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the concepts of Photogrammetric survey. 2 Understand the concept of remote sensing and aerial survey. 3 Apply the fundamentals of digital image processing and apply the same to civil engineering problems. 4 Conceptualize the use of GIS software and its applications. 5 Study the concept of Global navigation system.
	Structral Analysis	RCE 403	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the classification of structure and load transfer mechanism. 2 To analyze plane trusses and Pin jointed Determinate trusses. 3 To analyze and compute the deflections of Determinate beams, and frames. 4 To draw influence line diagrams for determinate beams and trusses and applications of Muller Breslau principle. 5 To analyze various types of Arches.

		<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand and analyze the time and space complexity of an algorithm. 2 Understand and implement fundamental algorithm including sorting algorithms, and dynamic programming. 3 Discuss various algorithm design techniques for developing algorithms. 4 Discuss various searching, sorting, and graph traversal algorithms. 5 Understand operation on Queue, priority queue, and D-Queue.
Data Structure	RCS 405	
		<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the concepts of Polymer synthesis. 2 Study high performance polymers and their processing. 3 Find the idea of polymerization. 4 Understand the concepts of ionic and cationic polymerization and chain statistics. 5 Study the preparation and application of thermoplastics, thermostats and elastomers.
Polymer Science and Technology	ROE 045	
		<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study and understand about the Industrial Sociology. 2 To study and analyze concept of Rise and Development of Industry. 3 To study and learn about Industrialization in India. Industrial Policy Resolutions. 4 To study and learning of Contemporary Issues: grievances and Grievance handling Procedure. 5 Study and learning of concept of Visualizing the future: Models of industrialization
SOCIOLOGY	RAS 502	
		<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study and understand about the Concrete and its compositions. 2 To study and analyze different types of Elements of the concrete and related properties. 3 To study and learn about the Mix design concept of the concrete. 4 To study and learning of different properties of the concrete & compositions. 5 Study and learning of concept of different types of concrete.
Concrete Technology	RCE 052	

SEM V

Managerial Economics	RAS 501	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none">1 To study and understand about the Introduction of Engineering Economics and Demand Analysis.2 To study and analyze concept of supply and forecasting.3 To study and learn about cost analysis.4 To study and learning of Market Structure.5 Study and learning of concept of Nature and characteristics of Indian economy, concepts of LPG, elementary concepts of National Income, Inflation and Business Cycles
Quantity Estimation & Management	RCE 503	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none">1 To study and understand about the different types of Estimations and Measurement Units.2 To study and analyze different types of Contract and Tenders, along with specifications and rate analysis for various quantities.3 To study and learn about various Elements of Management & Network Techniques.4 To study and learning of Equipment Management and their usage & Productivity in the construction process.5 Study and learning of concept of Project Cost Management and related elements.
Geotechnical Engineering	RCE 501	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none">1 To study and understand about the concept of soil and its compositions, about Geotechnical engineering & requirement, importance and engineering properties of the soil.2 To study and understand the concept of soil hydraulics relations, theories, stress and pressure analysis in the soil along with various effects.3 To study and learn about the concept compaction in soil, consolidation in soil, factors controlling compaction and consolidation in soil.4 To study and learning of shear strength in soil, methods and various theories to control straining in soil, various tests to calculate strength in the soil along with the concept of earth and pore pressure in the soil.5 Study and learning of concept of bearing capacity of the soil, foundation and its type, classification of foundation.

		<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the concepts and analysis of fixed and continuous beams. 2 Draw influence line diagrams for indeterminate beams and analyze two and three hinged arches. 3 Study and analyze suspension bridges and girders. 4 Analyze beams, frames and trusses by basic force and displacement matrix method. 5 Understand the basic principles of plastic analysis of beams and frames.
Design Of Structure I	RCE 502	
		<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study and understand about the Introduction: Concept and scope of Industrial Management. 2 To study and analyze Functions of Management. 3 To study and learn about the Work Study: Introduction, definition, objectives, steps in work study, Method study. 4 To study and learning of Quality Control. 5 Study and learning of concept of Project Management
Industrial Management	RAS 601	
		<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Evaluate the need of cyber security and information systems 2 Understand the need of application systems and assess the threats 3 Develop secure information system, CCTV and intrusion detection system. 4 Review security policies and evolving technology security 5 Have a know-how of information security systems and different laws prevalent to control cyber threats and cyber abuse
Cyber Security	RUC 601	
		<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study and understand about the Concrete and its compositions. 2 To study and analyze different types of Elements of the concrete and related properties. 3 To study and learn about the Mix design concept of the concrete. 4 To study and learning of different properties of the concrete & compositions. 5 Study and learning of concept of different types of concrete.
Design Of Structure II	RCE 601	

Environmental Engineering	RCE602	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study and understand about the concept of demand and supply of water system. 2 To study and analyze Storage and distribution of water. 3 To study and learn about the Physical, chemical and bacteriological examination of water and wastewater. 4 To study and learning Objectives of water treatment: unit operations, processes, and flow sheets of different properties of the concrete & compositions. 5 Study and learning of Objectives of waste water treatment: unit Operations, processes, and flow sheets. Secondary and tertiary treatment
Transportation Engineering	RCE 603	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study and understand about the Introduction: Role of Transportation, Modes of Transportation 2 To study and analyze Geometric Design (IRC: 73-Latest revision). 3 To study and learn about the Traffic Engineering: Traffic Characteristics. 4 To study and learning of Highway Materials: Properties of Sub-grade, Aggregates & Binding materials, Various tests and specifications, 5 Study and learning of Highway Construction.
Integrated Waste Management For A Smart City	REC 062	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 Understand the concepts of solid waste management and the idea of swachh bharat mission. 2 Understand the composition of municipal solid waste and the system involved in its processing. 3 Explain the process of municipal solid waste management. 4 Ascertain the beneficial uses of waste recovery. 5 Understand E- Waste and hazardous waste disposal and assess the risks involved in handling.

SEM VII	Design Of Steel Structure	NCE 701	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study and understand the properties of steel as structural member and the various loads which are acting upon the structure. Also detailed study of Limit state Method which is used in designing of members. 2 To study and analyze the connections (Riveted, Bolted and Welded) and the strength of joint. Also design both the connections for the load which were acted. 3 In this, to determine the strength of the members which carries tension force and also design tension members. 4 To study the and analyze the compression members and also design the compression members. 5 In this, understand and analyze the beams which are used in steel structure, how they fail and to design the beam for different support conditions.
	Water Resource Engineering	NCE 702	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To explain various key hydrological process, which are important from engineering aspect. 2 To study how the rainfall, stream flow, evaporation occurs and their measurement. 3 To study and analyze the concept of Runoff, their characteristics, measurement, discharge and time relation related to hydrograph. 4 Complete study of Flood on the basis of historical data and empirical equations. And to understand about Flood routing. 5 To understand the concept of sub surface water, types of aquifers. To evaluate the characteristics of Well Hydraulics.
	Open Channel Flow	NCE 043	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To understand the basic knowledge of open channel flow, types of channels and create the relationship between energy depth. 2 To study about Gradually Varied Flow, classification of surface profiles and how to compute the conditions of critical, sub critical and super critical flow. 3 To study Rapidly Varied Flow, Hydraulic jump and how to hydraulic jump occur through hydraulic structure. 4 To understand and evaluate the characteristics of Spatially varied Motion for unsteady flow. 5 To analyze the flow in non linear alignment and non prismatic sections and design considerations.

<p>Industrial Pollution And Control</p>	<p>NCE 034</p>	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study about Industrial wastes, their sources and various process required for water quality. 2 To study the various process which are responsible for water quality deterioration, control and removal of various toxic pollutants in water system. 3 To understand the methods of gaseous waste management. To study about hazardous wastes and their management policies. 4 To study about the various non biodegradable waste management and study about the various life cycle related to this process. 5 To understand the amendment of Environmental audit.
<p>Quality Management</p>	<p>NOE072</p>	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study about the basic knowledge of quality control, total quality management and how to determine quality control. 2 To study and analyze the connections (Riveted, Bolted and Welded) and the strength of joint. Also design both the connections for the load which acted. 3 In this, to determine the strength of the members which carries tension force and also design tension members. 4 To study and analyze the compression members and also design the compression members. 5 In this, understand and analyze the beams which are used in steel structure, how they fail and to design the beam for different support conditions.
<p>Transportation II</p>	<p>NCE 801</p>	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1 To study about the history of Railways and basic knowledge component of Railway. 2 To study and understand about Track Geometrics, Turnouts & Crossing, Stations & Yards. 3 To study about Signaling and Interlocking, Urban Railways, Method of train working block system. 4 Introduction to Airport Engineering, Aircraft characteristics, Design of Runway and Taxiway. 5 To study about Harbors and ports, layout and orientation of airport. To study about Inland Waterways.

SEM VIII

Ground Water Management	NCE 063	On completion of this course a successful candidate will 1 To understand the basic knowledge of hydrological cycle and how ground water move through a subsurface. 2 To study the flow through confined and unconfined aquifer and the concept of well hydraulics. 3 To understand the concept and types of wells and how to construct wells. 4 To determine the quality and standards of ground water, modeling techniques, ground water exploration and other parameters. 5 To analyze the ground water management techniques and how to improve ground water level through rain water harvesting.
Water Resource System	NCE 053	On completion of this course a successful candidate will 1 To study and understand the different types of a system and the problems in system analysis. 2 Understand and Apply Mathematical techniques used in system analysis. 3 To evaluate the cost analysis of systems and choose best alternative along with respect to cost. 4 Create Multi objective planning of water resources system with various objectives and simulate the behavior of the system. 5 Applications of Linear and Dynamic Programming using different techniques in water resources system projects.

Non-Conventional Energy Resources	NOE081	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none">1 To study about the various Non-conventional energy resources, their availability, classification and relative merits- demerits. To understand and analyze the characteristics of Solar Cells.2 To understand the basic knowledge of Solar Thermal Energy, types of solar collectors, their performance and types of solar power plants.3 To evaluate the sources of Geothermal Energy, their conversion into electrical energy. To understand the basic principles of working of Magneto Hydro dynamics power plant, principle and working of fuel cells.4 To analyze the working principle of thermo electrical and thermionic conversion. About Wind power and its sources and selection criteria.5 To study about Biomass and its conversion theory. To study about Ocean Thermal Energy and the principle of working
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PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO)**BTECH COMPUTER SCIENCE ENGINEERING (2018-19)****PROGRAMME OUTCOME**

PO1: The graduates are expected to develop an ability to apply knowledge of mathematics, science and engineering appropriate to the discipline.

PO2: The graduates are expected to apply mathematical foundations, algorithmic principles and computer science theory in modeling, design and conduct of experiments as well as data interpretation and analysis.

PO3: The graduates are expected to develop an ability to 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.

PO4: The graduates are expected to develop an ability to identify, formulate and solve real engineering problems and understand the global impact of engineering solutions.

PO5: The graduates are expected to develop an ability to function effectively on multidisciplinary teams to accomplish a common goal.

PO6: The graduates are expected to develop an understanding of professional, ethical, legal, security and social issues as well as responsibilities.

PO7: The graduates should have good knowledge of contemporary issues and are expected to communicate effectively with a range of audiences.

PO8: The graduates should be able to recognize the need for lifelong learning and are expected to apply the techniques, skills and modern engineering tools necessary for engineering practice.

PROGRAM SPECIFIC OUTCOMES

PSO1: Apply the fundamentals of mathematics, science and engineering knowledge to understand, analyze and develop computer programs in the areas related to algorithms, multimedia, big data analytics, machine learning, artificial intelligence and networking for efficient design of computer-based systems of varying complexity.

PSO2: Apply appropriate techniques and modern engineering hardware and software tools for the design and integration of computer system and related technologies, to engage in lifelong learning for the advancement of technology and its adaptation in multi-disciplinary environments.

PSO3: Implementation of professional engineering solutions for the betterment of society keeping the environmental context in mind, be aware of professional ethics and be able to communicate effectively.

COURSE OUTCOME

SEMESTER	COURSE NAME	COURSE CODE	COURSE OUTCOME
	PHYSICS	KAS101	1. To solve the classical and wave mechanics problems 2. To develop the understanding of laws of thermodynamics and their application in various processes 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams

SEM I

CHEMISTRY	KAS102	<ol style="list-style-type: none"> 1. Use of different analytical instruments. 2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water. 3. Measure hardness of water. 4. Estimate the rate constant of reaction.
MATHEMATICS -1	KAS103	<ol style="list-style-type: none"> 1. Remember the concept of matrices and apply for solving linear simultaneous equations. 2. Understand the concept of limit, continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems . 3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians. 4. Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity. 5. Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals
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SEMII

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WORKSHOP PRACTICES	KWS201	<ol style="list-style-type: none">1. Study and practice on machine tools and their operations2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping4. Welding and soldering operations5. Apply basic electrical engineering knowledge for house wiring practice <p>Text</p>

PROFFESIONAL ENGLISH	KAS204	<ol style="list-style-type: none"> 1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking. 2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc. 3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing. 4. Students will be made to evaluate the correct & error-free writing by being well-versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses. 5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing inter-personal communication skills and positive attitude leading to their professional competence.
Discrete Structures & Theory of Logic	RCS 301	<ol style="list-style-type: none"> 1. Write an argument using logical notation and determine if the argument is or is not valid. 2. Understand the basic principles of sets and operations in sets. 3. Demonstrate an understanding of relations and functions and be able to determine their properties 4. Demonstrate different traversal methods for trees and graphs. 5. Model problems in Computer Science using graphs and trees.
Computer Organization and Architecture	RCS 302	<ol style="list-style-type: none"> 1. Study of the basic structure and operation of a digital computer system. 2. Analysis of the design of arithmetic & logic unit and understanding of the fixed point and floating-point arithmetic operations. 3. Implementation of control unit techniques and the concept of Pipelining 4. Understanding the hierarchical memory system, cache memories and virtual memory 5. Understanding the different ways of communicating with I/O devices and standard I/O interfaces

SEM III

Data Structures	RCS305	<ol style="list-style-type: none">1. Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.2. Discuss the computational efficiency of the sorting and searching algorithms.3. Implementation of Trees and Graphs and perform various operations on these data structure4. Understanding the concept of recursion, application of recursion and its implementation and removal of recursion.5. Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.
Digital Logic Design	REC301	<ol style="list-style-type: none">1. Understand the concepts of various components to design stable analog circuits.2. Represent numbers and perform arithmetic operations.3. Minimize the Boolean expression using Boolean algebra and design it using logic gates.4. Analyze and design combinational circuit.5. Design and develop sequential circuits.6. Translate real world problems into digital logic formulations using VHDL
Universal Human Values & Professional Ethics	RVE301	<ol style="list-style-type: none">1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature

Mathematics-III	RAS301	<ol style="list-style-type: none"> 1. To know how root finding techniques can be used to solve practical engineering problems. 2. To apply the concept of numerical analysis to find the relative strengths and weaknesses of each computation method and know which are most applicable for given problem. 3. To apply the analytical technique to express periodic function as a Fourier sine and cosine series. 4. To apply partial differential techniques to solve the physical engineering problems. 5. To implement integration technique to determine the extreme values of a functional.
Operating Systems	RCS 401	<ol style="list-style-type: none"> 1. Understand the structure and functions of OS 2. Learn about Processes, Threads and Scheduling algorithms. 3. Understand the principles of concurrency and Deadlocks 4. Learn various memory management scheme 5. Study I/O management and File systems.
Software Engineering	RCS 402	<ol style="list-style-type: none"> 1. Understand and demonstrate basic knowledge in software engineering. 2. Identify requirements, analyze and prepare models. 3. Plan, schedule and track the progress of the projects. 4. Design & develop the software projects. 5. Identify risks, manage the change to assure quality in software projects. 6. Apply testing principles on software project and understand 7. the maintenance concepts.
Theory of Automata & Formal Languages	RCS 403	<ol style="list-style-type: none"> 1. Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars. 2. Analyse and design, Turing machines, formal languages, and grammars. 3. Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving. 4. Prove the basic results of the Theory of Computation. 5. State and explain the relevance of the Church-Turing thesis.

SEM IV

Mathematics III	RAS 401	<ol style="list-style-type: none">1. The idea of partial differentiation and types of partial differential equations.2. The idea of classification of second partial differential equations, wave , heat equation and transmission lines3. The basic ideas of statistics including measures of central tendency, correlation, regression and their properties.4. The idea's of probability and random variables and various discrete and continuous probability distributions and their properties.5. The statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties.
Environment & Ecology	RAS 402	<ol style="list-style-type: none">1. Understand core concepts and methods from ecological and physical sciences and their application in environmental problem-solving.2. Appreciate key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.4. Appreciate that one can apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.5. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex,interconnected world.
Introduction to Microprocessor	REC405	<ol style="list-style-type: none">1. Apply a basic concept of digital fundamentals to Microprocessor based personal computer system.2. Analyze a detailed s/w & h/w structure of the Microprocessor.3. Illustrate how the different peripherals (8085/8086) are interfaced with Microprocessor.4. Analyze the properties of Microprocessors(8085/8086)5. Evaluate the data transfer information through serial & parallel ports.

<p>Polymer Science & Technology</p>	<p>ROE 045</p>	<ol style="list-style-type: none"> 1. Isolate the key design features of a product which relate directly to the material(s) used in its construction 2. Indicate how the properties of polymeric materials can be exploited by a product designer 3. Describe the role of rubber-toughening in improving the mechanical properties of polymers 4. Identify the repeat units of particular polymers and specify the isomeric structures which can exist for those repeat units 5. Estimate the number- and weight-average molecular masses of polymer samples given the degree of polymerisation and mass fraction of chains present.
<p>Manegetrial Economics</p>	<p>RAS501</p>	<ol style="list-style-type: none"> 1. Understand the roles of managers in firms 2. Understand the internal and external decisions to be made by managers 3. Analyze the demand and supply conditions and assess the position of a company 4. Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets. 5. Analyze real-world business problems with a systematic theoretical framework. 6. Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.
<p>Cyber Security</p>	<p>RUC501</p>	<ol style="list-style-type: none"> 1. Understanding of the concepts and foundations of computer security, and identify vulnerabilities of IT systems. 2. The basic security threats that effect system security and can develop basic security enhancements in stand-alone applications. E-commerce and digital transactions. 3. The basic methods to tackle various types of intrusions on your system. 4. Understand policies related to web or cyber. 5. Understand of laws related to cyber and information.

SEM V

Database Management Systems	RCS-501	<ol style="list-style-type: none">1. Describe the fundamental elements of relational database management systems2. Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.3. Design ER-models to represent simple database application scenarios4. Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.5. Improve the database design by normalization.6. Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.
Design and Analysis of Algorithm	RCS-502	<ol style="list-style-type: none">1. Ability to analyze the performance of algorithms.2. Ability to choose appropriate algorithm design techniques for solving problems.3. Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.4. To clear up troubles the usage of set of rules design methods including the grasping approach, divide and overcome, dynamic programming, backtracking and department and certain.5. To understand the variations among tractable and intractable problems.6. To introduce p and np classes
Principles of Programming Languages	RCS-503	<ol style="list-style-type: none">1. Understanding the basic of what is programming languages, why they are used and related models.2. Learn the concepts of programming languages that are used in it , data and statements and its uses.3. Understanding the types of programs and their implementation.4. To learn about the OOPs Concepts with the help of any programming language examples.5. Understand and try to work with the logics of programming and related programming language.

	Web Technologies	RCS 052	<ol style="list-style-type: none"> 1. Students are able to develop a dynamic webpage by the use of java script and DHTML. 2. Students will be able to write a well formed / valid XML document. 3. Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table. 4. Students will be able to write a server side java application called Servlet to catch form data sent from client, process it and store it on database. 5. Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database
	Industrial Management	RAS 601	<ol style="list-style-type: none"> 1. The students get employed in jobs, related to Production Planning section, Industrial Engineering Department, Shop floor, Assembly lines, in all sectors like IT, Banking, Manufacturing, Share Market, Higher Education, Sports, where they can implement their statistical knowledge 2. This subject also helps a student to be a self-employable by getting knowledge of management techniques. 3. Statistical Knowledge enhances chances to get a certification from worldwide famous organization like ASQ. i.e. American Society for Quality 4. Student will demonstrate Commitment to quality, timeliness, and continuous improvement in production rate in manufacturing sector 5. Students also show the ability to formulate, conduct, analyze and interpret experiments and apply experimental results to improve processes in industry
	Industrial Sociology	RUC 601	<ol style="list-style-type: none"> 1. Definition of industry, meaning, pre-industrial, industrial society and its system. 2. Work in modern society. 3. Meaning and trends of Industrial disputes in India. 4. Labour welfare. 5. Industry and society

SEM VI

Computer Networks	RCS 601	<ol style="list-style-type: none">1. Have a good understanding of the OSI Reference Model and in particular have a good2. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.3. Have a basic knowledge of the use of cryptography and network security.4. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols.5. Have an understanding of the issues surrounding Mobile and Wireless Networks.6. Have a working knowledge of datagram and internet socket programming
Compiler Design	RCS 602	<ol style="list-style-type: none">1. To realize basics of compiler design and apply for real time applications.2. To introduce different translation languages3. To understand the importance of code optimization4. To know about compiler generation tools and techniques5. To learn working of compiler and non compiler applications6. Design a compiler for a simple programming language
Computer Graphics	RCS 603	<ol style="list-style-type: none">1. Understand the basic concepts of Computer Graphics.2. Demonstrate various algorithms for scan conversion and filling of basic objects and their comparative analysis.3. Apply geometric transformations, viewing and clipping on graphical objects.4. Explore solid model representation techniques and projections.5. Understand visible surface detection techniques and illumination models
Data warehousing & Data Mining	RCS 604	<ol style="list-style-type: none">1. Understand the functionality of the various data mining and data warehousing component.2. Appreciate the strengths and limitations of various data mining and data warehousing models.3. Explain the analyzing techniques of various data.4. Describe different methodologies used in data mining and data ware housing.5. Compare different approaches of data ware housing and data mining with various technologies

	Distributed Systems	NCS-701	<ol style="list-style-type: none"> 1. The student will explain various architectures used to design distributed systems, such as client-server and peer-to-peer. 2. The student will build distributed systems using various interprocess communication techniques, such as remote method invocation, remote events, and tuple spaces. 3. The student will build distributed systems using various techniques for tolerating partial failures, such as leasing and replication. 4. The student will build distributed systems using various interprocess coordination techniques, such as distributed mutual exclusion, distributed monitors, and tuple spaces. 5. The student will explain various distributed algorithms, such as logical clocks and leader election. 6. The student will analyze and explain current distributed systems research literature.
	Artificial Intelligence	NCS 702	<ol style="list-style-type: none"> 1. Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents. 2. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them 3. Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing 4. Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning 5. Formulate and solve problems with uncertain information using Bayesian approaches 6. Apply concept Natural Language processing to problems leading to understanding of cognitive computing

SEM VII

Quality Management	NOE-072	<ol style="list-style-type: none">1. Evaluate the principles of quality management and to explain how these principles can be applied within quality management systems.2. Identify the key aspects of the quality improvement cycle and to select and use appropriate tools and techniques for controlling, improving and measuring quality.3. Critically appraise the organisational, communication and teamwork requirements for effective quality management4. Critically analyse the strategic issues in quality. Management, including current issues and developments, and to devise and evaluate quality implementation plans.
Software Testing & Audit	NCS-071	<ol style="list-style-type: none">1. Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.2. Implement various test processes for quality improvement3. Design test planning.4. Manage the test process5. Apply the software testing techniques in commercial environment6. Use practical knowledge of a variety of ways to test software and an understanding of some of the tradeoffs between testing techniques.
Cryptographic & Network Security	NIT-701	<ol style="list-style-type: none">1. Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory.2. Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication3. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes4. Apply different digital signature algorithms to achieve authentication and create secure applications5. Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP.6. Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications

SEM VIII	Digital Image Processing	NCS 801	<ol style="list-style-type: none"> 1. Review the fundamental concepts of a digital image processing system. 2. Analyze images in the frequency domain using various transforms. 3. Evaluate the techniques for image enhancement and image a. restoration. 4. Categorize various compression techniques. 5. Interpret Image compression standards. 6. Interpret image segmentation and representation techniques.
	Non- Conventional Energy Resources	NOE 081	<ol style="list-style-type: none"> 1. Understand the different non-conventional sources and the power generation techniques to generate electrical 2. Design a prescribed engineering sub-system 3. Recognize the need and ability to engage in lifelong learning for further developments in this field.
	Data Compression	NCS 085	<ol style="list-style-type: none"> 1. Solve the problems associated different source coding techniques. 2. Understand the operation of scalar and vector quantizer. 3. Implement the compression techniques to compress the different raw data. 4. Summarize the concepts associated speech, image and video compression. 5. Recognize the usage data compression in telecommunication engineering and to solve the corresponding problems
	Cluster Computing	NCS 083	<ol style="list-style-type: none"> 1. Understand the concepts of Grid Computing, 2. Understand the concepts and application of Web Services, and Service-oriented architecture. 3. Understand architecture for grid computing, Cluster Computing, process scheduling and load balancing. 4. Setup of simple cluster, setting up nodes, clusters of clusters, System monitoring, Global Clocks Sync. 5. High availability clusters, high availability parallel computing, types of failures and errors, cluster architectures and configurations for high availability, Failure/Recovery clusters.

PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO)
BTECH ELECTRONICS & COMMUNICATION ENGINEERING (2018-19)

PROGRAMME OUTCOME

Engineering Graduates will be able to:

1. Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis:

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions:

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

4. Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability:

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics:

Apply ethical principles and commit to professional ethics and responsibilities And norms of the engineering practice.

9. Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication:

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

11. Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning:

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSE OUTCOME

SEMESTER	COURSE NAME	COURSE CODE	COURSE OUTCOME
SEM I	PHYSICS	KAS101	1. To solve the classical and wave mechanics problems 2. To develop the understanding of laws of thermodynamics and their application in various
	CHEMISTRY	KAS102	1. Use of different analytical instruments. 2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
	MATHEMATICS -1	KAS103	1. Remember the concept of matrices and apply for solving linear simultaneous equations. 2. Understand the concept of limit, continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems . 3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians. 4. Illustrate the working methods of multiple
	ELECTRICAL ENGINEERING	KEE101	1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. 2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. 3. Identify the application areas of a single phase
	PROGRAMMING FOR PROBLEM SOLVING	KCS101	1. To develop simple algorithms for arithmetic and logical problems. 2. To translate the algorithms to programs & execution (in C language). 3. To implement conditional branching, iteration
	ENGINEERING GRAPHICS AND DESIGN	KCE101	1: Understanding of the visual aspects of engineering design 2: Understanding of engineering graphics standards and solid modelling 3: Effective communication through graphics 4: Applying modern engineering tools necessary for engineering practice
	WORKSHOP PRACTICES	KWS101	operations 2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding 3. Identify and apply suitable tools for machining
	PHYSICS	KAS201	1. To solve the classical and wave mechanics problems 2. To develop the understanding of laws of thermodynamics and their application in various processes 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic
	CHEMISTRY	KAS202	1. Get an understanding of the theoretical principles understanding molecular structure, bonding and properties.

SEM II

MATHEMATICS -II	KAS203	<ol style="list-style-type: none"> 1. Understand the concept of differentiation and apply for solving differential equations. 2. Remember the concept of definite integral and apply for evaluating surface areas and volumes. 3. Understand the concept of convergence of
ELECTRICAL ENGINEERING	KEE201	<ol style="list-style-type: none"> 1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. 2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. 3. Identify the application areas of a single phase
PROGRAMMING FOR PROBLEM SOLVING	KCS201	<ol style="list-style-type: none"> 1. To develop simple algorithms for arithmetic and logical problems. 2. To translate the algorithms to programs & execution (in C language). 3. To implement conditional branching, iteration
ENGINEERING GRAPHICS AND DESIGN	KCE201	<ol style="list-style-type: none"> 1: Understanding of the visual aspects of engineering design 2: Understanding of engineering graphics standards and solid modelling 3: Effective communication through graphics 4: Applying modern engineering tools necessary for engineering practice
WORKSHOP PRACTICES	KWS201	<ol style="list-style-type: none"> 1. Study and practice on machine tools and their operations 2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding 3. Identify and apply suitable tools for machining
PROFFESIONAL ENGLISH	KAS204	<ol style="list-style-type: none"> basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking. 2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as
Network Analysis & Synthesis	REE-305	<ol style="list-style-type: none"> 1. Understand basics electrical circuits with nodal and mesh analysis. 2. Appreciate electrical network theorems. 3. Apply Laplace transform for steady state and transient analysis. 4. Determine different network functions.
Electronic Devices & Circuits	REC-302	<ol style="list-style-type: none"> 1. To understand the basic concepts of semiconductor materials. 2. To analyze the conductive behavior of semiconductor material 3. To analyze the behavior of p-n junction based devices such as optoelectronic devices. 4. To understand the working principle and characteristics of MOS devices.

SEM III	Signals and Systems	REC-303	<ol style="list-style-type: none"> 1. To understand the basic concept of signals and systems 2. To analyze different systems and their characteristics 3. To evaluate analog and digital signals in frequency domain 4. To apply different transformation tools for the
	Digital Logic Design	REC-301	<ol style="list-style-type: none"> 2. Design and analyze modular combinational
	Mathematics- III	RAS-301	<ol style="list-style-type: none"> 1. Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems. 2. Numerical methods to obtain approximate solutions to mathematical problems. 3. Numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations. 4. Analyze and evaluate the accuracy of common numerical methods. 5. Basic probability axioms and rules and the
	Human Values & Professional Ethics	RVE-301	<p>classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society</p> <ol style="list-style-type: none"> 2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self
	Polymer Science & Technology	ROE-045	<ol style="list-style-type: none"> 4. Describe the role of rubber-toughening in improving the mechanical properties of polymers. 5. Identify the repeat units of particular polymers and specify the isomeric structures which can exist
	Environment & Ecology	RAS-402	<ol style="list-style-type: none"> 1. Demonstrate an understanding of the impact of engineering solutions in a global and societal context
	Microprocessors & Microcontroller	REC-401	<ol style="list-style-type: none"> 1. Assess and solve basic binary math operations using the microprocessor and explain the microprocessor's and Microcontroller's internal architecture and its operation within the area of manufacturing and performance. 2. Apply knowledge and demonstrate programming proficiency using the various

SEM IV	Electromagnetic Field Theory	REC-402	<ol style="list-style-type: none"> 1. To understand basic concepts of vector calculus, Co-ordinate system and related transformations from one coordinate system to another system 2. To apply the concepts of vector calculus, Co-ordinate system and related transformations for solving different problems 3. To understand the theory related to Static Electric field and Static Magnetic field. 4. To understand the Maxwell's equations for static fields and time varying fields and relate it with various laws 5. To understand the concepts of EM waves and
	Electronic Measurement & Instrumentation	REC-403	<ol style="list-style-type: none"> 1. To understand the measuring parameters, Units of measurement, accuracy & different types of measuring errors for Electronic Measurement 2. To develop the concept and understand the application of the various measuring instruments 3. To understand the various display devices for Electronic Measurement
	Data Structure & Algorithms	RCS-406	<ol style="list-style-type: none"> 1. complexity of an algorithm 2. Understand and implement fundamental algorithms (including sorting algorithms, graph algorithms, and dynamic programming) 3. Discuss various algorithm design techniques for developing algorithms
SEM V	Advanced Semiconductor Devices	REC-055	<ol style="list-style-type: none"> 1. Acquire basic knowledge on the working of various semi-conductor devices 2. Develop analysis capability in BJT and FET Amplifier Circuits 3. Acquire basic knowledge on the working of various semi-conductor diodes.
	Integrated Circuit	REC-501	<ol style="list-style-type: none"> 1. To understand the basic concepts of analog ICs and related circuits 2. To understand the basic concepts of digital ICs and related circuits 3. To analyze analog and digital circuits 4. To design OP-AMP based analog linear integrated circuits 5. To design OP-AMP based analog non-linear
	Principle of Communication	REC-502	<ol style="list-style-type: none"> 1. To develop the understanding of basic concepts and terminologies of communication systems 2. To understand the frequency domain & time domain representation of different signals and systems 3. To analyse various schemes of analog communication systems (modulation and demodulation)
	Digital Signal Processing	REC-503	<ol style="list-style-type: none"> 1. To understand the basic concepts and terminologies of digital signal processing and filter design 2. To apply different transformation tools for the analysis of discrete time signals and systems 3. To apply basic concepts of digital signal processing in the design of different filters

	Cyber Security	RUC-501	6. Understanding of the concepts and foundations of computer security, and identify vulnerabilities of IT systems. 7. The basic security tools to enhance system security and can develop basic security enhancements in stand-alone applications.
	Managerial Economics	RAS-501	major financial institutions 2. Analyze and evaluate the New Economic Policies of the Government of India 3. Get an orientation to Indian Public Finance 4. Understand the fundamentals of National Income Analysis 5. Analyze the problems of inflation and BOP and
SEM VI	Microwave Engineering	REC-601	1. To understand the concepts of microwave guiding mediums 2. To understand the concepts of microwave passive devices and their performance parameters 3. To understand the concepts of microwave active devices and their performance parameters 4. To understand the microwave generating devices, their characteristics and applications
	Digital Communication	REC-602	1. To understand issues related to digital transmission and reception in modulation format digital communication systems 2. To analyze different line coding schemes and corresponding improvement techniques and also analyze different coding schemes to design optimum receiver for channel with ISI. 3. To apply fundamentals of probability theory and random process in solving different problems 4. To apply vector decomposition concept in signal and noise
	Microcontroller for Embedded Systems	REC-062	1. Explain the Microcontroller's internal architecture and its operation within the area of manufacturing and performance. 2. Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of
	Control System I	RIC-603	1. To understand basic concepts of a control system 2. To develop the mathematical model of various physical systems 3. To determine Transfer function and sensitivity of a complex physical system using block diagram reduction and signal flow graph method 4. To carry out the time domain analysis of first and second order systems. 5. To determine different parameters concerning stability of a system

	Sociology	RAS-602	<ol style="list-style-type: none"> 1. Understand the Nature and Scope of Industrial sociology and with Characteristics of the factory system and Work Environment 2. Identify the role of Motivation and Job satisfaction, stress management. Organizational culture, Leadership & group dynamics
	Industrial Management	RAS-601	<ol style="list-style-type: none"> 3. Select appropriate work study and recognize appropriate work measurement 4. List necessary tools, equipments and exercise proper inventory control 5. Draw a production , planning and schedule
SEM VII	Optical Communication	NEC-701	<ol style="list-style-type: none"> 1. To understand the fundamentals of optical fiber communication system 2. To understand the various types of optical fiber cable and related terminologies 3. To calculate various parameters related to optical fiber communication 4. To understand the various sources of optical
	Data Communication & Network	NEC-702	<ol style="list-style-type: none"> 1. To recall the concepts of different communication systems and related terminologies. 2. To analyze the characteristics of different signals used in communication systems. 3. To develop the understanding of vector decomposition concept in representation of different signals. 4. To analyze the practical use of optimal receivers (Memory and Memory less) in presence of AWGN
	VLSI Design	NEC-703	<ol style="list-style-type: none"> related terminologies 2. To understand the design constraints related to efficient design CMOS circuit 3. To understand the concepts related to CMOS circuits 4. To analyze different designing constraints related to CMOS circuit design
	Information Theory & Coding	NEC-031	<ol style="list-style-type: none"> 1. To understand the basic concepts of information theory and related terminologies 2. To understand the basic concepts of source coding and related terminologies 3. To understand the basic concepts of channel coding and related terminologies 4. To determine different parameters of Information theory
	Quality Management	NOE-072	<ol style="list-style-type: none"> 1. Students will be able to gain basic knowledge in total quality management relevant to both manufacturing and service industry including IT sector. 2. Critically appraise the organizational, communication and teamwork requirements for effective quality management.

SEM VIII

Wireless & Mobile Communication	NEC-801	<ol style="list-style-type: none">1. To understand the basic concepts of wireless & mobile communication and related terminologies2. To study different models of channel used in WMC3. To understand the concepts of spread spectrum modulation4. To understand different wireless communication technologies5. To understand the concepts of different mobile
Optical Network	NEC-802	<ol style="list-style-type: none">1. To recall the concepts of different communication systems and related terminologies.2. To analyze the characteristics of different signals used in communication systems.3. To develop the understanding of vector decomposition concept in representation of different signals.4. To analyze the practical use of optimal receivers
Satellite & Radar Systems	NEC-045	<ol style="list-style-type: none">1. To understand the fundamentals of various RADAR systems and related terminologies2. To understand the fundamentals of satellite communication and related terminologies3. To analyze different parameters of RADAR systems
Non-Conventional Energy Resources	NOE-081	<ol style="list-style-type: none">1. fuel availability and analyses the supply and demand of fuel in the world.2. Understand the fundamentals and main characteristics of renewable energy sources and their differences compared to fossil fuels.3. To enable students to identify the different sources of renewable energy and innovative

PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO)**BTECH ELECTRICAL & ELECTRONICS (2018-19)****PROGRAMME OUTCOME**

By the culmination of this program, the graduate acquires the ability to

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSE OUTCOME

SEMESTER	COURSE NAME	COURSE CODE	COURSE OUTCOME
	PHYSICS	KAS101	1. To solve the classical and wave mechanics problems 2. To develop the understanding of laws of thermodynamics and their application in various
	CHEMISTRY	KAS102	1. Use of different analytical instruments. 2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
	MATHEMATICS -1	KAS103	1. Remember the concept of matrices and apply for solving linear simultaneous equations. 2. Understand the concept of limit, continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and

SEM I			Leibnitz theorems . 3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians. 4. Illustrate the working methods of multiple
	ELECTRICAL ENGINEERING	KEE101	1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. 2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. 3. Identify the application areas of a single phase two winding transformer as well as an auto
	PROGRAMMING FOR PROBLEM SOLVING	KCS101	1. To develop simple algorithms for arithmetic and logical problems. 2. To translate the algorithms to programs & execution (in C language). 3. To implement conditional branching, iteration
	ENGINEERING GRAPHICS AND DESIGN	KCE101	1: Understanding of the visual aspects of engineering design 2: Understanding of engineering graphics standards and solid modelling 3: Effective communication through graphics 4: Applying modern engineering tools necessary for engineering practice
	WORKSHOP PRACTICES	KWS101	operations 2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding 3. Identify and apply suitable tools for machining
	PHYSICS	KAS201	1. To solve the classical and wave mechanics problems 2. To develop the understanding of laws of thermodynamics and their application in various processes 3. To formulate and solve the engineering problems on Electromagnetism &
	CHEMISTRY	KAS202	1. Get an understanding of the theoretical principles understanding molecular structure, bonding and properties.
	MATHEMATICS -II	KAS203	1. Understand the concept of differentiation and apply for solving differential equations. 2. Remember the concept of definite integral and apply for evaluating surface areas and volumes. 3. Understand the concept of convergence of
	ELECTRICAL ENGINEERING	KEE201	1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. 2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. 3. Identify the application areas of a single phase two winding transformer as well as an auto

SEM II	PROGRAMMING FOR PROBLEM SOLVING	KCS201	<ol style="list-style-type: none"> 1. To develop simple algorithms for arithmetic and logical problems. 2. To translate the algorithms to programs & execution (in C language). 3. To implement conditional branching, iteration
	ENGINEERING GRAPHICS AND DESIGN	KCE201	<ol style="list-style-type: none"> 1: Understanding of the visual aspects of engineering design 2: Understanding of engineering graphics standards and solid modelling 3: Effective communication through graphics 4: Applying modern engineering tools necessary for engineering practice
	WORKSHOP PRACTICES	KWS201	<ol style="list-style-type: none"> 1. Study and practice on machine tools and their operations 2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding 3. Identify and apply suitable tools for machining
	PROFFESIONAL ENGLISH	KAS204	<p>basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</p> <ol style="list-style-type: none"> 2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.
	Electrical and Electronics Engineering Materials	REE301	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1. Understand about different types of Dielectric Materials and their applications. 2. Understand about different types of Magnetic Materials and their applications. 3. Understand about different types of
	Electrical Measurement and Instrumentations	REE302	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1. Evaluate errors in measurement as well as identify and use different types of instruments for the measurement of voltage, current, power and energy. 2. Display the knowledge of measurement of electrical quantities resistance, inductance and
	Analog & Digital Electronics	REC 309	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1. To understand the basic concepts of special diodes & power electronics. 2. To analyze the working of amplifiers & its frequency response. 3. To understand the concepts of feedback based

SEM III	Mathematics -III	RAS 301	<p>1. Have a fundamental understanding of Fourier series and their properties and to be able to give Fourier expansion and half range Fourier series representation for a function of one variable.</p> <p>2. Understand Fourier Transform, the convergence issues, relation to Fourier series and properties of Fourier Transform and use of these to derive Fourier Transform and or inverse Fourier Transform of function of one variable.</p>
	Universal Human	RVE-301	<p>1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society</p>
	Basic Signal & System	REE-303	<p>systems</p> <p>2. To analyze different systems and their characteristics</p> <p>3. To evaluate analog and digital signals in frequency domain</p> <p>4. To apply different transformation tools for the analysis of analog signals and systems</p> <p>5. To understand State variable analysis and</p>
Sem IV	Polymer Science & Technology	R0E-045	<p>On completion of this course a successful candidate will</p> <p>1. Describe the role of rubber-toughening in improving the mechanical properties of polymers.</p>
	Environment & Ecology	RAS-402	<p>On completion of this course a successful candidate will</p> <p>1. Knowledge about environmental policy and sustainable development</p> <p>2. Understanding the need and role of Non Conventional Energy sources particularly when the conventional sources are scarce in nature</p>
	Power Plant Engineering	REE-401	<p>On completion of this course a successful candidate will</p> <p>1. To study and understand the different sources of energy and the energy conversion principle from one form to other.</p> <p>2. Site selection of sites of different types of power plants and apply the idea of laying out of such power plants and</p>

	Electrical Machine-I	REE-402	On completion of this course a successful candidate will 1. Understand energy conversion principles, laws and working of DC machines. 2. Analyze the construction, characteristics and application of various types of DC generators. 3. Understand electrical principle, laws, working and losses of single phase transformers. Also
	Network Analysis & Synthesis	REE-405	candidate will 1. Apply the knowledge of basic circuit law, nodal and mesh methods of circuit analysis and simplify the network using Graph Theory approach. 2. Analyze the AC and DC circuits using Kirchoff's law and Network simplification theorems. 3. Analyze steady-state responses and transient
SEM V	Managerial Economics	RAS-501	On completion of this course a successful candidate will 1. Choose best allocation of firm's scarce resources 2. Select best mix of available resources 3. Point towards the resource paucity of firms 4. Recognize that unused method of production
	Cyber Security	RUC 501	On completion of this course a successful candidate will CO1: Understanding of the concepts and foundations of computer security, and identify vulnerabilities of IT systems. CO2: The basic security tools to enhance system security and can develop basic security
	Electrical Machine-II	REE501	On completion of this course a successful candidate will 1. To impart the knowledge on fundamental of AC rotating machines. 2. To impart the knowledge on constructional details, principle of operation of three phase alternator and synchronous motor.
	Power Transmission & Distribution	REE502	On completion of this course a successful candidate will 1. Ability to learn the basics of various fundamentals of electric power generation, transmission and distribution 2. Ability to learn the transmission line

	Control System	REE503	On completion of this course a successful candidate will 1. Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form. 2. Employ time domain analysis to predict and diagnose transient performance parameters of
	Principle of Communication System	REE052	candidate will 1. To understand basic concepts and terminologies of communication systems 2. To determine frequency domain representation of different signals and systems 3. To analyse modulation and demodulation schemes of analog communication systems 4. To examine different waveform coding and decoding techniques
SME VI	Industrial Management	RAS 601	On completion of this course a successful candidate will 1. Choose the appropriate design of product 2. Describe production forecasting 3. Select appropriate work study and recognize appropriate work measurement 4. List necessary tools, equipments and exercise
	Sociology	RAS602	On completion of this course a successful candidate will 1. Choose better internal relations encompassing formal as well as informal ones 2. Select harmonious and satisfying external relations. 3. Describe dynamics of industrial society
	Power Electronics	REE601	On completion of this course a successful candidate will 1. To illustrate the construction, characteristics of thyristor family and understand the basic principle of operation of SCR. 2. To illustrate the operation of various triggering circuits for series and parallel operation of SCR's and various protection circuits of thyristors.
	Microprocessor	REE602	On completion of this course a successful candidate will 1. To understand the basic concept of Microprocessor and systems 2.To analyse different Elements of microprocessor and their characteristics 3. To evaluate the Function of Microprocessor and its programming

	Power System Analysis	REE603	On completion of this course a successful candidate will 1. Understand the concepts of per-unit system and modelling of power system network 2. Create computational models for analysis of both symmetrical and unsymmetrical conditions in power systems
	Special Electrical Machine	REE064	candidate will 1. To gain the knowledge about different types of Induction motor and performance analysis of power recovery schemes 2. To understand and apply the fundamentals of systematically components for the analysis of ac servo meters along with single phase motors
SEM VII	Electric drive	NEN701	On completion of this course a successful candidate will 1. Select a drive for a particular application based on power rating; mechanical characteristics for a particular drive application. 2. Understand about dynamics and control of electric drives
	Power System Practice	NEN702	On completion of this course a successful candidate will 1. Analyze general layout, major equipments and auxiliaries in thermal power station and hydro power station. 2. Illustrate the basics of nuclear power generation, gas turbine plant and diesel plants
	Analog & Digital Communication	NEC702A	On completion of this course a successful candidate will 1. To introduce students to various modulation and student will be able to demodulation techniques of analog communication. 2. Use of different modulation and demodulation 3. To analyze different parameters of analog techniques used in analog communication
	Power System Operation & Control	NEN031	On completion of this course a successful candidate will 1. Understand the economic operation of power system. 2. Discuss about thermal and hydro power plants operation in meeting the load demand optimally (state and central wide installation). 3. Understand the unit commitment problems

	Quality Management	NOE072	<p>candidate will</p> <ol style="list-style-type: none"> 1. Students will be able to gain basic knowledge in total quality management relevant to both manufacturing and service industry including IT sector. 2. Critically appraise the organizational, communication and teamwork requirements for effective quality management.
Sem VIII	Electrical & Electronics Engineering Materials	NEE 801	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1. Analyze the Structure of materials at different levels, basic concepts of crystalline materials like unit cell, FCC, BCC, HCP, APF (Atomic Packing Factor), Co-ordination Number etc.
	Embedded System	NEC 802	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1. The concepts and architecture of embedded systems 2. Basic of microcontroller 8051. The concepts of microcontroller interface. 3. The concepts of ARM architecture
	EHV & dc Transmission	NEE041	<p>On completion of this course a successful candidate will</p> <ol style="list-style-type: none"> 1. Do qualitative comparison of AC and DC transmission system with all aspects 2. Explain the Corona loss characteristics and interpret the limitation of audio noise in design of EHV transmission line 3. Perform analysis of design of EHV Lines and
	Non Conventional Energy Resources	NOE081	<p>candidate will</p> <ol style="list-style-type: none"> 1. To enable student to understand the issue of fuel availability and analyses the supply and demand of fuel in the world. 2. Understand the fundamentals and main characteristics of renewable energy sources and their differences compared to fossil fuels. 3. To enable students to identify the different

PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO)**BTECH MECHANICAL ENGINEERING (2018-19)****PROGRAMME OUTCOME**

By the culmination of this program, the graduate acquires the ability to

1. Analyze, identify and solve engineering problems, through application of knowledge in mathematics, science and engineering to function as good mechanical engineers and lead the people associated with.
2. Identify, formulate and solve engineering problems related to various materials and their properties using skills, techniques and state of art engineering tools.
3. Have good awareness of the trends in design, manufacturing, production and marketing.
4. Apply the mechanical engineering principles to design sound components which can be assembled into systems.
5. Select suitable materials with required properties for the designed components and system.
6. Understand and analyse the thermal and mechanical behaviour of the materials and systems.
7. Identify and apply the most suitable process to manufacture the components.
8. Interpret and use the experimental and field data to make oral / written presentations as required.
9. Understand the ethical requirements of the profession, the need for lifelong learning and the impacts of mechanical engineering activities on society.
10. Manage the job floor of an industry or a research organization efficiently and effectively by the optimized utilization of the resources for the maximum output.

COURSE OUTCOME

SEMESTER	COURSE NAME	COURSE CODE	COURSE OUTCOME
SEM I	PHYSICS	KAS101	<ol style="list-style-type: none"> 1. To solve the classical and wave mechanics problems 2. To develop the understanding of laws of thermodynamics and their application in various processes 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
	CHEMISTRY	KAS102	<ol style="list-style-type: none"> 1. Use of different analytical instruments. 2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water. 3. Measure hardness of water.
	MATHEMATICS -1	KAS103	<ol style="list-style-type: none"> 1. Remember the concept of matrices and apply for solving linear simultaneous equations. 2. Understand the concept of limit, continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems . 3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians. 4. Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity. 5. Remember the concept of vector and apply for directional derivatives,
	ELECTRICAL ENGINEERING	KEE101	<ol style="list-style-type: none"> 1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. 2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. 3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. 4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. 5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

PROGRAMMING FOR PROBLEM SOLVING	KCS101	<ol style="list-style-type: none"> 1. To develop simple algorithms for arithmetic and logical problems. 2. To translate the algorithms to programs & execution (in C language). 3. To implement conditional branching, iteration and recursion. 4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach. 5. To use arrays, pointers and structures to develop algorithms and programs.
ENGINEERING GRAPHICS AND DESIGN	KCE101	<ol style="list-style-type: none"> 1: Understanding of the visual aspects of engineering design 2: Understanding of engineering graphics standards and solid modelling 3: Effective communication through graphics 4: Applying modern engineering tools necessary for engineering practice 5: Applying computer-aided geometric design 6: Analysis of Isometric views 7: Creating working drawings
WORKSHOP PRACTICES	KWS101	<ol style="list-style-type: none"> 1. Study and practice on machine tools and their operations 2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding 3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping 4. Welding and soldering operations 5. Apply basic electrical engineering knowledge for house wiring practice
PHYSICS	KAS201	<ol style="list-style-type: none"> 1. To solve the classical and wave mechanics problems 2. To develop the understanding of laws of thermodynamics and their application in various processes 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
CHEMISTRY	KAS202	<ol style="list-style-type: none"> 1. Get an understanding of the theoretical principles understanding molecular structure, bonding and properties. 2. Know the fundamental concepts of determination of structure with various techniques. 3. Know the fundamental concepts of chemistry applicable in industrial processes.
MATHEMATICS -II	KAS203	<ol style="list-style-type: none"> 1. Understand the concept of differentiation and apply for solving differential equations. 2. Remember the concept of definite integral and apply for evaluating surface areas and volumes. 3. Understand the concept of convergence of sequence and series. Also evaluate Fourier series 4. Illustrate the working methods of complex functions and apply for finding analytic functions. 5. Apply the complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.
ELECTRICAL ENGINEERING	KEE201	<ol style="list-style-type: none"> 1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. 2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. 3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. 4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. 5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption

SEM II

PROGRAMMING FOR PROBLEM SOLVING	KCS201	<ol style="list-style-type: none">1. To develop simple algorithms for arithmetic and logical problems.2. To translate the algorithms to programs & execution (in C language).3. To implement conditional branching, iteration and recursion.4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.5. To use arrays, pointers and structures to develop algorithms and programs.
ENGINEERING GRAPHICS AND DESIGN	KCE201	<ol style="list-style-type: none">1: Understanding of the visual aspects of engineering design2: Understanding of engineering graphics standards and solid modelling3: Effective communication through graphics4: Applying modern engineering tools necessary for engineering practice5: Applying computer-aided geometric design6: Analysis of Isometric views7: Creating working drawings
WORKSHOP PRACTICES	KWS201	<ol style="list-style-type: none">1. Study and practice on machine tools and their operations2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping4. Welding and soldering operations5. Apply basic electrical engineering knowledge for house wiring practice <p>Text</p>
PROFFESIONAL ENGLISH	KAS204	<ol style="list-style-type: none">1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing.4. Students will be made to evaluate the correct & error-free writing by being well-versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses.5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing inter-personal communication skills and positive attitude leading to their professional competence.

SEM III	Fluid Mechanics	RCE-301	<p>On completion of this course candidate will</p> <ol style="list-style-type: none"> 1. Be able to convert units of any parameter between three systems of units, understand the physical properties and characteristic behaviour of fluids, and the basic principles of fluid mechanics. 2. Be able to describe and interpret the behaviour and performance of fluid at rest. 3. Be able to describe and interpret the behaviour and performance of fluid in motion. 4. Be able to describe the behaviour and performance of fluid when the fluid is flowing through the pipe. 5. Be able to derive the dimensions of different fluid parameters. 6. Be able to apply similitude and modelling principles and techniques to solve problems in hydraulics
	Material Science	RME-301	<p>On completion of this course a student can</p> <ol style="list-style-type: none"> 1. Understand the basic concepts of materials and its properties. 2. Able to describe the behaviour and characteristics of materials 3. Able to achieve good in knowledge in heat treatment.
	Mechanics of Solids	RME-302	<p>On completion of this course a student attains</p> <ol style="list-style-type: none"> 1. Sketch the shear force and bending moment diagrams for beams with different support conditions and different load conditions. 2. Determine the stresses and strains in the bars with varying sections, tapering sections, composite members etc. 3. Determine the stresses on oblique sections when the direct stresses and shear stresses are given. 4. Analyze both symmetrical and unsymmetrical sections subjected to bending stress. Understand the shear stress distribution for beam sections of different cross-sections. 5. Analyze both solid and hollow shafts subjected to torsion. 6. Solve problems of columns and struts using different methods such as Rankine's formula, Euler's theory.
	Thermodynamics	RME-303	<p>On completion of this course a student will have</p> <ol style="list-style-type: none"> 1. Impart the basic concepts of thermodynamics. 2. By studying thermodynamics, students will be able to solve different thermal problems. 3. Understand and analyze the thermal and mechanical behavior of the materials and systems.
	Environment & Ecology	RAS 302	<p>After taking this course, the student should be able to</p> <ol style="list-style-type: none"> 1. Understand core concepts and methods from ecological and physical sciences and their application in environmental problem-solving. 2. Appreciate key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions. 3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems. 4. Appreciate that one can apply systems concepts and methodologies

Universal Human Values and Professional Ethics	RVE-301	After taking this course, the student should be able to 1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society 2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body. 3. Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society 4. Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature. 5. Distinguish between ethical and unethical practices, and start
Fluid Mechanics Lab	RCE-351	On completion of this course a student attains 1. Be able to convert units of any parameter between three systems of units, understand the physical properties and characteristic behaviour of fluids, and the basic principles of fluid mechanics. 2. Be able to describe and interpret the behaviour and performance of fluid at rest. 3. Be able to describe and interpret the behaviour and performance of fluid in motion.
Material Science & Testing Lab	RME-351	On completion of this course students are able to 1. Prepare specimen for micro structural examination - cutting, grinding, polishing, and etching. 2. Determine grain size for a given specimen.
Machine Drawing I	RME-352	On completion of this course students are able to 1. Produce orthographic drawings of different machine parts 2. Produce Assembly drawings
Thermodynamics Lab	RME-353	On completion of this course students are able to 1. Prepare specimen for micro structural examination - cutting, grinding, polishing, and etching. 2. Determine grain size for a given specimen.
Engg. Mathematics-III	RAS-401	On completion of this course students are able to 1. Produce orthographic drawings of different machine parts 2. Produce Assembly drawings
Polymer Science & Technology	ROE-045	On completion of this course a student attains 1. Able to understand basic Boiler mountings and accessories. 2. Get knowledge of working of fire tube boilers and their applications. 3. Get knowledge of working of water tube boilers and their applications. 4. Get knowledge of working of steam engine. 5. Get knowledge of working of Internal combustion engines and use in automobiles.

SEM IV

Electrical Machines & Controls	REE-409	<p>After taking this course, the student should be able to</p> <ol style="list-style-type: none"> 1. Have a fundamental understanding of Fourier series and their properties and be able to give Fourier expansions and half range Fourier series representation for a function of one variable 2. Understand Fourier Transform, the convergence issues, relation to Fourier Series and properties of Fourier Transform, and use these to derive Fourier Transforms and / or inverse Fourier Transform of functions of one variable 3. Solve first and higher order differential equations selecting from a variety of techniques covered in the syllabus 4. Demonstrate an understanding of basic principles of probability, and random variables, Work with the basic discrete distributions (Binomial, and Poisson) and the basic continuous distributions (Uniform, Exponential and Normal,) and Calculate resulting probabilities 5. Define null and alternative hypotheses know when to use a single or two tailed test and evaluate a null hypothesis using the appropriate model
Applied Thermodynamics	RME-401	<p>After taking this course, the student should be able to</p> <ol style="list-style-type: none"> 1. Describe the role of rubber-toughening in improving the mechanical properties of polymers. 2. Identify the repeat units of particular polymers and specify the isomeric structures which can exist for those repeat units. 3. Estimate the number- and weight-average molecular masses of polymer samples given the degree of polymerization and mass fraction of chains present.
Manufacturing Science & Technology I	RME-402	<p>On completion of this course students are able to</p> <ol style="list-style-type: none"> 1. Understand metal forming processes. 2. Understand casting processes and their parameters. 3. Understand powder metallurgy.
Measurement & Metrology	RME-403	<p>The expected outcomes of this course are</p> <ol style="list-style-type: none"> 1. Students will be able to understand and appreciate the importance of basic principles of traditional material removal processes. 2. Understand the application of those principles in practice. 3. To understand the principles of metrology and measurements, methods of measurement and its application in manufacturing industries.
Electrical Machines & Controls Lab	REE-459	<p>The expected outcomes of this course are</p> <ol style="list-style-type: none"> 1. To implement the basic principles of Servo-Motor calibration of DC Machines 2. To study the effects of Lead, Lag and Lag-Lead series compensator on a second- Order system transient and steady state system response. 3. To understand the performance and characteristics of DC machines and Transformers 4. To Perform testing on transformer and to evaluate efficiency and voltage regulation. 5. The students are aware of various types of control systems.

Machine Drawing II Lab	NME-451	<p>The expected outcomes of this course are</p> <ol style="list-style-type: none"> 1. Draw machine parts from assembly drawing and the appropriate uses of each class of instrument. 2. Students understand how to manage the job floor of an industry or a research organization efficiently and effectively by the optimized utilization of the resources for the maximum output. 3. Students understand and analyze the thermal and mechanical behaviour of the materials and systems. 4. Students Identify and apply the most suitable process to manufacture the components.
Manufacturing Technology I Lab	RME-452	<ol style="list-style-type: none"> 1. Students will learn the necessity to manage manufacturing processes and systems for the best use of material and human resources with particular emphasis on quality and product cost, human safety and environmental considerations. 2. Students will learn to design a pattern and to make a pattern as per design, produce a sand casting and gravity die casting. 3. Students will be able to perform to different sheet metal operations on press machines. 4. Students will be able to perform forging operations and injection moulding process to produce a desired product. 5. Students will be able to perform sheet bending and pipe bending operations.
Metrology Lab	RME-453	<ol style="list-style-type: none"> 1. Students will be able to understand and appreciate the importance of basic principles of traditional material removal processes. 2. Understand the application of those principles in practice. 3. To understand the principles of metrology and measurements, methods of measurement and its application in manufacturing industries.
Machine Design-I	RME-501	<p>On completion of this course a student will be able</p> <ol style="list-style-type: none"> 1. To design for Static Load 2. To design for Fluctuating Loads 3. To design of helical springs subjected to static and fatigue loading.
Kinematics Of Machines	RME-502	<p>On completion of this course a student will be able</p> <ol style="list-style-type: none"> 1. To understand the basic components and layout of linkages in the assembly of a system / machine. 2. To understand the principle involved in assembly, the displacement, velocity and acceleration at any point in a link of a mechanism. 3. To understand the motion resulting from specified set of linkages. 4. To understand and to design few linkage mechanisms and cam mechanisms for specified output motions. 5. To understand the basic concepts of toothed gearing and kinematics of gear trains.
Manufacturing Science & Technology II	RME-503	<p>On completion of this course students are able to</p> <ol style="list-style-type: none"> 1. Understand metal cutting and its various processes. 2. Understand metal joining processes. 3. Find applications of unconventional machining and welding.

SEM V	Heat & Mass Transfer	RME-504	On completion of this course 3. Students will be able to get a useful foundation and basic knowledge of heat transfer. 4. Knowledge of the subject required for innovative work and advanced studies. 5. Students will get an idea about the subject and well informed about the practical application of different formulae from an engineering point of view.
	IC Engines & Compressors	RME-505	On completion of this course a student will have 1. Impart the basic concepts of IC engines 2. To study different parts of an engine and process 3. Understand and analyze the engine parameters.
	Cyber Security	RUC-501	1. Understanding of the concepts and foundations of computer security, and identify vulnerabilities of IT systems. 2. The basic security tools to enhance system security and can develop basic security enhancements in stand-alone applications. 3. Understand cyber laws. 4. Understand E-Commerce and digital transactions. 5. The basic methods to tackle various types of intrusions on your system.
	Engg. Economics	RHU-501	On completion of this course the student will 1. Understand the structure and functioning of the major financial institutions 2. Analyze and evaluate the New Economic Policies of the Government of India 3. Get an orientation to Indian Public Finance 4. Understand the fundamentals of National Income Analysis 5. Analyse the problems of inflation and BOP and suggest measures to control them. 6. Have an understanding of the major issues in International Economics
	Machine Design-I Lab	RME-551	On completion of this course students are able to 1. Design & drawing of Cotter joint. 2. Design and drawing of screw jack. 3. Design & drawing of Knuckle joint.
	Seminar	RME-552	On completion of this course students are able to 1. Able to identify important concepts from the readings and provided depth in coverage of the topic. 2. Developed effective group communication and presentation skills. 3. Developed self-management & reflection skills. 4. Able to write technical documents and give oral presentation
	Manufacturing Technology II Lab	RME-553	On completion of this course students are able to 1. Determine tool wear and tool life. 2. Perform Gas welding experiment. 3. Perform Gear cutting on Milling machine.
	Heat & Mass Transfer Lab	RME-554	On completion of this course students are able to 1. Perform experiments on convection, conduction and radiation.
		Machine Design-II	RME-602

SEM VI

Dynamics Of Machines	RME-603	On the completion of this course the student will have 1 Helps to understand basic principles involved in dynamics of machines. 2 Helps to identify and analyze various problems related to balancing of masses. 3 Helps to understand basic concepts of vibration. 4 With a good knowledge of the subject, student will be able to interpret problems related to dynamics of machineries faced in industries.
Refrigeration & Air-Conditioning	RME-604	On the completion of this course the student will have 1 Imparts the basic concepts of Refrigeration and Air conditioning in students. 2 Gives the ability to design refrigeration or air-conditioning equipment that meets the required specification 3 Helps to solves simple problems related to refrigeration. 4 Gives an awareness of basic principles and thermodynamics of refrigeration. 5 Helps to understand various refrigeration components. 6 Helps to design the various components associated with a refrigeration system.
Mechanical Vibrations	RME-013	After taking this course, the student should be able to 1. Find natural frequencies of single, double and several degree of freedom systems. 2. Determine equations of motion in dynamic equilibrium. 3. Find applications of influence coefficients and Maxwell's reciprocal theorem.
Fluid Machinery	RME-021	After taking this course, the student should be able to 1. Operate every hydraulic machines 2. Analyze and identify various factors affecting the performance of machine 3. Design Protection of every hydraulics machine. 4. Ability to solve flow problems through the hydraulics machines and use of appropriate equations. 5. Ability to apply principles of fluid mechanics to the operation, design, and selection of fluid machinery such as pumps and turbines. 6. Ability to select and evaluate performances of hydropower plants.
Industrial Management	RAS-601	On completion of the course 1 Provides an exposure to the fundamental tools and techniques in Industrial Engineering. 2 Helps to improve inter related work activities and production management in an industry. 3 Gives awareness about product development and design. 4 Helps to manage the job floor of an industry or a research organization efficiently and effectively by the optimized utilization of the resources for the maximum output.
Industrial Sociology	RUC 601	1. Definition of industry, meaning, pre-industrial, industrial society and its system. 2. Work in modern society. 3. Meaning and trends of Industrial disputes in India. 4. Labour welfare. 5. Industry and society
Fluid Machinery Lab	RME-651	On completion of this course 1. Students get a complete awareness on hydraulic machines and flow measuring instruments. 2. Students can find Impact of Jet.

Machine Design - II Lab	RME-652	<p>On completion of this course students will be able to</p> <ol style="list-style-type: none"> 1. Be able to understand basics of spur gears and helical gears. Students will also develop understanding to learn force analysis and design procedures including beam strength and wear strength for both spur gears and helical gears. 2. Be able to learn terminology, force analysis, beam strength and wear strength of bevel gears and worm gears. 3. Be able to learn basics of sliding contact bearings with their different types of lubrication and will be able to select bearing from manufacturer catalogues as per the requirements. Students will also be able to design thrust bearing with pivot and collar configuration. 4. Be able to learn basics of rolling contact bearing including their types, selection and life. Students will be able to select bearing subjected to dynamic equivalent load for roller contact bearing under constant and variable loading along with varying reliability. 5. Be able to design various IC Engine parts e.g. cylinder and cylinder head, piston and its parts like piston ring and gudgeon pin, connecting rod and crankshaft.
Theory of Machines Lab	RME-653	<p>On completion of this course students will be able to</p> <ol style="list-style-type: none"> 1. Find transverse vibration. 2. Find Longitudinal vibration. 3. Determine effect of gyroscope.
Refrigeration & Air-Conditioning	RME-654	<ol style="list-style-type: none"> 1. Students are able to study different types of expansion devices. 2. Students are able to perform experiment on air conditioning test rig and calculation of various performance parameters.
Quality Management	NOE-072	<p>On completion of this course students will be able to</p> <ol style="list-style-type: none"> 1. Students be able to understand quality, quality control, concept change, TQM Modern concept, procurement procedure, Quality in sales and services, Guarantee, analysis of claims, evaluation of supplies, Capacity verification. 2. Have an in-depth understanding about quality cost, quality economy & will be able to design and fit organization structure for different types of products and company. 3. Students will learn about various control charts and will have in depth knowledge about R chart and C chart with their practical applications. 4. Students learn about the concept zero defect, reliability, MTTF, MTBF and control charts for attributes (P chart) with their applications. 5. Students learn the concept about ISO: 9000 series, Taguchi method and JIT method.
Computer Aided Manufacturing	NME-031	<p>On completion of this course a student will be able to</p> <ol style="list-style-type: none"> 1. Students will be able to examine technologies those have been developed to automate manufacturing operations. 2. By studying about CAD/CAM students will be able to visualize three dimensional objects and that will enable them to design new products.
Mechanical System Design	NME-043	<p>On completion of this course a student will be able to</p> <ol style="list-style-type: none"> 1. Understand various system theories. 2. Perform system evaluation. 3. Make decision analysis.

SEM VII	Computer Aided Design	NME-701	On completion of this course a student will be able to 1. Students will get an idea about comprehensive concepts of the design aspects and its importance in computer assisted design and manufacture. 2. Students can understand and use the principles of computer aided part programming.
	Automobile Engineering	NME-702	On completion of this course a student will be able to 1. Find gear ratio and design of gear box. 2. Analyse fuel supply system. 3. Understand Thermal aspects of braking system.
	CAD/ CAM Lab	NME-751	On completion of this course a student 1. Students will get an idea about comprehensive concepts of the design aspects and its importance in computer assisted design and manufacture. 2. Students can understand and use the principles of computer aided part programming.
	I.C. Engine & Automobile Lab	NME-752	After the completion of this course 1. Impart the basic concepts of IC engines 2. To study different parts of an engine and process 3. Understand and analyze the engine parameters.
	Industrial Training	NME-753	On completion of this course a student 1. Develop technical skills for applying knowledge of Mechanical Engineering studies in Industry 2. Ability to function in a multi-disciplinary team 3. Understand professional and ethical responsibility 4. Understand the importance of effective communication in industry 5. Understand the impact of engineering solutions to the society
	Non-Conventional Energy Resources	NOE-081	On completion of this course a student 1. Will able to understand natural resources. 2. Will get to know various sources of energy.
	Non Destructive Testing	NM065	On completion of this course a student 1. Students will able to understand different types of non-destructive testing methods and be able to differentiate between destructive & non-destructive testing methods. They will learn about visual inspection method and chalk whitening method 2. Have an in-depth understanding of Die penetration method and magnetic particle testing method. Also they will learn about Leak testing. 3. Students will learn X-ray radiographic method and gamma ray radiographic method. 4. Students learn the concept about Piezoelectricity, CRO techniques & Ultrasonic testing method with their application in castings, forgings etc. 5. Students learn the in-depth about Eddy current inspection method, also be able to understand its application, limitations, advantages etc.
	Operations Research	NME-051	On completion of this course a student will be able to 1. Implement Transportation and assignment problems. 2. Find use of Game theory.

SEM VIII	Power plant Engineering	NME-801	On completion of this course a student 1. Will understand about steam power plant. 2. Able to understand Nuclear power plant. 3. Will get an idea of non-conventional power plants.
	Seminar	NME-851	After taking this course, the student should be able to 1. Able to identify important concepts from the readings and provided in depth coverage of the topic. 2. Develop effective group communication and presentation skills. 3. Develop self-management & reflection skills. 4. Able to write technical documents and give oral presentation.
	Project	NME-852	After taking this course, the student should be able to 1. Student should be able to manage project as a member of team and to use the technique, skill and modern engineering tools. 2. Students should be able to create solutions to authentic (real world and ill-defined) problems. 3. Students will be able to collect and disseminate information related to selected project. 4. Students should be able to design a system, component or process to meet desired need within realistic constraints. 5. Students should be able to develop an action plan to improve presentation skills and have the confidence to make more of an impact on their audience.