



Wainganga Bahu-Uddeshiya Vikas Sanstha's

Wainganga College of Engineering and Management

Near Gumgaon Railway Station, Dongargaon, Wardha Road. Nagpur 441108

Website: www.wcem.in

(An ISO Certified Institute)

DTE Code: 4145

Contact No - 9764767508

First Year	
Semester-I	
Course Name: Applied Mathematics-I	CODE: BESI-1
At the end of course Students will	
CO1	Able to understand the idea of derivatives & also able to solve problem involving relationship between changing quantities
CO2	Able to understand concepts of function of several variables & their individual effects on function & Its application in optimization.
CO3	Understand, Analyze & transfer the data in a proper form for advance Engineering studies
CO4	Able to clarify & identify different types of D.E & to arrive at solution & Its Interpretation
CO5	Students will develop an ability to design conduct & analyze different stream(Electrical & Mechanical) related problems
CO6	Understand the concept of complex numbers & its application in Engineering filed.
Course Name: Engineering Physics	CODE: BESI-2T
At the end of course Students will	
CO1	Understand the basic principles of Quantum mechanics and will be able to apply these to the complex phenomenon of interaction of radiation with matter.
CO2	Understand the concept of wave packets using Heisenberg's uncertainty principle.
CO3	Able to apply Schrodinger's wave equations to study the complex physical phenomenon.
CO4	Able to understand the structure of crystalline solids by applying knowledge of crystallography.
CO5	Able to understand semiconducting materials by using the concepts of band theory of solids.
CO6	Able to apply the knowledge of semiconductor fundamentals to study various electronic devices.
Course Name: Engineering Chemistry	CODE: BESI-3T
At the end of course Students will	
CO1	Understand the concept of hardness and the treatment methods to remove them which includes domestic water treatment and use of this water as an Engineering Material. Identification of problem and providing solutions
CO2	Understand ecological balance and awareness towards sustainable development

CO3	Provide solution to the problem pertaining to complex chemical processes useful in engineering concepts.
CO4	Understand the manufacturing processes of cement, importance of microscopic constituents and various properties including types of cement their uses.
CO5	Understand new concept of energy storage devices and its applications
CO6	Understand and identify the professional responsibilities and the impact of engineering practices on society.
Course Name: Basics of Electrical Engineering	
CODE: BESI-4T	
At the end of course Students will	
CO1	Able to define and explain the meaning of charge current, voltage, power, energy, Passive elements
CO2	Able to understand the basic concepts of magnetic circuits as applied to electric machines.
CO3	Able to understand the EMF generation and AC fundamentals.
CO4	Able to understand the relation between voltage and current for pure R,L,C ,series & parallel network
CO5	Able to understand the three phase systems – types of connections, relationship between line and phase values of voltage and current
CO6	Able to understand the performance of the single phase transformers and to calculate the losses, efficiency and parameters of the machines
Course Name: Basics of Civil Engineering	
CODE: BESI-5T	
At the end of course Students will	
CO1	Students will acquire the basic knowledge in different fields of Civil Engineering and materials used in construction.
CO2	know the importance of surveying and to study different types of modern instrument.
CO3	Understand different types of highways, types of pavements, traffic rules and causes of accidents.
CO4	Understand the importance and necessity of drinking water standards, necessity of water treatment and water supply system & storage of water.
CO5	Understand the importance & necessity of different methods of waste management.
CO6	Demonstrate the knowledge of different types of instrument, sustainable techniques used in construction.
Course Name: Engineering Graphics	
CODE: BESI-6T	
At the end of Course Students will	
CO1	Know about different construction method for engineering curves
CO2	aware about the projection of points and straight lines
CO3	Know about projection of plane
CO4	Know basic concepts of projection of solids.

CO5	Convert pictorial view into orthographic projections
CO6	Know about isometric view and projection
Course Name: Communication Skills	
CODE: BES1-7T	
At the end of Course Students will	
CO1	Apply basic principles of communication in English language.
CO2	Use various models of verbal and nonverbal communication in professional and social sphere.
CO3	Understand the basic rules of phonology, grammar and will use them in communication
CO4	Do accent neutralization
CO5	Understand the importance of intonation, stresses, syntax construction, voice modulation etc.
CO6	Use communication skills in order to analyze & interpret different projects undertaken at various departmental levels.
Semester - II	
Course Name: Applied Mathematics-II	
CODE: BESII-1	
Student will be able to	
CO1	Evaluate improper integrals by Beta/Gamma function and Differentiation under Integral sign technique.
CO2	Trace the curves and rectify , to find the area ,Volume of the curves in Cartesian and polar form
CO3	Understand the concept of double and Triple Integration and their application in finding mass, area and center of gravity in Cartesian and polar form.
CO4	Represent vectors analytically and geometrically and compute dot and cross products for presentation of lines and planes
CO5	Understand the concept of vector integration and student should be able to apply the results of the theorems as fundamental problem solving tools .
CO6	Represent and statistically analyze data both graphically and numerically and to design the mathematical models for solution of contextual problems.
Course Name: Advanced Physics	
CODE: BESII-2T	
At the end of course Students will	
CO1	Able to understand the principle behind the working of LASERS.
CO2	Able to understand the phenomenon of interference in thin films and its various applications.
CO3	Able to understand the dynamics behind the trajectories of charged particles in electric and magnetic fields.
CO4	Able to apply the concepts of electron optics to understand the working of various electro-optic devices.
CO5	Able to understand the concept of total internal reflection in optical fiber and its applications.
CO6	Able to learn various synthesis processes and basics of nanomaterials. The students will be able to understand the impact of Nanoscience and Nanotechnology on society.
Course Name: Materials Chemistry	
CODE: BESII-3T	

At the end of Course Students will	
CO1	Apply scientific knowledge towards energy management including resources.
CO2	Develop analytical skill towards identification of properties and its application in real world engineering phenomenon.
CO3	Develop manufacturing intelligence towards energy resources
CO4	Develop material know how/engineering know how for operational efficiency.
CO5	Understand exploitation of cutting edge knowledge in diverse spheres of engineering field through advanced engineering materials.
CO6	Apply technological changes in multidisciplinary environment with professional responsibilities.
Course Name: Engineering Mechanics	
CODE: BESII-4T	
At the end of course Students will	
CO1	Understand the basic concepts of forces, couples, couple momen in two dimensional & spatial system.
CO2	Apply the concepts of free body diagrams for static equilibrium in the beams and trusses.
CO3	Apply the concept of friction between two surfaces or bodies.
CO4	Understand the basic concept of moment and product of inertia of plane areas and solids.
CO5	Understand the application of principle of virtual work in simple beams and frames.
CO6	Analyze the effect of dynamic forces on a body by using D'Alemberts Principle and study the application of Linear Impulse Momentum for system of particles.
Course Name: Advanced Electrical Engineering	
CODE: BESII-5T	
At the end of course Students will	
CO1	Understand the operation of different conventional and nonconventional power generation. Also to analyze the transmission , distribution and protective devices for safety
CO2	Understand the basic concepts and importance of Earthing , Inverter and UPS.
CO3	Able analyze the behavior , characteristics and types of DC motor and generator.
CO4	Analyze the utilization of electrical energy and calculation of Electrical bill.
CO5	Understand the basic concepts of Illumination and its applications.
CO6	Analyze the performance of the single phase and three phase Induction Motors and characteristics of the Induction Machines
Course Name: Ethical Science	
CODE: BESII-8	
At the end of Course Students will	
CO1	Able to apply knowledge of humanities and social engineering process in diverse sphere of social life.
CO2	Able to make appropriate use of socio-legal tools for the overall benefit of the society.
CO3	Able to apply the principles of industrial psychology and industrial sociology and industrial democracy in industry.

CO4	Able to apply tools of motivation at work place, comprehend work organization and forms of organization.
CO5	Able to apply the tools of transactional analysis, to solve complex behavioral problems and develop leadership traits.
CO6	Able to develop awareness for environment sustainability and apply dynamic principles of social and ethical science.
Department of Civil Engineering	
Course Outcomes(CO)	
Semester - 3rd	
Course Name: Applied Mathematics - III	Code: BECVE301
At the end of course Students will	
CO1	Demonstrate the ability of using Fourier series in solving the Ordinary Differential Equations and Partial Differential Equations.
CO2	Solve the partial differential equations by separation variable methods.
CO3	Able to know about Calculus of variation students can work upon the problems in economics, network engineering, financial modeling, computational radiology, and in the new field of constraint programming.
CO4	Set up and solve linear systems/linear inequalities graphically/geometrically and algebraically using matrices
CO5	Grasp the concept of numerical methods and apply them
CO6	Learn how the derivative affects the shape of graph of a function and in particular how to locate the maximum and minimum value of the function.
Course Name: Strength of Material	Code: BECVE302
At the end of course Students will	
CO1	Understand the behavior of materials under different stress and strain conditions
CO2	To make students learn and understand the concept and theory of deflection of beams, frames, trusses.
CO3	Able to draw bending stress and shear stress distribution for beams under different conditions of loading.
CO4	Understand concept and theory of torsion
CO5	Understand the concept and theory of slope and deflection of beams and calculate it.
CO6	Understand concept of state of stresses in two dimensions.
Course Name: Environment Engineering -I	Code: BECVE303
At the end of course Students will	
CO1	The students would be able to understand the importance and necessity of water supply.
CO2	The students would be able to determine the capacity of water supply scheme.

CO3	The students would have the basic knowledge related to the conveyance systems and the appurtenances used.
CO4	The students would have knowledge of characteristics of water, drinking water standards and necessity of treatment.
CO5	The students would be able to design various units of conventional water treatment plant.
CO6	The students would be equipped with the basic knowledge related to design of water supply system.
Course Name: Engineering Geology Code: BECVE304	
At the end of course Students will	
CO1	Understand the internal structure of the Earth and geomorphic forms.
CO2	Identify important rocks and minerals.
CO3	Understand the geological structures like folds and faults etc.
CO4	Know reason and effects of earthquakes.
CO5	Know about groundwater availability zones and field procedures of subsurface exploration
CO6	Know engineering properties of rocks and uses of rocks as a construction material.
Course Name: Concrete Technology Code: BECVE305	
At the end of course Students will	
CO1	The students would be able to check and recommend different constituent of concrete.
CO2	The students would be able to control method of manufacture of concrete.
CO3	The students would be able to test strength and quality of plastic and set concrete.
CO4	The students would have the understanding of application admixture and its effect on properties of concrete.
CO5	The students would be able to understand the effect of process of manufacturing on different properties of concrete.
CO6	The students would be able to understand various environmental factors which affect durability of concrete, analyse cause of deterioration of concrete components and to suggest various preventive measures to it.
Semester – 4th	
Course Name: Structural Analysis-I Code: BECVE401	
At the end course of Students will	
CO1	The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams, frames, trusses and columns under various loading conditions using different analysis methods.
CO2	The student would be able to apply knowledge to determine forces in determinate and indeterminate structures by the force and matrix method.
CO3	The students would be able to perform ILD analysis of determinate beams and trusses.
CO4	Able to use Euler's and Rankine's formula for finding buckling of column and beam.

CO5	Able to use slope deflection method for analysis of Indeterminate beam and frame
CO6	Able to apply knowledge to determine forces in determinate and indeterminate structures by the force and matrix method.
Course Name: Geotechnical Engineering -I Code:BECVE402	
At the end course of Students will	
CO1	Students would be able to determine the index and engineering properties of the soil.
CO2	Students would be able to determine the suitability of foundation for a particular type of soil.
CO3	Students will be able to classify the soils.
CO4	Students would be able to evaluate the stresses in the soil mass.
CO5	Determine the suitability of foundation for a particular type of soil.
CO6	Determine the shear strength of the soil.
Course Name: Transportation Engineering - I Code:BECVE403	
At the end course of Students will	
CO1	A person with broad vision and complete knowledge of design and construction practices in highway engineering and pavement.
CO2	The student will be able to test highway materials and draw appropriate conclusion.
CO3	The student will be able to maintain and propose measurement.
CO4	Able to maintain and propose measurements of highways.
CO5	The student will be able to undertake Traffic studies.
CO6	Able to know methods and techniques of repairs and maintenance of bridges and highways.
Course Name: Surveying-I Code: BECVE404	
At the end of course Students will	
CO1	The students would be able to do temporary and permanent adjustments.
CO2	The students would be able to measure distances and angles.
CO3	The students would be able to orient and draw the various maps.
CO4	The students would be able to calculate areas and volumes of the Civil Engg. work.
CO5	The student would be able to undertake various civil engineering surveys work.
CO6	Able to develop knowledge of the new surveying equipments.
Course Name: Building Construction Materials Code:BECVE405	
At the end of course Students will	
CO1	The students should able to understand different types of foundation, causes of failure and remedial measure.
CO2	The students are able to identify components of a building.
CO3	The students are able to differentiate and identify types of building materials.
CO4	The students are able to select appropriate material for building construction.
CO5	The students are able to plan various construction related activities and their quality control.

CO6	The students should able to understand plastering, pointing, centering & painting.
Semester - 5th	
Course Name: Structural Analysis-II	Code: BECVE501
At the end of course Students will	
CO1	Apply the different methods of analysis of frames in practical problems
CO2	Apply MDM for analysis of Beam and frames and to understand the behavior of different structural members
CO3	Formulation of stiffness matrix, transformation matrix, load matrix for various structural components for analysis purposes.
CO4	Understand the basics of finite element method in the analysis of structural components.
CO5	Understand the concepts related to structural dynamics.
CO6	Apply the basics of finite element method in the analysis of structural components and understand the concepts related to structural dynamics.
Course Name: Reinforced Cement Concrete (RCC)	Code: BECVE502
At the end of course Students will	
CO1	Understand the basic concepts of structural design Methods of RCC to the practical problem
CO2	Understand the composite action of reinforced steel and concrete in reinforced concrete structural members
CO3	Use the knowledge of the structural properties of materials i.e. steel and concrete in assessing the strength.
CO4	Understand the limit state of collapse in compression. And analysis and design of axially loaded and uniaxial bending column.
CO5	Use the knowledge in structural planning and design of various components of buildings.
CO6	Apply the concepts and applications of prestressed concrete in real problems
Course Name: Fluid Mechanics - I	Code: BECVE503
At the end of course Students will	
CO1	Measure and determine fluid pressures and forces on plates/surfaces, pipe bends, etc.
CO2	Apply the principles of hydrostatics and determine the forces.
CO3	Understand the concepts of dimensional analysis use the dimensionless number suitably.
CO4	Understand the basic concepts related to laminar and turbulent flow.
CO5	Apply the principles of hydrostatics and determine the forces.
CO6	Understand the concepts of dimensional analysis use the dimensionless number suitably.
Course Name: Geotechnical Engineering	Code: BECVE504
At the end of course Students will	
CO1	Use the knowledge of different soil techniques to ascertain the properties of soil.
CO2	Use the knowledge of different soil exploration techniques to ascertain the properties of soil

CO3	To analyze the stability of natural slopes, safety & sustainability of the slopes, design of retaining structures, reinforced earth walls, etc.
CO4	Practice Ground Improvement Techniques.
CO5	Design of shallow foundation
CO6	Design the shallow & deep foundation.
Course Name: Hydrology And Water Resources Code: BECVE505	
At the end of course Students will	
CO1	Use of knowledge of basics of hydrology in calculating infiltration, evaporation, total runoff.
CO2	Use the techniques of the Hydrographs to forecast flood discharge at various durations.
CO3	Apply the Statistical techniques to analyze the flood occurrence & frequency.
CO4	Analyze the flood occurrence & frequency, Use the knowledge pertaining to the flood to plan flood routine & emergency plans.
CO5	Apply the knowledge of geo-hydrology terms in planning, assessing & computation of ground water potential and its assessment using various techniques.
CO6	Apply the knowledge of geo-hydrology terms in planning, assessing & computation of ground water potential and its assessment using various techniques.
Semester – 6th	
Course Name: Steel Structures Code: BECVE601	
At the end of course Students will	
CO1	Use the knowledge of structural properties in assessing its strength for the construction purpose.
CO2	Understand basic types of connections in a structure by use of weld, rivet, bolt, etc.
CO3	Apply the knowledge of various techniques in analyzing the steel structural components of a building.
CO4	Make use of knowledge of analysis in structural planning of various components.
CO5	Make use of knowledge of analysis in design of various components
CO6	Understand the importance of IS Code and its implementation considering design safety and norms of the engineering practice
Course Name: Surveying-II Code: BECVE602	
At the end of course Students will	
CO1	Carry forward the concepts of basic surveying techniques.
CO2	Operate various survey instruments effectively with precision
CO3	Use different types of techniques in various surveying problems
CO4	Apply the concepts of modern surveying techniques & instrumentation.

CO5	Take – up mini project using different surveying techniques.
CO6	Apply the concepts of modern surveying techniques & instrumentation.
Course Name: Fluid Mechanics-II	
Code:BECVE603	
At the end of course Students will	
CO1	Understand the concepts related to boundary layer theory and determination of drag and lift forces.
CO2	Apply the knowledge of theories and equations of pipe flow in analyzing and designing the pipe network systems and its components including water hammer pressures.
CO3	Use the concepts of uniform and critical flow through open channels including design of efficient channel sections.
CO4	Make use of specific energy concepts in the analysis of open channel flow. Undertake Gradually Varied Flow analysis and its computation.
CO5	Understand the different techniques of dimensional analysis and its use in model testing.
CO6	Understand and apply basics related to Turbines & Pumps in Water Resources planning
Course Name:Environment Engineering -II	
Code:BECVE605	
At the end of course Students will	
CO1	Use the concept related to water & its quality, sewage, sewer, storm water, etc in its hydraulic design
CO2	To test the sample of waste water in the laboratory for physical & chemical characteristics.
CO3	Take-up functional planning, layout and design of water treatment plant components.
CO4	Take-up functional planning, layout and design of sewage treatment plant components
CO5	Take up functional planning, layout and design of Plan for rural sanitation provisions, perform functional design of septic tank,
CO6	Analyze the industrial waste water for its treatment units. Make use of knowledge & effect of air pollution, solid waste in planning for its prevention and control.
Semester -7th	
Course Name: Advanced Concrete Structures	
Code:BECVE701	
At the end of course Students will	
CO1	Understand the behavior and failure modes different concrete members
CO2	Understand the behavior and failure modes of different concrete member .Analysis and design of columns.
CO3	Analyze and apply the results in designing various concrete member of structure.
CO4	Apply the knowledge & skills in practical problems
CO5	Understand the relevant software and use the same in analysis & design of concrete members.
CO6	Understand the relevant software and use the same in analysis & design of concrete members.
Course Name: Estimating And Costing	
Code:BECVE702	
At the end of course Students will	

CO1	Prepare the preliminary estimate for administrative approval & technical sanction for a civil engineering project.
CO2	Use the concept of SD, EMD, MAS, Running Bill, Final Bill during the entire project
CO3	Prepare the tender documents, fill the contracts and make use of knowledge of different contract submission & opening in awarding the work to the contractor. Schedule the project for its timely completion.
CO4	Write the specification of the works to be undertaken, Use the concept of SD, EMD, MAS, Running Bill, Final Bill during the entire project.
CO5	Use the technique of Rate analysis in estimating the exact cost of material & manpower and hence the entire project.
CO6	Estimate the bill of quantities using different techniques of preliminary & detailed estimation of buildings & roads
Course Name: Earthquake Resistant Design of Structures Code: BECVE703	
At the end of course Students will	
CO1	Understand the different aspects related to seismology and terms related to it
CO2	Perform the analysis and design of structures against earthquake loading
CO3	Analyze multi-storey structure using different methods like Equivalent Static Lateral Load Method and Response Spectrum Method
CO4	Analyze multi-storey structure using different methods like Equivalent Static Lateral Load Method and Response Spectrum Method
CO5	Understand the different seismic retrofitting techniques and its implementation.
CO6	Understand the different seismic retrofitting techniques and its implementation
Course Name: Air pollution And Solid Waste Managements Code: BECVE703	
At the end of course Students will	
CO1	Able to understand different aspects of air pollutants, its sources and effects on man, animal, plants and materials etc.
CO2	Understand different aspects of air pollutants, its sources and effects on man and material etc.
CO3	Design controls methods and equipments for air pollution to reduce its impact on environment.
CO4	Able to understand problems arriving in handling large amount of solid waste generated
CO5	Understand problems arriving in handling large amount of solid waste generated ,its collection and transportation, processing and will be able to design safe collection and disposal methods.
CO6	Able to design safe collection and disposal methods.
Course Name: Construction Management & Law Code: BECVE704	
At the end of course Students will	

CO1	Demonstrate the understanding of various types of projects, modern construction techniques and will exhibit the mastery in construction planning, scheduling and various controls.
CO2	Achieve the knowledge of various types' of equipments to be used in the construction and its operational cost estimates, understand manpower requirement, planning, resources utilization and management.
CO3	Achieve the knowledge of various types' of equipments to be used in the construction and its operational cost estimates, understand manpower requirement, planning, resources utilization and management.
CO4	Know the quality control aspects in planning & management, modern trends project management, application of information system in management of construction projects, safety provisions and equipments.
CO5	Analyze the legal aspects in construction projects.
CO6	Understanding of various laws pertaining to civil engineering and architectural planning & sanctioning, labor & organizational welfare measure, provisions of arbitration and litigations.

Course Name: Transportation Engineering - II

Code: BECVE705

At the end of course Students will

CO1	Understand the functions of various elements of railways, airports, tunnels and docks and harbor.
CO2	Plan and design various elements of railways, airports, tunnels and docks and harbor.
CO3	Understand the various principles traffic control in railways, airports, tunnels and docks and harbor.
CO4	Understand layout, design and construction permanent way, runway, taxiways, tunnels, births and jetty.
CO5	Evaluate the plans, design and maintenance of various elements of airports, docks and harbour.
CO6	Understand the maintenance of various elements of railways, airports, tunnels and docks and harbor.

Semester -8th

Course Name: Irrigation Engineering

Code: BECVE801

At the end of course Students will

CO1	Understand the importance and scope of irrigation engineering
CO2	Understand fully the methods and efficiencies of irrigation, crop water requirement.
CO3	Understand the basic profile of dams and use the knowledge in checking stability of Gravity dams and Earth dams.
CO4	Understand the planning, design and operation of storage reservoir and make use of it in the practical situation.
CO5	Understand the theories of canal design and apply the concept to design lined and unlined canals and detail out the cross sections.

CO6	Understand the basic profile of dams and use the knowledge in checking stability of Gravity dams and Earth dams.
Course Name: Pavement Analysis And Design Code: BECVE802	
At the end of course Students will	
CO1	Analyze and Design pavement and under different loading conditions for highways and airfields taking into consideration different characteristics.
CO2	Propose a pavement management system framework.
CO3	Able to design flexible pavements by IRC methods to meet desired needs within realistic constraints
CO4	Perform different tests considering field conditions and using the knowledge to increase the strength of pavements along with its economy point of view
CO5	Able to design rigid pavements by IRC methods to meet desired needs within realistic constraints
CO6	Able to understand strengthening and maintenance of pavements
Course Name: Advanced Reinforced Cement Concrete Design Code: BECVE803	
At the end of course Students will	
CO1	Analysis and design of overhead circular service reservoirs.
CO2	Analysis and design of Intze service reservoirs.
CO3	Design and understand behavior of special RC structure under IRC class AA track vehicle loading
CO4	Design and understand behavior of special RC structure under IRC class A and class AA wheel vehicle loading
CO5	Analysis and design of multi storied frame structure incorporating seismic forces.
CO6	Analysis and design of cylindrical shells.
Course Name: Water and Waste Water Treatment Code: BECVE803	
At the end of course Students will	
CO1	Understand concepts of pipes, reservoir, pumps and valves.
CO2	Use the techniques, skills, and modern engineering tools necessary for environmental engineering practices.
CO3	Analyze water distribution networks and its designing process.
CO4	Understand knowledge about recent development in water & waste water treatment
CO5	Procedure for Conduct a various test on water & waste water
CO6	Carry out optimal design of water distribution network
Course Name: Construction Economics And Finance Code: BECVE804	

At the end of course Students will	
CO1	Understand the significance of construction industry and will comprehend the issues and dynamics of construction industry from economic perspective
CO2	Understand the various factors of production and will solve the problems based on financial data like IRR, ROI, NPV.
CO3	Understand the market structures and will develop broad perspective on recession, stagflation and its socio economic imperatives.
CO4	Understand various financial sources for funding the project and will understand the financial management of the project.
CO5	Understand various financial ratios and other financial parameters to gauge the performance of the project.
CO6	Understand the balance sheet and capital structure of the business along with financial measures.
Department of Computer Technology	
Course Outcomes(CO)	
Semester - 3rd	
Course Name: Applied Mathematics-III	Code:BECT201
At the end of course Students will	
CO1	Understand the concept of Laplace transform & can apply to solve D.E and integral equation.
CO2	Find Fourier series and Fourier transform of function in different interval.
CO3	Understand the concept of Z transform and use it to solve difference equation.
CO4	Identify analytic function & can apply Cauchy integral formula or residue theorem to solve complex integral.
CO5	Extend the concept of matrices to eigen value & eigen vector and use it to solve various engineering problem.
CO6	Extend the concept of probability to find distribution and mathematical expectation.
Course Name: Program Logic Design in 'C'	Code:BECT202
At the end of course Students will	
CO1	Understand and implement Array, String and Structure using 'C' Programming language.
CO2	Understand and implement file handling operations and dynamic memory allocation concept.
CO3	Understand pointers and implement the use of pointers in various applications.
CO4	Study and implement basic computer graphics programming.
CO5	Understand fundamental concepts of Problem Solving & Programming methodology and the fundamentals of space and time complexity for designing an algorithm.

CO6	Understand various Problem Solving & Programming approaches and fundamental concepts of object oriented programming.
Course Name: Digital Circuits and Microprocessors Code:BECT203	
At the end of course Students will	
CO1	Demonstrate knowledge of binary number theory, Boolean algebra and binary codes, logic gates and their truth tables.
CO2	Analyze and design combinational systems using standard gates and minimization methods (such as Karnaugh maps).
CO3	Analyze and design combinational systems composed of standard combinational modules, such as multiplexers and decoders.
CO4	Analyze and design flip-flops and convert one type f/f to another and sequential systems composed of standard sequential modules, such as counters and registers.
CO5	Identify the basic elements and functions of microprocessors 8085 and operation of microprocessors 8085.
CO6	Analyze instruction sets of 8085. Apply the programming techniques in designing simple assembly language programs for solving simple problems by using instruction sets of microprocessor.
Course Name: Social & Ethical aspects Of IT Code:BECT204	
At the end of course Students will	
CO1	To understand ethics and its importance in IT Industries ,to ensure ethical decision making, Relationship between IT Workers and other professionals.
CO2	Study different types of computer crimes and perpetrators and counter measures.
CO3	Understand concepts of Privacy of data, Freedom of speech, and Protection against computer malfunction (hardware and software) and crime.
CO4	To understand intellectual properties and laws to protect them. Identify ethical issues that arise in a software development environment and how to address them.
CO5	Impact of IT on quality of life , Productivity & Healthcare
CO6	Social networking sites with their application and key ethical issues. Understand types of workers in IT industries and issues related with them ,and understand H 1-B Visa process and outsourcing process,green computing .
Course Name: Computer Architecture & Organization Code:BECT205	
At the end of course Students will	
CO1	Explain the basic components of a computer,including CPU, memories, and input/output, and their organization, Write and the execution ofcomplete instruction.
CO2	Calculate mathematical operations on integer and floating point numbers also will able to Construct Fast Adder.
CO3	Describe the concept of Hierarchical memory technology and Explain the cost performance in memory Design.
CO4	Explain the concepts of I/O operation, interrupts, memory access by I/O and different peripherals.
CO5	Demonstrate the basics of pipeline execution.
CO6	Explain the basic concept of parallel processing and classification of parallel architecture.

Semester - 4 th	
Course Name: Discrete Mathematics and Graph Theory Code: BECT208	
At the end of course Students will	
CO1	Recall the concept of set theory and solve the logic problems
CO2	Understand the basic concept of relation and classify types of function
CO3	Explain the basic concept of group
CO4	Develop the concept of group for ring and illustrate lattice and Boolean algebra
CO5	illustrate the basic concept of graph theory and trees
CO6	Find the generating function and recurrence relation , solve simple problems of pigeon hole principle
Course Name: Data Structure & Program Design Code: BECT209	
At the end of course Students will	
CO1	Implement and analyze different searching and sorting algorithms.
CO2	Develop ADT for Stack data structure and its applications.
CO3	Develop ADT for Queue data structure and its applications
CO4	Demonstrate ability to apply knowledge of dynamic data structures like linked-lists and Extend its applications.
CO5	Apply fundamentals of Tree data structures to implement Tree and problems including Tree traversals.
CO6	Explain implementation of Graph data structure and Graph traversals.
Course Name: Advance Microprocessor & Interfacing Code: BECT210	
At the end of course Students will	
CO1	Describe internal organization of 8086 microprocessors, concept of memory organization & it's interfacing, stack memory & addressing mode.
CO2	Interfacing of Keyboard/ Display, ADC & DAC with 8086.
CO3	Demonstrate the concept of interrupts & Interfacing of various hardware such as PPI, PIC, USART & DMA with microprocessor 8086 & their working modes.
CO4	Describe the concept of keyboard / display controller, bus controller, bus arbiter, numeric co processor & maximum mode of 8086.
CO5	Describe architecture of 8051 micro controller, concept of memory organization & addressing mode of 8051 & concept of protected mode operation, segmentation, segment descriptors, selectors, privilege levels, paging.
CO6	Describe the concept of Pentium processor, pipe lining, branch prediction, instruction & data cache, floating point unit, software programming model, protecting segmented access, page level protection, multitasking, TSS descriptors, task switching, exceptions & interrupts, IDT descriptors & IOPL.
Course Name: Theory of Computation Code: BECT211	
At the end of course Students will	
CO1	Understand the basic concepts of Mathematical Preliminaries, induction and proof methods, formal grammars and Chomsky hierarchy.

CO2	Understand and design Finite Automata without output and with output to recognize regular languages.
CO3	Understand and differentiate Regular Grammar and Context Free Grammar.
CO4	Understand and design Push Down Automata to recognize Context Free Languages.
CO5	Understand Linear Bounded Automata ,Turing Machine and design it to recognize unrestricted languages.
CO6	Understand the basic concepts of Computability, Decidability, Solvability, Post Correspondence Problem and Ackerman Problem of Turing Machine.
Course Name:Introduction to Mainframe Language	
Code:BECT212	
At the end of course Students will	
CO1	Understand the concepts of Mainframe computers and their features.
CO2	Understand the Operating system used on Mainframe computers i.e Z/OS operating system .
CO3	Understand the concept of JCL and Various statement used in JCL.
CO4	Understand basics fundamentals of COBOL Language.
CO5	Understand basic concept of files and their programming.
CO6	Understand the basic concept of COBOL DB2 programs.
Semester – 5 th	
Course Name: Object Oriented Modeling	
Code:BECT301	
At the end of course Students will	
CO1	Understand basic concept of Object Orientation and Unified Modeling Language.
CO2	Understand basic concept of different Structural modeling and its implementation
CO3	Understand basic concept of different Behavioral modeling and its implementation
CO4	Understand basic concept of different Architectural Modeling and its implementation
CO5	Understand the concept of unified process, learning development life cycle.
CO6	Understand the concept of Architecture centric process and design the case study.
Course Name: Data Base Management System	
Code:BECT302	
At the end of course Students will	
CO1	Understand the concepts of DBMS and Data models.
CO2	Understand the concepts of Relational algebra, functional dependencies and implementation of normalization.
CO3	Understand the concepts of indexing techniques and PL/SQL Programming.

CO4	Understand the concepts of Query Processing and Query Optimization.
CO5	Understand the concepts of transactions, concurrency control and its solutions.
CO6	Understand the concepts of recovery systems and advance techniques.
Course Name: Operating System	
Code: BECT303	
At the end of course Students will	
CO1	Identify the different type of a operating system and their responsibilities.
CO2	Understand issues in different file systems describe the access methods for files and solve problems of disk scheduling.
CO3	Compare process and thread and solve scheduling problems based on them.
CO4	Solve the memory management problems with techniques like paging and segmentation and also use page replacement algorithms.
CO5	Explain the concurrency conditions and critical section problem and apply the solutions to process synchronization problems.
CO6	Define deadlock and implement methods for its avoidance, detection and identify goals of protection.
Course Name: Design and Analysis of Algorithms	
Code: BECT304	
At the end of course Students will	
CO1	Understand, implement and analyze various techniques for solving Recurrences.
CO2	Understand, implement and analyze Divide and Conquer Strategy.
CO3	Understand, implement and analyze Greedy Approach.
CO4	Understand, implement and analyze Dynamic Programing.
CO5	Understand, implement and analyze Backtracking.
CO6	Understand, implement and analyze NP-Completeness.
Course Name: Data Communication	
Code: BECT305	
At the end of course Students will	
CO1	Understand the concept type of data and data communication.
CO2	Understand the Signal conversions and conflicting issues and resolution techniques in data transmission in communication media. (Wire and wireless)
CO3	Describe the mechanism and techniques of encoding.
CO4	Understand the signal conversion techniques.
CO5	Describe Communication components, procedure and techniques that make it functional.
CO6	Understanding Audio and Video data representation formats and compression technique.
Semester – 6th	
Course Name: Computer Graphics	
Code: BECT306	
At the end of course Students will	
CO1	Explain the applications, areas, and graphic pipeline, display and hardcopy technologies.

CO2	Apply and compare the algorithms for drawing 2D images also explain aliasing, anti aliasing and half toning techniques.
CO3	Discuss OpenGL application programming Interface and apply it for 2D & 3D computer graphics.
CO4	Analyze and apply clipping algorithms and transformation on 2D images.
CO5	Solve the problems on viewing transformations and explain the projection and hidden surface removal algorithms.
CO6	Explain basic ray tracing algorithm, shading, shadows, curves and surfaces and also solve the problems of curves.

Course Name: Computer Networks **Code: BECT307**

At the end of course Students will

CO1	explain different types of network topologies and protocols. enumerate and explain the functions of each layers of OSI and TCP/IP Model
CO2	identify the types of Error and Error recovery mechanism.
CO3	listing and explaining various Data Link layer Protocols like point to point protocol and multiple access protocols.
CO4	analyze the concepts of Sub netting, Routing and listing, explain various routing algorithms.
CO5	compare and assess various Congestion control protocols and other network layer protocols.
CO6	To Assess the various parameters of Quality of Services and explain the concepts of ISDN, ATM reference model, SONET and Bluetooth Technology.

Course Name: Software Engg. & Project Management **Code: BECT308**

At the end of course Students will

CO1	Understand basics of Software Engineering and different software development process models.
CO2	Understand Software Engineering Principles and different process engineering practices.
CO3	Understand different software modeling approaches and design engineering concepts.
CO4	Understand different software testing strategies , types and their significance.
CO5	Understand the concept of Software Quality Assurance and project management.
CO6	Understand Software risk Management ,Software quality management and Software Re-engineering.

Course Name: Embedded System Design **Code: BECT309**

At the end of course Students will

CO1	Define basics of embedded system and will be able to discuss about design problems and challenges of ES.
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CO2	Understand concept of inter process communication, shared data problem and their solutions.
CO3	Understand basic concepts and working environment of Real Time Operating System.
CO4	Understand basic concepts and architecture of micro controller and its programming.
CO5	Understand Basics of Communication and to perform interrupt programming.
CO6	Understand the interfacing of Micro-controller with various external devices .

Course Name: Functional English **Code: BECT310**

At the end of course Students will

CO1	Make use of functional grammar proficiently and comprehend business phraseology effectively.
CO2	improve their vocabulary, word power, interpret technical jargons and face job interviews more confidently.
CO3	Construct business letters and make use of e-mail etiquettes effectively.
CO4	demonstrate analytical comprehension skills and acquire skills required to draft technical documents effectively (reviews, user manuals, proposals, reports, research papers etc.)
CO5	Demonstrate group discussion skills and team spirit.
CO6	Unleash public speaking/ presentation skills.

Semester – 7th

Course Name: Compilers **Code: BECT401**

At the end of course Students will

CO1	Understand the concepts of formal language translator, various phases of compiler and demonstrate its analytical phases.
CO2	Understand and demonstrate various parsing techniques on context free grammar.
CO3	Understand and demonstrate syntactic structure of programming language as well as semantic rules for translation scheme.
CO4	Understand various code optimization techniques and evaluate the effects of code optimizations.
CO5	Understand role of assembler in code generation phase.
CO6	Understand the concepts of symbol table, various data structures used by compiler and error recovery strategies.

Course Name: Artificial Intelligence **Code: BECT402**

At the end of course Students will

CO1	Understand the concepts of AI, its importance in various fields and basics of AI problem solving techniques with more stress on various problem characteristics.
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CO2	Understand and demonstrate various search techniques and to understand various types of knowledge representation scheme using logic.
CO3	Study various non-formal knowledge representation methods and statistical reasoning methods in AI problem solving.
CO4	Understand the concepts of Expert system and types of various learning methods.
CO5	Understand the basic concepts of Natural Language Processing, basic parsing technique and search technique to be applied to game playing.
CO6	Understand basic concepts of soft computing paradigms like artificial neural networks and genetic algorithms.

Course Name: Advanced Data Base Management System **Code:BECT403**

At the end of course Students will

CO1	Differentiate Centralized and Distributed database management system and to understand their use in the real world.
CO2	Understand the concept of Parallel Database System and its use in the real world.
CO3	Understand the concepts of Object Oriented Databases and provide solutions to a broad range of database problems using OODBMS.
CO4	Understand the extensible Markup Language (XML) concepts and its applications in World Wide Web.
CO5	Understand the basics concepts of Data Warehouse, its data models and data per-processing techniques.
CO6	Understand the concepts of database security problems and solutions to the different security issues like locking and granting privileges.

Course Name: Advanced Operating System **Code:BECT404**

At the end of course Students will

CO1	Understand fundamentals and foundations of distributed OS.
CO2	Gain knowledge on Distributed operating system concepts that includes distributed Mutual exclusion and study different algorithms.
CO3	Study Deadlock detection algorithms and agreement protocols.
CO4	Gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, Distributed file systems.
CO5	Understand the concept of distributed scheduling and study various load distributing algorithms.
CO6	Gain insight on failure recovery and commit protocols.

Course Name: DWM **Code:BECT405**

At the end of course Students will

CO1	Understand the basic concepts of data warehouses, On-line Analytical Processing and data cube technology.
CO2	Understand the fundamentals of Data Mining and discuss various techniques for Data Preprocessing.

CO3	Understand and implement methods for Classification and Data Clustering.
CO4	Understand and implement mining techniques for frequent itemset mining.
CO5	Understand various techniques of Web, Temporal and Spatial data mining.
CO6	Understand the concepts, challenges of big data and to analyze, manage the big data using Map-Reduce and Hadoop.
Course Name: Cloud Computing	
Code: BECT406	
At the end of course Students will	
CO1	Understand the basic concept of cloud computing.
CO2	Understand in detail the cloud computing architecture.
CO3	Understand and implement big data analysis, Hadoop and Mapreduce.
CO4	Understand various security concepts in cloud computing.
CO5	Understand and implement Cloud based Application using C#.
CO6	Study cloud application using Windows Azure.
Semester 8th	
Course Name: CIS	
Code: BECT407	
At the end of course Students will	
CO1	Understand the need of information security and study various encryption techniques.
CO2	Understand and implement symmetric key cryptography algorithms.
CO3	Understand and implement Asymmetric key cryptography algorithms.
CO4	Understand and implement various message authentication, hash function and PKI Architecture.
CO5	Understand Firewall Functionality and intrusion detection system (IDS).
CO6	Understand various Software Vulnerability and Electronic Mail security System.
Course Name: WDM	
Code: BECT408	
At the end of course Students will	
CO1	Understand the Web data modeling , web applications and semistructured data including web data management with XML.
CO2	Understand the concepts of XPath, XQuery, FLWOR expression and Xupdate.
CO3	Understand the concept of automata's on trees , XML schema languages and XML Query Evaluation.
CO4	Understand the ontologies ,querying and data integration using RDF schema and the Web Ontology Language (OWL) .
CO5	Understand the concepts of building web scale applications and distributed systems .
CO6	Understand various distributed access structures and management of large scale data with HADOOP.
Course Name: Parallel Computing	
Code: BECT409	
At the end of course Students will	
CO1	Understand various Architectures of Parallel Processing machines and the programmability issues.
CO2	Understand the Data Dependency Analysis for parallel and Shared Memory Programming.
CO3	Understand the various Algorithms for Parallel Machines
CO4	Understand the Message Passing Programming and the various Parallel Programming languages.

CO5	Understand the concepts involved in Debugging of Parallel Programs and Architecture of Memory and I/O Subsystems.
CO6	Understand the different Parallelism Paradigms and the performance metrics for parallel processors.
Department of Electronics Engineering	
<u>Course Outcome</u>	
Semester 3 rd	
Course Name: Applied Mathematics-III Code:BEENE301	
At the end of Course Students will be	
CO1	Able to develop mathematical thinking in the conduct of different experiments and presentation of results precisely.
CO2	Able to enhance those mathematical skills required for further studies in, the technological sciences.
CO3	able to apply their knowledge in modern industry and teaching.
CO4	Securing acceptance in high quality graduate programmes in mathematics and other fields such as finance, Statistics and actuarial science.
CO5	Exhibit ethical and profession behavior.
Course Name: Electronic devices and circuits Code: Code: BEENE302	
At the end of Course Students will	
CO1	Understand of the relation between physical structure and circuit behavior of semiconductor devices like PN junction diode & its application
CO2	Characterize the electronic device (Transistor) in terms of appropriate external variables and differentiate different biasing techniques
CO3	Use device parameters for Small signal and High frequency analysis
CO4	Extend the understanding of how electronic circuits and their functions fit into larger electronic systems analysis tool for analog circuits
CO5	Use electronic device as a circuit element in applications such as amplifier,oscillator,filter.
CO6	Understand the structure of FET & its use in IC technology
Course Name: Electronics Measurement and Instrumentation Code: BEENE303	
At the end of Course Students will	
CO1	Explain basic concepts and definitions in measurement.
CO2	Explain the operation and design of electronic instruments for parameter measurement and operation of different Transducers
CO3	Explain the operation of oscilloscopes and the basic circuit blocks in the design of an oscilloscope.
CO4	Explain the circuitry and design of various function generators.
Course Name: Object Oriented programming and Data Structure Code:BEENE304	
At the end of Course Students will	
CO1	Implement the concept of object oriented programming in any programming language
CO2	Explain the basic data structures and algorithms for manipulating them..
CO3	Implement these data structures and algorithms in the C++ language.
CO4	Integrate these data structures and algorithms in larger program.
CO5	Code and test well-structured programs of moderate size using the C++
CO6	Apply principles of good program design to the C++ language

Course Name: Network Analysis and Synthesis	
Code: BEENE305	
At the end of Course Students will be	
CO1	Analyze the various Electrical and Electrical Networks using the mesh and nodal Techniques
CO2	Network analysis for different network theorems
CO3	Demonstrate Knowledge of resonance in series and parallel circuits for telecommunication system
CO4	Apply filters approximation to design analog signal of active and passive filters for communication system
CO5	Determine the transfer function and design the initial condition.
CO6	Analyze and formulate network function of ladder network and pole zero configuration
Semester 4 th	
Course Name: M-IV	
Code:BEENE401	
CO1	Know and understand various types of numerical methods, that play a vital role in many areas of Engineering and technology.
CO2	Apply concept of Z-transform for solving difference equations and analyze discrete time system.
CO3	Able to demonstrate basic knowledge of Bessel's function and Legendre's polynomial.
CO4	Know about discrete and continuous random variables and theory of probability.
CO5	Know expected behavior, dispersion of random variables
CO6	Understands thoroughly standard probability distributions and apply them in different areas of Engineering.
Course Name: Power Drives and Machines	
Code:BEENE402	
At the end of Course Students will	
CO1	Understand the basics of different components used in Power Electronics
CO2	Understand the working and characteristics of different power devices along with their applications in electronic circuits
CO3	Understand the concept of AC-DC Converters
CO4	Understand the concept of DC-DC (Choppers) , DC-AC(Inverters) and their Industrial applications
CO5	To learn the construction, working principle of three phase transformer and Induction motor
CO6	Understand the different AC/DC machines and their speed control methods
Course Name: Electromagnetic Field	
Code:BEENE402	
At the end of Course Students will	
CO1	Understand the concept of Electric, Magnetic, Electromagnetic Fields required to understand the concept of Electronic Communication
CO2	Understand the different coordinate coordinate system for mathematical Analysis of Electromagnetic Engineering
CO3	Understand the Maxwell's equation for time varying and time constant field.
CO4	Understand the wave propagation in different medium
CO5	Understand the use of waveguides for the transmission of electromagnetic waves at higher frequencies

CO6	Understand the basic concept of radiation and elements used for radiation along with the basic terminologies.
Course Name: Digital Circuit & Fundamental of Microprocessor Code:BEENE404	
At the end of Course Students will	
CO1	Understand the fundamental of basic gates and their use in combinational and sequential circuits.
CO2	Understand the use of digital components as a switching element.
CO3	To make use of digital ICs to design logical circuits
CO4	Be able to generate basic arithmetic and logical circuits required in microcomputer systems
CO5	To design different types of combinational circuits such as Adder, Subtractor, MUX, DEMUX, Encoder, Decoder etc.
CO6	To understand the Architecture of microprocessor 8085 and Instruction set which are useful for programming.
Course Name: signals and systems Code:BEENE405	
At the end of Course Students will	
CO1	Get knowledge about different types of signals and systems used in communication Electronics
CO2	Understand the concept of probability and its use in communication system.
CO3	Be able to embed the use of fourier series and fourier transform for feature extraction of different electronic signals
CO4	Understand different coding schemes and able to apply selective coding scheme for the application needed
CO5	Understand the different analog and digital modulation schemes
Semester - 5th	
Course Name: ST Code:BEENE501	
At the end of Course Students will	
CO1	Study designing aspects of digital circuits.
CO2	Study properties of partially ordered sets & lattices.
CO3	Study minimization of Booleans function by using K-map, Tabulation method, functional decomposition, symmetric function.
CO4	Study the diagnosis of switching circuits & methods for improving their reliability
CO5	Study various aspects of Finite state machines
CO6	Elobrate the concept of synthesis of sequential circuits
Course Name:Microprocessor & Microcontroller Code:BEENE502	
At the end of Course Students will	
CO1	Describe internal organization of 8086/8088 microprocessors, concept of memory organization, stack memory & addressing mode.
CO2	Demonstrate the concept of interrupts & interfacing of Keyboard/ Display & memory with 8086 & its programming.
CO3	Interface various hardware with microprocessor 8086.
CO4	Describe the concept of DMA, Pentium processor & 8087 Numeric coprocessor & its use in practical application.
CO5	Describe architecture of 8051 microcontroller, concept of memory organization, stack memory, addressing mode & interrupts.

CO6	Interface 8051 with Keyboard/ Display, ADC/DAC, Stepper motor etc.
Course Name:ANALOG CIRCUIT AND DESIGN Code:BEENE503	
At the end of Course Students will	
CO1	Know the basic differential Amplifier using transistor and its operation & characteristic.
CO2	Design linear Op-Amp circuits such as Voltage follower, Summing amplifier, scaling and averaging amplifier,
CO3	Design Instrumentation amplifier circuits for various practical applications.
CO4	Design non-linear Op-Amp such as Comparators, Comparator IC such as LM 339, Schmitt trigger, multivibrator circuits for various practical applications using IC555.
CO5	Analyze and design amplifier circuits, oscillators, Filter, regulated power supply
Course Name: communication electronics Code:BEENE504	
At the end of Course Students will	
CO1	Describe the concept of Amplitude Modulation and its generation methods.
CO2	Demonstrate the concept of Angle Modulation, its mathematical analysis and demodulation of analog signals.
CO3	Describe the concept of Band Limited, Time Limited Signals, Pulse Analog Modulation and its types.
CO4	Describe the concept of noise, its types, properties and its effect.
CO5	Explain the working principles of AM, FM Receivers, FM Detectors and their features.
CO6	Demonstrate the concept of Fundamental of Broadband Communication Links and Haul Systems.
Course Name: Engg Eco & ED Code:BEENE505	
At the end of Course Students will	
CO1	Students will be able to understand business structure and business economics and will apply this knowledge in a complex business environment.
CO2	Students will be able to identify and understand market structure, economic reforms and its social impact by applying the knowledge of economics.
CO3	Students will be able to comprehend the process of entrepreneurial development for setting up engineering / business unit.
CO4	Students will be able to apply knowledge of economics and entrepreneurship with professional and ethical responsibilities.
CO5	Students will understand application of economics and entrepreneurial know-how in multidisciplinary domains of industry.
Semester - 6th	
Course Name: Microwave Engineering Code:BEENE601	
At the end of Course Students will	
CO1	Analyze mathematically the operation and working of the various tubes or sources for the transmission of the microwave frequencies.

CO2	Demonstrate the use of different magnetron devices.
CO3	Describe the transmission and waveguide structures and how they are used as elements in impedance matching and filter circuits.
CO4	Analyze different microwave components using scattering parameter.
CO5	Acquire knowledge about the measurements to be done at microwaves.
CO6	Know about the significance ,types and characteristics of microwave solid state devices.
Course Name:Digital Signal Processing Code:BEENE602	
At the end of Course Students will	
CO1	Study and represent discrete time signals analytically and visualize them in time domain.
CO2	Study behavior of discrete time system using Z Transform.
CO3	Describe the various transforms for analysis of signals and system like DFT.
CO4	Design and implement IIR digital filter for various applications .
CO5	Design and implement FIR digital filter for various applications .
CO6	Describe the concept of multi rate signal processing and how to apply it for the wavelet transform.
Course Name: Control system engineering Code:BEENE603	
At the end of Course Students will	
CO1	Study the fundamental concepts of control system and mathematical modeling of the system.
CO2	Sudy the concept of time response and frequency response of the system.
CO3	Study the basics of stability analysis of the system.
CO4	Study the frequency response method of analysis of linear system.
CO5	Sudy the controller & compensators.
CO6	Study the state variable approach in transfer function.
Course Name: DCOM Code:BEENE604	
At the end of Course Students will	
CO1	Study basic components of digital communication systems
CO2	Understand the designing aspects of optimum receivers for digital modulation techniques.
CO3	Study the analysis of error performance of digital modulation techniques
CO4	Study the designing of digital communication systems under given power, spectral and error performance constraint
CO5	Understand the concept of coding and decoding techniques.
CO6	Model digital communication systems using appropriate mathematical techniques .
Course Name:Functional English Code:BEENE60605	
At the end of Course Students will	
CO1	Apply English language proficiency seamlessly in professional careers.
CO2	Identify the communication gaps and barriers to communication in professions and rectify them professionally.
CO3	Write contents, prepare technical documents, legal documents, Board documents, Minutes of the Meetings, internal and external communication in a proficient English language.
CO4	Build and develop a team of corporate communicators.
CO5	Exploit the social digital media for effective corporate communication.

CO6	Unleash public speaking/ presentation skills.
Semester - 7th	
Course Name: DSP Processor & Arch.	
Code: BEENE701	
At the end of Course Students will	
CO1	Understand the fundamental of basic Programmable DSPs and data types.
CO2	Describe the detailed architecture, bus structure and addressing modes of TMS320C5X DSP processor.
CO3	Understand and make use of Assembly Language Instructions to design simple ALP and describe operations of DSP starter kit.
CO4	Describe the detailed architecture and addressing modes of TMS320C54X DSP processor.
CO5	Compare the various advanced Programmable DSPs and understand the Code Composer Studio.
CO6	Design multi-rate filters and evaluate performance of DFT and FFT for filtering data sequences.
Course Name: Embedded System	
Code: BEENE702	
At the end of Course Students will	
CO1	Know Design challenges, Applications and Recent trends in Embedded system.
CO2	Understand the Hardware & Software architecture and Memory architecture of Embedded system.
CO3	Design Embedded based system using ARM processor.
CO4	Design Embedded system based on communication protocol.
CO5	Design Embedded system based on RTOS.
CO6	Understand the case study of Embedded system in various fields.
Course Name: Optical Communication	
Code: BEENE703	
At the end of Course Students will	
CO1	Learn the basic elements of optical fiber.
CO2	Understand the different kinds of losses, signal distortion in optical wave guides & othesignal degradation factors.
CO3	Classify various optical source materials, LED structures, LASER diodes.
CO4	Learn the fiber optic receivers such as PIN, APD diodes, receiver operation & performance.
CO5	Understand the operational principal of WDM, SONET, measurement of attenuation, dispersion, refractive index profile in optical fibers.
Course Name: ADSD	
Code: BEENE704	
At the end of Course Students will	
CO1	Know VHDL development flow and Basic VHDL concepts
CO2	Design of combinational & sequential circuit .
CO3	Understand functions procedures and attributes
CO4	Design of Finite Stat machines
CO5	Understand Synthesis and timing analysis
CO6	Experimentation on Hardware /Software co-design.
Course Name: Mobile Communication	
Code: BEENE705	
At the end of Course Students will	

CO1	Describe Evolution of mobile radio communication and Cellular telephone system with various strategies.
CO2	Demonstrate basic losses and propagation in mobile radio environment and also describe air traffic, fundamentals of channel coding, fading effects in mobile systems.
CO3	Compare different digital modulation techniques used for mobile communication.
CO4	Describe fundamentals of equalization and diversity techniques.
CO5	Solve the problems involving bandwidth calculation using various multiple access techniques.
CO6	Describe architecture and signal processing in GSM system and define CDMA digital cellular std(IS-95).
Semester - 8th	
Course Name: MEMS & SOC Code: BEENE801	
At the end of Course Students will	
CO1	Understand working principles of currently available micro sensors ,actuators, used in micro systems.
CO2	Understand the basic principles and applications of micro-fabrication processes such as photo lithography,ion implantation,diffusion ,oxidation,CVD,PVD and etching .
CO3	Understand the principle of operation of different types of transducers & actuators.
CO4	understand the basic concepts of RF inductor ,capacitor , RF MEMS components in communication,space and defence applications.
CO5	understand the different types of packaging techniques used in MEMS
CO6	Consider recent advancements in the field of MEMS and devices
Course Name: Computer Communication Network Code: BEENE802	
At the end of Course Students will	
CO1	Understand the requirement of theoretical & practical aspect of computer network.
CO2	Understand the network traffic in computer network.
CO3	Describe various protocols used in network.
CO4	Describe the concept of computer network security.
CO5	Understand the different wired & wireless LAN stds.& Routers.
Course Name: Data Compression & Encryption Code: BEENE803	
CO1	Implement various text compression technique.
CO2	Implement various audio compression technique.
CO3	Implement various image & video compression technique.
CO4	Understand the conventional encryption techniques and application to digital communication.
CO5	Understand the public key encryption , number theory and application to digital communication.
CO6	Understand the system security and related case studies.
Course Outcomes:Wireless sensor network Code: BEENE804	
At the end of Course Students will	
CO1	Demonstrate advanced knowledge and Principle of wireless sensor network and Explain its Architecture.
CO2	Demonstrate the knowledge of Radio technology primer, and fundamentals of Physical layer & Medium Access Control Protocols.
CO3	Describe Routing strategies , Challenges & design issues in wireless sensor network.

CO4	Describe Transport Control Protocols for Wireless Sensors Networks.
CO5	Demonstrate principles and architecture of Middleware.
CO6	Describe Network Management for Wireless Sensor Network and discuss Performance and Traffic Management Issues.
Course Outcomes: CMOS-VLSI	
Code: BEENE805	
CO1	Design PMOS and NMOS transistor.
CO2	Implement different combinational logic circuits.
CO3	Design layout for various circuits.
CO4	Design CMOS transistor.
CO5	Experiment on CMOS layout design optimization & transistor sizing.
CO6	Detect and correct errors in VLSI Design.
Department of Electrical Engineering	
Course Outcomes(CO)	
Semester - 3rd	
Course Name: Applied Mathematics-III	
Code: BEELE301	
At the end of course Students will	
CO1	Understand Laplace Transform and should be able to solve differential equations.
CO2	Expand the function in periodic form using Fourier series and understand the relationship between z transform and the Fourier transform for discrete time signals.
CO3	Use the functions of several variables in engineering problems.
CO4	Understand the fundamental concepts of complex analysis and also be able to evaluate some standard integrals using contour integrals.
CO5	Student will be able to formulate and solve linear partial differential equations in the field of Industrial Organization and Engineering.
CO6	Set up and solve linear systems/linear inequalities graphically/geometrically and algebraically using matrices.
Course Name: Non-Conventional Energy Sources	
Code: BEELE302	
At the end of course Students will able to	
CO1	Fundamental of solar radiation and measurement
CO2	Explain principles of collector and solar energy storage system
CO3	Explain the different application of solar energy
CO4	Explain the selection site for wind farm and different types of wind generators, energy storage , application of wind energy
CO5	Explain the concept of OTEC , various process and components of generating system for OTEC and tidal energy
CO6	Able to understand the basics of small hydro and other Non-Conventional Energy Sources
Course Name: Electrical Measurement and Instrumentation	
CodeBEELE303	
At the end of course Students will able to	
CO1	Measure the different types of parameters like resistance , inductance and capacitance by using different methods of measuring instruments
CO2	Understand the principle operation of various types of analog instruments as well as special instruments
CO3	Analyze and measure the power and energy in single phase as well as polyphase circuits

CO4	Measure the force , torque , velocity and acceleration with the help of various kinds of load cell and accelerometer
CO5	Measure the temperature pressure and flow by different types of thermometer, thermocouples and flow meters.
CO6	Get idea about measurement of temperature using thermistor, RTD and thermocouple and Two color pyrometers, Optical pyrometer; pressure and flow
Course Name: Network Analysis	
Code: BEELE304	
At the end of course Students will able to	
CO1	Apply Source transformation and loop (mesh) analysis
CO2	Apply mesh analysis and source transformation method for ac and dc circuit analysis
CO3	Develop the basic skills in solving DC and AC circuits for steady state and transient response using Laplace transform techniques
CO4	Analyze periodic inputs to electric circuits using Fourier series and their response. Compute initial and final conditions for current and voltage in first and second order circuits.
CO5	Analyze first and second order AC and DC circuits for steady state and transient response using Laplace transform techniques
CO6	Characterize two-port networks by Z, Y, T, h parameters.
Course Name: Electronic Devices and Circuits	
Code: BEELE305	
At the end of course Students will	
CO1	Know basic fundamentals of Semiconductor Devices.
CO2	Know basic fundamentals, Principles and working of Transistors
CO3	know concept of Amplifiers
CO4	know the basics of Oscillators, FETs and MOSFETs
CO5	know the Principle of Differential Amplifier Circuits
CO6	know the Logic Gates and Truth Table.
Semester - 4th	
Course Name: Applied Mathematics -IV	
Code:BEELE401	
At the end of course Students will	
CO1	Acquaint students with mathematical formulation and use of Laplace Transform to control system.
CO2	Apply concept of transform for solving difference equations.
CO3	Deal with vague data using fuzzy sets and fuzzy logic
CO4	Grasp the concept of numerical methods and apply them to solve various algebraic, transcendental and simultaneous equations.
CO5	Grasp the concept of numerical methods and apply them to solve linear and non-linear differential equations.
CO6	Students will become familiar with random variables and probability. To determine probabilities of events, determine probabilities and find means and standard deviations of both discrete and continuous probability distributions.
Course Name:Elements of Electromagnetics	
Code:BEELE402	
At the end of course Students will	
CO1	Acquire knowledgeable in static electric and magnetic fields.
CO2	Analyse various laws of electromagnetic systems.
CO3	Understand the physical basis for the functioning of circuit elements.
CO4	Apply electromagnetic boundary conditions.

CO5	Familiar with the four Maxwell's equations used to study time varying electromagnetic or dynamics fields.
CO6	Understand the concept of uniform plane-wave propagation and electromagnetic power density flow in lossless medium
Course Name: Digital and Linear Electronic Circuits. Code:BEELE403	
At the end of course Students will	
CO1	Know basic fundamentals of combinational logic concepts.
CO2	Know basic fundamentals of flip flops and memories.
CO3	know concepts of sequential circuits
CO4	Basics of Operation Amplifiers and its Application
CO5	Simple Linear Circuit
CO6	Study of Linear Ics
Course Name: Electrical Machines-I Code:BEELE404	
At the end of course Students will	
CO1	Able to understand Principle, construction, connections, vector grouping, operation and testing of 3-phase transformer
CO2	Able to understand conversion of 3-phase supply to 2-phase supply, parallel operation of 3-ph. Transformers.
CO3	Able to understand Principle, armature and field construction, types, operation characteristics, armature reaction, commutation, methods to improve commutation in dc generators, Principle, types, voltage build up, performance characteristics, torque evaluation in dc motors
CO4	Able to understand Principle, construction, types, torque development, performance characteristics, tests to determine performance indices & parameters of equivalent circuit of 3-phase and double cage induction motors
CO5	Able to understand methods of starting, speed control and braking of induction motors.
CO6	Understand Revolving and cross field theories, operation, characteristics, types, equivalent circuit & tests.
Course Name: Computer Programming Code:BEELE405	
At the end of course Students will	
CO1	Understands the basics and syntax of programming and able to apply the knowledge of operators, loops, conditional and iterative statements in programs.
CO2	Apply the knowledge of programming in arrays, for searching an element using linear and binary search, matrix addition.
CO3	Able to construct the structure using different data elements, nesting of structure, printing two different data of more than one company, file opening, closing, reading and writing.
CO4	Understand object Oriented programming and able to apply the knowledge of object oriented programming for real world application.
CO5	Able to construct the matrix, different operations on matrix using Matlab.
CO6	Able to plot and analyze the graphs of different waveform, plot of different equations in one graph using Matlab.
Semester 5 th	
Course Name: Electrical Power System-I Code:BEELE501	

At the end of course Students will	
CO1	Develop the ability to understand Structure of electrical power system, concept of Substation and elementary consideration of power system.
CO2	Develop the ability for Representation of power system elements and per unit system representation
CO3	Able to understand elementary distribution scheme and insulator
CO4	Develop the ability to represent and understand the transmission line parameters
CO5	Able to understand the interconnection of two bus systems and concept of load flow analysis.
CO6	Develop the ability to understand Elementary concepts of real and reactive power control
Course Name: Utilisation of Electrical Energy Code:BEELE501	
At the end of course Students will	
CO1	Understand various types of Electric Heating and its application.
CO2	Apply Electric Welding for various applications.
CO3	Design Illumination schemes for Indoor / Outdoor lightings.
CO4	Understand Construction, working and applications of Refrigeration & Air conditioning.
CO5	Understand Various types of Fans & Pumps, its working and applications.
CO6	Understand basic idea and energy saving opportunities in Compressors and DG Sets .
Course Name: Electrical Machines Design Code:BEELE502	
At the end of course Students will	
CO1	Able to Select proper material for design of a machine.
CO2	Able to Design a overall transformer.
CO3	Able to Design cooling circuit of transformer.
CO4	Able to Design stator core of Induction Motor.
CO5	Able to Design rotor core of Induction Motor.
CO6	Able to Design overall dimensions of synchronous machines.
Course Name: Electrical Machines Design Code:BEELE503	
At the end of course Students will	
CO1	Able to Select proper material for design of a machine.
CO2	Able to Design a overall transformer.
CO3	Able to Design cooling circuit of transformer.
CO4	Able to Design stator core of Induction Motor.
CO5	Able to Design rotor core of Induction Motor.
CO6	Able to Design overall dimensions of synchronous machines.
Course Name: Microprocessor and Interfacing Code:BEELE504	
At the end of course Students will	
CO1	Able to understand VLSI circuit concept and system bus concept of microprocessor based system.
CO2	Able to understand 8085 architecture and its working.
CO3	Able to understand Programming concept and stack operation
CO4	Able to understand software and hardware interrupts
CO5	Able to understand method of data transfer of different Peripherals chips.
CO6	Able to understand hardware considerations and interfacing of devices.

Course Name: Electrical Machines-II		Code:BEELE505
At the end of course Students will		
CO1	Understood principle , construction, laying of armature and field windings, types, generation of emf,	
CO2	Understood steady state operation of synchronous machine	
CO3	Understood synchronization and parallel operation of synchronous generators	
CO4	Understood principle, construction, methods of starting of synchronous motor, its operation with variable load, operation with variable excitation, performance evaluation.	
CO5	Understood Transient and sub- transient reactance's and their measurement	
CO6	Understood special motors, like Repulsion, Hysteresis, Reluctance and Universal motors	
Semester - 6th		
Course Name:Power Station Practice		Code:BEELE601
At the end of course Students will		
CO1	Understand different source of Energy and factors (load survey) associated with energy generation	
CO2	Understand the requirement for installation , estimation of thermal power plant (economics of generation) and to work in power plant	
CO3	Understand the various types of hydro power plant ,their major components , to work in power plant	
CO4	Understand the principal of nuclear energy, its components and to work in power plant	
CO5	Understand voltage control of AC generators and calculation tariff	
CO6	Understand technology of co-generation captive power generation and overcome energy problem	
Course Name: Economics and Industrial Management		
		Code:BEELE602
At the end of course Students will		
CO1	Able to understand business structure and business economics and will apply this knowledge in a complex business environment.	
CO2	Able identify and understand market structure, economic reforms and its social impact by applying the knowledge of economics.	
CO3	Able to comprehend the process of entrepreneurial development for setting up engineering / business unit.	
CO4	Able to apply knowledge of economics and entrepreneurship with professional and ethical responsibilities.	
CO5	Understand application of economics and entrepreneurial know-how in multidisciplinary domains of industry.	
CO6	Understand business & economics on a large scale.	
Course Name:Electrical Drives and their Controls		
		Code:BEELE603
At the end of course Students will		
CO1	To understand the fundamentals of starting, speed control/braking of Electric motors	
CO2	To understand the heating and cooling characteristics of electric and to learn the use of flywheel.	
CO3	To learn the basics Concept of PLC and its programming	
CO4	To understand different methods of starting & braking of DC and three phase Induction motor using AC & DC contractors & relay	

CO5	To Study the motors used in Electric Traction.
CO6	To understand the idea about drives commonly used in industries and digital control of electric drives.
Course Name: Power Electronics	
Code: BEELE604	
At the end of course Students will	
CO1	Acquire knowledge about fundamental concepts and techniques used in power electronics.
CO2	Ability to analyze various single phase and three phase power converter circuits and understand their applications.
CO3	Foster ability to identify basic requirement for power electronics based design application.
CO4	Develop skills to build and troubleshoot power electronics circuits.
CO5	Foster ability to understand the use of power converters in commercial and industrial applications.
CO6	Understand the applications of power electronics circuits for conserving electrical energy to save environment.
Course Name: Control System-I	
Code: BEELE605	
At the end of course Students will	
CO1	Model the linear system and study the control system component specification through classical approach
CO2	Understand the time response specification and its control
CO3	Analyze the absolute stability
CO4	Analyze the relative stability
CO5	Frequency response tools like bode plot and nyquist plot
CO6	Understand the introductory concept of state variable approach.
Course Name: Functional English	
Code: BEELE606	
At the end of course Students will	
CO1	Apply English language proficiency seamlessly in professional careers.
CO2	Identify the communication gaps and barriers to communication in professions and rectify them professionally.
CO3	Write contents, prepare technical documents, legal documents, Board documents, Minutes of the Meetings, internal and external communication in a proficient English language.
CO4	Build and develop the team of corporate communicators.
CO5	Exploit the social digital media for effective corporate communication.
CO6	Unleash public speaking/ presentation skills.
Semester 7th	
Course Name: Control System-II	
Code: BEELE701	
At the end of course Students will	
CO1	Analyze the transfer function of different classical Compensators for the system.
CO2	Analyze the practical system for the desired specifications through state variable approach.
CO3	Analyze the controllability and observability and design of state variable feedback.
CO4	Design the optimal control with and without constraints.
CO5	Analyze non-linear system with describing and phase plane method
CO6	Analyze the digital system from stability point of view.

Course Name: Electrical Installation Design Code:BEELE705	
At the end of course Students will	
CO1	the concept of electrical load and forecasting , concepts of cable and its ratings.
CO2	draw single line diagrams with symmetrical fault calculations of electrical distribution for residential an commercial installations
CO3	design hardware of induction motor starting and controlling with proper protection system
CO4	Design and analysis of 11 kv and 33 kv line with suitable transformer testing and commissioning for practical system.
CO5	design and analyse substations for utility and industrial installations and specify the ratings and specifications of apparatus used.
CO6	understand necessity of earthing and provisions of IE rules for low medium and high voltage installations
Course Name: Electrical Power System-II Code:BEELE702	
At the end of course Students will	
CO1	Represent the circuits using symmetrical component transformation.
CO2	Analyse symmetrical Fault .
CO3	Analyse unsymmetrical Fault.
CO4	Determine stability of power system and undergo stability studies.
CO5	Obtain economic operation of power system.
CO6	Understand basic concept of neutral grounding and compensation.
Course Name: Flexible AC Transmission System (Elective-I) Code:BEELE703	
At the end of course Students will	
CO1	Understand the facts concept and general system consideration
CO2	Understand the concept of voltage-sourced and current. sourced converters
CO3	Analyse the concept of static shunts compensators
CO4	Analyse the concept of static series compensators
CO5	Ulearn the concept of static voltage and phase angle regulators
CO6	Understand the concept of combined compensators and special purpose FACTs controllers
Course Name: Non Conventional Energy Sources (Elective-I) Code:BEELE703	
At the end of course Students will	
CO1	Able to learn fundamentals of solar radiation geometry
CO2	Learn about Solar Energy Collectors & Solar Energy Storage
CO3	Learn application of solar energy
CO4	Learn about selection of sites for wind farm, different types of wind generators.
CO5	Understand the basics of ocean, tidal & wave energy
CO6	Understand the basics of small hydro and other Non-Conventional Energy Sources
Course Name: High Voltage Engineering Code:BEELE704	
At the end of course Students will	
CO1	Understand breakdown strength of various dielectric materials under different conditions
CO2	Understand Lighting and switching over voltages,Mechanism of lighting, types of strokes and its protection
CO3	Understand Concepts of travelling waves and insulation co-ordination ,attenuation and distortion effects of travelling waves

CO4	Understand Different methods for generating high voltages/currents for various applications
CO5	Understand Different techniques to measure high voltage and current
CO6	Understand Non destructive and high voltage testing of electrical apparatus
Semester 8 th	
Course Name: Extra High Voltage AC and DC Transmission (Elective-II)	
Code: BEELE801	
At the end of course Students will	
CO1	Student should be able to know power handling capacity of transmission systems.
CO2	Student should be able to know the effects of electrostatic fields in EHVAC lines .
CO3	Student should be able to know the comparison between EHVAC/HVDC systems & kinds of DC link.
CO4	Student should be able to know voltage and current control systems in HVDC system.
CO5	Student should understand the knowledge of AC/DC filters and reactive power compensation .
CO6	Student should understand the protection schemes of HVDC system and substation layout.
Course Name: Power Semiconductor Based Drives (Elective-III)	
Code: BEELE802	
At the end of course Students will	
CO1	To understand the dynamics of electrical drives and their control
CO2	To understand the control of DC motor drives
CO3	To understand the semiconductor based control of Induction motor
CO4	To understand the semiconductor based control of Synchronous motor
CO5	To carry research on the newer Switched reluctance motor & Brushless Induction motor
CO6	To understand the traction drive with AC & DC motors
Course Name: Switchgear and Protection	
Code: BEELE803	
At the end of course Students will	
CO1	Understand the basic fundamental of protective relaying and theory of main components used in power system protection
CO2	know the protection systems used for medium voltage transmission line
CO3	know the protection systems used for high voltage transmission line
CO4	Understand the protection systems used for electric machine, transformer and busbar
CO5	know the operation of static relays & its application
CO6	Understand the theory, construction & applications of main types of circuit breakers
Course Name: Computer Application in Power System	
Code: BEELE804	
At the end of course Students will	
CO1	Determine network matrix of a power system using graphical representation
CO2	Determine network matrix of a power system using algorithm
CO3	Analysis of balance and unbalance condition by algorithm formation of 3-ph impedance matrix
CO4	Load flow study of power system by iterative methods
CO5	Perform short circuit study for 3-ph network under balance and unbalance faults
CO6	Determine transient stability of power system networks.
Department of Electronics & Telecommunication Engineering	
Course Outcomes(CO)	

Semester - 3rd	
Course Name: Applied Mathematics-III Code: BEETE 301	
At the end of course Students will	
CO1	Understand Laplace Transform and its properties to solve differential equations.
CO2	Expand the function in periodic form using Fourier series and understand the relationship between z transform and the Fourier transform for discrete time signals.
CO3	Use the functions of several variables in solution of boundary value problems.
CO4	Understand the fundamental concepts of complex analysis and also evaluate some standard integrals using contour integrals.
CO5	Formulate and solve linear partial differential equations in the field of Engineering and Technology.
CO6	Apply and solve linear systems/linear inequalities graphically/geometrically and algebraically using matrices.
Course Name: Electronic Devices and Circuits Code: BEETE 302	
At the end of course Students will	
CO1	Able to understand Diode and its application
CO2	Able to understand BJT Biasing working and construction
CO3	Able to understand Transistor small signal Analysis & Negative feedback amplifier
CO4	Able to understand Principle of Positive feedback
CO5	Able to understand Power Amplifiers and their classification
CO6	Able to understand Field effect Transistor and MOSFET
Course Name: Electronics Measurement and Instrumentation Code: BEETE 303	
At the end of course Students will	
CO1	Able to understand the Fundamental of Electronics Measurement and Instrumentation
CO2	Able to understand the Fundamental of Electromechanical Instruments
CO3	Able to understand the AC and DC Bridge concept
CO4	Able to understand the Transducer their types and classification
CO5	Able to understand the Oscilloscope and Signal Generator
CO6	Able to understand the Signal Analyzer and Data Acquisition System
Course Name: Object Oriented Programming and Data Structure Code: BEETE 304	
At the end of course Students will	
CO1	Able to understand Introduction to Object oriented Programming.
CO2	Able to understand Features of Object Oriented Programming.
CO3	Able to understand Inheritance and their types.
CO4	Able to understand Introduction to Data Structure.
CO5	Able to understand Introduction to Stack and Queue.
CO6	Able to understand Trees and Terminology.
Course Name: Network Analysis and Synthesis Code: BEETE 305	
At the end of course Students will	
CO1	Able to understand basic circuit analysis and simplification techniques
CO2	Able to understand Network Theorems.
CO3	Able to understand Frequency Selective Networks.
CO4	Able to understand Filters and Attenuators.
CO5	Able to understand Laplace Transform and its application.
CO6	Able to understand 2 Port Parameters and functions

Semester - 4th	
Course Name: Applied Mathematics IV Code: BEETE 401	
At the end of course Students will	
CO1	Able to understand Numerical method.
CO2	Able to understand Z Transform.
CO3	Able to understand Special function and series solution.
CO4	Able to understand Theory of probability.
CO5	Able to understand Mathematical Expectation.
CO6	Able to understand Probability Distribution.
Course Name: Power Devices and Machines Code: BEETE 402	
At the end of course Students will	
CO1	Understand the basics of different components used in Power electronics.
CO2	Understand the working and characteristics of different power devices along with their applications in electronics circuits.
CO3	Understand the concept of AC-DC converters and their industrial applications.
CO4	Understand the concept of Chopper and Inverter and their industrial applications.
CO5	Understand the construction ,working principle of three phase transformer and Induction motor with their starting methods.
CO6	Understand the different Types of AC/DC machines and their speed control methods.
Course Name: Electromagnetic Fields Code: BEETE 403	
At the end of course Students will	
CO1	Understand different coordinate systems and basics of electrostatics.
CO2	Understand Current and Current density, continuity equation, and basics of magnetostatics.
CO3	Derive the Maxwell's equations and boundary conditions.
CO4	Apply Maxwell's equations for electromagnetic wave propagation.
CO5	Understand the use of waveguides for the transmission of electromagnetic waves at higher frequencies.
CO6	Understand the basic concepts of Radiation and Elements used for radiation along with the basic terminologies.
Course Name: Digital Circuit & Fundamental of Microprocessor Code: BEETE 404	
At the end of course Students will	
CO1	Understand the fundamental of basic gates and their use in combinational and sequential circuits.
CO2	Design different types of combinational circuits such as Adder, Subtractor, MUX, DEMUX, Encoder, Decoder etc.
CO3	Evaluate performance of various Flip-flops based systems.
CO4	Design synchronous and asynchronous systems such as up/down counter, ring counter, shift register.
CO5	Make use of digital ICs to design logical circuits.
CO6	Understand the Architecture of microprocessor 8085 and Instruction set which are useful for programming.
Course Name: SIGNALS AND SYSTEMS Code: BEETE 405	
At the end of course Students will	

CO1	Get knowledge about different types of signals and systems used in communication Electronics & Be able to embed the use of fourier series and fourier transform for feature extraction of different electronic signals.
CO2	Understand the concept of probability and its use in communication system.
CO3	Be able to understand different digital formats in line coding ,effect of intersymbol interference and Nyquist criterion.
CO4	Understand the different analog modulation schemes
CO5	Understand the binary modulation schemes
CO6	Find channel capacity for discrete and continuous channel .To be able to understand different source and channel coding schemes
Semester – 5th	
Course Name: Antennas and Wave Propagation	
Code: BEETE 501	
At the end of course Students will	
CO1	Analyse transmission line characteristics and parameters .
CO2	Analyse the field equations, various parameters such as Power radiated , Radiation resistance, Radiation pattern etc. of Linear Antenna and its ground effects and their application.
CO3	Design and analysis of antenna arrays.
CO4	Discuss the concept, radiation mechanism and applications of Microstrip Patch Antenna.
CO5	Classify different Reflector antennas , Horn antennas and analyse them.
CO6	Discuss the different aspects of Antenna measurements and radio wave propagation.
Course Name: Microprocessor & Microcontrollers	
Code: BEETE502	
At the end of course Students will	
CO1	Describe architecture, operating modes, addressing modes, instruction set, the concept of interrupts, concept of memory organization in 8086 and its interfacing.
CO2	Write assembly language program of 8086 and perform the Interfacing of I/O devices and peripherals ICs (8255 & 8279) with 8086 microprocessor.
CO3	Describe architecture, operating modes & interfacing of peripherals ICs (8254, 8259 & 8251) with 8086 & its programming.
CO4	Describe architecture, operating modes & interfacing of DMA8237, 8087 Numeric co-processor with 8086 & its programming, introduction of Pentium Processor.
CO5	Describe architecture of 8051 microcontroller, concept of interrupts, concept of memory organization and its interfacing with 8051.
CO6	Describe instruction set, addressing modes, serial communication, I/O expansion using 8255, counter/timer programming in various modes of 8051, interfacing of keyboard, LED display, ADC & DAC, stepper motor with 8051 & its programming.
Course Name: Analog Circuit and Design	
Code: BEETE503	
At the end of course Students will	
CO1	Analyse the basic differential Amplifier using transistor and its operation, Op-Amp Fundamentals & its characteristic.
CO2	Design linear Op-Amp circuits such as Voltage follower, Summing amplifier, scaling and averaging amplifier, Instrumentation amplifier circuits for various practical applications.
CO3	Design non-linear Op-Amp such as Comparators, Comparator IC such as LM 339, Schmitt trigger, multivibrator circuits for various practical applications using IC555.

CO4	Design and analyse unregulated DC power supply system, series voltage regulators, regulators using IC 78xx and 79xx, protection circuits for regulators, SMPS (Buck & Boost).
CO5	Design and analyse sinusoidal oscillators, Function generator and evaluate figure of merit for all oscillator circuits.
CO6	Design of Butterworth Active Filter (up to 6th order), Relay driver circuit, stepper motor control circuit, DC servo motor control circuit.
Course Name: Communication Electronics Code: BEETE504	
At the end of course Students will	
CO1	Make the students aware of the concepts and types of modulation along with their applications.
CO2	Differentiate different analog modulation techniques in terms of bandwidth, modulation index, power requirements etc. Students also would learn the different generations techniques of each modulation type.
CO3	Identify the basic difference between CW and pulse modulation and learn different pulse analog and pulse digital modulation techniques along with their generation techniques and applications.
CO4	Understand the concept of noise and its effect on signal reception and to learn various types of noises along with the causes of occurrence as well as methods to remove.
CO5	Understand and differentiate between various AM & FM receivers/detectors
CO6	Students would learn broadband communication links for short and medium haul systems. In addition to this the students will be made aware of the different channel multiplexing techniques such as FDM, TDM, CDM
Course Name: Industrial economics and entrepreneurship development Code: BEETE505	
At the end of course Students will	
CO1	Understand business structure and business economics and will apply this knowledge in a complex business environment.
CO2	Identify and understand market structure, economic reforms and its social impact by applying the knowledge of economics.
CO3	Comprehend the process of entrepreneurial development for setting up engineering / business unit.
CO4	Apply knowledge of economics and entrepreneurship with professional and ethical responsibilities.
CO5	Understand application of economics and entrepreneurial know-how in multidisciplinary domains of industry.
CO6	Understand business & economic on a large scale.
Semester – 6TH	
Course Name: Telecommunication switching systems Code: BEETE601	
At the end of course Students will	
CO1	Describe the different types of telephone switching systems
CO2	Describe the Unit of Traffic, Traffic measurement, Lost- call system, Queuing systems and their performance analysis
CO3	Describe the types of Switching Networks, Gradings and their application ,Call processing Functions
CO4	Understand the fundamentals of Network Synchronization and Management
CO5	Acquire the knowledge of various Data Networks like LANs, MANs, Fiber optic networks and Data network Standards

CO6	Understand Cellular Telephone Concepts
Course Name: Digital Signal Processing	
Code: BEETE602	
At the end of course Students will	
CO1	Describe Sampling, reconstruction Process, representation of discrete time signals and analysis of discrete time systems.
CO2	Use Z-transforms for analysis of signals and systems.
CO3	Use Discrete Fourier Transforms for analysis of signals and systems.
CO4	Design and implement IIR digital filter for various applications .
CO5	Design and implement FIR digital filter for various applications .
CO6	Describe the concept of multirate signal processing and apply it for the wavelet transform.
Course Name: Control System Engineering	
Code: BEETE603	
At the end of course Students will	
CO1	Analyze various control systems & control system components ,represent the mathematical model of a system.
CO2	Understand the system with respect to time and the response of different order systems for various inputs.
CO3	Analyze the stability of the system and root locus
CO4	Analyze the system with respect to Bode plot, Nyquist plot
CO5	Understand various compensation techniques
CO6	Apply the state variable approach in design.
Course Name: Digital Communication	
Code: BEETE604	
At the end of course Students will	
CO1	Acquire the knowledge of basic concepts of digital communication system.
CO2	Understand different methods of Source & Waveform Coding
CO3	Describe various Digital Modulation techniques
CO4	Understand the basics of Galois Field, types of error control and Convolution coding
CO5	Understand concepts of Trellis coded modulation, Turbo coding, Reed Solomon Codes, Low density parity check coding (LDPC)
CO6	Describe spread spectrum methods and its application
Course Name: Functional English	
Code: BEETE605	
At the end of course Students will	
CO1	Apply English language proficiency seamlessly in professional careers.
CO2	Identify the communication gaps and barriers to communication in professions and rectify them professionally.
CO3	Write contents, prepare technical documents, legal documents, Board documents, Minutes of the Meetings, internal and external communication in a proficient English language.
CO4	Build and develop the team of corporate communicators.
CO5	Exploit the social digital media for effective corporate communication.
CO6	Unleash public speaking/ presentation skills.
Semester – 7TH	
Course Name: Television and Video Engineering	
Code: BEETE70	
At the end of course Students will	

CO1	Understand the fundamentals of television and display.
CO2	Understand various TV standards.
CO3	Understand digital TV systems.
CO4	Understand modern TV systems.
CO5	Understand Video Recorders.
CO6	Understand various consumer applications of Television Systems
Course Name: DSP Processor and Architecture	
Code: BEETE701	
At the end of course Students will	
CO1	Explain design concepts and features of PDSPs.
CO2	Describe the detailed architecture, addressing modes and instructions of TMS320C5X
CO3	Describe instructions and write simple ALP of DSP Processor.
CO4	Describe internal architecture, addressing modes of TMS320C54XX..
CO5	Design & implement DSP algorithm using code composer studio
CO6	Design decimation filter and interpolation filter.
Course Name: Optical Communication	
Code: BEETE703	
At the end of course Students will	
CO1	Understand the basic elements of optical fiber.
CO2	Understand the different kinds of losses, signal distortion in optical wave guides & other signal degradation factors.
CO3	Describe the classification of various optical source materials, LED structures, LASER diodes.
CO4	Understand the fiber optic receivers such as PIN, APD diodes, receiver operation & performance.
CO5	Understand the analog and digital links of optical fibers.
CO6	Understand and use the operational principal of WDM, SONET, measurement of attenuation, dispersion, refractive index profile in optical fibers.
Course Name: Advanced Digital System Design	
Code: BEETE704	
At the end of course Students will	
CO1	Describe and understand VHDL development flow and Basic VHDL concepts.
CO2	Design the combinational & sequential circuit using VHDL
CO3	Develop the skills to become VLSI front end designers.
CO4	Implement the digital system.
CO5	perform experimentation on Hardware /Software co-design.
Course Name: Data Compression and Encryption	
Code: BEETE705	
At the end of course Students will	
CO1	Implement various text compression techniques.
CO2	Implement various audio compression techniques
CO3	Implement various Image and video compression techniques
CO4	Implement various security techniques in communication.
CO5	Provide various authentications using digital communication.
CO6	Gain the knowledge of encryption techniques application to digital.
Course Name: VLSI Signal Processing	
Code: BEETE705	
At the end of course Students will	
CO1	Implement pipelining and parallel processing for clock period minimization & \ or low power.

CO2	Perform retiming of DFG for clock period minimization.
CO3	Use unfolding algorithm for sample period reduction, parallel processing.
CO4	Use folding transform for register minimization and multirate system.
CO5	Implement convolution using fast convolution algorithm.
CO6	Solve convolution using cyclic & iterated convolution method.
Semester 8 th	
Course Name: Microwave and Radar Engineering	
Code: BEETE801	
At the end of course Students will	
CO1	Understand and analyze the use of active microwave devices like Klystron, TWT, BWO and magnetron.
CO2	Analyze and use different power distribution Tees and passive microwave devices using scattering parameter.
CO3	Understand and analyze different solid state microwave devices.
CO4	Measure various parameters like frequency, power, attenuation, VSWR, impedance, insertion loss, dielectric constant, Q of a cavity resonator, phase shift.
CO5	Understand and analyze fundamentals of Radar.
CO6	Demonstrate acquisition of technical competence in specialized areas of Radar Engineering.
Course Name: Computer Communication Network	
Code: BEETE802	
At the end of course Students will	
CO1	Understand the requirement of theoretical & practical aspect of computer network.
CO2	Understand the switching techniques of computer networks.
CO3	Understand the different wired & wireless LAN standards & hardware.
CO4	Describe various protocols and routing techniques used in network.
CO5	Describe various application protocols used in communication.
CO6	Describe the concept of computer network security and network administration.
Course Name: Wireless & Mobile Communication	
Code: BEETE803	
At the end of course Students will	
CO1	Design a model of cellular system communication and analyze their Operation and performance.
CO2	Quantify the causes and effects of path loss and signal fading on received signal characteristics.
CO3	Analyze equalization, various polarization techniques and different diversities.
CO4	Construct and analyze the GSM system.
CO5	Understand the various protocols used in wireless networking and study other wireless access protocol.
CO6	Understand various wireless LAN networks technology.
Course Name: Wireless Sensor Network (Elective-2)	
Code: BEETE804	
At the end of course Students will	
CO1	Understand wireless sensor network environment and its various applied areas.
CO2	Understand sensor network architecture, sensor networking principles and protocols and case studies.
CO3	Impart sensor network protocols & routing schemes in Wireless Sensor Networks.
CO4	To demonstrate a computing science approach, in terms of design spaces for sensor networks & sensor transport control protocols.

CO5	Understand the concept of middleware for sensor networks; sensor specific programming languages.
CO6	Demonstrate wireless sensor network solutions with practical implementation examples and case studies; and the way these will impact on the engineering product enterprise process.
Course Name: Embedded System (Elective-2) Code: BEETE804	
At the end of course Students will	
CO1	Understand basics of Embedded System, Various design metrics and design challenge of Embedded System
CO2	Understand hardware and software architecture of processor and various types of memory
CO3	Understand the internal organization, various operation modes and programming of ARM processor.
CO4	Understand the different Communication Protocol and Buses in Embedded System
CO5	Understand the various concepts regarding Real Time Operating System
CO6	Design Embedded System based on RTOS
Course Name: Robotics & Automation (Elective-3) Code: BEETE805	
At the end of course Students will	
CO1	The course has been so designed to give the students an overall view of the mechanical components of robot and artificial intelligence.
CO2	Explore Logic and knowledge representation.
CO3	Speech synthesis and speech recognition concluding to working of robot brain.
CO4	Effectively utilization of Image processing and various techniques for the same in robotics
CO5	Efficient mechanism of various types of sensors
CO6	Understanding Robot level programming languages and their types.
Course Name: Satellite Communication (Elective-3) Code: BEETE805	
At the end of course Students will	
CO1	Understand the working principle of satellite communication system and orbital aspects and components of a satellite communication system.
CO2	Design and analyze the link budget of a satellite communication system and study of satellite orbits and launching.
CO3	Describe multiple access techniques in Satellite Communication
CO4	Understand propagation and rain effect on satellite.
CO5	Study of error correction and detection codes related to Satellite Communication.
CO6	Understand the different components in satellite communication earth stations.
Department of Information Technology Engineering	
Course Outcome	
Semester 3 rd	
Course Name: AMIII Code: BEIT301	
At the end of Course Students will	
CO1	Understand Laplace Transform and should be able to solve differential equations.
CO2	Expand the function in periodic form using Fourier Transform.
CO3	Apply concept of Z- transform for solving difference equation and discrete signals.

CO4	Setup and solve linear systems/ linear inequalities graphically / geometrically and algebraically using matrices.
CO5	Know about random variables and theory of probability and compute probabilities in appropriate ways.
CO6	Learn about mathematical Expectations and apply them to predict expected behavior of Random Variables.
Course Name: PLDC Code: BEIT302	
At the end of Course Students will	
CO1	Understand and implement the programming concept of C Language.
CO2	Understand and implement the concepts of Function, pointers and arrays in C.
CO3	Understand and implement the concept of Strings and Structures in C.
CO4	Understand and implement console and file operations & functions.
CO5	Understand the programming concepts using Graphics in C.
CO6	Understand the advanced concepts in C.
Course Name: EIT Code: BEIT303	
At the end of Course Students will	
CO1	Have sound foundation of concepts of Ethics and understand basic need of Ethics in IT industry.
CO2	Know about various Computer and Internet crimes and understand what security measures are needed to handle them.
CO3	Understand about importance of privacy protection and the various laws associated with it, freedom of expression and the issues related to it.
CO4	Identify various ways to protect different types of intellectual properties and how to develop good quality software.
CO5	Implement Ethics in IT organizations regarding non-traditional, contingent and H1B visa workers and protection of whistle blowers.
CO6	Analyze the local and the global impact of Information Technology, Mobile and wireless technology on individuals, organizations and the society.
Course Name: DEFM Code: BEIT304	
At the end of Course Students will	
CO1	Describe the fundamental of basic gates, number system and types of codes used in combinational and sequential circuit. Describe the fundamental of basic gates, number system and types of codes used in combinational and sequential circuit.
CO2	Analyze, design and evaluate digital circuit of medium complexity.
CO3	Analyze and design various Combinational and Arithmetic circuits.
CO4	Evaluate the performance of various Flip-flops and sequential circuits.
CO5	Study fundamentals and Architecture of microprocessor.
CO6	Study different interrupt techniques, memory organization and build Assembly language programs.
Course Name: DC Code: BEIT305	
At the end of Course Students will	
CO1	Understand basic concepts of Data communication and type of communicating networks.
CO2	Able to enumerate the fundamental concepts of various network model and network addressing schemes.

CO3	Able to analyze analog & digital signals and understand the methods of conversion as well as transmission of signals in communication systems.
CO4	Able to explain the concept of analog signal conversion, multiplexing and switching.
CO5	Able to analyze and compare various transmission media.
CO6	Able to identify various network components, topologies, and working of LAN, MAN, WAN networks.
Course Name: EE	
Code: BEIT306	
At the end of Course Students will	
CO1	Know About the environment its benefits, impacts of human actions on environment and measures to minimize and mitigate them.
CO2	Sensitize towards the environment in which they are living and to make them aware about its benefits.
CO3	Enable realize the importance of the sustainable use of natural resources
CO4	Aware of the impacts of human actions on environment and measures to minimize and mitigate them.
CO5	Enable the students to become aware of the current issues and problems pertaining to the environment
CO6	Solve solutions for environmental problems created by local, national and global developmental activities.
Semester 4th	
Course Name: DMGT	
Code: BEIT401	
At the end of Course Students will	
CO1	Apply standard logical equivalence and to be able to prove that two logical expressions are or are not logically equivalent.
CO2	Use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers.
CO3	Discriminate, identify and prove the properties of groups and subgroups.
CO4	Know some elementary concepts from the theory of rings such as zero divisor, division rings and fields.
CO5	Model and solve real-world problems using graphs and trees, both quantitatively and qualitatively.
CO6	Students will be able to apply diverse counting strategies to solve varied problems involving strings, combinations, distribution, and partitions.
Course Name: ADS	
Code: BEIT402	
At the end of Course Students will	
CO1	Identify, understand and determine the usage of various data structure, operations and associated algorithms.
CO2	Student will Understand and implement the concept of stack and queue data structure and its operations.
CO3	Student will Understand and implement different types of Linked List data structure and its operations, Applications.
CO4	Student will Understand and implement General tree data structure, including binary tree, Traversal Techniques.
CO5	Student will Understand and implement Graph data structure, including DFS and BFS, Spanning Trees, Shortest Path Algorithms.
CO6	Demonstrate understanding the various Searching and Sorting Techniques and hashing Techniques.

Course Name: TOC	
Code: BEIT403	
At the end of Course Students will	
CO1	Understand the basic kinds of Finite Automata and their capabilities.
CO2	Describe and transform Regular Expressions and grammars.
CO3	Understand Context Free Language.
CO4	Understand of Turing Machine.
CO5	Identify different Undecidable Problems.
CO6	Discuss the Concept of Computability.
Course Name: CAO	
Code: BEIT404	
At the end of Course Students will	
CO1	Understand the major components of a computer including CPU, memory, I/O and storage.
CO2	Learn how instruction sets are used in computer and how processor get executed
CO3	Study how control signals are generated to activate various components
CO4	Learn how arithmetic operation get performed in computer
CO5	Sudy how memory unit is used to store and fetch data from memory
CO6	Understand how different Input output peripherals use to transfer data.
Course Name: Engineering Physics	
CODE: BESI-2T	
At the end of Course Students will	
CO1	Know the importance of system analysis and design in solving complex problems.
CO2	Show how the object oriented approach differs from the traditional approach to system analysis and design.
CO3	Explain the importance of modeling
CO4	Know how the UML represents an object oriented system using a number of modeling views.
CO5	Recognize the difference between various object relationships, inheritance, association, whole part and dependency relationship.
CO6	Show the role and function of each UML model in developing Object Oriented software.
Semester 5 th	
Course Name: SP	
BEIT501	
At the end of Course Students will	
CO1	Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
CO2	Describe and design the various concepts of assemblers.
CO3	Describe and design the various concepts of macro-processors.
CO4	Understand how linker and loader create an executable program from an object module created by assembler and compiler.
CO5	Understand the various phases of compiler and compare its working with assembler.
CO6	Understand the various Device drivers, its types an installation.
Course Name: DAA	
BEIT502	
At the end of Course Students will	
CO1	Understand the various complexity finding methods.
CO2	Understand the analysis of various algorithms for time and space complexity.
CO3	Implement and analyze greedy strategy algorithms.

CO4	Implement and analyze dynamic strategy algorithms
CO5	Understand back tracking strategy to solve the examples.
CO6	Understand the in-feasibility problems (NP Hard and NP complete)
Course Name: SE Code: BEIT503	
At the end of Course Students will	
CO1	Understanding the processes followed in software development life cycle.
CO2	Finding practical solution to the problem.
CO3	Analyzing system and requirement engineering concept.
CO4	Understanding design engineering concept.
CO5	Analyze software testing fundamentals.
CO6	Identify risk and quality management.
Course Name: CG Code: BEIT504	
At the end of Course Students will	
CO1	Understand the core concepts of Computer Graphics.
CO2	Study Graphics Primitives & 2D Transformations.
CO3	Study about Segment table, Windowing & Clipping.
CO4	Understand concept of 3D modeling in Computer Graphics
CO5	Understand concept of Curves and methods of Interpolation
CO6	Study about color models & color application including Animations.
Course Name: JP Code: BEIT505	
At the end of Course Students will	
CO1	Understand the basics of java and its features.
CO2	Study how to collect same data type into one variable using Arrays and Strings.
CO3	Find how polymorphism is achieved in java and how to handle run time error called exception also understand the concept of inheritance.
CO4	Understand how to run multiple threads at a time.
CO5	Study how input output operation get performed in java
CO6	Study how to create the web application using Applet or Swing.
Course Name: IEED Code: BEIT506	
At the end of Course Students will	
CO1	Able to understand business structures & business economics & will apply this knowledge in a complex business environment.
CO2	Able to identify & understand market structures, economic reforms & its social impact by applying the knowledge of economics.
CO3	Able to comprehend the process of entrepreneurial development for setting up engineering / business unit.
CO4	Able to apply knowledge of economics & entrepreneurship with professional & ethical responsibilities.
CO5	Understand application of economics & entrepreneurship know-how in multidisciplinary domains of industry.
CO6	Able to understand business & economics on a large scale.
Semester 6 th	
Course Name: CN Code: BEIT601	
At the end of Course Students will	
CO1	Understand basic concepts of computer network and Wireless network concepts.

CO2	Detail study about Data Link Layer and different protocols.
CO3	Detail study about network layer.
CO4	Discover the concept of Transport layer and Application Layer.
CO5	Detail study about BOOTP and DHCP packet format, DNS Internet, resolution, connection and command processing.
CO6	Identify various network techniques for the data transfer and security in real world.
Course Name: OS	
Code: BEIT602	
At the end of Course Students will	
CO1	Analyzing the working of an operating system and its components.
CO2	Comparing and analyzing different file systems being used in different operating systems
CO3	Identifying the working methodology of multi threaded applications
CO4	Learning the management of different type of memories in the computer system
CO5	Defining and Analyzing the synchronization process
CO6	Determining the reasons of deadlocks, and their remedial measures in an operating system
Course Name: DBMS	
Code: BEIT603	
At the end of Course Students will	
CO1	Study the fundamentals of DBMS and Formal relational query language.
CO2	Understand File organization, Indexing, Hashing.
CO3	Study the various data models and design of relational database.
CO4	Understand the requirement of query processing and optimization.
CO5	Understand the Transaction Management.
CO6	Understand and implement SQL and PL/SQL
Course Name: IP	
Code: BEIT604	
At the end of Course Students will	
CO1	Understand the HTML Tags and Cascade Style Sheet
CO2	Understand the Java script and its event.
CO3	Concept of XML and XSL.
CO4	Transformation from Static and Dynamic Site Concept.
CO5	Understand the need of Java Server Page.
CO6	Understand the android application Component.
Course Name: DWM	
Code:BEIT701	
At the end of Course Students will	
CO1	Understand basic concepts and applications of Data Warehousing.
CO2	Know why preprocessing of data is important and understand various preprocessing techniques.
CO3	Understand the need of multidimensional analysis in Data Warehouse and study OLAP.
CO4	Analyze the different operations and techniques involved in Data Mining
CO5	Understand Association Rule Mining and study relationship across result sets.
CO6	Explore more recent areas like Business Intelligence, Big Data and Hadoop.
Course Name: CSS	
Code:BEIT702	
At the end of Course Students will	

CO1	Understanding the need of information security and study various encryption techniques.
CO2	Analyzing how symmetric key cryptography algorithm works.
CO3	Analyzing how Asymmetric key cryptography algorithm works.
CO4	Understanding message authentication and hash function.
CO5	Identifying Network security protocols.
CO6	Understanding web security requirement and security system.
Course Name: AI Code:BEIT703	
At the end of Course Students will	
CO1	Understand the importance of AI in related field and in different problem solving and main methods of processing required for computers to analyze and understand texts in a human language.
CO2	Able to know about how heuristics are used to provide adequate solutions to hard search problems.
CO3	Able to understand various methods of knowledge representation.
CO4	Able to understand structural knowledge representation.
CO5	Understand real time examples of Expert system shell and different learning methods and its implementations
CO6	Understand the reasoning techniques to solve problems.
Course Name: MC Code:BEIT704	
At the end of Course Students will	
CO1	Understand the Generation of Mobile Computing, GSM Architecture i.e Localization, Security etc
CO2	Understand and analysis architecture for mobile computing and its working in three tier .
CO3	Understand and analysis Wireless LAN and the IEEE 802.11 standard
CO4	Understand how to mobile management.
CO5	Understand Wireless Application Protocol
CO6	Understand and implement android development basic.
Course Name: Multimedia Code: BEIT705	
At the end of Course Students will	
CO1	Understand the Latest technology exist in multimedia.
CO2	Able to study about hardware and software for multimedia Project and able to find which one will be suitable
CO3	Able to understand multimedia elements and their editing tools .
CO4	Understand data compression techniques.
CO5	Know multimedia skills and file formats.
CO6	Understand process of multimedia production and delivering on internet.
Course Name: STQA Code: BEIT706	
At the end of Course Students will	
CO1	Understand the basic concepts of testing.
CO2	Study the concept of unit testing & how to apply it in the extreme Programming.
CO3	Analyze the outline of control flow testing & Test data selection criteria.
CO4	Understand how to perform Data Flow testing & Fundamentals of System Integration.
CO5	Analyze different types of tests include in System Test Categories & Test Design Process.

CO6	Study the concept of acceptance Testing & How to determine Software quality using different ISO standards.
Semester 8th	
Course Name: Engineering Physics	
CODE: BESI-2T	
At the end of Course Students will	
CO1	Understand the basic concepts of Distributed Systems.
CO2	Study the different types of inter process communication in distributed systems.
CO3	Analyze the concept of process & thread synchronization in depth.
CO4	Understand the concept of deadlock detection, Prevention, Avoidance & resolution using different algorithms of distributed Systems.
CO5	Analyze architecture of distributed shared memory & its Pros-Cons.
CO6	Study distributed File system to determine Desirable features of good distributed file system by performing different operations on file such as accessing, sharing etc.
Course Name: GAP	
Code:BEIT802	
At the end of Course Students will	
CO1	Understand basics principals of Game Design and Game Design Process.
CO2	Recognize technical aspects of Game Design and Architecture and learn how to apply Tier based approach to architecture design.
CO3	Understand importance of standards required to be followed for good quality code and testing and also the basics of display technology , Software Development Kit (SDK), Application Programming Interface (API).
CO4	Understand basic design guidelines for gaming application and also industry wide best practices to follow and the various ways in which the game grabs inputs from various devices.
CO5	Become familiar with 2D Drawing and DirectX.
CO6	Recognize various image, audio, and art formats, data compression, 3D Graphics, DirectX sample browser and popular 3D engines used in Gaming industry.
Course Name: ES	
Code:BEIT803	
At the end of Course Students will	
CO1	Understand the basic of ES, its components and Skills.
CO2	Understand the concept of co-design, tools and memories of ES.
CO3	Understand the different RTOS for embedded system
CO4	Understand the parallel and serial communication devices used for ES.
CO5	Understand the programming concept of ES implemented in C, and C++.
CO6	Able to Design, implement and test microcontroller based embedded system.
Course Name: EComm&ERP	
Code:BEIT804	
At the end of Course Students will	
CO1	Understand foundation and importance of E-commerce and E-commerce software.
CO2	Analyze Business to Business and Business to consumer E-commerce.
CO3	Identify various electronics payment system and and study environment of E-commerce.
CO4	Understand ERP architecture and related technologies.
CO5	Evaluate key aspects of ERP Implementation life cycle.
CO6	Understand Business Modules of an ERP package and study present and future aspects of ERP AND E-commerce.

Department of Mechanical Engineering	
Course Outcomes(CO)	
Semester - 3rd	
Course Name: Fluid Mechanics	Code: BEME303T
At the end of course Students will	
CO1	Understand the various fluid properties & concept of fluid kinematics including types of flow, velocity components, velocity potential & stream function & continuity equation in Cartesian co ordinates.
CO2	Understand principles of static of fluid including pressure measurement, Archimedes principle & buoyancy & stability of floating & submerged bodies.
CO3	Understand the concept of fluid dynamics which includes introduction of Navier stroke equation, Erulers & Bernoulli's equation & various application of bernoulli's equation like pitot tube, venturimeter & orifice meter.
CO4	Understand basics concept & theory of laminar & turbulent flow along with the concept of dimensional analysis which includes Rayleigh method & Buckingham's theorem.
CO5	Understand concept of flow through pipes which includes major & minor losses in pipes, TEL, HGL & transmission of power.
CO6	Understand boundary layer theory comprising of laminar and turbulent boundary layer & flow around immersed body which includes lift and drag, flow around circular cylinder & airfoil & lift development on airfoil.
Course Name: Kinematics Of Machine	Code: BEME302T
At the end of course Students will	
CO1	Fundamentals of mechanism and machine, and relationship between its geometry and relative motion.
CO2	Analyse elements of a mechanism/ machine with respect velocity and acceleration by using graphical as well as analytical method.
CO3	This course will help students to classify and draw the profile of cam and follower according to their application .
CO4	Acquire a basic knowledge of gears, gear train and perform gear kinematics and torque analysis in gear train.
CO5	Students will be able to synthesis a mechanism using graphical approach.
CO6	Students will get familiar with application of laws of frictions, clutches, brakes and dynamometer.
Course Name: Applied Mathematics-III	Code: BEME301
At the end of course Students will	
CO1	Understand Laplace Transform and should be able to solve differential equations.
CO2	Expand the function in periodic form using Fourier series and understand the relationship between z transform and the Fourier transform for discrete time signals.
CO3	Use the functions of several variables in engineering problems.
CO4	Understand the fundamental concepts of complex analysis and also be able to evaluate some standard integrals using contour integrals.
CO5	Student will be able to formulate and solve linear partial differential equations in the field of Industrial Organization and Engineering.
CO6	Set up and solve linear systems/linear inequalities graphically/geometrically and algebraically using matrices.
Course Name: Engineering Metallurgy	Code: BEME305T

At the end of course Students will	
CO1	Understand the fundamental of various engineering materials and crystallography.
CO2	Understand the equilibrium diagram and make use of this knowledge to illustrate the iron carbon diagram, also to understand the classification and applicatin of steel.
CO3	Understand the the composition, microstructure, properties and applications of alloy steel, tool steel and stainless steel.
CO4	Understand the importance of heat treatment and TTT diagram and to realize the significance and general procedure of heat treatment process.
CO5	Understand the the composition, microstructure, properties of various cast iron, ferrous and non ferrous metals.
CO6	Understand the principles of hardness measurement, non destructive testing and powder metallurgy.
Course Name: Manufacturing Processes	
Code: ME304T	
At the end of course Students will	
CO1	Learn the properties of material for pattern making, tolerances on patterns, properties of molding sand, and various molding techniques.
CO2	Learn principles, operations and capabilities of various metal casting methods and working of various types of furnaces
CO3	Students will learn principles, operations and capabilities of various metal joining processes
CO4	Able to understand the principle of various metal forming processes and hot and cold working processes.
CO5	Learn the principle of various metal press working, press terminology and die cutting operations.
CO6	Students will learn principles, operations and capabilities of various processing on plastics and properties of plastics.
Semester - 4th	
Course Name: Mechanics of Materials	
Code: BEME405T	
At the end of course Students will	
CO1	Ability to apply the concept of various types of stresses and strain, its effects and its applications to various design related problems.
CO2	Students will be able to understand and apply the numerical based approach for ascertaining the shear force, bending moment diagram and different types of stresses in beams.
CO3	Students will acquire an ability to understand and apply the analytical / graphical based approach for deflection of beam for various loading conditions and for principal stresses and strain.
CO4	Acquire an ability to solve problem related to torsion of circular shaft and to conversant with numerical approach for column and strut with different loading criteria.
CO5	Students will be able to understand the fracture mechanics, strain energy and impact loading for different conditions.
CO6	Able to analyze and understand basics related to failure, stress concentration, different theories of failure and its numerical approach considering application for solid and hollow shaft with static and variable loading conditions
Course Name: Engineering Thermodynamics	
Code: BEME402T	
At the end of course Students will	

CO1	Students will understand the basic concept of thermodynamics and it's law, ideal gas it's law, universal gas constant & calculation of heat transfer, work transfer internal energy & enthalpy for thermodynamic processes.
CO2	Acquire basic concept of first law of Thermodynamics & it's application for various flow processes.
CO3	Understand the concept of second law of thermodynamics, heat engine, refrigerator & heat pump, concept of entropy for different thermodynamics process and availability.
CO4	Understand the .basic properties of steam and calculation of work and heat transfer using molier chart
CO5	Understand the concept of vapour carnot cycle, Rankine cycle and methods to improve thermal efficiency of cycle
CO6	students will understand the analysis of air standard cycles like otto cycle, diesel cycle, bray ton cycle, stirling cycle and ericsson cycle

Course Name: Hydraulic Machines **Code: BEME403T**

At the end of course Students will

CO1	Understand the principle of compressible flow including study of the effect of shock wave in nozzle, vapour flow through nozzle, isentropic expansion & introduction of impact of jet.
CO2	Students will understand theory & classification of turbo machines & principle, construction features, installation & velocity diagram analysis, including performance characteristics of impulse turbine.
CO3	Students will understand the principle operation of reaction turbine & constructional features, working proportion, design parameter of francis & kaplan turbine.
CO4	Students will understand operational p[principle, constructional features, classification, design consideration & working proportion including the performance characteristics of centrifugal pump.
CO5	Students will understand basics principle & classification of positive displacement pump including theory & constructional feature of reciprocating pump, gear pump, screw pump & vane pump.
CO6	Students will understand the concept & significance of similitude, model testing theory & constructional features of various miscellaneous, water lifting devices like air lift pump, hydraulic ram, submersible pump, regenerative pump.

Course Name: Applied Mathematics-IV **Code: BEME401**

At the end of course Students will

CO1	Grasp the concept of numerical methods and apply them to solve various types of equations.
CO2	Solve differential equations & Eigen value problems using numerical methods
CO3	To apply concept of transform for solving difference equations.
CO4	Able to solve differential equations with variable coefficients like Bessel's equation, Legendre equation Hermite's equations
CO5	Students will become familiar with random variables and probability.
CO6	Determine probabilities of events, determine probabilities and find means and standard deviations of both discrete and continuous probabillity distribution

Course Name: Machining Processes **Code: BEME404T/**

At the end of course Students will

CO1	Able to learn the principle and mechanics of metal cutting, its fundamentals and tool geometry of single point cutting tool and determination of torque and power required.
CO2	Develop an ability to study of various machine tools, time estimation for turning operation and to know center lathe and capstan and turret lathe.
CO3	Students will be able to know working principles, and mechanism of machine tools like shaper planer and slotter and concept of quick return mechanism.
CO4	Learn the principle of operation, specification of milling machine and indexing mechanism.
CO5	Develop an ability to know various grinding operations and specifications of grinding wheels.
CO6	Learn working principles, operations and capabilities drilling machines, and various drilling operations; such as reaming boring, broaching etc.
Semester - 5th	
Course Name: Design Of Machine Element	
Code: BEME502T	
At the end of course Students will	
CO1	Able to understand the basic introduction to machine design, criteria for selection of material for design purpose and failure of selected material.
CO2	Students will be able to design of various joints,brackets, levers and its checking for failure under various loading conditions.
CO3	Students will be able to understand the design of pressure vessel based on stresses induced in it.
CO4	Students will be able to understand the design of power transmission shaft and keys and their ASME codes.
CO5	Students will be able to design the helical , leaf and laminated spring under static and variable loading condition.
CO6	Students will be able to understand terminology of power screw its design and design various types of breaks and clutches
Course Name: Mechanical Measurement & Metrology	
Code: BEME505T	
At the end of course Students will	
CO1	Able to understand generalized measurement system,static & dynamic characteristic of measuring system.
CO2	Able to understand the Classification and principle of various sensing elements and working of instruments for the measurement of mechanical parameters like displacement,speed,load,torque and power.
CO3	Able to understand and handle measuring equipment for measurement of pressure,temperature,vaccum & flow.
CO4	Able to understand basic standards of measurement ,working standards and measuring equipment used for linear and angular measurements
CO5	Able to understand various types of limits,fits,tolerances and design of limit gauges
CO6	Famework where the students will be able to understand various types of comparators and measurement of gear tooth profile.
Course Name: Heat Transfer	
Code: BEME504T	
At the end of course Students will	

CO1	Understand the basic modes of Heat transfer and it's law ,General heat conduction equation in Cartesian, cylindrical and spherical coordinates, numerical approach of heat conduction through composite wall, cylinder and sphere, Concept of Overall heat transfer and critical thickness of insulation
CO2	Students will be able to understand concept of conduction with internal heat generation for plane wall, cylinder and sphere, concept of fin, fin efficiency, effectiveness and it's analysis for the different types of fin, analytical and graphical method of unsteady state heat transfer
CO3	Students will understand the significance of dimensionless number, flow over flat plate, concept of hydrodynamic and thermal boundary layer and also able to do dimensional analysis of forced convection
CO4	students will understand the significance of dimensionless number and able to do dimensional analysis of free convection, numerical approach of flow over horizontal & vertical plate, Cylinder & sphere, pool boiling curve and Film wise and drop wise condensation.
CO5	Students will acquire concept of radiation & it's law, Properties of radiation, Analysis of radiation exchange between parallel plate, cylinder & sphere, shape factor And radiation Shield
CO6	students will understand the concept of heat exchanger and it's classification, analysis and design for parallel and counter flow heat exchanger

Course Name: Advance production process **Code: BEME503T**

At the end of course Students will

CO1	Understand fundamental of various non-conventional machining processes.
CO2	Teach advanced joining processes.
CO3	Teach advancement in traditional lathe machine, design tool layout, and basic fundamental of micromachining process.
CO4	Teach various operations performed on sheet metal.
CO5	To make usage of jig & fixtures.
CO6	Introduce various super finishing processes

Course Name: IEED **Code: BEME501T**

At the end of course Students will

CO1	Students will be able to apply knowledge of dynamics of market forces demand and supply along with the types of elasticity.
CO2	Students will be able to apply the knowledge of production function, laws of returns and cost concepts in applied engineering.
CO3	Students will be able to apply the knowledge of market structure, inflationary impact on economy in applied engineering.
CO4	Students will be able to comprehend the process of entrepreneurial development for setting up engineering / business unit.
CO5	Students will be able to apply knowledge of economics and entrepreneurship with professional and ethical responsibilities.
CO6	Understand application of economics and entrepreneurial know-how in multidisciplinary domains of industry. Students will be able to prepare a project report and carry out market survey and project viability.

Semester - 6th

Course Name: Control System Engg. **Code: BEME602T**

At the end of course Students will

CO1	Familiarize with control system, control and modelling of mechanical system
CO2	Understand the significance of transfer function through block diagram and SFG
CO3	Students will get in depth knowledge of system response signals, mode of control and controller mechanism
CO4	Students will be able to understand concept of stability criterion through root locus
CO5	Familiarize with frequency domain analysis through Bode Plot and polar plot
CO6	Students will be able to develop the concept of state space, representation of continuous time system.

Course Name: Operation Research **Code: BEME603T**

At the end of course Students will

CO1	understand the formal quantitative approach of various OR Models and problem solving techniques of LPP.
CO2	Able to understand the transportation and assignment Models.
CO3	Understand formulation and problems solving techniques of game theory and sequencing models.
CO4	Understand the techniques which provide the tool that can used to solve project management problems.
CO5	Understand the individual and group replacement problems of machine age & concept of waiting line simulation.
CO6	Able to gain the proficiency with tool of simulation models & Queuing theory models

Course Name: Dynamic Of Machines **Code: BEME605T**

At the end of course Students will

CO1	Able to apply concepts of machine element dynamics to simple two degree freedom system and to understand the concept and application of gyroscopic effect.
CO2	Understand the dynamics of planar mechanism, by virtual work method and graphical method, Cam dynamics and jump-off phenomenon.
CO3	Students will be to Understand the concept of Static & Dynamic balancing in rotating machines and reciprocating mechanism
CO4	Student will be able to understand the concept of flywheel , various types of governor and its working principle.
CO5	Student will be able to understand the equation of motion, free vibration of single-degree-of-freedom system with and without damping, Forced vibration of single-degree-of-freedom system and vibration isolation, critical speed of rotors
CO6	Ability to find equation of motion for two-degree-of-freedom system. Understand the concept of natural frequencies, mode shapes and torsional oscillation of two-disc and three disc rotors. Concept of FFT analyzer.

Course Name: Mechatronics **Code: BEME604T**

At the end of course Students will

CO1	Understand elements of mechatronics system.
CO2	Understand communication, interfacing between input and output devices.
CO3	Understand various electrical and mechanical actuating systems.
CO4	Understand use of 8085 microprocessor in mechatronics system.
CO5	Understand basic and application of PLC in mechatronics system.
CO6	Understand use of SCADA, EIS and MEMS in mechatronics system.

Course Name: Energy Conversion -I **Code: BEME601T /**

At the end of course Students will

CO1	Students will understands principles of steam generation and working of different types of boiler.
CO2	Students will be able to design the chimney parameters.They will be able to evaluate the performance of boiler.
CO3	Students will learn working principles of fluidized boiler,coal and ash handling systems.They will understand working principle and applicatoin of cogeneration.
CO4	Understand working and design parameters of steam nozzles.student will acquires knowledge of classification, working and compounding
CO5	Able to evaluate performance of steam turbine and analyze it.
CO6	Learn basics ,working principles ,classification and design calculation of condensers.
Semester -7th	
Course Name: Computer Aided Design Code:BEME703T/	
At the end of course Students will	
CO1	Understand conventional & CAD design techniques of frame buffer & also write algorithm of geometric modeling.
CO2	Able to understand Windowing, Clipping & Solve 2-D, 3-D transformation.
CO3	Student will be able to understand various techniques for geometric Modeling & Assembly Modeling.
CO4	Student will be able to understand the fundamental concept of finite element method & also able to solve 1-D Problem
CO5	Student will be able to solve truss & 2-D FEM Problems.
CO6	Student will be able to understand the various Optimization in engineering design techniques & able to solve optimum design problem of Mechanical Engineering.
Course Name: Industrial Engineering Code:BEME701T	
At the end of course Students will	
CO1	Formulated to design and develop the tools and techniques to improve the productivity.
CO2	Work measurement techniques and human engineering techniques emphasized in the course.
CO3	Various demand forecasting methods elaborate in the course to aware the students.
CO4	The course is formulated for implementation of various maintenance techniques.
CO5	Students will be able to control the quality of manufacturing products using various SQC tools.
CO6	Framework for implementation of various advanced quality control techniques.
Course Name: Energy Conversion-II Code:BEME704T	
At the end of course Students will	
CO1	Understand the working principle of reciprocating compressor and also they will be able to estimate the different efficiencies of reciprocating compressor.
CO2	Understand the construction and working of rotary ,centrifugal and axial flow compressor.they will also be able to evaluate the performance and power requirement of compressor.
CO3	Learn the classification and working principle of internal combustion engine ,,their combustion phenomenon and fule injection system.
CO4	Student will be able to understand and calculate the performance parameters of I.C. Engines .They will learn to analyse performanse of single and multicylinder engine
CO5	Understand the operation of VCRS ,VARs and refrigeration systems and also learn to calculate COP of refrigeration system.

CO6	Learn psychrometric properties and its applications in various air conditioning system.
Course Name: Design Of Mechanical Drives	
Code: BEME705T	
At the end of course Students will	
CO1	Understand design procedure of flywheel and coupling and its practical utility.
CO2	Student will be able to understand design procedure and practical utility of different types of bearing.
CO3	Student will be able to analyze selection of belt drive and its design procedure.
CO4	Student will understand design procedure and practical application of roller chain and wire rope drive.
CO5	Student will be able to compare different drives with gear drive and its design procedure.
CO6	Student will be able to understand worm gear design and design of I.C. Engine components.
Course Name: Automobile Engg.	
Code: BEME702T3	
At the end of course Students will	
CO1	Able to understand basic components of Automobile Fuel supply System, Cooling System & Lubrication System
CO2	Able to understand construction & working of automobile components like clutches, gear box etc.
CO3	Student will be able to understand Transmission system, differential and different types of Brakes.
CO4	Understand the basics, working principle of steering system and suspension system.
CO5	Able to understand basic components Electrical system in Automobile and types of wheel & tyres used.
CO6	Able to develop sense of body and safety consideration in automobile, its components and recent advances in automobile
Semester - 8th	
Course Name: Advanced IC Engine	
Code: BEME803T5	
At the end of course Students will	
CO1	Students will be able to understand the basic concepts of IC Engine operating cycle and its components.
CO2	Able to understand Automobile fuels and characteristics for SI and CI engine and various fuel supply system.
CO3	Able to understand combustion in SI Engine and ignition systems.
CO4	Able to understand combustion in CI engine and ignition systems.
CO5	Able to understand atmosphere pollution from Automobile engine and emission control systems
CO6	Able to understand engine testing and engine performance characteristics
Course Name: Finite Element Method	
Code: BEME802T1	
At the end of course Students will	
CO1	Able to understand background of FEM, Matrix Algebra, Solid Mechanics & Finite element modeling.
CO2	Student will be able to understand & Solve the problems of plane truss, beam & frames.
CO3	Student will be able to understand & Solve the problems of Multipoint Constraints 1D Element, 2D CST Element.

CO4	Student will be able to understand & Solve the problems of Isoparametric Elements and FE Discretisation.
CO5	Student will be able to understand & Solve the problems of steady state heat transfer & dynamics of Undamped free vibrations.
CO6	Student will be able to do Pre-Processing, Meshing Technique, Processing & Post processing of FEM problem.
Course Name: Automation In Production Code: BEME804T	
At the end of course Students will	
CO1	Understand the basic concept of automation, automated flow lines & automated assembly systems.
CO2	Understand the basic concept of numerical control, NC part programming & APT programming.
CO3	Understand the basic concept of industrial robotics & its practical application.
CO4	Understand the basic concept of automated material handling & storage.
CO5	Understand the basic concept of automated inspection & group technology.
CO6	Understand the basic concept of computer aided manufacturing, Flexible manufacturing system , computer aided process planning & shop floor control
Course Name: Energy Conversion -III Code: BEME805T	
At the end of course Students will	
CO1	Students acquire the knowledge of application of gas turbine considering it's performance operating parameters and it's related calculations
CO2	Students will able to understand the concept of propulsion system and its performance parameter. Conversely they would also understand the working of nuclear power plant and its classification and comparison with other power plants.
CO3	Students will acquire the knowledge about solar energy and its application, advanced technology like fuel cell, MHD generator and wind generator.
CO4	Students will able to understand the importance of energy audit considering its method, instruments used for auditing and various related parameters.
CO5	Students will acquire knowledge about hydraulic system considering applications of actuators and hydraulic valves.
CO6	Students will acquire the knowledge of principle of pneumatic system considering its circuits, valves and applications.
Course Name: Refrigeration & Air-conditioning Code: BEME802T5	
At the end of course Students will	
CO1	Understand operation simple VCRS, VARS, analysis of VCRS. Refrigerant properties, nomenclature, environmental issues associated with it, alternate refrigerants.
CO2	Understand working & analysis of compound VCRS & multiple evaporator systems, types and working of basic components of VCRS ie. Compressors, condensers, expansion devices, evaporators, methods of defrosting, various R & AC controls
CO3	Understand working and analysis of various air cycle refrigeration systems, other refrigeration techniques like steam jet refrigeration, thermoelectric refrigeration, vortex tube
CO4	To learn applications of Cryogenics & methods for liquification of gases and its analysis .
CO5	Understand study of psychrometrics, properties & processes and to design calculations for air conditioning systems & various heating load calculations.

CO6	Understand principle & working of air transmission systems and air distribution systems, to understand methods of duct design and air conditioning controls
Course Name: Industrial Management Code: BEME801T	
At the end of course Students will	
CO1	Able to understand the Principles of management, development of scientific management and principles of Fredric W. Taylor, principles of Henry Fayol
CO2	Able to understand the Personal management, functions of personal management, labor welfare, Trade union act & Labor Legislation.
CO3	Able to understand the Marketing management, modern concept of marketing, market research, marketing mix and market segmentation
CO4	Able to understand the Financial management, Sources of finance, financing organizations and types of capital.
CO5	Able to understand the Plant management, Plant location, plant layout, Material handling, Industrial safety, causes & cost of accidents
CO6	Able to understand the Recent trends in production and operation management

MASTER OF TECHNOLOGY	
POWER ELECTRONICS AND POWER SYSTEM	
Semester-I	
Course Name: Advanced Power Electronics CODE: PGPEPS 101T	
At the end of course Students will able to	
CO1	Develop in depth knowledge of advanced power electronics devices.
CO2	Study, design and analyze dc to dc converters with their applications.
CO3	Understand and analyze various resonant and soft switching techniques for converters.
CO4	Understand the operation of modern power converters and multilevel inverters.
CO5	Understand the basic principles of power electronics in drives and its control, types of drives and basic requirements placed by mechanical systems on electric drives.
CO6	Understand the operation of 1 ϕ & 3 ϕ converter drives for separately excited & series DC motors.

Course Name: Power System Modeling CODE: PGPEPS102T	
At the end of course Students will able to	
CO1	Use Park's transformation and per unit system for simulation and stability analysis of power system.
CO2	Understand the general construction and relationship between the various fluxes and its impact on induced emf during the small and transient disturbances.
CO3	Understand the operational behavior and problems of two machine and multi-machine power system for stability study
CO4	To obtain the equivalent circuit, its parameters and simulation model for various components including loads in power system for static and dynamic stability studies.
CO5	To develop analytical approach and program tools for testing transition processes in power system.
CO6	Find equivalent pi model, sending and receiving end power using circle diagram, efficiency & regulation of long transmission line and compare the same with medium and short transmission lines.
Course Name: ADVANCE CONTROL THEORY CODE: PGPEPS103T	
At the end of course Students will able to	
CO1	Develop mathematical models of physical systems.

CO2	Design optimal controllers for physical systems including power electronic and power systems.
CO3	Analyze the issues related to the stability of automatic control systems.
CO4	Design complex nonlinear systems by linearizing them
Course Name: Micro and Smart grid	
CODE: PGPEPS104T	
At the end of course Students will able to	
CO1	Microgrid concepts, Power Electronics interface in AC & DC microgrids, Communication infrastructure, modes of operation and control, Protection and islanding issues, etc
CO2	Power quality issues in microgrids like modeling and stability analysis, regulatory standards and economics and basic smart grid concepts
CO3	Load and generation Power flow analysis, economic dispatch and unit commitment problems and various verticals of smart grid
CO4	Smart grid communication and measurement technologies like Phasor Measurement Unit(PMU), Smart meters, Wide Area Monitoring system(WAMS) etc
CO5	Penetration of Renewable Energy Sources in smart grid and associated issues and their applications in Electric vehicles etc
Course Name: Utilization of Electrical Energy	
CODE: PGOPEN 105T	
At the end of course Students will able to	
CO1	To select their electric drive system based on application and availability of power source.
CO2	Apply power electronics technology in efficient utilization of electrical heating
CO3	Apply power electronics technology in efficient utilization of electrical welding
CO4	Create lighting system using illumination fundamentals and various illumination Technologies.
CO5	Analyze effective utilization of Power Electronic technologies in Electrical Traction.
Semester-II	
Course Name: HVDC and FACTS	
CODE: PGPEPE201T	
At the end of course Students will able to	
CO1	Describe types of topology and multi terminal HVDC System Describe converter operation in various modes.
CO2	Describe converter control modes Describe the application of filters to eliminates harmonics
CO3	Analyse the fault in HVDC system and provide proper protection. Apply knowledge of FACTS controller to AC transmission system Apply shunt, series and their combination for compensation.
CO4	Understand the basic requirements in AC transmission and limitations of AC transmission systems.
CO5	Understand the operating characteristic of various FACTS controllers and their role on enhancing maximum power transfer capacity of power transmission systems.
CO6	Understand the various methods of controlling voltage, angle and impedance in AC transmission system.
Course Name: Power Quality	
CODE: PGPEPS202T	
At the end of course Students will able to	
CO1	Identify the various power quality events like short and long duration variations, Waveform distortion

CO2	Unbalance, Transients, Power factor etc. Analyze the power quality issues using the Power quality indices
CO3	Suggest suitable mitigation strategies for some of the power quality issues
CO4	Provide solution for the mitigation of power quality issues like waveform distortion, unbalance, and poor power factor.
CO5	Analyze various power quality issues as sag, flicker, waveform distortion, unbalance, transients, etc.
CO6	Provide solution for the mitigation of power quality issues like harmonic distortion, unbalance, poor power factor.
Course Name: Advanced Electrical Drives CODE: PGPEPS203T	
At the end of course Students will able to	
CO1	Select the suitable drive for drive system
CO2	To understand the heating and cooling characteristics of electric and to learn the use of flywheel
CO3	To understand different methods of starting & braking of DC and three phase Induction motor using AC & DC contractors & relay
CO4	To Study the motors used in Electric Traction.
CO5	To understand the idea about drives commonly used in industries and digital control of electric drives.
CO6	Select the suitable drive for drive system such as phase angle controlled, chopper-controlled dc drive depending upon its rating.
Course Name: Power System Planning CODE: PGPEPS204T	
At the end of course Students will able to	
CO1	Understanding some advanced concepts of power planning.
CO2	Able to use the basics of load forecasting generation planning that will be useful for engineering professional practice in the power sector operation.
CO3	Able to use the basics of transmission planning that will be useful for engineering professional practice in the power sector operation
CO4	Understanding concepts of power system reliability that will be useful for engineering professional practice in the power sector operation and planning.
CO5	Able to understand the System Operation & Environmental Aspects in Planning that will be useful for engineering professional practice in the power sector.
Course Name: Research Methodology CODE: PGFD205T	
At the end of course Students will able to	
CO1	Knowledge on various kinds of research questions and research designs
CO2	Formulate research problems (task) and develop a sufficiently coherent research design
CO3	Assess the appropriateness of different kinds of research designs
CO4	Knowledge on qualitative, quantitative and mixed methods of research, as well as relevant ethical and philosophical considerations
CO5	Develop independent thinking for critically analyzing research reports
Semester-III	
Course Name: PLC & SCADA CODE: PGOPEN 301T	

At the end of course	
CO1	Students will take part in all sorts of PLC system
CO2	Students will be in condition to deal with the problems of PLC programming.
CO3	They will find out the real time schedule of operation of advanced PLC function
CO4	Students will be in condition to deal with various PLC application.
CO5	They will handle the problems related with automation and SCADA
Course Name: Project Planning and Management CODE: PGFD302T	
At the end of course Students will able to	
CO1	Conduct a basic needs assessment for a proposed project
CO2	Develop a project proposal, Develop a logical framework
CO3	Develop measureable indicators
CO4	Have ability to insert Monitoring and Evaluation into a project
CO5	Develop a grant proposal
CO6	Develop a project budget
INTEGRATED POWER SYSTEM	
Semester-I	
Course Name: Advanced Power Electronics CODE: PG IPS101T	
At the end of course Students will able to	
CO1	Develop in depth knowledge of advanced power electronics devices.
CO2	Study, design and analyze dc to dc converters with their applications.
CO3	Understand and analyze various resonant and soft switching techniques for converters.
CO4	Understand the operation of modern power converters and multilevel inverters.
CO5	Understand the basic principles of power electronics in drives and its control, types of drives and basic requirements placed by mechanical systems on electric drives.
CO6	Understand the operation of 1 ϕ & 3 ϕ converter drives for separately excited & series DC motors.
Course Name: Power System Modeling CODE: PGIPS102T	
At the end of course Students will able to	
CO1	Use Park's transformation and per unit system for simulation and stability analysis of power system.
CO2	Understand the general construction and relationship between the various fluxes and its impact on induced emf during the small and transient disturbances.
CO3	Understand the operational behavior and problems of two machine and multi-machine power system for stability study
CO4	To obtain the equivalent circuit, its parameters and simulation model for various components including loads in power system for static and dynamic stability studies.
CO5	To develop analytical approach and program tools for testing transition processes in power system.
CO6	Find equivalent pi model, sending and receiving end power using circle diagram, efficiency & regulation of long transmission line and compare the same with medium and short transmission lines.
Course Name: Power System Deregulation and Automation CODE: PGIPS103T	
At the end of course Students will able to	
CO1	To get a practical idea of the role and various aspects of distribution system and its shortcomings with reference to of Indian scenarioconverters.

CO2	To get understand the idea of energy forecasting and load forecasting and the actual need of energy generation in terms of short, medium and long period of operation of the distribution system.
CO3	To understand the role of automation to make distribution system more smart, reliable & efficient and correlate this aspect with required technology of PLC based components & SCADA
CO4	To get a thorough idea of the role of reconfiguration of distribution system and understand the best use of distribution system with reduction of losses and faulty lines
CO5	To understand the inclusive role of SCADA making the distribution system more smart and all proof.
CO6	To understand the role of advanced technologies in this field to make the system more communicative, well controlled, well set with RTUs etc

Course Name: Micro and Smart grid **CODE: PGIPS104T**

At the end of course Students will able to

CO1	Microgrid concepts, Power Electronics interface in AC & DC microgrids, Communication infrastructure, modes of operation and control, Protection and islanding issues, etc
CO2	Power quality issues in microgrids like modeling and stability analysis, regulatory standards and economics and basic smart grid concepts
CO3	Load and generation Power flow analysis, economic dispatch and unit commitment problems and various verticals of smart grid
CO4	Smart grid communication and measurement technologies like Phasor Measurement Unit(PMU), Smart meters, Wide Area Monitoring system(WAMS) etc
CO5	Penetration of Renewable Energy Sources in smart grid and associated issues and their applications in Electric vehicles etc

Course Name: Utilization of Electrical Energy **CODE: PGOPEN 105T**

At the end of course Students will able to

CO1	To select their electric drive system based on application and availability of power source.
CO2	Apply power electronics technology in efficient utilization of electrical heating
CO3	Apply power electronics technology in efficient utilization of electrical welding
CO4	Create lighting system using illumination fundamentals and various illumination Technologies.
CO5	Analyze effective utilization of Power Electronic technologies in Electrical Traction.

Semester-II

Course Name: HVDC and FACTS **CODE: PGIPS201T**

At the end of course Students will able to

CO1	Describe types of topology and multi terminal HVDC System Describe converter operation in various modes.
CO2	Describe converter control modes Describe the application of filters to eliminates harmonics
CO3	Analyse the fault in HVDC system and provide proper protection. Apply knowledge of FACTS controller to AC transmission system Apply shunt, series and their combination for compensation.
CO4	Understand the basic requirements in AC transmission and limitations of AC transmission systems.
CO5	Understand the operating characteristic of various FACTS controllers and their role on enhancing maximum power transfer capacity of power transmission systems.

CO6	Understand the various methods of controlling voltage, angle and impedance in AC transmission system.
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Course Name: Power Quality		CODE: PGIPS202T
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At the end of course Students will able to

CO1	Identify the various power quality events like short and long duration variations, Waveform distortion
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CO2	Unbalance, Transients, Power factor etc. Analyze the power quality issues using the Power quality indices
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CO3	Suggest suitable mitigation strategies for some of the power quality issues
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CO4	Provide solution for the mitigation of power quality issues like waveform distortion, unbalance, and poor power factor.
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CO5	Analyze various power quality issues as sag, flicker, waveform distortion, unbalance, transients, etc.
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CO6	Provide solution for the mitigation of power quality issues like harmonic distortion, unbalance, poor power factor.
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Course Name: POWER SYSTEM PROTECTION		CODE: PGIPS203T
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At the end of course Students will able to

CO1	The students should understand primary & backup protection, unit and non-unit protection, fundamental characteristics of protective relaying, concept of reach, types of abnormal conditions and faults, classification of relays.
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CO2	Students should be able to design protective scheme for transmission lines.
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CO3	The students should be able to design distance protection scheme for high voltage lines.
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CO4	The students should be able to understand operating principle of numerical relays, hardware used, programming aspects and its application in time domain and frequency domain.
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CO5	To learn solution techniques to analyze faults in power system
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Course Name: Energy Audit and Management		CODE: PGIPS204T
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At the end of course Students will able to

CO1	An ability to develop in depth knowledge for energy balance and understand the various acts for the same
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CO2	To carry out energy audits for optimal use of energy
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CO3	An ability to understand billing process for various industrial applications and selection of the factors for better utilization of energy.
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CO4	Understand energy conservation in thermal power station.
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CO5	Carry out performance analysis of electrical appliances and related case studies for improvement.
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Course Name: Research Methodology		CODE: PGFD205T
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At the end of course Students will able to

CO1	Knowledge on various kinds of research questions and research designs
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CO2	Formulate research problems (task) and develop a sufficiently coherent research design
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CO3	Assess the appropriateness of different kinds of research designs
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CO4	Knowledge on qualitative, quantitative and mixed methods of research, as well as relevant ethical and philosophical considerations
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CO5	Develop independent thinking for critically analyzing research reports
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Semester-III	
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Course Name: PLC & SCADA		CODE: PGOPEN 301T
At the end of course		
CO1	Students will take part in all sorts of PLC system	
CO2	Students will be in condition to deal with the problems of PLC programming.	
CO3	They will find out the real time schedule of operation of advanced PLC function	
CO4	Students will be in condition to deal with various PLC application.	
CO5	They will handle the problems related with automation and SCADA	

Course Name: Project Planning and Management		CODE: PGFD302T
At the end of course Students will able to		
CO1	Conduct a basic needs assessment for a proposed project	
CO2	Develop a project proposal, Develop a logical framework	
CO3	Develop measureable indicators	
CO4	Have ability to insert Monitoring and Evaluation into a project	
CO5	Develop a grant proposal	
CO6	Develop a project budget	

Computer Science and Engineering (CSE)		
Semester-I		
Course Name: High Performance ComputerArchitecture		CODE: PGCSE101T
At the end of course Students will able to		
CO1	To understand the basics of the Parallel Computer Models.	
CO2	To understand the Pipelining in the Parallel Computer Models.	
CO3	Understand the compiling issues for various parallel architectures.	
CO4	Implementation of transformation techniques for code parallelization.	
CO5	Understand memory management and scheduling for parallel machine.	
CO6	To understand the basics of Parallel and Scalable Architecture.	

Course Name: Advances in Operating System Design		CODE: PGCSE102T
At the end of course Students will able to		
CO1	Describe the important computer system resources and the role of operating system in their management	
CO2	policies and algorithms.	
CO3	Understand the process management policies and scheduling of processes by CPU	
CO4	Evaluate the requirement for process synchronization and coordination handled by operating system	
CO5	Describe and analyze the memory management and its allocation policies.	
CO6	Understand the fundamentals of real time operating systems	

Course Name: Data Science		CODE: PGCSE103T
At the end of course Students will able		
CO1	To understand the basics of the Data science articulate.	
CO2	To understand the concepts of Machine Learning.	
CO3	To understand the important of Big Data Analytics.	
CO4	To understand the how to identify the feature for the particular problem statement.	
CO5	To understand the Graph Analytics and its use in real life scenario.	

Course Name: Software Architecture		CODE: PGCSE104/1T
At the end of course Students will able to		
CO1	understand the basic of Architectural Drivers.	

CO2	Illustrate the current state of the discipline of Software Architecture and examine the ways in which
CO3	architectural design can affect software design.
CO4	Understand implementation and evaluation of various architectural styles used in software engineering.
CO5	To present concrete examples of actual system architectures that can serve as model for new designs having
CO6	well-understood architectural paradigms.

Course Name: AI and Expert System Design		CODE:PGCSE104/2T
At the end of course Students will able		
CO1	To apply the various searching techniques, constraint satisfaction problem and example problems game	
CO2	To be familiar with terminology used in knowledge based system and expert system.	
CO3	To classify knowledge based system by problem solving technique.	
CO4	To be able to design a knowledge based system.	
CO5	To analyze important historical and current trends addressing artificial intelligence.	

Semester-II		
Course Name: Advances in Algorithms		CODE: PGCSE201T
CO1	To understand the basics of Data Structure.	
CO2	Understand the algorithm design paradigm, methods of analysis of algorithms and classify algorithms in P and NP domains.	
CO3	Understand applications of algorithms in real life problems, like searching, social network analysis, constraint handling and implementation of algorithms for distributed and parallel systems.	
CO4	Understand the application of algorithms in Internet programming, search engines design and data compression.	
CO5	Understand the applications of Randomized, Geometric and Numerical algorithms for solving real life problems and designing solutions.	

Course Name: AI and Expert System Design		CODE:PGCSE104/2T
At the end of course Students will able		
CO1	To apply the various searching techniques, constraint satisfaction problem and example problems game	
CO2	To be familiar with terminology used in knowledge based system and expert system.	
CO3	To classify knowledge based system by problem solving technique.	
CO4	To be able to design a knowledge based system.	
CO5	To analyze important historical and current trends addressing artificial intelligence.	

Course Name: Advances Computer Networkand Security		CODE: PGCSE202T
At the end of course Students will able to		
CO1	Describe the functions of each layer in OSI and TCP/IP model.	
CO2	Explain the functions of Application layer and Presentation layer paradigms and Protocols.	
CO3	Classify the routing protocols and analyze how to assign the IP addresses for the given network.	
CO4	Describe the functions of data link layer and explain the protocols.	
CO5	Explain the types of transmission media with real time applications	

Course Name: Advance Digital Image Processing		CODE: PGCSE203T
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At the end of course Students will able	
CO1	Understand the digital image fundamentals.
CO2	Understand morphological operations and its application in region-filling and boundary extraction.
CO3	Understand the concept of feature detection (edge and boundary) and image segmentation.
CO4	Analyze the significance of coding and data compression in image processing (efficient storage and compression schemes)
CO5	Implement object recognition and classification techniques.

Course Name: Advance Multimedia System		CODE: PGCSE204/1T
At the end of course Students will able		
CO1	Developed understanding of technical aspect of Multimedia Systems.	
CO2	Understand various file formats for audio, video and text media.	
CO3	Develop various Multimedia Systems applicable in real time.	
CO4	Apply various networking protocols for multimedia applications.	
CO5	To evaluate multimedia application for its optimum performance.	

Course Name: Internet of Things		CODE: PGCSE204/2T
At the end of course Students will able to		
CO1	Introduction and description of core concepts of IoT, role and scope of smart sensors for insuring convergence of Technologies and multidisciplinary engineering practices, Quotient.Machine Intelligence	
CO2	Understanding the need for migrating towards software defined networks and integrating time series data from wireless sensor networks.	
CO3	Hardware platforms and operating systems commonly used in IoT systems.	
CO4	Big data predictive analytics and transformation from IT to IOT.	
CO5	Awareness of IoT related cyber legislation.	

SEMESTER III

Course Name: Project planning and Management		CODE: PGFD302T
At the end of course Students will able to		
CO1	Conduct a basic needs assessment for a proposed project	
CO2	Develop a project proposal, Develop a logical framework	
CO3	Develop measureable indicators	
CO4	Have ability to insert Monitoring and Evaluation into a project	
CO5	Develop a grant proposal	
CO6	Develop a project budget	

Software System

SEMESTER I		
Course Name: Advances System Software Design		CODE: PGSS102T
At the end of course Students will able to		
CO1	Apply the knowledge of System Software such as Assemblers, Loaders, Linkers and Macro processors to compare the architectures.	
CO2	Apply the knowledge of compilers and develop lexical analyzers.	
CO3	Analyze the given grammar and design parser using different approach.	
CO4	Apply the knowledge of synthesis phase and analyze the correlation between syntax tree and code generation.	

Course Name: Software Architecture		CODE: PGSS103T
At the end of course Students will able to		
CO1	Able to understand the basic concepts of software architecture and software architecture Business cycle.	
CO2	Understand the various architectural styles with case studies	
CO3	Define various quality attributes of software architecture and explain the techniques to achieve them.	
CO4	Understand the concepts of various architectural patterns and some design patterns.	

Course Name: Advanced Data Structure and Algorithms		CODE: PGSS101T
At the end of course Students will able to		
CO1	Design and analyze programming problem statements.	
CO2	Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.	
CO3	Understand the necessary mathematical abstraction to solve problems.	
CO4	Come up with analysis of efficiency and proofs of correctness	

Course Name: Real Time System & Software		CODE: PGOPEN105/1T
At the end of course Students will able to		
CO1	Understand concepts of Real-Time systems and modeling	
CO2	Recognize the characteristics of a real-time system	
CO3	Understand and develop document on an architectural design of a real-time system	
CO4	Develop and document Task scheduling, resource management, real-time operating systems and fault tolerant applications of Real-Time Systems.	

SEMESTER II		
Course Name: Automata and Advanced Computability		CODE: PGSS201T
At the end of course Students will able to		
CO1	Define the notions of countable and uncountable sets	
CO2	Define the various categories of languages and grammars in the Chomsky hierarchy	
CO3	Define various categories of automata (deterministic and nondeterministic finite state automata, and variants of Turing machines)	
CO4	Define the notions of computability and decidability.	

Course Name: Software Design and Construction		CODE: PGSS202T
At the end of course Students will able to		
CO1	Analyze the structure and organization in a larger program	
CO2	Critically evaluate design principles and -patterns in relation to desired properties of software and interfaces	
CO3	Design a program that handles internationalization and localization	
CO4	Apply tools that help the user to refactor or generate source-code	

Course Name: Organization Theory and Behavior		CODE: PGSS204/2T
At the end of course Students will able to		
CO1	Compare and contrast theories of organizational behavior.	
CO2	Analyze management issues as related to organizational behavior.	
CO3	Evaluate ethical issues as related to organizational behavior.	
CO4	Examine challenges of effective organizational communication.	
CO5	Examine the differences and similarities between leadership, power, and management.	

Course Name: Research Methodology		CODE: PGFD205T
At the end of course Students will able to		
CO1	Knowledge on various kinds of research questions and research designs	
CO2	Formulate research problems (task) and develop a sufficiently coherent research design	
CO3	Assess the appropriateness of different kinds of research designs	
CO4	Knowledge on qualitative, quantitative and mixed methods of research, as well as relevant ethical and philosophical considerations	
CO5	Develop independent thinking for critically analyzing research reports	

Course Name: Internet of Things		CODE: PGCSE204/2T
At the end of course Students will able to		
CO1	Introduction and description of core concepts of IoT, role and scope of smart sensors for insuring convergence of Technologies and multidisciplinary engineering practices, Quotient.Machine Intelligence	
CO2	Understanding the need for migrating towards software defined networks and integrating time series data from wireless sensor networks.	
CO3	Hardware platforms and operating systems commonly used in IoT systems.	
CO4	Big data predictive analytics and transformation from IT to IOT.	
CO5	Awareness of IoT related cyber legislation.	

SEMESTER III

Course Name: Software Testing Methodologies		CODE: PGFD302T
At the end of course Students will able to		
CO1	Have an ability to apply software testing knowledge and engineering methods.	
CO2	Have an ability to design and conduct a software test process for a software testing project.	
CO3	Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.	
CO4	Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.	
CO5	Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.	

Course Name: Project planning and Management		CODE: PGFD302T
At the end of course Students will able to		
CO1	Conduct a basic needs assessment for a proposed project	
CO2	Develop a project proposal, Develop a logical framework	
CO3	Develop measureable indicators	
CO4	Have ability to insert Monitoring and Evaluation into a project	
CO5	Develop a grant proposal	
CO6	Develop a project budget	

M Tech (CAD/CAM)

SEMESTER I

Course Name:COMPUTER INTEGRATED MANUFACTURING		CODE: PGOPEN301/1T
At the end of course Students will able to		
CO1	Describe various types of automation and manufacturing concepts. Over view of Computer Integrated Manufacturing software.	
CO2	Explain group technology along with classification and coding also machine design.	

CO3	Explain flexible manufacturing systems and automated inspection devices.
CO4	Analyze and Design appropriate automated assembly systems, production process planning.
CO5	Explain the Manufacturing system control along with business function.

Course Name: Computer Graphics for CAD/CAM		CODE: PGCC102T
At the end of course Students will able to		
CO1	Explain the concepts and underlying theory of origin of computer graphics Along with modeling and the usage of models in different engineering applications.	
CO2	Describe various types of mathematical representation of drawing like curves, wire frame entities.	
CO3	Explain the surface modeling; the mathematical and parametric representation of surfaces.	
CO4	Explain the volume modeling; the boundary representation, hybrid viewing transformations - techniques for visual realism.	
CO5	Explain the graphics standards: data exchange standards and communication standards LAN, WAN.	

Course Name: CNC & Robotics		CODE: PGCC103T
At the end of course Students will able to		
CO1	Explain the concepts of NC, CNC, DNC for the manufacturing of product on CNC machine.	
CO2	2. Explain the concepts of programming, simulation and verification on CNC machine using CAD/CAM.	
CO3	3. Explain the concepts of robotic workspace analysis for design of robotic manipulator required work cell applications.	
CO4	4. Design and analyze the end effectors for given robotic manipulator configuration and also selection of sensors for required integrated industrial application.	
CO5	5. Design of robotic work cell controller and its programming for given serial robotic manipulator for industrial application	

Course Name: MECHANICAL BEHAVIOR OF ENGINEERING MATERIALS		CODE: PGCC104T
At the end of course Students will able to		
CO1	Explain the mechanical properties and behavior of materials also knowledge of how these properties are measured.	
CO2	To develop the student's ability to understand and apply the definitions of stress and strain in three dimensions along with the application of simple constitutive laws, to determine states of stress in three dimensions, to apply constitutive laws to solve deformable body problems.	
CO3	To train students to identify, formulate, and solve engineering problems involving resistance to plastic deformation, fatigue, and fracture.	
CO4	Describe the details of creep: Description of creep. Creep curve. Stress rupture test, Creep mechanisms Dislocation glide and material aspects creep design.	
CO5	Describe the details of fracture mechanics: Types of fracture, Theoretical strength of a solid, Dislocation Theories of Brittle fracture, Ductile fracture, Analysis of propagation, Stress intensity factor, Crack opening displacement, J integrals - Fracture toughness measurement methods.	

Course Name: TOTAL QUALITY SYSTEM & ENGINEERING		CODE: PGOPEN105T
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At the end of course Students will able to	
CO1	Outline the Dimensions and Barriers regarding with Quality.
CO2	Illustrate the customer focus and satisfaction with quality.
CO3	Illustrate the TQS Principles and Demonstrate Tools utilization for Quality improvement.
CO4	Explain the various types of Techniques are used to measure cost of Quality.
CO5	Apply various Quality Systems and Auditing on implementation of TQS.

SEMESTER II	
Course Name: ADVANCED FINITE ELEMENT ANALYSIS	
CODE: PGCC201T	
At the end of course Students will able to	
CO1	Understand the concepts behind formulation methods in FEM.
CO2	2. Analyze of FEA elements such as axial bar, trusses and beams elements.
CO3	3. Explain 2D and 3D problems along with finite element modeling.
CO4	4. Explain scalar field problems: 1D Heat conduction, Slabs fins, 2D heat conduction problems and torsional problems.
CO5	5. Explain Dynamic considerations, Dynamic equations, consistent Values, Eigen vector, natural frequencies, modal shapes, modal analysis.

Course Name: PRODUCT DESIGN AND DEVELOPMENT	
CODE: PGCC202T	
At the end of course Students will able to	
CO1	Describe product design and development process
CO2	Explain in details material selection and process selection process.
CO3	Students familiar with the benchmarking: DNA, DFA, DFX, concurrent engineering also discuss with Investment Decision Sensitivity Analysis.
CO4	Undertake a methodical approach to the management of product development to customer needs.
CO5	Explain to the students Product Development Cycle and Importance of Prototyping also Factors Concerning to RP

Course Name: COMPUTER AIDED TOOL DESIGN	
CODE: PGCC203T	
At the end of course Students will able to	
CO1	Describe in details in three dimensional stress patterns.
CO2	Demonstrate various types of dies and press working operations for mass production of sheet metal parts.
CO3	Demonstrate various types of jigs and fixtures and design of different types of fixtures.
CO4	Demonstrate various gauges and its design and forging equipments.
CO5	Demonstrate various types of cutting tools also design procedures on different types of machine tool.

Course Name: MECHATRONICS	
CODE: PGCC204T	
At the end of course Students will able to	
CO1	Identification of key elements of mechatronics system and its representation in terms of block diagram
CO2	Understanding the concept of performance terminology, displacement position and proximity, velocity and motion, fluid pressure, temperature sensors, light sensors , selection of sensors, signal processing and servo systems.

CO3	Introduce programming of microprocessor Interfacing of D/A converters and A/D converters with application.
CO4	Development of PLC ladder programming and implementation of real life system
CO5	Introduce Design and Mechatronics: Possible design solution with case studies of Mechatronics systems.

Course Name: Research Methodology		CODE: PGFD205T
At the end of course Students will able to		
CO1	Knowledge on various kinds of research questions and research designs	
CO2	Formulate research problems (task) and develop a sufficiently coherent research design	
CO3	Assess the appropriateness of different kinds of research designs	
CO4	Knowledge on qualitative, quantitative and mixed method of research, relevant ethical and philosophical considerations	
CO5	Develop independent thinking for critically analyzing research report	

SEMESTER III		
Course Name: MANUFACTURING SYSTEM INTEGRATION AND MANAGEMENT		CODE: PGOPEN301T
At the end of course Students will able to		
CO1	Understand the concepts behinds manufacturing system and	
CO2	Explain the various types of process planning for the manufacturing and introduce the related software.	
CO3	Understand the concepts of Computer integrated Production management Systems and its control technique.	
CO4	Understand the concepts of manufacturing recourses planning and how to achieve pull production.	
CO5	Understand the concepts of simulation and uses of need and approaches of the simulation for integrating manufacturing systems.	

Course Name: PROJECT PLANNING, EVALUATION & MANAGEMENT		CODE: PGFD302T
At the end of course Students will able to		
CO1	Assumes responsibility as a professional practitioner of project management, applying PM principles and practices while maintaining high standards of practice taking ethical judgments and decisions in a respectful, and sustaining professional standing through commitment to life-long learning.	
CO2	Understand project characteristics and various stages of a project and identification and selection of the project.	
CO3	Understand the conceptual clarity about project consideration and feasibility a: I- sec -Market, Technical, Financial and Economic and also project risk management nlan and analyse the role of stakeholders	
CO4	Understand the Project Quality Management and Value Engineering, Project Management Information System and Purchasing and Contracting for project.	
CO5	Understand the Project Performance Measurement and Evaluation, Project Execution and Control, Project Close-out, Termination and Follow-up and Project Management Software.	

Department of Electronics Engineering		
SEMESTER I		
Course Name: HSSDC		CODE: PGETX102T

At the end of Course student will able to	
CO1	Identify different NOS devices for the specific application
CO2	Able to understand Fabrication of different MOS devices corresponding to the requirements
CO3	Able to Integrate different MOS Devices
CO4	Able to understand the Review of Crystal Structure.
CO5	Able to understand Advanced Devices HBT and HEMT Devices

Course Name: ADC		CODE: PGETV104/3T
At the end of Course student will able to		
CO1	Be able to Describe and Analyze the Digital Transmission of Signals.	
CO2	Be able to describe the effective digital Modulation techniques as per the applications.	
CO3	Be able to Model Digital Communication systems using appropriate mathematical techniques	

Course Name: ADSP		CODE: PGETX101T
At the end of Course student will able to		
CO1	Be able to Represent Discrete Time Signals Analytically and Visualize them in the time Domain	
CO2	Be Able to meet the requirement of theoretical and practical aspects of DSP with regard to sampling and Reconstruction	
CO3	Be able to design and Implement Digital Filter for various Applications.	
CO4	Be able to estimate the power spectrum.	
CO5	Be able to describe the concept of multirate signal processing and how to apply it for the wavelet transform.	
CO6	Be able to Describe the various transforms for analysis of Signals and Systems	

Course Name: AESD		CODE: PGETX103T
At the end of Course student will able to		
CO1	Be able to Select and Design suitable embedded systems for real world applications	
CO2	Able to embed different Components as the application.	

SEMESTER II

Course Name: ASD		CODE: PGETX203T
At the end of Course student will able to		
CO1	Be Able to Demonstrate system Modelling	
CO2	Be able to Simulate Different Linear and Non linear systems	

Course Name: DSMS		CODE: PGETX201T
At the end of Course student will able to		
CO1	Be able to design of Combinational and Sequential Circuit	
CO2	Be able to Implement of Design System.	
CO3	Be able to Experiment on Hardware/Software co-design	

Course Name: HPCN		CODE: PGETX202T
At the end of Course student will able to		
CO1	Be able to understand the requirement of theoretical & Practical aspect of Computer Network.	
CO2	Be able to Describe various protocols used in High Performance based networks.	
CO3	Be able to design MANET based applications.	

Course Name: MCOM		CODE:PGETX204/3T
At the end of Course student will		
CO1	Be able to understand the cellular systems.	
CO2	Be able to know the concept of switching systems.	
CO3	Be able to understand the concept of Base station subsystems.	