

<b>PRIYADARSHINI COLLEGE OF ENGINEERING</b>	
<b>Course Outcome</b>	
<b>First Year</b>	
<b>Semester-I</b>	
<b>Course Name: Applied Mathematics-I</b>	<b>CODE: BESI-1</b>
At the end of course Students will	
<b>CO1</b>	Able to understand the idea of derivatives & also able to solve problem involving relationship between changing quantities
<b>CO2</b>	Able to understand concepts of function of several variables & their individual effects on function & Its application in optimization.
<b>CO3</b>	Understand, Analyze & transfer the data in a proper form for advance Engineering studies
<b>CO4</b>	Able to clarify & identify different types of D.E & to arrive at solution & Its Interpretation
<b>CO5</b>	Students will develop an ability to design conduct & analyze different stream(Electrical & Mechanical) related problems
<b>CO6</b>	Understand the concept of complex numbers & its application in Engineering filed.
<b>Course Name: Engineering Physics</b>	
<b>CODE: BESI-2T</b>	
At the end of course Students will	
<b>CO1</b>	Understand the basic principles of Quantum mechanics and will be able to apply these to the complex phenomenon of interaction of radiation with matter.
<b>CO2</b>	Understand the concept of wave packets using Heisenberg's uncertainty principle.
<b>CO3</b>	Able to apply Schrodinger's wave equations to study the complex physical phenomenon.
<b>CO4</b>	Able to understand the structure of crystalline solids by applying knowledge of crystallography.
<b>CO5</b>	Able to understand semiconducting materials by using the concepts of band theory of solids.
<b>CO6</b>	Able to apply the knowledge of semiconductor fundamentals to study various electronic devices.
<b>Course Name: Engineering Chemistry</b>	
<b>CODE: BESI-3T</b>	
At the end of Course Students will	
<b>CO1</b>	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
<b>CO2</b>	Understand ecological balance and awareness towards sustainable development
<b>CO3</b>	Provide solution to the problem pertaining to complex chemical processess useful in engineering concepts.
<b>CO4</b>	Understand the manufacturing processes of cement, importance of microscopic constituents and various properties including types of cement their uses.
<b>CO5</b>	Understand new concept of energy storage devices and its applications
<b>CO6</b>	Understand and identify the professional responsibilities and the impact of engineering practices on society.
<b>Course Name: Basics of Electrical Engineering</b>	
<b>CODE: BESI-4T</b>	
At the end of Course Students will	
<b>CO1</b>	Able to define and explain the meaning of charge current, voltage, power, energy, Passive elements
<b>CO2</b>	Able to understand the basic concepts of magnetic circuits as applied to electric machines.
<b>CO3</b>	Able to understand the EMF generation and AC fundamentals.

Sheet1

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
<b>Course Name: Basics of Civil Engineering</b>	
<b>CODE: BESI-5T</b>	
<b>At the end of Course Students will be able to</b>	
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.
<b>Course Name: Engineering Graphics</b>	
<b>CODE: BESI-6T</b>	
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
<b>Course Name: Communication Skills</b>	
<b>CODE: BESI-7T</b>	
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.
<b>Semester - II</b>	
<b>Course Name: Applied Mathematics-II</b>	
<b>CODE: BESII-1</b>	
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

Sheet1

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.
<b>CODE: BESII-2T</b>	
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.
<b>Course Name: Materials Chemistry</b> <b>CODE: BESII-3T</b>	
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 time 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.
<b>Course Name: Engineering Mechanics</b> <b>CODE: BESII-4T</b>	
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.
<b>Course Name: Advanced Electrical Engineering</b> <b>CODE: BESII-5T</b>	
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

<b>Course Name: Ethical Science</b>	
<b>CODE: BESII-8</b>	
At the end of Course Students will	
<b>CO1</b>	Able to apply knowledge of humanities and social engineering process in diverse sphere of social life.
<b>CO2</b>	Able to make appropriate use of socio-legal tools for the overall benefit of the society.
<b>CO3</b>	Able to apply the principles of industrial psychology and industrial sociology and industrial democracy in industry.
<b>CO4</b>	Able to apply tools of motivation at work place, comprehend work organization and forms of organization.
<b>CO5</b>	Able to apply the tools of transactional analysis, to solve complex behavioral problems and develop leadership traits.
<b>CO6</b>	Able to develop awareness for environment sustainability and apply dynamic principles of social and ethical science.
<b>Department of Aerounotical Engineering</b>	
<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Aerothermodynamics</b>	
<b>Code: BEAE-302T</b>	
At the end of Course Students will	
<b>CO1</b>	Able to apply the basic concepts of thermodynamics to determine the work and heat transfer in various thermodynamics processes.
<b>CO2</b>	Able to implement the first law of thermodynamics to closed system and open system.
<b>CO3</b>	Able to apply the second law of thermodynamics to heat engine, heat pump refrigerator and will also evaluate entropy and availability of engineering systems.
<b>CO4</b>	Able to sketch P - v, T - s and h - s plot for the phase process and will also used steam table to determine the various properties of pure substances.
<b>CO5</b>	Able to analyze different air standard cycle viz. Otto Cycle, Diesel Cycle and Brayton Cycle and Vapour Cycle on the basis of different performance parameters.
<b>CO6</b>	Able to explain the application of Nozzle, Diffuser, Turbine, Compressor and Throttling Valve.
<b>Course Name: Fluid Mechanics and Machinery</b>	
<b>Code: BEAE-303T</b>	
At the end of Course Students will	
<b>CO1</b>	Get the idea about basic fluid properties, Newton's law of viscosity and its application & detailed idea about different pressure measuring device (like manometer, bourdon's gauge)
<b>CO2</b>	Get basic idea about flow visualization techniques, Euler's equation of motion & Bernoulli's equation & its application
<b>CO3</b>	Able to get a clear idea about the types of flow depending on the Reynolds' number, Significance of Reynolds' and Mach number in the fluid flow, Phenomena for separation of flow and after the completion of this unit students will be able to find lift and drag force on an immersed body.
<b>CO4</b>	Able to Classify the hydraulic machines (such as turbines & pumps) understand about the working principle, Constructional features, Performance Characteristics, Governing & Selection criteria for Impulse Turbines
<b>CO5</b>	Able to Classify the hydraulic machines (such as turbines & pumps) understand about the working principle, Constructional features, Performance Characteristics, Governing & Selection criteria for Reaction Turbines
<b>CO6</b>	Get the basic idea regarding the classification of pumps, Applications of pumps.

<b>Course Name: Computer Programming</b>		<b>Code:BEAE-304T</b>
At the end of Course Students will		
<b>CO1</b>	Understand the programming concept of C Language.	
<b>CO2</b>	Understand the concept of function, call by value and call by reference and how to use functions in programs and use of pointers.	
<b>CO3</b>	Understand the concept of array, one dimension, two dimension and multi dimension.	
<b>CO4</b>	Understand the concept of structure through programming, union and additional features of structure in C.	
<b>CO5</b>	Understand the concepts of files and its different functions, random access of files by using functions.	
<b>CO6</b>	Understand the use of ROM BIOS functions and TSR programming.	
<b>Course Name: Elements of Aeronautics</b>		
<b>Code:BEAE-305T</b>		
At the end of Course Students will		
<b>CO1</b>	Able to understand the basic concepts of aerospace engineering, historical revolution, early airplanes, biplanes and monoplanes.	
<b>CO2</b>	Able to understand the evolution in the field of aerodynamics, materials, structures and propulsion over the years.	
<b>CO3</b>	Able to explain about the major components of an airplane and their functions, Different types of flight vehicles, classifications ,flight instruments for flying.	
<b>CO4</b>	Able to understand the physical properties and structure of the atmosphere, Temperature, pressure and altitude relationships, Evolution of lift, drag and moment.	
<b>CO5</b>	Able to understand different types of fuselage structures, wing structure and will able to get the knowledge of various Metallic and non-metallic materials, Use of aluminium alloy, titanium, stainless steel and composite materials.	
<b>CO6</b>	Able to understand different types of air breathing and non airbreathing engines, their comparative merits demrits..	
<b>Semester - 4<sup>th</sup></b>		
<b>Course Name: Manufacturing Process -I</b>		
<b>Code:BEAE-402T</b>		
At the end of Course Students will		
<b>CO1</b>	The students will able to understand the basic concepts of Casting Process, types of Patterns, moulding process and various moulding machines	
<b>CO2</b>	The students will able to understand the concepts of gating design process, various types of Melting furnaces and special casting processes.	
<b>CO3</b>	The students will able to explain about the mechanics of forming processes, forging process, extrusion & wire drawing processes.	
<b>CO4</b>	The students will able to understand the various kinds of metal joining processes, weldability of metals, defects & inspection of welding.	

Sheet1

CO5	The students will able to understand different types of powder metallurgy processes, sintered carbide cutting tools and types of composite materials and its applications.
CO6	The students will able to explain different types of processing of plastics methods use for processing of plastic materials.
<b>Course Name: Aircraft Materials</b> <b>Code:BEAE-403T</b>	
At the end of Course Students will	
CO1	Able to understand classification, composition, properties heat treatments and applications of aerospace materials.
CO2	Enumerate the classification, advantages and applications of composite materials.
CO3	Describe preparation of moulding compounds, prepares and manufacturing of advanced composites.
CO4	Enumerate creep curve, various stages of creep, metallurgical factors influencing various stages.
CO5	Illustrate Various types of fracture, fatigue, oxidation and hot corrosion of aircraft materials .
CO6	Able to understand Iron base, Nickel base, Cobalt base super alloys and high temperature ceramics.
<b>Course Name: Aircraft Structure-I</b> <b>Code:BEAE-404T</b>	
At the end of Course Students will	
CO1	Understand the concept of simple stresses & strains, Torsion of circular shafts and Thin cylinders and spherical shells subjected to internal pressure.
CO2	Understand and analyse the Shear force & bending moment, Pure bending, deflection of beams and Shear stresses in beams concept.
CO3	Understand the Strain energy & impact loading and Statically indeterminate beams and frames.
CO4	Understand the Buckling of columns.
CO5	Establish relations for Principal stresses & strains and analyze member's subjected to different types of stresses simultaneously.
CO6	Analyze the derivation of maximum, minimum principle stresses & maximum shear stress induced in shaft when it is subjected to bending moment, torque & axial load.
<b>Course Name: Aerodynamics-I</b> <b>Code:BEAE-405T</b>	
At the end of Course Students will	
CO1	Able to apply the knowledge in order to measure the lift and drag characteristics of an aerodynamic body
CO2	Able to apply the knowledge of potential flow theory in order to measure the lift and drag characteristics
CO3	Able to design and measure the lift and drag characteristics of an aerofoil

Sheet1

CO4	Able to determine the flow characteristics in a variable area duct and the flow across a shock wave
CO5	Able to determine the flow characteristics across a shock wave
CO6	Able to solve the boundary layer problems.
<b>Semester - 5<sup>th</sup></b>	
<b>Course Name: Heat Transfer</b> <span style="float: right;"><b>Code:BEAE-501T</b></span>	
At the end of Course Students will	
CO1	Able to understand the thermal response of engineering systems for application of Heat Transfer mechanism in both steady and unsteady state of conduction mode.
CO2	Able to apply the Dimensionless numbers into the free convection mode of heat transfer, Boiling and Condensation.
CO3	Able to apply the empirical correlations of the forced convection and also able to determine laminar and turbulent flow through ducts.
CO4	Able to apply the basic laws for radiation mode of heat transfer and also explain the concepts of black and gray body radiation heat transfer.
CO5	Able to explain the concept of heat exchanger and also apply the heat exchanger analysis for parallel, cross & counter flow by using NTU method.
CO6	Able to Remember the concepts to work out real time problems in Aerospace industry which involves the concepts of Heat Transfer mechanisms in the areas of gas turbine combustion chamber, rocket thrust chamber and ablative heat transfer
<b>Course Name: Aircraft Flight Mechanics</b> <span style="float: right;"><b>Code:BEAE-502T</b></span>	
At the end of Course Students will	
CO1	Understand the dimensional analysis, similarity laws and model laws with ISA for aircraft in various operating conditions.
CO2	Understand and analyze the general Forces and moment distribution of aircraft for different flight conditions.
CO3	Analyze the performance of aircraft under steady straight level Flight conditions.
CO4	Analyze the performance of aircraft during climbing, gliding, turning and other maneuvers.
CO5	Understand the establishment of aircraft stability criteria and co-relate various stability aspects with aircraft control. Understanding case study of longitudinal static stability.
CO6	Analysis of longitudinal stability and control aspect due to aircraft components including fuselage, engine nacelle and control surface effectiveness.
<b>Course Name: Aerodynamics-II</b> <span style="float: right;"><b>Code:BEAE-503T</b></span>	
At the end of Course Students will	
CO1	Able to explain the formation of wing tip vortex and will able to measure the lift and induced drag characteristic using momentum theory.
CO2	Able to apply the knowledge of lifting line theory in order to measure the induced drag characteristics

Sheet1

CO3	Able to to measure the drag and moment characteristics of complete airplane using different theories.
CO4	Able to measure the lift and drag characteristics over an airfoil section at supersonic speed.
CO5	Able to explain the classification, construction and working of a wind tunnel will its application in Aerospace industry.
CO6	Able to explain the instrumentation part along with flow visualisation techniques used in Wind tunnel.
<b>Course Name: Aircraft Structure -II</b>	
<b>Code:BEAE-504T</b>	
At the end of Course Students will	
CO1	Get idea about the symmetrical and unsymmetrical structural members of the aircraft structure, Section properties of the structural members and will be able to find the Neutral Axis Position, maximum bending stress position for the specified structural members
CO2	Able to find the shear centre and shear flow diagrams for the closed section and open section
CO3	Get the idea and knowledge of Membrane Analogy, Bredt - Batho formula application for Single and multi-cell structures. Shear flow in single and multicell structures under torsion and the overall understanding of Shear flow in single and multi cell under bending with walls effective and ineffective
CO4	Get the knowledge about Rectangular sheets under compression, Local buckling stress of thin walled sections, Crippling stresses by Needham's and Gerard's methods, thin walled column strength the theory Sheet stiffener panels, effective width, Inter rivet and sheet wrinkling failures which will give a clear idea to the students about aircraft structural failure.
CO5	Able to apply the knowledge of previous four units to solve the problem of the real aircraft structural components using the theory of bending, shear, torsion and buckling in the real aircraft structural components like wing and fuselage
CO6	Able to apply the knowledge of previous four units to solve the problem of the real aircraft structural components using the theory of bending, shear, torsion and buckling in the real aircraft structural components like wing and fuselage
<b>Course Name: Propulsion I</b>	
<b>Code:BEAE-505T</b>	
At the end of Course Students will	
CO1	Able to explain about different types of jet engine, there working principal and performance characteristics, apply basic concept of gas turbine cycle on jet engine and thrust augmentation methods
CO2	Able to explain about different types of inlets (mainly subsonic and supersonic), internal and external flow in terms of boundary layer separation and stall condition, diffuser performance and shock swallowing by area variation
CO3	Able to explain about various type of combustion chamber used in gas turbine cycle, and the factor affecting to design and performance parameters of combustion chamber, they can also able to apply the fundamental knowledge on different types flaming technique used in combustion chamber
CO4	Able to explain about the basic operating principle of convergent and divergent nozzles, the choking condition in nozzles, the various types of CD nozzles and thrust reversal methods
CO5	Able to explain about various types of compressor and turbine, their performance parameters, their efficiency and component characteristics



Sheet1

<b>CO6</b>	Able to explain about basic working principal of gas turbine components like: inlet, compressor, combustion chamber, turbine and nozzle, and able to apply fundamental concept on numerical technique
<b>Semester - 6<sup>th</sup></b>	
<b>Course Name: Propulsion II</b> <span style="float: right;"><b>Code:BEAE-601T</b></span>	
At the end of Course Students will	
<b>CO1</b>	Able to explain about working principal and performance characteristics of Ramjet engine in terms of their subcritical, critical and supercritical operation and the combustion process in Ramjet engine, they can also able to apply the same on numerical concept
<b>CO2</b>	Able to explain about working principal and performance characteristics of scramjet engine and hypersonic propulsion, they also must be able to elaborate preliminary concept of supersonic combustion
<b>CO3</b>	Able to explain about the basic operating principal of rocket propulsion, Rocket nozzle classification, Rocket performance considerations and they able to apply the same of numerical concept
<b>CO4</b>	Able to explain about the solid propellant, Selection criteria of solid propellants, Important hardware components of solid rockets and Propellant grain design considerations
<b>CO5</b>	Able to explain about liquid propellant, Thrust control in liquid rockets, Cooling in liquid rockets, Limitations of hybrid rockets, Relative advantages of liquid rockets over solid rockets and must be able to apply the same on numerical problems
<b>CO6</b>	Able to explain about advanced propulsion technique like: Electric rocket propulsion, Ion propulsion techniques, Nuclear rocket, Types, Solar sail, Preliminary Concepts in nozzle less propulsion and their operating principal etc.
<b>Course Name: System Modeling and Simulation</b> <span style="float: right;"><b>Code:BEAE-603T</b></span>	
At the end of Course Students will	
<b>CO1</b>	Get the basic knowledge of the mathematical representation of physical system and the solving those equations by block diagram algebra
<b>CO2</b>	Get the basic idea about systems modeling and various types of example of system modelling
<b>CO3</b>	Get a general idea about system studies specially about the corporate system model studies
<b>CO4</b>	Get knowledge about the mathematical formation of control system and finding the transfer function of various types of basic control systems
<b>CO5</b>	Get a basic overview of MATLAB by using SIMULINK
<b>CO6</b>	Study about avionics architecture in detail and different types of DATA bus system for commercial and fighter aircraft
<b>Course Name: Aircraft Design</b> <span style="float: right;"><b>Course Code:BEAE605T</b></span>	
At the end of Course Students will	
<b>CO1</b>	Explain the Airplane design process including conceptual, preliminary & detail design phases, Classify the airplanes, list out the factors affecting the configuration, Merits of different airplane layouts
<b>CO2</b>	Outline the Principal features, Explain the aerodynamic and structural consideration, Weights and Strength considerations

Sheet1

CO3	Utilize the Data collection and make 3-View drawings, model the initial sizing, rubber engine sizing and fixed engine sizing, do the calculations of weight estimation, do the choice of wing loading and thrust loading,.
CO4	Examine the Wing design, List out the Airworthiness requirements, Relate V-n diagram with real problem, List out the Elements of wing design, explain the Structural features.
CO5	Examine the Fuselage design, explain Loads on fuselage, List out the Elements of fuselage design, Determination of tail surface areas, explain Structural features.
CO6	Examine the Landing gear design, explain Loads on Landing gear, perform the Preliminary landing gear design.
<b>Semester - 7<sup>th</sup></b>	
<b>Course Name: Aircraft System And Instrumentation                      Course Code:BEAE701T</b>	
At the end of Course Students will	
CO1	Able to understand airplane control systems
CO2	Able to describe aircraft hydraulic systems
CO3	Able to describe aircraft pneumatic & hybrid systems
CO4	Able to understand different Engine Systems
CO5	Able to explain auxilliary system of the aircraft
CO6	Able to identify different aircraft instruments and thire operation and principles.
<b>Course Name: Space Flight Mechanics    Course Code:BEAE703T</b>	
At the end of Course Students will	
CO1	Explain the Solar System, Reference frames and coordinate systems, Celestial Sphere, Motion of Vernal Equinox, Sidereal, Solar and Standard time and the Earth's Atmosphere.
CO2	Outline the application and derive the Equations of The N-body problem, The two-body problem, Many body problems, The circular restricted three body problem, Lagrange-Jacobi identity, Satellite orbits and all the Orbital Elements.
CO3	Utilize and derive the equations for the Satellite orbit transfer, General aspects of satellite injections, Orbit deviations due to injection errors, Special and general perturbations, Cowell's and Encke's method.
CO4	Examine and derive the equations for the Two dimensional interplanetary trajectories, Fast interplanetary trajectories, Three dimensional interplanetary trajectories, Launch of interplanetary spacecraft, Trajectory about the target plant.
CO5	Derive and explain The boost phase, Ballistic phase and Re-entry.
CO6	Explain the Space environment and its peculiarities and the effect of space environment on the selection of materials of spacecraft.
<b>Course Name: AGEMP    Code:BEAE-705T</b>	
At the end of Course Students will	
CO1	Able to understand the aircraft ground handling techniques such as mooring, jacking, leveling, towing operations and also student will get aware of engine starting procedures.

Sheet1

CO2	Able to understand the ground servicing various sub systems such as air conditioning and pressurization system, oxygen and oil systems.
CO3	Able to understand the shop safety and environmental cleanliness precautions. And also student will get aware of hand tools identification terminology.
CO4	Able to understand how the problems are identified by troubleshooting aircraft structural, mechanical or electrical systems and also Discussing the types of documentation, Regular documentation, Airline generated documentation, ATA document standards
CO5	Able to understand the specification and correct use of various aircraft hardware, American and British systems of specifications, and identification of all types of fluid line fittings.
CO6	Able to understand the plumbing connector's cables swaging procedures, tests, Advantages of swaging over splicing.
<b>Semester - 8<sup>th</sup></b>	
<b>Course Name: Vibration and Aero-Elasticity</b> <span style="float: right;"><b>Code:BEAE-802T</b></span>	
At the end of Course Students will	
CO1	Able to determine the equation of motion of vibratory system by using Newton's Method, Energy Method and D' Alembert Principal.
CO2	Able to determine the natural frequency of single degree of freedom vibratory system for free and forced vibration .
CO3	Able to apply the concepts of vibration to multi degree of freedom system and also understand the concepts of static and dynamic coupling.
CO4	Able to solve different vibratory problem by using Hamilton's Theorem and Lagrange's Equation.
CO5	Able to apply the concepts of vibration of string to derive the equation of motion for lateral , longitudinal and torsional vibration of beam.
CO6	Able to explain different Aero elastic instabilities associated with vibration of different components of aircraft.
<b>Course Name: Reliability Centered Maintenance</b> <span style="float: right;"><b>Code:BEAE-803T</b></span>	
At the end of Course Students will	
CO1	Able to understand reliability and apply it for the failure data analysis.
CO2	Able to apply systems reliability concepts and techniques to design problems.
CO3	Able to understand History, Evolution, Achievements and Methodologies of Reliability Centered Maintenance.
CO4	Able to understand Failure Mode and Effect Analysis (FMEA), Analysis & Categories of failure Mode.
CO5	Understand methods needed for RCM Maintainability
CO6	Able demonstrate understanding and application of RCM.
<b>Course Name: Computational Fluid Dynamics</b> <span style="float: right;"><b>Code:BEAE-805T</b></span>	
At the end of Course Students will	
CO1	Get chance for reviewing the basic fluid dynamics governing equations ( continuity, energy and momentum) and get knowledge about Importance of CFD to various engineering streams.

Sheet1

CO2	Get the knowledge in depth for the Description and procedure used in Finite Difference, Finite Element and Finite Volume schemes for simple one dimensional conduction problems, Application to unsteady one-dimensional conduction problems.
CO3	Able to apply the knowledge of Finite Difference method to 1D & 2D steady and unsteady conduction problems and get idea about the use of different numerical schemes
CO4	Get the knowledge in depth for initial and boundary value problems and numerical methods like Runge Kutta and shooting method
CO5	Get the idea about the numerical and analytical solution methods for 1D and 2D Conduction and convection problems, application of Navier Stokes equations for incompressible flow. Pressure correction scheme, staggered grid, SIMPLE and SIMPLER schemes.
CO6	Get the knowledge about FVM method for compressible flow
<b>Department of Civil Engineering</b>	
<b>Course Outcomes(CO)</b>	
<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Applied Mathematics - III</b> <span style="float: right;"><b>Code: BECVE301</b></span>	
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.
<b>Course Name: Strength of Material</b> <span style="float: right;"><b>Code: BECVE302</b></span>	
At the end of course Students will	
CO1	Understand the behavior of materials under different stress and strain conditions
CO2	Able to draw Axial Force, Bending Moment and Shear Force Diagram for beams under different conditions of loading.
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.
<b>Course Name: Environment Engineering -I</b> <span style="float: right;"><b>Code: BECVE303</b></span>	
At the end of course Students will	

Sheet1

<b>CO1</b>	Able to understand the importance and necessity of water supply and able to determine the capacity of water supply scheme
<b>CO2</b>	Know the basic knowledge related to the conveyance systems and the appurtenances used
<b>CO3</b>	Understand characteristics of water, drinking water standards
<b>CO4</b>	Able to design various units of conventional water treatment plant
<b>CO5</b>	Equipped with the basic knowledge related to design of water supply system
<b>CO6</b>	Understand of necessity of treatment, types of treatment Processes and disposal methods for solid waste

**Course Name: Engineering Geology** **Code: BECVE304**

At the end of course Students will

<b>CO1</b>	Understand the internal structure of the Earth and geomorphic forms.
<b>CO2</b>	Identify important rocks and minerals.
<b>CO3</b>	Understand the geological structures like folds and faults etc.
<b>CO4</b>	Know reason and effects of earthquakes.
<b>CO5</b>	Know about groundwater availability zones and field procedures of subsurface exploration
<b>CO6</b>	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

<b>CO1</b>	Understand the effect of process of manufacturing on different properties of concrete
<b>CO2</b>	Recommend, check different constituent of concrete and control method of manufacture of concrete
<b>CO3</b>	Test strength and quality of plastic and set concrete
<b>CO4</b>	Understand application of admixture and its effect on properties of concrete
<b>CO5</b>	Understand various environmental factors which affect durability of concrete, analyze cause of deterioration of concrete components and to suggest various preventive measures to it
<b>CO6</b>	Test various strength of concrete by destructive and nondestructive testing methods

**Semester – 4<sup>th</sup>**

**Course Name: Structural Analysis-I** **Code: BECVE401**

At the end course of Students will

<b>CO1</b>	Able to understand bending moment and shear force diagram for indeterminate structure such as beams and frames.
<b>CO2</b>	Able to perform ILD analysis of determinate beams and trusses
<b>CO3</b>	Able to apply strain energy method to redundant frame and truss

Sheet1

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.
<b>Course Name: Geotechnical Engineering -I</b> <span style="float: right;"><b>Code:BECVE402</b></span>	
At the end course of Students will	
CO1	Know the types of soils and understand the three phase system.
CO2	Determine the index properties of the soil and classify the soils.
CO3	Determine the engineering properties of the soil.
CO4	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.
<b>Course Name: Transportation Engineering - I</b> <span style="float: right;"><b>Code:BECVE403</b></span>	
At the end course of Students will	
CO1	Able to understand the broad vision and complete knowledge of design of highways pavement
CO2	Able to understand the construction practices in highway engineering and pavement.
CO3	Able to test the highway materials and draw appropriate conclusion.
CO4	Able to maintain and propose measurements of highways.
CO5	Able to undertake traffic studies on highways.
CO6	Able to know methods and techniques of repairs and maintenance of bridges and highways.
<b>Course Name: Surveying-I</b> <span style="float: right;"><b>Code: BECVE404</b></span>	
At the end of course Students will	
CO1	Able to measure distances and angles.
CO2	Able to undertake various civil engineering surveys work.
CO3	Able to do temporary and permanent adjustments.
CO4	Able to orient and draw the various maps.
CO5	Able to calculate areas and volumes of the civil engineering work.
CO6	Able to develop knowledge of the new surveying equipments.
<b>Course Name: Building Construction Materials</b> <span style="float: right;"><b>Code:BECVE405</b></span>	
At the end of course Students will	
CO1	The students should able to understand different types of foundation, causes of failure and remedial measure.

Sheet1

CO2	The students should able to understand classification of bricks & different types of brickwork.
CO3	The students should able to understand types of stone masonry & damp proofing.
CO4	The students should able to understand different types & methods of construction of roof & floor.
CO5	The students should able to understand functional design of different types of staircase, door & window.
CO6	The students should able to understand plastering, pointing, centering & painting.
<b>Semester - 5<sup>th</sup></b>	
<b>Course Name: Structural Analysis-II</b> <span style="float: right;"><b>Code: BECVE501</b></span>	
At the end of course Students will	
CO1	Apply the Kanis methods for analysis of frames
CO2	Apply MDM for analysis of Beam and frames and to understand the behavior of different structural members
CO3	Formulate the globe stiffness matrix, load matrix for analysis purpose for plan truss.
CO4	Formulate the globe stiffness matrix, load matrix for analysis purpose for beam.
CO5	Formulate the stiffness matrix, transformation matrix, load matrix for analysis purpose for plan frame.
CO6	Apply the basics of finite element method in the analysis of structural components and understand the concepts related to structural dynamics.
<b>Course Name: Reinforced Cement Concrete (RCC)</b> <span style="float: right;"><b>Code: BECVE502</b></span>	
At the end of course Students will	
CO1	Understand the basic concepts of RCC design with working stress method.
CO2	Understand the different method of prestressing of concrete. And analysis of prestress beam and slab.
CO3	Understand the basis concepts of limits state method. And design of beam for limit state of serviceability and limit state of collapse
CO4	Understand the limit state of collapse in compression. And analysis and design of axially loaded and uniaxial bending column.
CO5	Understand the behaviour of RCC to control cracking and design of beam for shear and bond.
CO6	Use the knowledge of structural design for design of various slab .
<b>Course Name: Fluid Mechanics - I</b> <span style="float: right;"><b>Code: BECVE503</b></span>	
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 basic concepts related to laminar and turbulent flow.

Sheet1

CO4	Apply the Bernoulli's equation to solve the problems in fluid.
CO5	Understand and apply the concept of fluid measurement and its control through discharge
CO6	Understand the concepts of dimensional analysis use the dimensionless number suitably.
<b>Course Name: Geotechnical Engineering</b>	
<b>Code: BECVE504</b>	
At the end of course Students will	
CO1	Use the knowledge of different soil techniques to ascertain the properties of soil.
CO2	Analysis of stability of natural slope, safety and sustainability of slopes.
CO3	Design of retaining structure, reinforced earth wall.
CO4	Practice of ground improvement techniques.
CO5	Design of shallow foundation
CO6	Design of deep foundation.
<b>Course Name: Hydrology And Water Resources</b>	
<b>Code: BECVE505</b>	
At the end of course Students will	
CO1	Compute precipitation, rainguage network
CO2	Compute infiltration, evaporation and traspiration
CO3	Determine total runoff, Use the techniques of the Hydrographs to forecast flood discharge at various durations.
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	Understand concept of recharge, Rainwater harvesting, planning of water resources mini project
<b>Semester – 6<sup>th</sup></b>	
<b>Course Name: Steel Structures</b>	
<b>Code: BECVE601</b>	
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



Sheet1

<b>CO6</b>	Understand the importance of IS Code and its implementation considering design safety and norms of the engineering practice
<b>Course Name: Surveying-II</b>	
<b>Code: BECVE602</b>	
At the end of course Students will	
<b>CO1</b>	Carry forward the concepts of basic surveying techniques.
<b>CO2</b>	Set out the curves on the field by various surveying methods.
<b>CO3</b>	Set out the transition curve on the field.
<b>CO4</b>	Gain the knowledge of geodetic surveying and triangulation adjustment.
<b>CO5</b>	Gain the knowledge of photographic surveying.
<b>CO6</b>	Apply the concepts of modern surveying techniques & instrumentation.
<b>Course Name: Fluid Mechanics-II</b>	
<b>Code: BECVE603</b>	
At the end of course Students will	
<b>CO1</b>	Understand the concepts related to boundary layer theory and determination of drag and lift forces.
<b>CO2</b>	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.
<b>CO3</b>	Use the concepts of uniform and critical flow through open channels including design of efficient channel sections.
<b>CO4</b>	Make use of specific energy concepts in the analysis of open channel flow. Undertake Gradually Varied Flow analysis and its computation.
<b>CO5</b>	Understand the different techniques of dimensional analysis and its use in model testing.
<b>CO6</b>	Understand and apply basics related to Turbines & Pumps in Water Resources planning
<b>Course Name: Environment Engineering -II</b>	
<b>Code: BECVE605</b>	
At the end of course Students will	
<b>CO1</b>	Understand concept related to water & its quality, sewage, sewer, storm water, etc in its hydraulic design.
<b>CO2</b>	Apply the knowledge of different components of sewer in construction, testing & maintenance of sewers
<b>CO3</b>	Test the sample of waste water in the laboratory for physical & chemical characteristics.
<b>CO4</b>	Take up functional planning, layout and design of water treatment plant Components and sewage treatment plant components.
<b>CO5</b>	Take up functional planning, layout and design of Plan for rural sanitation provisions, perform functional design of septic tank,
<b>CO6</b>	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.
<b>Semester -7<sup>th</sup></b>	
<b>Course Name: Advanced Concrete Structures</b>	
<b>Code: BECVE701</b>	

Sheet1

At the end of course Students will	
CO1	Understand the principles of analysis and design of circular and rectangular water tank.
CO2	Understand the behavior and failure modes of different concrete member .Analysis and design of columns.
CO3	Analyze and apply the results in designing of beam.
CO4	Design of retaining wall.
CO5	Understand the relevant software and use the same in analysis & design of concrete members.
CO6	Design of Combine footing.
<b>Course Name: Estimating And Costing Code:BECVE702</b>	
At the end of course Students will	
CO1	Prepare the preliminary estimate for administrative approval & technical sanction for a civil engineering project.
CO2	Estimate the bill of quantities using different techniques of preliminary & detailed estimation of buildings.
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	Arrive the exact value of the asset (movable & immovable) using different Valuation techniques.
<b>Course Name: Earthquake Resistant Design of Structures Code:BECVE703</b>	
At the end of course Students will	
CO1	Understand the different aspects related to seismology and terms related to it
CO2	Analyze earthquake loading effect on structures.
CO3	Perform the analysis and design of structures against earthquake loading.
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	Use the knowledge in practical situation.
<b>Course Name: Air pollution And Solid Waste Managements Code:BECVE703</b>	
At the end of course Students will	

Sheet1

CO1	Able to understand different aspects of air pollutants, its sources and effects on man, animal, plants and materials etc.
CO2	Able to design controls methods for air pollution to reduce its impact on environment
CO3	Able to design 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	Able to understand problems arriving in its collection, transportation, and processing
CO6	Able to design safe collection and disposal methods.
<b>Course Name: Construction Management &amp; Law</b>	
<b>Code: BECVE704</b>	
At the end of course Students will	
CO1	Understand various types of projects and modern construction techniques.
CO2	Understand construction planning, scheduling and various controls.
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.
<b>Course Name: Transportation Engineering - II</b>	
<b>Code: BECVE705</b>	
At the end of course Students will	
CO1	Understand the functions of various elements of railways.
CO2	Plan and design various elements of railways.
CO3	Understand the various principles traffic control in railways.
CO4	Understand the functions of various elements of airports.
CO5	Evaluate the plans, design and maintenance of various elements of airports, docks and harbour.
CO6	Understand the basic knowledge about various elements of Tunnels.
<b>Semester -8<sup>th</sup></b>	
<b>Course Name: Irrigation Engineering</b>	
<b>Code: BECVE801</b>	
At the end of course Students will	
CO1	Understand the importance of irrigation engineering, the methods of irrigation and crop water requirement.

Sheet1

CO2	Understand the planning, design and operation of storage reservoir and make use of it in the practical situation.
CO3	Understand the basic profile of dams and use the knowledge in checking stability of Gravity dams and Earth dams.
CO4	Gain the knowledge of types of spillways and design of diversion head works.
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 water logging and provide the solution to such problem.
<b>Course Name: Pavement Analysis And Design Code:BECVE802</b>	
At the end of	course Students will
CO1	Able to understand design parameters of various pavements
CO2	Able to analyz flexible pavements, conduct tests & experiments and interpret the data
CO3	Able to design flexible pavements by IRC methods to meet desired needs within realistic constraints
CO4	Able to analyz rigid pavements, conduct tests & experiments and interpret the data
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
<b>Course Name: Advanced Reinforced Cement Concrete Design Code:BECVE803</b>	
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.
<b>Course Name: Water and Waste Water Treatment Code:BECVE803</b>	
At the end of	course Students will
CO1	Understand various concept realated to Water treatment plant , detail concept, design of aeration.
CO2	Use the techniques, skills, and modern engineering tools necessary for environmental engineering practices.
CO3	Designing of different units of water &waste water treatment plant.

Sheet1

CO4	Understand knowledge about recent development in water & waste water treatment
CO5	Procedure for Conduct a various test on water & waste water
CO6	Understand modern methods of treatment.
<b>Course Name: Construction Economics And Finance Code: BECVE804</b>	
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.
<b>Department of Computer Technology</b>	
<b>Course Outcomes(CO)</b>	
<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Applied Mathematics-III Code: BECT201</b>	
At the end of	course Students will
CO1	Understand Laplace Transform and should be able to solve differential equation
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	Apply concept of Z- transform for solving difference equation.
CO4	Understand the fundamental concept of complex analysis and also be able to evaluate some standard integral using contour integrals
CO5	Setup and solve linear systems/ linear inequalities graphically / geometrically and algebraically using matrices
CO6	Compute probabilities and conditional probabilities in appropriate ways and able to learn about mathematical expectation and apply them to predict expected behavior of any function
<b>Course Name: Program Logic Design in 'C' Code: BECT202</b>	
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.

Sheet1

<b>CO4</b>	Study and implement basic computer graphics programming.
<b>CO5</b>	Understand fundamental concepts of Problem Solving & Programming methodology and the fundamentals of space and time complexity for designing an algorithm.
<b>CO6</b>	Understand various Problem Solving & Programming approaches and fundamental concepts of object oriented programming.
<b>Course Name: Digital Circuits and Microprocessors</b> <span style="float: right;"><b>Code: BECT203</b></span>	
At the end of course Students will	
<b>CO1</b>	Analyze Boolean Algebra and basics of digital logic circuits
<b>CO2</b>	Analyze fundamentals of different combinational circuits
<b>CO3</b>	Analyze and design of various sequential circuits
<b>CO4</b>	Analyze the architecture and pin diagram of 8085
<b>CO5</b>	Analyze the different types of instruction set of UP 8085
<b>CO6</b>	Analyze the interrupt structure and Programming Technique of UP 8085
<b>Course Name: Social &amp; Ethical aspects Of IT</b> <span style="float: right;"><b>Code: BECT204</b></span>	
At the end of course Students will	
<b>CO1</b>	Understand the concepts of ethics in business world and IT community.
<b>CO2</b>	Understand cyber crimes and privacy laws.
<b>CO3</b>	Understand the freedom of Expression issues.
<b>CO4</b>	Understand intellectual property issues, trade secrets and software development process.
<b>CO5</b>	Understand the impact of IT on productivity, health care cost and social networking issues.
<b>CO6</b>	Understand the concept of contingent workers, outsourcing, whistle blowing, online virtual worlds.
<b>Course Name: Computer Architecture &amp; Organization</b> <span style="float: right;"><b>Code: BECT205</b></span>	
At the end of course Students will	
<b>CO1</b>	Understand basic functional units, their functioning and their interconnection of a computer system.
<b>CO2</b>	Apply Methodical treatment of machine instructions, addressing techniques, instruction sequencing and basic aspects of 2's complement arithmetic facilitates.
<b>CO3</b>	Recognize Register-Transfer-level treatment of the instruction fetching and execution by Hardwired & Microprogrammed control unit.
<b>CO4</b>	Examine Arithmetic unit of computer logic design for fixed-point operating hardware on 2's complement number.
<b>CO5</b>	Describe Cache and multiple-module memory systems for increasing main memory bandwidth.

CO6	Express large system uses many processor operating in parallel Interconnection networks for multiprocessors.
<b>Semester - 4<sup>th</sup></b>	
<b>Course Name: Discrete Mathematics and Graph Theory</b> <b>Code:BECT208</b>	
At the end of	course Students will
CO1	Able to apply standard logical equivalence and to be able to prove that two logical expressions are or not logically equivalent.
CO2	Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions and integers.
CO3	Able to discriminate. Identify and prove the properties of groups and subgroups.
CO4	Students will able to know some elementary concepts from the theory of rings such as zero divisor, division rings and fields.
CO5	Able to model and solve real world problems using graphs and trees, both quantitatively and qualitatively.
CO6	Able to apply diverse counting strategies to solve various problems involving strings, combinations, distribution and partitions.
<b>Course Name: Data Structure &amp; Program Design</b> <b>Code:BECT209</b>	
At the end of	course Students will
CO1	Understand basic concepts of Data structure and role of data structures in structuring and manipulating data like searching and sorting.
CO2	Understand the concepts of stack and queue along with their implementation of various operations and evaluation of expressions using stack.
CO3	Understand the concepts and types of Linked list and implementation of its various operations.
CO4	Understand Binary tree , its representations, traversals methods and searching techniques.
CO5	Understand the significance of graph , its implementations and applications of graphs.
CO6	Understand concept of file Storage structures and its various techniques.
<b>Course Name: Advance Microprocessor &amp; Interfacing</b> <b>Code:BECT210</b>	
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.

Sheet1

<b>CO6</b>	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.
<b>Course Name: Theory of Computation</b> <b>Code:BECT211</b>	
At the end of course Students will	
<b>CO1</b>	Understand the basic concepts of Mathematical Preliminaries, induction and proof methods, formal grammars and Chomsky hierarchy.
<b>CO2</b>	Understand and design Finite Automata without output and with output to recognize regular languages.
<b>CO3</b>	Understand and differentiate Regular Grammar and Context Free Grammar.
<b>CO4</b>	Understand and design Push Down Automata to recognize Context Free Languages.
<b>CO5</b>	Understand Linear Bounded Automata ,Turing Machine and design it to recognize unrestricted languages.
<b>CO6</b>	Understand the basic concepts of Computability, Decidability, Solvability, Post Correspondence Problem and Ackerman Problem of Turing Machine.
<b>Course Name:Introduction to Mainframe Language</b> <b>Code:BECT212</b>	
At the end of course Students will	
<b>CO1</b>	Understand the concepts of Mainframe computers and their features.
<b>CO2</b>	Understand the Operating system used on Mainframe computers i.e Z/OS operating system .
<b>CO3</b>	Understand the concept of JCL and Various statement used in JCL.
<b>CO4</b>	Understand basics fundamentals of COBOL Language.
<b>CO5</b>	Understand basic concept of files and their programming.
<b>CO6</b>	Understand the basic concept of COBOL DB2 programs.
<b>Semester – 5<sup>th</sup></b>	
<b>Course Name: Object Oriented Modeling</b> <b>Code:BECT301</b>	
At the end of course Students will	
<b>CO1</b>	Understand basic concept of Object Orientation and Unified Modeling Language.
<b>CO2</b>	Understand basic concept of different Structural modeling and its implementation
<b>CO3</b>	Understand basic concept of different Behavioral modeling and its implementation
<b>CO4</b>	Understand basic concept of different Architectural Modeling and its implementation
<b>CO5</b>	Understand the concept of unified process, learning development life cycle.
<b>CO6</b>	Understand the concept of Architecture centric process and design the case study.
<b>Course Name: Data Base Management System</b> <b>Code:BECT302</b>	
At the end of course Students will	
<b>CO1</b>	Understand the concepts of DBMS and Data models.
<b>CO2</b>	Understand the concepts of Relational algebra, functional dependencies and implementation of normalization.



Sheet1

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.
<b>Course Name: Operating System Code:BECT303</b>	
At the end of course Students will	
CO1	Understand various techniques for solving Recurrences.
CO2	Understand asymptotic notations and implement , analyze Divide & Conquer Strategy.
CO3	Understand, implement and analyze Greedy Method.
CO4	Understand, implement and analyze Dynamic Programming Strategy.
CO5	Understand, implement and analyze Backtracking Strategy.
CO6	Understand the concepts of NP-Hard and NP-Completeness.
<b>Course Name: Design and Analysis of Algorithms Code:BECT304</b>	
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.
<b>Course Name: Data Communication Code:BECT305</b>	
At the end of course Students will	
CO1	Analyze and formulate various digital and analog signal modulation techniques to draw clear and reasonable ways of various data transmission methods.
CO2	Able to use mathematical and statistical methods to use various binary data coding techniques usually used for error free transmission of data.
CO3	Develop an ability to understand analog to digital signal conversion techniques to be able to transmit the data for long distance communication.
CO4	Exhibit knowledge of data communication to identify, formulate and solve engineering and social problems.
CO5	Exhibit the ability to analyze and interpret the data for successfully .
CO6	Develop an ability to design ,conduct and analyze.

<b>Semester – 6<sup>th</sup></b>	
<b>Course Name: Computer Graphics</b> <b>Code: BECT306</b>	
At the end of course Students will	
<b>CO1</b>	Understand basic concepts of computer graphics, Recognize the importance of computer graphics and exploring its wide spread applications.
<b>CO2</b>	Study and implement Basic Raster Graphics Algorithms for Drawing 2D primitives and various polygon filling algorithms.
<b>CO3</b>	Study and implement 2D Clipping algorithms for regular and irregular windows and various types of curves.
<b>CO4</b>	Understand and implement various 2D Transformations .
<b>CO5</b>	Understand 3D System Basics and 3D Transformations and to study various hidden surface removal algorithms.
<b>CO6</b>	Understand the basics of Graphics Programming using OPENGL and its <b>implementation.</b>
<b>Course Name: Computer Networks</b> <b>Code: BECT307</b>	
At the end of course Students will	
<b>CO1</b>	understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
<b>CO2</b>	apply knowledge of different techniques for error detection and correction during data transmission.
<b>CO3</b>	understand the concept of IP address, subnet mask and default gateway in a routed network .
<b>CO4</b>	understand and demonstrate the working of Transport layer protocols such as TCP and UDP.
<b>CO5</b>	understand and demonstrate application layer protocols such as HTTP, FTP, SMTP etc.
<b>CO6</b>	understand the organization of wireless LAN , ISDN Service & ATM , Cellular Telephony , Satellite Networks.
<b>Course Name: Software Engg. &amp; Project Management</b> <b>Code: BECT308</b>	
At the end of course Students will	
<b>CO1</b>	Understand basics of Software Engineering and different software development process models.
<b>CO2</b>	Understand Software Engineering Principles and different process engineering practices.
<b>CO3</b>	Understand different software modeling approaches and design engineering concepts.
<b>CO4</b>	Understand different software testing strategies , types and their significance.
<b>CO5</b>	Understand the concept of Software Quality Assurance and project management.
<b>CO6</b>	Understand Software risk Management , Software quality management and Software Re-engineering.
<b>Course Name: Embedded System Design</b> <b>Code: BECT309</b>	

Sheet1

At the end of	course Students will
<b>CO1</b>	Define basics of embedded system and will be able to discuss about design problems and challenges of ES.
<b>CO2</b>	Understand concept of inter process communication, shared data problem and their solutions.
<b>CO3</b>	Understand basic concepts and working environment of Real Time Operating System.
<b>CO4</b>	Understand basic concepts and architecture of micro controller and its programming.
<b>CO5</b>	Understand Basics of Communication and to perform interrupt programming.
<b>CO6</b>	Understand the interfacing of Micro-controller with various external <b>devices</b> .
<b>Course Name: Functional English Code: BECT310</b>	
At the end of	course Students will
<b>CO1</b>	Apply English language proficiency seamlessly in professional careers.
<b>CO2</b>	Identify the communication gaps and barriers to communication in professions and rectify them professionally.
<b>CO3</b>	Write contents, prepare technical documents, legal documents, Board documents, Minutes of the Meetings, internal and external communication in a proficient English language.
<b>CO4</b>	Build and develop the team of corporate communicators.
<b>CO5</b>	Exploit the social digital media for effective corporate communication.
<b>CO6</b>	Unleash public speaking/ presentation skills.
<b>Semester – 7<sup>th</sup></b>	
<b>Course Name: Compilers Code: BECT401</b>	
At the end of	course Students will
<b>CO1</b>	Understand the concepts of formal language translator, various phases of compiler and demonstrate its analytical phases.
<b>CO2</b>	Understand and demonstrate various parsing techniques on context free grammar.
<b>CO3</b>	Understand and demonstrate syntactic structure of programming language as well as semantic rules for translation scheme.
<b>CO4</b>	Understand various code optimization techniques and evaluate the effects of code optimizations.
<b>CO5</b>	Understand role of assembler in code generation phase.
<b>CO6</b>	Understand the concepts of symbol table, various data structures used by compiler and error recovery strategies.
<b>Course Name: Artificial Intelligence Code: BECT402</b>	
At the end of	course Students will
<b>CO1</b>	Understand the concepts of AI, its importance in various fields and basics of AI problem solving techniques with more stress on various problem characteristics.
<b>CO2</b>	Understand and demonstrate various search techniques and to understand various types of knowledge representation scheme using logic.
<b>CO3</b>	Study various non-formal knowledge representation methods and statistical reasoning methods in AI problem solving.

Sheet1

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.
<b>Course Name: Advanced Data Base Management System Code:BECT403</b>	
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.
<b>Course Name: Advanced Operating System Code:BECT404</b>	
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.
<b>Course Name: DWM Code:BECT405</b>	
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.

Sheet1

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.
<b>Course Name: Cloud Computing</b>	
<b>Code: BECT406</b>	
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.
<b>Semester 8<sup>th</sup></b>	
<b>Course Name: CIS</b>	
<b>Code: BECT407</b>	
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.
<b>Course Name: WDM</b>	
<b>Code: BECT408</b>	
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.
<b>Course Name: Parallel Computing</b> <b>Code:BECT409</b>	
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.
<b>Department of Electronics Engineering</b>	
<b><u>Course Outcome</u></b>	
<b>Semester 3 rd</b>	
<b>Course Name: Applied Mathematics-III</b> <b>Code:BEENE301</b>	
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.
<b>Course Name: Electronic devices and circuits</b> <b>Code: BEENE302</b>	
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
<b>Course Name: Electronics Measurement and Instrumentation</b> <b>Code: BEENE303</b>	

Sheet1

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.
<b>Course Name: Object Oriented programming and Data Structure      Code:BEENE304</b>	
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
<b>Course Name: Network Analysis and Synthesis      Code: BEENE305</b>	
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
<b>Semester 4 th</b>	
<b>Course Name: M-IV      Code:BEENE401</b>	
At the end of Course Students will	
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.
<b>Course Name:Power Drives and Machines</b> <b>Code:BEENE402</b>	
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
<b>Course Name: Electromagnetic Field</b> <b>Code:BEENE402</b>	
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 propogation 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.
<b>Course Name: Digital Circuit &amp; Fundamental of Microprocessor</b> <b>Code:BEENE404</b>	
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.
<b>Course Name: signals and systems</b> <b>Code:BEENE405</b>	
At the end of Course Students will	



Sheet1

<b>CO1</b>	Get knowledge about different types of signals and systems used in communication Electronics
<b>CO2</b>	Understand the concept of probability and its use in communication system.
<b>CO3</b>	Be able to embed the use of fourier series and fourier transform for feature extraction of different electronic signals
<b>CO4</b>	Understand different coding schemes and able to apply selective coding scheme for the application needed
<b>CO5</b>	Understand the different analog and digital modulation schemes
<b>Semester - 5<sup>th</sup></b>	
<b>Course Name: ST</b> <span style="float: right;"><b>Code:BEENE501</b></span>	
At the end of Course Students will	
<b>CO1</b>	Study designing aspects of digital circuits.
<b>CO2</b>	Study properties of partially ordered sets & lattices.
<b>CO3</b>	Study minimization of Booleans function by using K-map, Tabulation method, functional decomposition, symmetric function.
<b>CO4</b>	Study the diagnosis of switching circuits & methods for improving their reliability
<b>CO5</b>	Study various aspects of Finite state machines
<b>CO6</b>	Elaborate the concept of synthesis of sequential circuits
<b>Course Name: Microprocessor &amp; Microcontroller</b> <span style="float: right;"><b>Code:BEENE502</b></span>	
At the end of Course Students will	
<b>CO1</b>	Describe internal organization of 8086/8088 microprocessors, concept of memory organization, stack memory & addressing mode.
<b>CO2</b>	Demonstrate the concept of interrupts & interfacing of Keyboard/ Display & memory with 8086 & its programming.
<b>CO3</b>	Interface various hardware with microprocessor 8086.
<b>CO4</b>	Describe the concept of DMA, Pentium processor & 8087 Numeric coprocessor & its use in practical application.
<b>CO5</b>	Describe architecture of 8051 microcontroller, concept of memory organization, stack memory, addressing mode & interrupts.
<b>CO6</b>	Interface 8051 with Keyboard/ Display, ADC/DAC, Stepper motor etc.
<b>Course Name: ANALOG CIRCUIT AND DESIGN</b> <span style="float: right;"><b>Code:BEENE503</b></span>	
At the end of Course Students will	
<b>CO1</b>	Know the basic differential Amplifier using transistor and its operation & characteristic.
<b>CO2</b>	Design linear Op-Amp circuits such as Voltage follower, Summing amplifier, scaling and averaging amplifier,
<b>CO3</b>	Design Instrumentation amplifier circuits for various practical applications.

Sheet1

<b>CO4</b>	Design non-linear Op-Amp such as Comparators, Comparator IC such as LM 339, Schmitt trigger, multivibrator circuits for various practical applications using IC555.
<b>CO5</b>	Analyze and design amplifier circuits, oscillators, Filter, regulated power supply
<b>Course Name: communication electronics</b> <span style="float: right;"><b>Code:BEENE504</b></span>	
At the end of Course Students will	
<b>CO1</b>	Describe the concept of Ampitude Modulation and its generation methods.
<b>CO2</b>	Demonstrate the concept of Angle Modulation, its mathematical analysis and demodulation of analog signals.
<b>CO3</b>	Describe the concept of Band Limited, Time Limited Signals, Pulse Analog Modulation and its types.
<b>CO4</b>	Describe the concept of noise,its types,properties and its effect.
<b>CO5</b>	Explain the working principles of AM, FM Recievers,FM Detectors and their features.
<b>CO6</b>	Demonstrate the concept of Fundamental of Broadband Communication Links and Haul Systems.
<b>Course Name: Engg Eco &amp; ED</b> <span style="float: right;"><b>Code:BEENE505</b></span>	
At the end of Course Students will	
<b>CO1</b>	Students will be able to understand business structure and business economics and will apply this knowledge in a complex business environment.
<b>CO2</b>	Students will be able identify and understand market structure, economic reforms and its social impact by applying the knowledge of economics.
<b>CO3</b>	Students will be able to comprehend the process of entrepreneurial development for setting up engineering / business unit.
<b>CO4</b>	Students will be able to apply knowledge of economics and entrepreneurship with professional and ethical responsibilities.
<b>CO5</b>	Students will understand application of economics and entrepreneurial know-how in multidisciplinary domains of industry.
<b>Semester - 6<sup>th</sup></b>	
<b>Course Name: Microwave Engineering</b> <span style="float: right;"><b>Code:BEENE601</b></span>	
At the end of Course Students will	
<b>CO1</b>	Analyze mathematically the operation and working of the various tubes or sources for the transmission of the microwave frequencies.
<b>CO2</b>	Demonstrate the use of different magnetron devices.
<b>CO3</b>	Describe the transmission and waveguide structures and how they are used as elements in impedance matching and filter circuits.
<b>CO4</b>	Analyze different microwave components using scattering parameter.
<b>CO5</b>	Acquire knowledge about the measurements to be done at microwaves.
<b>CO6</b>	Know about the significance ,types and characteristics of microwave solid state devices.

<b>Course Name:Digital Signal Processing</b>		<b>Code:BEENE602</b>
At the end of Course Students will		
<b>CO1</b>	Study and represent discrete time signals analytically and visualize them in time domain.	
<b>CO2</b>	Study behavior of discrete time system using Z Transform.	
<b>CO3</b>	Describe the various transforms for analysis of signals and system like DFT.	
<b>CO4</b>	Design and implement IIR digital filter for various applications .	
<b>CO5</b>	Design and implement FIR digital filter for various applications .	
<b>CO6</b>	Describe the concept of multi rate signal processing and how to apply it for the wavelet transform.	
<b>Course Name: Control system engineering</b>		<b>Code:BEENE603</b>
At the end of Course Students will		
<b>CO1</b>	Study the fundamental concepts of control system and mathematical modeling of the system.	
<b>CO2</b>	Study the concept of time response and frequency response of the system.	
<b>CO3</b>	Study the basics of stability analysis of the system.	
<b>CO4</b>	Study the frequency response method of analysis of linear system.	
<b>CO5</b>	Study the controller & compensators.	
<b>CO6</b>	Study the state variable approach in transfer function.	
<b>Course Name: DCOM</b>		<b>Code:BEENE604</b>
At the end of Course Students will		
<b>CO1</b>	Study basic components of digital communication systems	
<b>CO2</b>	Understand the designing aspects of optimum receivers for digital modulation techniques.	
<b>CO3</b>	Study the analysis of error performance of digital modulation techniques	
<b>CO4</b>	Study the designing of digital communication systems under given power, spectral and error performance constraint	
<b>CO5</b>	Understand the concept of coding and decoding techniques.	
<b>CO6</b>	Model digital communication systems using appropriate mathematical techniques .	
<b>Course Name:Functional English</b>		<b>Code:BEENE60605</b>
At the end of Course Students will		
<b>CO1</b>	Apply English language proficiency seamlessly in professional careers.	
<b>CO2</b>	Identify the communication gaps and barriers to communication in professions and rectify them professionally.	
<b>CO3</b>	Write contents, prepare technical documents, legal documents, Board documents, Minutes of the Meetings, internal and external communication in a proficient English language.	
<b>CO4</b>	Build and develop a team of corporate communicators.	
<b>CO5</b>	Exploit the social digital media for effective corporate communication.	
<b>CO6</b>	Unleash public speaking/ presentation skills.	
<b>Semester - 7<sup>th</sup></b>		
<b>Course Name: DSP Processor &amp; Arch.</b>		<b>Code: BEENE701</b>
At the end of Course Students will		
<b>CO1</b>	Understand the fundamental of basic Programmable DSPs and data types.	

Sheet1

<b>CO2</b>	Describe the detailed architecture, bus structure and addressing modes of TMS320C5X DSP processor.
<b>CO3</b>	Understand and make use of Assembly Language Instructions to design simple ALP and describe operations of DSP starter kit.
<b>CO4</b>	Describe the detailed architecture and addressing modes of TMS320C54X DSP processor.
<b>CO5</b>	Compare the various advanced Programmable DSPs and understand the Code Composer Studio.
<b>CO6</b>	Design multi-rate filters and evaluate performance of DFT and FFT for filtering data sequences.
<b>Course Name: Embedded System</b> <span style="float: right;"><b>Code: BEENE702</b></span>	
At the end of Course Students will	
<b>CO1</b>	Know Design challenges, Applications and Recent trends in Embedded system.
<b>CO2</b>	Understand the Hardware & Software architecture and Memory architecture of Embedded system.
<b>CO3</b>	Design Embedded based system using ARM processor.
<b>CO4</b>	Design Embedded system based on communication protocol.
<b>CO5</b>	Design Embedded system based on RTOS.
<b>CO6</b>	Understand the case study of Embedded system in various fields.
<b>Course Name: Optical Communication</b> <span style="float: right;"><b>Code: BEENE703</b></span>	
At the end of Course Students will	
<b>CO1</b>	Learn the basic elements of optical fiber.
<b>CO2</b>	Understand the different kinds of losses, signal distortion in optical wave guides & othesignal degradation factors.
<b>CO3</b>	Classify various optical source materials, LED structures, LASER diodes.
<b>CO4</b>	Learn the fiber optic receivers such as PIN, APD diodes, receiver operation & performance.
<b>CO5</b>	Understand the operational principal of WDM, SONET, measurement of attenuation, dispersion, refractive index profile in optical fibers.
<b>Course Name: ADSD</b> <span style="float: right;"><b>Code: BEENE704</b></span>	
At the end of Course Students will	
<b>CO1</b>	Know VHDL development flow and Basic VHDL concepts
<b>CO2</b>	Design of combinational & sequential circuit .
<b>CO3</b>	Understand functions procedures and attributes
<b>CO4</b>	Design of Finite Stat machines
<b>CO5</b>	Understand Synthesis and timing analysis
<b>CO6</b>	Experimentation on Hardware /Software co-design.
<b>Course Name: Mobile Communication</b> <span style="float: right;"><b>Code: BEENE705</b></span>	
At the end of Course Students will	
<b>CO1</b>	Describe Evolution of mobile radio communication and Cellular telephone system with various strategies.
<b>CO2</b>	Demonstrate basic losses and propagation in mobile radio environment and also describe air traffic, fundamentals of channel coding, fading effects in mobile systems.
<b>CO3</b>	Compare different digital modulation techniques used for mobile communication.
<b>CO4</b>	Describe fundamentals of equalization and diversity techniques.
<b>CO5</b>	Solve the problems involving bandwidth calculation using various multiple access techniques.
<b>CO6</b>	Describe architecture and signal processing in GSM system and define CDMA digital cellular std(IS-95).

Sheet1

<b>Semester - 8<sup>th</sup></b>	
<b>Course Name: MEMS &amp; SOC</b> <span style="float: right;"><b>Code: BEENE801</b></span>	
At the end of Course Students will	
<b>CO1</b>	Understand working principles of currently available micro sensors ,actuators, used in micro systems.
<b>CO2</b>	Understand the basic principles and applications of micro-fabrication processes such as photo lithography,ion implantation,diffusion ,oxidation,CVD,PVD and etching .
<b>CO3</b>	Understand the principle of operation of different types of transducers & actuators.
<b>CO4</b>	understand the basic concepts of RF inductor ,capacitor , RF MEMS components in communication,space and defence applications.
<b>CO5</b>	understand the different types of packaging techniques used in MEMS
<b>CO6</b>	Consider recent advancements in the field of MEMS and devices
<b>Course Name: Computer Communication Network</b> <span style="float: right;"><b>Code: BEENE802</b></span>	
At the end of Course Students will	
<b>CO1</b>	Understand the requirement of theoretical & practical aspect of computer network.
<b>CO2</b>	Understand the network traffic in computer network.
<b>CO3</b>	Describe various protocols used in network.
<b>CO4</b>	Describe the concept of computer network security.
<b>CO5</b>	Understand the different wired & wireless LAN stds.& Routers.
<b>Course Name: Data Compression &amp; Encryption</b> <span style="float: right;"><b>Code: BEENE803</b></span>	
At the end of Course Students will be able to	
<b>CO1</b>	Implement various text compression technique.
<b>CO2</b>	Implement various audio compression technique.
<b>CO3</b>	Implement various image & video compression technique.
<b>CO4</b>	Understand the conventional encryption techniques and application to digital communication.
<b>CO5</b>	Understand the public key encryption , number theory and application to digital communication.
<b>CO6</b>	Understand the system security and related case studies.
<b>Course Outcomes:Wireless sensor network</b> <span style="float: right;"><b>Code: BEENE804</b></span>	
At the end of Course Students will	
<b>CO1</b>	Demonstrate advanced knowledge and Principle of wireless sensor network and Explain its Architecture.
<b>CO2</b>	Demonstrate the knowledge of Radio technology primer, and fundamentals of Physical layer & Medium Access Control Protocols.
<b>CO3</b>	Describe Routing strategies , Challenges & design issues in wireless sensor network.
<b>CO4</b>	Describe Transport Control Protocols for Wireless Sensors Networks.
<b>CO5</b>	Demonstrate principles and architecture of Middleware.
<b>CO6</b>	Describe Network Management for Wireless Sensor Network and discuss Performance and Traffic Management Issues.
<b>Course Outcomes: CMOS-VLSI</b> <span style="float: right;"><b>Code: BEENE805</b></span>	
At the end of Course Students will be able to	
<b>CO1</b>	Design PMOS and NMOS transistor.
<b>CO2</b>	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.
<b>Department of Electrical Engineering</b>	
<b>Course Outcomes(CO)</b>	
<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Applied Mathematics-III</b>	
<b>Code: BEELE301</b>	
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.
<b>Course Name: Non-Conventional Energy Sources</b>	
<b>Code: BEELE302</b>	
At the end of course Students will	
CO1	Able to learn fundamentals of solar radiation geometry
CO2	Able to learn about Solar Energy Collectors & Solar Energy Storage
CO3	Able to learn application of solar energy
CO4	Able to learn about selection of sites for wind farm, different types of wind generators.
CO5	Able to understand the basics of ocean, tidal & wave energy
CO6	Able to understand the basics of small hydro and other Non-Conventional Energy Sources
<b>Course Name: Electrical Measurement and Instrumentation</b>	
<b>Code: BEELE303</b>	
At the end of course Students will	
CO1	Understood the details of different methods (Bridges) used for measurement of R,L,C
CO2	Understood the details of different electrical instrument used for electrical measurement And Instrumentation.
CO3	Understood the details of different types of potentiometers and CT and PT and measurement of Power and Energy.
CO4	Get idea about transducer and instrumentation System
CO5	Get idea about measurement of acceleration, velocity, angular velocity, Torque and Power measurement, Torque meter
CO6	Get idea about measurement of temperature using thermistor, RTD and thermocouple and Two color pyrometers, Optical pyrometer; pressure and flow

<b>Course Name: Network Analysis</b>	<b>Code: BEELE304</b>
At the end of course	Students will
<b>CO1</b>	Apply Source transformation and loop (mesh) analysis
<b>CO2</b>	Apply node analysis and duality
<b>CO3</b>	Use various network theorems for analysis and design of electric circuits
<b>CO4</b>	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.
<b>CO5</b>	Determine the response of a circuit excited by a waveform composed of various step and ramp components.
<b>CO6</b>	Characterize two-port networks by Z, Y, T, h parameters.
<b>Course Name: Electronic Devices and Circuits</b>	<b>Code: BEELE305</b>
At the end of course	Students will
<b>CO1</b>	Know basic fundamentals of Semiconductor Devices.
<b>CO2</b>	Know basic fundamentals, Principles and working of Transistors
<b>CO3</b>	know concept of Amplifiers
<b>CO4</b>	know the basics of Oscillators, FETs and MOSFETs
<b>CO5</b>	know the Principle of Differential Amplifier Circuits
<b>CO6</b>	know the Logic Gates and Truth Table.
<b>Semester - 4<sup>th</sup></b>	
<b>Course Name: Applied Mathematics -IV</b>	<b>Code: BEELE401</b>
At the end of course	Students will
<b>CO1</b>	Acquaint students with mathematical formulation and use of Laplace Transform to control system.
<b>CO2</b>	Apply concept of transform for solving difference equations.
<b>CO3</b>	Deal with vague data using fuzzy sets and fuzzy logic
<b>CO4</b>	Grasp the concept of numerical methods and apply them to solve various algebraic, transcendental and simultaneous equations.
<b>CO5</b>	Grasp the concept of numerical methods and apply them to solve linear and non-linear differential equations.
<b>CO6</b>	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.
<b>Course Name: Elements of Electromagnetics</b>	<b>Code: BEELE402</b>
At the end of course	Students will
<b>CO1</b>	Acquire knowledgeable in static electric and magnetic fields.
<b>CO2</b>	Analyse various laws of electromagnetic systems.
<b>CO3</b>	Understand the physical basis for the functioning of circuit elements.
<b>CO4</b>	Apply electromagnetic boundary conditions.

Sheet1

<b>CO5</b>	Familiar with the four Maxwell's equations used to study time varying electromagnetic or dynamics fields.
<b>CO6</b>	Understand the concept of uniform plane-wave propagation and electromagnetic power density flow in lossless medium
<b>Course Name: Digital and Linear Electronic Circuits. Code:BEELE403</b>	
At the end of course Students will	
<b>CO1</b>	Know basic fundamentals of combinational logic concepts.
<b>CO2</b>	Know basic fundamentals of flip flops and memories.
<b>CO3</b>	know concepts of sequential circuits
<b>CO4</b>	Basics of Operation Amplifiers and its Application
<b>CO5</b>	Simple Linear Circuit
<b>CO6</b>	Study of Linear ICs
<b>Course Name: Electrical Machines-I Code:BEELE404</b>	
At the end of course Students will	
<b>CO1</b>	Able to understand Principle, construction, connections, vector grouping, operation and testing of 3-phase transformer
<b>CO2</b>	Able to understand conversion of 3-phase supply to 2-phase supply, parallel operation of 3-ph. Transformers.
<b>CO3</b>	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
<b>CO4</b>	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
<b>CO5</b>	Able to understand methods of starting, speed control and braking of induction motors.
<b>CO6</b>	Understand Revolving and cross field theories, operation, characteristics, types, equivalent circuit & tests.
<b>Course Name: Computer Programming Code:BEELE405</b>	
At the end of course Students will	
<b>CO1</b>	Understands the basics and syntax of programming and able to apply the knowledge of operators, loops, conditional and iterative statements in programs
<b>CO2</b>	Apply the knowledge of programming in arrays, for searching an element using linear and binary search, matrix addition
<b>CO3</b>	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.



Sheet1

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.
<b>Semester 5 th</b>	
<b>Course Name: Electrical Power System-I Code:BEELE501</b>	
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
<b>Course Name: Utilisation of Electrical Energy Code:BEELE501</b>	
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 .
<b>Course Name: Electrical Machines Design Code:BEELE502</b>	
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.

<b>Course Name: Electrical Machines Design</b>		<b>Code:BEELE503</b>
At the end of course Students will		
<b>CO1</b>	Able to Select proper material for design of a machine.	
<b>CO2</b>	Able to Design a overall transformer.	
<b>CO3</b>	Able to Design cooling circuit of transformer.	
<b>CO4</b>	Able to Design stator core of Induction Motor.	
<b>CO5</b>	Able to Design rotor core of Induction Motor.	
<b>CO6</b>	Able to Design overall dimensions of synchronous machines.	
<b>Course Name: Microprocessor and Interfacing</b>		
		<b>Code:BEELE504</b>
At the end of course Students will		
<b>CO1</b>	Able to understand VLSI circuit concept and system bus concept of microprocessor based system.	
<b>CO2</b>	Able to understand 8085 architecture and its working.	
<b>CO3</b>	Able to understand Programming concept and stack operation	
<b>CO4</b>	Able to understand software and hardware interrupts	
<b>CO5</b>	Able to understand method of data transfer of different Peripherals chips.	
<b>CO6</b>	Able to understand hardware considerations and interfacing of devices.	
<b>Course Name: Electrical Machines-II</b>		
		<b>Code:BEELE505</b>
At the end of course Students will		
<b>CO1</b>	Understood principle , construction, laying of armature and field windings, types, generation of emf,	
<b>CO2</b>	Understood steady state operation of synchronous machine	
<b>CO3</b>	Understood synchronization and parallel operation of synchronous generators	
<b>CO4</b>	Understood principle, construction, methods of starting of synchronous motor, its operation with variable load, operation with variable excitation, performance evaluation.	
<b>CO5</b>	Understood Transient and sub- transient reactance's and their measurement	
<b>CO6</b>	Understood special motors, like Repulsion, Hysteresis, Reluctance and Universal motors	
<b>Semester - 6<sup>th</sup></b>		
<b>Course Name:Power Station Practice</b>		<b>Code:BEELE601</b>
At the end of course Students will		
<b>CO1</b>	Understand different source of Energy and factors (load survey) associated with energy generation	
<b>CO2</b>	Understand the requirement for installation , estimation of thermal power plant (economics of generation) and to work in power plant	

Sheet1

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
<b>Course Name: Economics and Industrial Management Code:BEELE602</b>	
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.
<b>Course Name:Electrical Drives and their Controls Code:BEELE603</b>	
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.
<b>Course Name: Power Electronics Code:BEELE604</b>	
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.

Sheet1

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

<b>Course Name: Electrical Power System-II</b>		<b>Code:BEELE702</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Represent the circuits using symmetrical component transformation.	
<b>CO2</b>	Analyse symmetrical Fault .	
<b>CO3</b>	Analyse unsymmetrical Fault.	
<b>CO4</b>	Determine stability of power system and undergo stability studies.	
<b>CO5</b>	Obtain economic operation of power system.	
<b>CO6</b>	Understand basic concept of neutral grounding and compensation.	
<b>Course Name: Flexible AC Transmission System (Elective-I)</b>		
		<b>Code:BEELE703</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand the facts concept and general system consideration	
<b>CO2</b>	Understand the concept of voltage-sourced and current. sourced converters	
<b>CO3</b>	Analyse the concept of static shunts compensators	
<b>CO4</b>	Analyse the concept of static series compensators	
<b>CO5</b>	Ulearn the concept of static voltage and phase angle regulators	
<b>CO6</b>	Understand the concept of combined compensators and special purpose FACTS controllers	
<b>Course Name: Non Conventional Energy Sources (Elective-I)</b>		
		<b>Code:BEELE703</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Able to learn fundamentals of solar radiation geometry	
<b>CO2</b>	Learn about Solar Energy Collectors & Solar Energy Storage	
<b>CO3</b>	Learn application of solar energy	
<b>CO4</b>	Learn about selection of sites for wind farm, different types of wind generators.	
<b>CO5</b>	Understand the basics of ocean, tidal & wave energy	
<b>CO6</b>	Understand the basics of small hydro and other Non-Conventional Energy Sources	
<b>Course Name: High Voltage Engineering</b>		
		<b>Code:BEELE704</b>
<b>At the end of course Students will</b>		
<b>CO1</b>	Understand breakdown strength of various dielectric materials under different conditions	
<b>CO2</b>	Understand Lighting and switching over voltages, Mechanism of lighting, types of strokes and its protection	
<b>CO3</b>	Understand Concepts of travelling waves and insulation co-ordination ,attenuation and distortion effects of travelling waves	
<b>CO4</b>	Understand Different methods for generating high voltages/currents for varoius applications	

Sheet1

<b>CO5</b>	Understand Different techniques to measure high voltage and current
<b>CO6</b>	Understand Non destructive and high voltage testing of electrical apparatus
<b>Semester 8 th</b>	
<b>Course Name: Extra High Voltage AC and DC Transmission (Elective-II) Code:BEELE801</b>	
<b>At the end of course Students will</b>	
<b>CO1</b>	Student should able to know power handling capacity of transmission systems.
<b>CO2</b>	Student should able to know the effects of electrostatic fields in EHVAC lines .
<b>CO3</b>	Student should able to know the comparison between EHVAC/HVDC systems & kinds of DC link.
<b>CO4</b>	Student should able to know voltage and current control systems in HVDC system.
<b>CO5</b>	Student should understand the knowledge of AC/DC filters and reactive power compensation .
<b>CO6</b>	Student should understand the protection schemes of HVDC system and substation layout.
<b>Course Name: Power Semiconductor Based Drives (Elective-III) Code:BEELE802</b>	
<b>At the end of course Students will</b>	
<b>CO1</b>	To understand the dynamics of electrical drives and their control
<b>CO2</b>	To understand the control of DC motor drives
<b>CO3</b>	To understand the semiconductor based control of Induction motor
<b>CO4</b>	To understand the semiconductor based control of Synchronous motor
<b>CO5</b>	To carry research on the newer Switched reluctance motor & Brushless Induction motor
<b>CO6</b>	To understand the traction drive with AC & DC motors
<b>Course Name: Switchgear and Protection Code:BEELE803</b>	
<b>At the end of course Students will</b>	
<b>CO1</b>	Understand the basic fundamental of protective relaying and theory of main components used in power system protection
<b>CO2</b>	know the protection systems used for medium voltage transmission line
<b>CO3</b>	know the protection systems used for high voltage transmission line
<b>CO4</b>	Understand the protection systems used for electric machine, transformer and busbar
<b>CO5</b>	know the operation of static relays & its application
<b>CO6</b>	Understand the theory, construction & applications of main types of circuit breakers
<b>Course Name: Computer Application in Power System Code:BEELE804</b>	

<b>At the end of course Students will</b>	
<b>CO1</b>	Determine network matrix of a power system using graphical representation
<b>CO2</b>	Determine network matrix of a power system using algorithm
<b>CO3</b>	Analysis of balance and unbalance condition by algorithm formation of 3-ph impedance matrix
<b>CO4</b>	Load flow study of power system by iterative methods
<b>CO5</b>	Perform short circuit study for 3-ph network under balance and unbalance faults
<b>CO6</b>	Determine transient stability of power system networks.

**Department of Electronics & Telecommunication Engineering**  
**Course Outcomes(CO)**

**Semester - 3<sup>rd</sup>**

**Course Name: Applied Mathematics-III** **Code: BEETE 301**

<b>At the end of course Students will</b>	
<b>CO1</b>	Understand Laplace Transform and its properties to solve differential equations.
<b>CO2</b>	Expand the function in periodic form using Fourier series and understand the relationship between z transform and the Fourier transform for discrete time signals.
<b>CO3</b>	Use the functions of several variables in solution of boundary value problems.
<b>CO4</b>	Understand the fundamental concepts of complex analysis and also evaluate some standard integrals using contour integrals.
<b>CO5</b>	Formulate and solve linear partial differential equations in the field of Engineering and Technology.
<b>CO6</b>	Apply and solve linear systems/linear inequalities graphically/geometrically and algebraically using matrices.

**Course Name: Electronic Devices and Circuits** **Code: BEETE 302**

<b>At the end of course Students will</b>	
<b>CO1</b>	Understand the relation between physical structure and circuit behavior of PN junction diode and analysis of its applications.
<b>CO2</b>	Characterize the electronic device (Bipolar Junction Transistor) in terms of appropriate external variables and differentiate different biasing techniques.
<b>CO3</b>	Use device parameters for Small signal and High frequency analysis along with principle of Negative feedback in electronic circuits.
<b>CO4</b>	Use electronic device (Transistor) as a circuit element in applications such as oscillators and Multivibrators.
<b>CO5</b>	Understand various types of power amplifiers and their applications.
<b>CO6</b>	Characterize the electronic device (Field Effect Transistor) in terms of appropriate external variables and differentiate different biasing techniques.

**Course Name: Electronics Measurement and Instrumentation** **Code: BEETE 303**

<b>At the end of course Students will</b>	
<b>CO1</b>	Understand Laplace Transform and its properties to solve differential equations.

Sheet1

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.
<b>Course Name: Object Oriented Programming and Data Structure Code: BEETE 304</b>	
At the end of course Students will	
CO1	Implement the concept of object oriented programming in any programming language.
CO2	Describe and apply principles of good program design like operator,function overloading and class template to the C++ language
CO3	Describe and apply various object oriented features like inheritance, pure virtual function to solve various computing problems using C++ language.
CO4	Understand and implement the basic search and sort algorithms
CO5	Implement and use linear and non-linear data structures like stacks, queues , linked list to solve various computing problems.
CO6	Describe and implement fundamental algorithmic problems including Trees--for solving complex programming problems.
<b>Course Name:Network Analysis and Synthesis Code: BEETE 305</b>	
At the end of course Students will	
CO1	Analyze the various Electrical and Electrical Networks using the mesh and nodal Techniques
CO2	Analyze the different circuits by using 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
<b>Semester - 4<sup>th</sup></b>	
<b>Course Name: Applied Mathematics IV Code: BEETE 401</b>	
At the end of course Students will	
CO1	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.
CO3	Demonstrate basic knowledge of Bessel's function, Legendre's polynomial and series solutions.
CO4	Understand concept of random variables and theory of probability to use in communication system.
CO5	Apply mathematical Expectations and use them to predict expected behavior of any function.
CO6	Understand thoroughly fundamentals of probability distributions and apply it to respective branch of engineering.
<b>Course Name: Power Devices and Machines Code: BEETE 402</b>	
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.



Sheet1

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.
<b>Course Name: Electromagnetic Fields</b> <span style="float: right;"><b>Code: BEETE 403</b></span>	
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.
<b>Course Name: Digital Circuit &amp; Fundamental of Microprocessor</b> <span style="float: right;"><b>Code: BEETE 404</b></span>	
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.
<b>Course Name: SIGNALS AND SYSTEMS</b> <span style="float: right;"><b>Code: BEETE 405</b></span>	
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
<b>Semester – 5<sup>TH</sup></b>	
<b>Course Name: Antennas and Wave Propagation</b> <span style="float: right;"><b>Code: BEETE 501</b></span>	
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.
<b>Course Name: Microprocessor &amp; Microcontrollers</b> <span style="float: right;"><b>Code: BEETE502</b></span>	
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.

Sheet1

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.
<b>Course Name: Analog Circuit and Design Code: BEETE503</b>	
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.
<b>Course Name: Communication Electronics Code: BEETE504</b>	
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
<b>Course Name: Industrial economics and entrepreneurship development Code: BEETE505</b>	
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.

<b>Semester – 6TH</b>	
<b>Course Name: Telecommunication switching systems</b>	<b>Code: BEETE601</b>
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
<b>Course Name: Digital Signal Processing</b>	
<b>Code: BEETE602</b>	
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.
<b>Course Name: Control System Engineering</b>	
<b>Code: BEETE603</b>	
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.
<b>Course Name: Digital Communication</b>	
<b>Code: BEETE604</b>	
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
<b>Course Name: Functional English</b>	
<b>Code: BEETE605</b>	
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.
<b>Semester – 7TH</b>	

<b>Course Name: Television and Video Engineering</b>		<b>Code: BEETE702</b>
At the end of course Students will		
<b>CO1</b>	Understand the fundamentals of television and display.	
<b>CO2</b>	Understand various TV standards.	
<b>CO3</b>	Understand digital TV systems.	
<b>CO4</b>	Understand modern TV systems.	
<b>CO5</b>	Understand Video Recorders.	
<b>CO6</b>	Understand various consumer applications of Television Systems	
<b>Course Name: DSP Processor and Architecture</b>		
		<b>Code: BEETE701</b>
At the end of course Students will		
<b>CO1</b>	Explain design concepts and features of PDSPs.	
<b>CO2</b>	Describe the detailed architecture, addressing modes and instructions of TMS320C5X	
<b>CO3</b>	Describe instructions and write simple ALP of DSP Processor.	
<b>CO4</b>	Describe internal architecture, addressing modes of TMS320C54XX..	
<b>CO5</b>	Design & implement DSP algorithm using code composer studio	
<b>CO6</b>	Design decimation filter and interpolation filter.	
<b>Course Name: Optical Communication</b>		
		<b>Code: BEETE703</b>
At the end of course Students will		
<b>CO1</b>	Understand the basic elements of optical fiber.	
<b>CO2</b>	Understand the different kinds of losses, signal distortion in optical wave guides & other signal degradation factors.	
<b>CO3</b>	Describe the classification of various optical source materials, LED structures, LASER diodes.	
<b>CO4</b>	Understand the fiber optic receivers such as PIN, APD diodes, receiver operation & performance.	
<b>CO5</b>	Understand the analog and digital links of optical fibers.	
<b>CO6</b>	Understand and use the operational principal of WDM, SONET, measurement of attenuation, dispersion, refractive index profile in optical fibers.	
<b>Course Name: Advanced Digital System Design</b>		
		<b>Code: BEETE704</b>
At the end of course Students will		
<b>CO1</b>	Describe and understand VHDL development flow and Basic VHDL concepts.	
<b>CO2</b>	Design the combinational & sequential circuit using VHDL	
<b>CO3</b>	Develop the skills to become VLSI front end designers.	
<b>CO4</b>	Implement the digital system.	
<b>CO5</b>	perform experimentation on Hardware /Software co-design.	
<b>Course Name: Data Compression and Encryption</b>		
		<b>Code: BEETE705</b>
At the end of course Students will		
<b>CO1</b>	Implement various text compression techniques.	
<b>CO2</b>	Implement various audio compression techniques	
<b>CO3</b>	Implement various Image and video compression techniques	
<b>CO4</b>	Implement various security techniques in communication.	
<b>CO5</b>	Provide various authentications using digital communication.	
<b>CO6</b>	Gain the knowledge of encryption techniques application to digital.	
<b>Course Name: VLSI Signal Processing</b>		
		<b>Code: BEETE705</b>
At the end of course Students will		
<b>CO1</b>	Implement pipelining and parallel processing for clock period minimization & \ or low power.	
<b>CO2</b>	Perform retiming of DFG for clock period minimization.	
<b>CO3</b>	Use unfolding algorithm for sample period reduction, parallel processing.	

Sheet1

<b>CO4</b>	Use folding transform for register minimization and multirate system.
<b>CO5</b>	Implement convolution using fast convolution algorithm.
<b>CO6</b>	Solve convolution using cyclic & iterated convolution method.
<b>Semester 8 th</b>	
<b>Course Name: Microwave and Radar Engineering</b> <span style="float: right;"><b>Code: BEETE801</b></span>	
At the end of course Students will	
<b>CO1</b>	Understand and analyze the use of active microwave devices like Klystron, TWT, BWO and magnetron.
<b>CO2</b>	Analyze and use different power distribution Tees and passive microwave devices using scattering parameter.
<b>CO3</b>	Understand and analyze different solid state microwave devices.
<b>CO4</b>	Measure various parameters like frequency, power, attenuation, VSWR, impedance, insertion loss, dielectric constant, Q of a cavity resonator, phase shift.
<b>CO5</b>	Understand and analyze fundamentals of Radar.
<b>CO6</b>	Demonstrate acquisition of technical competence in specialized areas of Radar Engineering.
<b>Course Name: Computer Communication Network</b> <span style="float: right;"><b>Code: BEETE802</b></span>	
At the end of course Students will	
<b>CO1</b>	Understand the requirement of theoretical & practical aspect of computer network.
<b>CO2</b>	Understand the switching techniques of computer networks.
<b>CO3</b>	Understand the different wired & wireless LAN standards & hardware.
<b>CO4</b>	Describe various protocols and routing techniques used in network.
<b>CO5</b>	Describe various application protocols used in communication.
<b>CO6</b>	Describe the concept of computer network security and network administration.
<b>Course Name: Wireless &amp; Mobile Communication</b> <span style="float: right;"><b>Code: BEETE803</b></span>	
At the end of course Students will	
<b>CO1</b>	Design a model of cellular system communication and analyze their Operation and performance.
<b>CO2</b>	Quantify the causes and effects of path loss and signal fading on received signal characteristics.
<b>CO3</b>	Analyze equalization, various polarization techniques and different diversities.
<b>CO4</b>	Construct and analyze the GSM system.
<b>CO5</b>	Understand the various protocols used in wireless networking and study other wireless access protocol.
<b>CO6</b>	Understand various wireless LAN networks technology.
<b>Course Name: Wireless Sensor Network (Elective-2)</b> <span style="float: right;"><b>Code: BEETE804</b></span>	
At the end of course Students will	
<b>CO1</b>	Understand wireless sensor network environment and its various applied areas.
<b>CO2</b>	Understand sensor network architecture, sensor networking principles and protocols and case studies.
<b>CO3</b>	Impart sensor network protocols & routing schemes in Wireless Sensor Networks.
<b>CO4</b>	To demonstrate a computing science approach, in terms of design spaces for sensor networks & sensor transport control protocols.
<b>CO5</b>	Understand the concept of middleware for sensor networks; sensor specific programming languages.
<b>CO6</b>	Demonstrate wireless sensor network solutions with practical implementation examples and case studies; and the way these will impact on the engineering product enterprise process.
<b>Course Name: Embedded System (Elective-2)</b> <span style="float: right;"><b>Code: BEETE804</b></span>	
At the end of course Students will	
<b>CO1</b>	Understand basics of Embedded System, Various design metrics and design challenge of Embedded System
<b>CO2</b>	Understand hardware and software architecture of processor and various types of memory
<b>CO3</b>	Understand the internal organization, various operation modes and programming of ARM processor.

Sheet1

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
<b>Course Name:</b> Robotics & Automation (Elective-3) <b>Code:</b> BEETE805	
At the end of	course Students will
<b>CO1</b>	The course has been so designed to give the students an overall view of the mechanical components of robot and artificial intelligence.
<b>CO2</b>	Explore Logic and knowledge representation.
<b>CO3</b>	Speech synthesis and speech recognition concluding to working of robot brain.
<b>CO4</b>	Effectively utilization of Image processing and various techniques for the same in robotics
<b>CO5</b>	Efficient mechanism of various types of sensors
<b>CO6</b>	Understanding Robot level programming languages and their types.
<b>Course Name: Satellite Communication (Elective-3) Code: BEETE805</b>	
At the end of	course Students will
<b>CO1</b>	Understand the working principle of satellite communication system and orbital aspects and components of a satellite communication system.
<b>CO2</b>	Design and analyze the link budget of a satellite communication system and study of satellite orbits and launching.
<b>CO3</b>	Describe multiple access techniques in Satellite Communication
<b>CO4</b>	Understand propagation and rain effect on satellite.
<b>CO5</b>	Study of error correction and detection codes related to Satellite Communication.
<b>CO6</b>	Understand the different components in satellite communication earth stations.
<b>Department of Information Technology Engineering</b>	
<b>Course Outcome</b>	
<b>Semester 3 rd</b>	
<b>Course Name: AMIII Code: BEIT301</b>	
At the end of	Course Students will
<b>CO1</b>	Understand Laplace Transform and should be able to solve differential equations.
<b>CO2</b>	Expand the function in periodic form using Fourier Transform.
<b>CO3</b>	Apply concept of Z- transform for solving difference equation and discrete signals.
<b>CO4</b>	Setup and solve linear systems/ linear inequalities graphically / geometrically and algebraically using matrices.
<b>CO5</b>	Know about random variables and theory of probability and compute probabilities in appropriate ways.
<b>CO6</b>	Learn about mathematical Expectations and apply them to predict expected behavior of Random Variables.
<b>Course Name: PLDC Code: BEIT302</b>	
At the end of	Course Students will
<b>CO1</b>	Understand and implement the programming concept of C Language.
<b>CO2</b>	Understand and implement the concepts of Function, pointers and arrays in C.
<b>CO3</b>	Understand and implement the concept of Strings and Structures in C.
<b>CO4</b>	Understand and implement console and file operations & functions.
<b>CO5</b>	Understand the programming concepts using Graphics in C.
<b>CO6</b>	Understand the advanced concepts in C.
<b>Course Name: EIT Code: BEIT303</b>	
At the end of	Course Students will
<b>CO1</b>	Have sound foundation of concepts of Ethics and understand basic need of Ethics in IT industry.
<b>CO2</b>	Know about various Computer and Internet crimes and understand what security measures are needed to handle them.

Sheet1

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.
<b>Course Name: DEFM</b>	
<b>Code: BEIT304</b>	
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.
<b>Course Name: DC</b>	
<b>Code: BEIT305</b>	
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.
<b>Course Name: EE</b>	
<b>Code: BEIT306</b>	
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.
<b>Semester 4<sup>th</sup></b>	
<b>Course Name: DMGT</b>	
<b>Code: BEIT401</b>	
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.

Sheet1

<b>CO5</b>	Model and solve real-world problems using graphs and trees, both quantitatively and qualitatively.
<b>CO6</b>	Students will be able to apply diverse counting strategies to solve varied problems involving strings, combinations, distribution, and partitions.
<b>Course Name: ADS</b> <span style="float: right;"><b>Code: BEIT402</b></span>	
At the end of	Course Students will
<b>CO1</b>	Identify, understand and determine the usage of various data structure, operations and associated algorithms.
<b>CO2</b>	Student will Understand and implement the concept of stack and queue data structure and its operations.
<b>CO3</b>	Student will Understand and implement different types of Linked List data structure and its operations, Applications.
<b>CO4</b>	Student will Understand and implement General tree data structure, including binary tree, Traversal Techniques.
<b>CO5</b>	Student will Understand and implement Graph data structure, including DFS and BFS, Spanning Trees, Shortest Path Algorithms.
<b>CO6</b>	Demonstrate understanding the various Searching and Sorting Techniques and hashing Techniques.
<b>Course Name: TOC</b> <span style="float: right;"><b>Code: BEIT403</b></span>	
At the end of	Course Students will
<b>CO1</b>	Understand the basic kinds of Finite Automata and their capabilities.
<b>CO2</b>	Describe and transform Regular Expressions and grammars.
<b>CO3</b>	Understand Context Free Language.
<b>CO4</b>	Understand of Turing Machine.
<b>CO5</b>	Identify different Undecidable Problems.
<b>CO6</b>	Discuss the Concept of Computability.
<b>Course Name: CAO</b> <span style="float: right;"><b>Code: BEIT404</b></span>	
At the end of	Course Students will
<b>CO1</b>	Understand the major components of a computer including CPU, memory, I/O and storage.
<b>CO2</b>	Learn how instruction sets are used in computer and how processor get executed
<b>CO3</b>	Study how control signals are generated to activate various components
<b>CO4</b>	Learn how arithmetic operation get performed in computer
<b>CO5</b>	Sudy how memory unit is used to store and fetch data from memory
<b>CO6</b>	Understand how different Input output peripherals use to transfer data.
<b>Course Name: Engineering Physics</b> <span style="float: right;"><b>CODE: BESI-2T</b></span>	
At the end of	Course Students will
<b>CO1</b>	Know the importance of system analysis and design in solving complex problems.
<b>CO2</b>	Show how the object oriented approach differs from the traditional approach to system analysis and design.
<b>CO3</b>	Explain the importance of modeling
<b>CO4</b>	Know how the UML represents an object oriented system using a number of modeling views.
<b>CO5</b>	Recognize the difference between various object relationships, inheritance, association, whole part and dependency relationship.
<b>CO6</b>	Show the role and function of each UML model in developing Object Oriented software.
<b>Semester 5 th</b>	
<b>Course Name: SP</b> <span style="float: right;"><b>BEIT501</b></span>	
At the end of	Course Students will
<b>CO1</b>	Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
<b>CO2</b>	Describe and design the various concepts of assemblers.
<b>CO3</b>	Describe and design the various concepts of macro-processors.
<b>CO4</b>	Understand how linker and loader create an executable program from an object module created by assembler and compiler.



Sheet1

<b>CO5</b>	Understand the various phases of compiler and compare its working with assembler.
<b>CO6</b>	Understand the various Device drivers, its types an installation.
<b>Course Name: DAA</b> <span style="float: right;"><b>BEIT502</b></span>	
At the end of	Course Students will
<b>CO1</b>	Understand the various complexity finding methods.
<b>CO2</b>	Understand the analysis of various algorithms for time and space complexity.
<b>CO3</b>	Implement and analyze greedy strategy algorithms.
<b>CO4</b>	Implement and analyze dynamic strategy algorithms
<b>CO5</b>	Understand back tracking strategy to solve the examples.
<b>CO6</b>	Understand the in-feasibility problems (NP Hard and NP complete)
<b>Course Name: SE</b> <span style="float: right;"><b>Code: BEIT503</b></span>	
At the end of	Course Students will
<b>CO1</b>	Understanding the processes followed in software development life cycle.
<b>CO2</b>	Finding practical solution to the problem.
<b>CO3</b>	Analyzing system and requirement engineering concept.
<b>CO4</b>	Understanding design engineering concept.
<b>CO5</b>	Analyze software testing fundamentals.
<b>CO6</b>	Identify risk and quality management.
<b>Course Name: CG</b> <span style="float: right;"><b>Code: BEIT504</b></span>	
At the end of	Course Students will
<b>CO1</b>	Understand the core concepts of Computer Graphics.
<b>CO2</b>	Study Graphics Primitives & 2D Transformations.
<b>CO3</b>	Study about Segment table, Windowing & Clipping.
<b>CO4</b>	Understand concept of 3D modeling in Computer Graphics
<b>CO5</b>	Understand concept of Curves and methods of Interpolation
<b>CO6</b>	Study about color models & color application including Animations.
<b>Course Name: JP</b> <span style="float: right;"><b>Code: BEIT505</b></span>	
At the end of	Course Students will
<b>CO1</b>	Understand the basics of java and its features.
<b>CO2</b>	Study how to collect same data type into one variable using Arrays and Strings.
<b>CO3</b>	Find how polymorphism is achieved in java and how to handle run time error called exception also understand the concept of inheritance.
<b>CO4</b>	Understand how to run multiple threads at a time.
<b>CO5</b>	Study how input output operation get performed in java
<b>CO6</b>	Study how to create the web application using Applet or Swing.
<b>Course Name: IEED</b> <span style="float: right;"><b>Code: BEIT506</b></span>	
At the end of	Course Students will
<b>CO1</b>	Able to understand business structures & business economics & will apply this knowledge in a complex business environment.
<b>CO2</b>	Able to identify & understand market structures, economic reforms & its social impact by applying the knowledge of economics.
<b>CO3</b>	Able to comprehend the process of entrepreneurial development for setting up engineering / business unit.
<b>CO4</b>	Able to apply knowledge of economics & entrepreneurship with professional & ethical responsibilities.
<b>CO5</b>	Understand application of economics & entrepreneurship know-how in multidisciplinary domains of industry.
<b>CO6</b>	Able to understand business & economics on a large scale.
<b>Semester 6 th</b>	
<b>Course Name: CN</b> <span style="float: right;"><b>Code: BEIT601</b></span>	
At the end of	Course Students will
<b>CO1</b>	Understand basic concepts of computer network and Wireless network concepts.

Sheet1

<b>CO2</b>	Detail study about Data Link Layer and different protocols.
<b>CO3</b>	Detail study about network layer.
<b>CO4</b>	Discover the concept of Transport layer and Application Layer.
<b>CO5</b>	Detail study about BOOTP and DHCP packet format, DNS Internet, resolution, connection and command processing.
<b>CO6</b>	Identify various network techniques for the data transfer and security in real world.
<b>Course Name: OS Code: BEIT602</b>	
At the end of	Course Students will
<b>CO1</b>	Analyzing the working of an operating system and its components.
<b>CO2</b>	Comparing and analyzing different file systems being used in different operating systems
<b>CO3</b>	Identifying the working methodology of multi threaded applications
<b>CO4</b>	Learning the management of different type of memories in the computer system
<b>CO5</b>	Defining and Analyzing the synchronization process
<b>CO6</b>	Determining the reasons of deadlocks, and their remedial measures in an operating system
<b>Course Name: DBMS Code: BEIT603</b>	
At the end of	Course Students will
<b>CO1</b>	Study the fundamentals of DBMS and Formal relational query language.
<b>CO2</b>	Understand File organization, Indexing, Hashing.
<b>CO3</b>	Study the various data models and design of relational database.
<b>CO4</b>	Understand the requirement of query processing and optimization.
<b>CO5</b>	Understand the Transaction Management.
<b>CO6</b>	Understand and implement SQL and PL/SQL
<b>Course Name: IP Code: BEIT604</b>	
At the end of	Course Students will
<b>CO1</b>	Understand the HTML Tags and Cascade Style Sheet
<b>CO2</b>	Understand the Java script and its event.
<b>CO3</b>	Concept of XML and XSL.
<b>CO4</b>	Transformation from Static and Dynamic Site Concept.
<b>CO5</b>	Understand the need of Java Server Page.
<b>CO6</b>	Understand the android application Component.
<b>Course Name: DWM Code:BEIT701</b>	
At the end of	Course Students will
<b>CO1</b>	Understand basic concepts and applications of Data Warehousing.
<b>CO2</b>	Know why preprocessing of data is important and understand various preprocessing techniques.
<b>CO3</b>	Understand the need of multidimensional analysis in Data Warehouse and study OLAP.
<b>CO4</b>	Analyze the different operations and techniques involved in Data Mining
<b>CO5</b>	Understand Association Rule Mining and study relationship across result sets.
<b>CO6</b>	Explore more recent areas like Business Intelligence, Big Data and Hadoop.
<b>Course Name: CSS Code:BEIT702</b>	
At the end of	Course Students will
<b>CO1</b>	Understanding the need of information security and study various encryption techniques.
<b>CO2</b>	Analyzing how symmetric key cryptography algorithm works.
<b>CO3</b>	Analyzing how Asymmetric key cryptography algorithm works.
<b>CO4</b>	Understanding message authentication and hash function.
<b>CO5</b>	Identifying Network security protocols.
<b>CO6</b>	Understanding web security requirement and security system.
<b>Course Name: AI Code:BEIT703</b>	
At the end of	Course Students will

Sheet1

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.
<b>Course Name: MC</b> <b>Code:BEIT704</b>	
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.
<b>Course Name: Multimedia</b> <b>Code: BEIT705</b>	
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.
<b>Course Name: STQA</b> <b>Code: BEIT706</b>	
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.
<b>Semester 8<sup>th</sup></b>	
<b>Course Name: Engineering Physics</b> <b>CODE: BESI-2T</b>	
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.
<b>Course Name: GAP</b> <b>Code:BEIT802</b>	
At the end of	Course Students will
CO1	Understand basics principals of Game Design and Game Design Process.

Sheet1

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.
<b>Course Name: ES</b> <span style="float: right;"><b>Code:BEIT803</b></span>	
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.
<b>Course Name: EComm&amp;ERP</b> <span style="float: right;"><b>Code:BEIT804</b></span>	
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.
<b>Department of Mechanical Engineering</b>	
<b>Course Outcomes(CO)</b>	
<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Fluid Mechanics</b> <span style="float: right;"><b>Code: BEME303T</b></span>	
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.
<b>Course Name: Kinematics Of Machine</b> <span style="float: right;"><b>Code: BEME302T</b></span>	
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.

Sheet1

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 - 4 <sup>th</sup>	
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.

Sheet1

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
<b>Course Name: Engineering Thermodynamics Code: BEME402T</b>	
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
<b>Course Name: Hydraulic Machines Code: BEME403T</b>	
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.
<b>Course Name: Applied Mathematics-IV Code: BEME401</b>	
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 probabirity distribution

<b>Course Name: Machining Processes</b>		<b>Code: BEME404T/</b>
At the end of course Students will		
<b>CO1</b>	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.	
<b>CO2</b>	Develop an ability to study of various machine tools, time estimation for turning operation and to know center lathe and capstan and turret lathe.	
<b>CO3</b>	Students will be able to know working principles, and mechanism of machine tools like shaper planer and slotter and concept of quick return mechanism.	
<b>CO4</b>	Learn the principle of operation, specification of milling machine and indexing mechanism.	
<b>CO5</b>	Develop an ability to know various grinding operations and specifications of grinding wheels.	
<b>CO6</b>	Learn working principles, operations and capabilities drilling machines, and various drilling operations; such as reaming boring, broaching etc.	
<b>Semester - 5<sup>th</sup></b>		
<b>Course Name: Design Of Machine Element</b>		<b>Code: BEME502T</b>
At the end of course Students will		
<b>CO1</b>	Able to understand the basic introduction to machine design, criteria for selection of material for design purpose and failure of selected material.	
<b>CO2</b>	Students will be able to design of various joints, brackets, levers and its checking for failure under various loading conditions.	
<b>CO3</b>	Students will be able to understand the design of pressure vessel based on stresses induced in it.	
<b>CO4</b>	Students will be able to understand the design of power transmission shaft and keys and their ASME codes.	
<b>CO5</b>	Students will be able to design the helical, leaf and laminated spring under static and variable loading condition.	
<b>CO6</b>	Students will be able to understand terminology of power screw its design and design various types of breaks and clutches	
<b>Course Name: Mechanical Measurement &amp; Metrology</b>		<b>Code: BEME505T</b>
At the end of course Students will		
<b>CO1</b>	Able to understand generalized measurement system, static & dynamic characteristic of measuring system.	
<b>CO2</b>	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.	
<b>CO3</b>	Able to understand and handle measuring equipment for measurement of pressure, temperature, vacuum & flow.	
<b>CO4</b>	Able to understand basic standards of measurement, working standards and measuring equipment used for linear and angular measurements	
<b>CO5</b>	Able to understand various types of limits, fits, tolerances and design of limit gauges	
<b>CO6</b>	Framework where the students will be able to understand various types of comparators and measurement of gear tooth profile.	
<b>Course Name: Heat Transfer</b>		<b>Code: BEME504T</b>
At the end of course Students will		
<b>CO1</b>	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	
<b>CO2</b>	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	
<b>CO3</b>	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	

Sheet1

<b>CO4</b>	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.
<b>CO5</b>	Students will acquire concept of radiation & it's law, Properties of radiation, Analysis of radiation exchange between parallel plate, cylinder & sphere, shape factor And rasion Shield
<b>CO6</b>	students will understand the concept of heat exchanger and it's classification, analysis and design for parallel and counter flow heat exchanger
<b>Course Name: Advance production process Code: BEME503T</b>	
At the end of course Students will	
<b>CO1</b>	Understand fundamental of various non-conventional machining processes.
<b>CO2</b>	Teach advanced joining processes.
<b>CO3</b>	Teach advancement in traditional lathe machine, design tool layout ,and basic fundamental of micromachining process.
<b>CO4</b>	Teach various operations preformed on sheet metal.
<b>CO5</b>	To make usage of jig & fixtures.
<b>CO6</b>	Introduce various super finis.hing processes
<b>Course Name: IEED Code: BEME501T</b>	
At the end of course Students will	
<b>CO1</b>	Students will be able to apply knowledge of dynamics of market forces demand and supply along with the types of elasticity.
<b>CO2</b>	Students will be able apply the knowledge of production function, laws of returns and cost concepts in applied engineering.
<b>CO3</b>	Students will be able apply the knowledge of market structure, inflationary impact on economy in applied engineering.
<b>CO4</b>	Students will be able to comprehend the process of entrepreneurial development for setting up engineering / business unit.
<b>CO5</b>	Students will be able to apply knowledge of economics and entrepreneurship with professional and ethical responsibilities.
<b>CO6</b>	Understand application of economics and entrepreneurial know-how in multidisciplinary domains of industry. Students will be able to prepare a project report and carryout market survey and project viability.
<b>Semester - 6<sup>th</sup></b>	
<b>Course Name: Control System Engg. Code: BEME602T</b>	
At the end of course Students will	
<b>CO1</b>	Familiarize with control system, control and modelling of mechanical system
<b>CO2</b>	Understand the significance of transfer function through block diagram and SFG
<b>CO3</b>	Students will get in depth knowledge of system response signals, mode of control and controller mechanism
<b>CO4</b>	Students will be able to understand concept of stability criterion through root locus
<b>CO5</b>	Familiarize with frequency domain analysis through Bode Plot and polar plot
<b>CO6</b>	Students will be able to develop the concept of state space, representation of continuous time system.
<b>Course Name: Operation Research Code: BEME603T</b>	
At the end of course Students will	
<b>CO1</b>	understand the formal quantitative approach of various OR Models and problem solving techniques of LPP.
<b>CO2</b>	Able to understand the transportation and assignment Models.
<b>CO3</b>	Understand formulation and problems solving techniques of game theory and sequencing models.
<b>CO4</b>	Understand the techniques which provide the tool that can used to solve project management problems.



Sheet1

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
<b>Course Name: Dynamic Of Machines</b> <span style="float: right;"><b>Code: BEME605T</b></span>	
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.
<b>Course Name: Mechatronics</b> <span style="float: right;"><b>Code: BEME604T</b></span>	
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.
<b>Course Name: Energy Conversion -I</b> <span style="float: right;"><b>Code: BEME601T /</b></span>	
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.
<b>Semester -7<sup>th</sup></b>	
<b>Course Name: Computer Aided Design</b> <span style="float: right;"><b>Code: BEME703T/</b></span>	
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.

<b>Course Name: Industrial Engineering</b>	<b>Code: BEME701T</b>
At the end of course Students will	
<b>CO1</b>	Formulated to design and develop the tools and techniques to improve the productivity.
<b>CO2</b>	Work measurement techniques and human engineering techniques emphasized in the course.
<b>CO3</b>	Various demand forecasting methods elaborate in the course to aware the students.
<b>CO4</b>	The course is formulated for implementation of various maintenance techniques.
<b>CO5</b>	Students will be able to control the quality of manufacturing products using various SQC tools.
<b>CO6</b>	Framework for implementation of various advanced quality control techniques.
<b>Course Name: Energy Conversion-II</b>	<b>Code: BEME704T</b>
At the end of course Students will	
<b>CO1</b>	Understand the working principle of reciprocating compressor and also they will be able to estimate the different efficiencies of reciprocating compressor.
<b>CO2</b>	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.
<b>CO3</b>	Learn the classification and working principle of internal combustion engine ,,their combustion phenomenon and fule injection system.
<b>CO4</b>	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
<b>CO5</b>	Understand the operation of VCRS ,VARs and refrigeration systems and also learn to calculate COP of refrigeration system.
<b>CO6</b>	Learn psychrometric properties and its applications in various air conditioning system.
<b>Course Name: Design Of Mechanical Drives</b>	<b>Code: BEME705T</b>
At the end of course Students will	
<b>CO1</b>	Understand design procedure of flywheel and coupling and its practical utility.
<b>CO2</b>	Student will able to understand design procedure and practical utility of different ty6pes of bearing.
<b>CO3</b>	Student will be able to analysis selection of belt drive and its design procedure.
<b>CO4</b>	Student will understand design procedure and practical application of roller chain and wire rope drive.
<b>CO5</b>	Student will be able to compare different drives with gear drive and its design procedure.
<b>CO6</b>	Student will be able to understand worm gear design and design of I.C.Engine components.
<b>Course Name: Automobile Engg.</b>	<b>Code: BEME702T3</b>
At the end of course Students will	
<b>CO1</b>	Able to understand basic components of Automobile Fuel supply System, Cooling System & Lubrication System
<b>CO2</b>	Able to understand construction & working of automobile components like clutches, gear box etc.
<b>CO3</b>	Student will be able to understand Transmission system, differential and different types of Brakes.
<b>CO4</b>	Understand the basics, working principle of steering system and suspension system.
<b>CO5</b>	Able to understand basic components Electrical system in Automobile and types of wheel & tyres used.
<b>CO6</b>	Able to develop sense of body and safety consideration in automobile, its components and recent advances in automobile
<b>Semester - 8<sup>th</sup></b>	
<b>Course Name: Advanced IC Engine</b>	<b>Code: BEME803T5</b>
At the end of course Students will	
<b>CO1</b>	Students will able to understand the basic concepts of IC Engine operating cycle and its components.

Sheet1

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
<b>Course Name: Finite Element Method</b>	
<b>Code: BEME802T1</b>	
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.
<b>Course Name: Automation In Production</b>	
<b>Code: BEME804T</b>	
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
<b>Course Name: Energy Conversion -III</b>	
<b>Code: BEME805T</b>	
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.
<b>Course Name: Refrigeration &amp; Air-conditioning</b>	
<b>Code: BEME802T5</b>	
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.

Sheet1

<b>CO2</b>	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
<b>CO3</b>	Understand working and analysis of various air cycle refrigeration systems, other refrigeration techniques like steam jet refrigeration, thermoelectric refrigeration, vortex tube
<b>CO4</b>	To learn applications of Cryogenics & methods for liquification of gases and its analysis .
<b>CO5</b>	Understand study of psychrometrics, properties & processes and to design calculations for air conditioning systems & various heating load calculations.
<b>CO6</b>	Understand principle & working of air transmission systems and air distribution systems, to understand methods of duct design and air conditioning controls
<b>Course Name:Industrial Management Code:BEME801T</b>	
At the end of course Students will	
<b>CO1</b>	Able to understand the Principles of management, development of scientific management and principles of Fredric W. Taylor, principles of Henry Fayol
<b>CO2</b>	Able to understand the Personal management, functions of personal management, labor welfare, Trade union act & Labor Legislation.
<b>CO3</b>	Able to understand the Marketing management, modern concept of marketing, market research,marketing mix and market segmentation
<b>CO4</b>	Able to understand the Financial management, Sources of finance, financing organizations and types of capital.
<b>CO5</b>	Able to understand the Plant management, Plant location, plant layout, Material handling, Industrial safety, causes & cost of accidents
<b>CO6</b>	Able to understand the Recent trends in production and operation management



























































































































































# PRIYADARSHINI COLLEGE OF ENGINEERING

## Course Outcome

### First Year

Semester-I	
<b>Course Name: Applied Mathematics-I</b>	
<b>CODE: BESI-1</b>	
At the end of course Students will	
<b>CO1</b>	Able to understand the idea of derivatives & also able to solve problem involving relationship between changing quantities
<b>CO2</b>	Able to understand concepts of function of several variables & their individual effects on function & Its application in optimization.
<b>CO3</b>	Understand, Analyze & transfer the data in a proper form for advance Engineering studies
<b>CO4</b>	Able to clarify & identify different types of D.E & to arrive at solution & Its Interpretation
<b>CO5</b>	Students will develop an ability to design conduct & analyze different stream(Electrical & Mechanical) related problems
<b>CO6</b>	Understand the concept of complex numbers & its application in Engineering filed.
<b>Course Name: Engineering Physics</b>	
<b>CODE: BESI-2T</b>	
At the end of course Students will	
<b>CO1</b>	Understand the basic principles of Quantum mechanics and will be able to apply these to the complex phenomenon of interaction of radiation with matter.
<b>CO2</b>	Understand the concept of wave packets using Heisenberg's uncertainty principle.
<b>CO3</b>	Able to apply Schrodinger's wave equations to study the complex physical phenomenon.
<b>CO4</b>	Able to understand the structure of crystalline solids by applying knowledge of crystallography.
<b>CO5</b>	Able to understand semiconducting materials by using the concepts of band theory of solids.
<b>CO6</b>	Able to apply the knowledge of semiconductor fundamentals to study various electronic devices.
<b>Course Name: Engineering Chemistry</b>	
<b>CODE: BESI-3T</b>	
At the end of Course Students will	
<b>CO1</b>	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
<b>CO2</b>	Understand ecological balance and awareness towards sustainable development
<b>CO3</b>	Provide solution to the problem pertaining to complex chemical processess useful in engineering concepts.
<b>CO4</b>	Understand the manufacturing processes of cement, importance of microscopic constituents and various properties including types of cement their uses.
<b>CO5</b>	Understand new concept of energy storage devices and its applications
<b>CO6</b>	Understand and identify the professional responsibilities and the impact of engineering practices on society.
<b>Course Name: Basics of Electrical Engineering</b>	
<b>CODE: BESI-4T</b>	
At the end of Course Students will	
<b>CO1</b>	Able to define and explain the meaning of charge current, voltage, power, energy, Passive elements
<b>CO2</b>	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
<b>Course Name: Basics of Civil Engineering</b>	
<b>CODE: BESI-5T</b>	
<b>At the end of Course Students will be able to</b>	
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.
<b>Course Name: Engineering Graphics</b>	
<b>CODE: BESI-6T</b>	
<b>At the end of Course Students will</b>	
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
<b>Course Name: Communication Skills</b>	
<b>CODE: BESI-7T</b>	
<b>At the end of Course Students will</b>	
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.
<b>Semester - II</b>	
<b>Course Name: Applied Mathematics-II</b>	
<b>CODE: BESII-1</b>	
<b>Student will be able to</b>	
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.

<b>Course Name: Advanced Electrical Engineering</b> <b>CODE: BESII-5T</b>	
At the end of Course Students will	
<b>CO1</b>	Understand the operation of different conventional and nonconventional power generation. Also to analyze the transmission, distribution and protective devices for safety
<b>CO2</b>	Understand the basic concepts and importance of Earthing, Inverter and UPS.
<b>CO3</b>	Able to analyze the behavior, characteristics and types of DC motor and generator.
<b>CO4</b>	Analyze the utilization of electrical energy and calculation of Electrical bill.
<b>CO5</b>	Understand the basic concepts of Illumination and its applications.
<b>CO6</b>	Analyze the performance of the single phase and three phase Induction Motors and characteristics of the Induction Machines
<b>Course Name: Ethical Science</b> <b>CODE: BESII-8</b>	
At the end of Course Students will	
<b>CO1</b>	Able to apply knowledge of humanities and social engineering process in diverse sphere of social life.
<b>CO2</b>	Able to make appropriate use of socio-legal tools for the overall benefit of the society.
<b>CO3</b>	Able to apply the principles of industrial psychology and industrial sociology and industrial democracy in industry.
<b>CO4</b>	Able to apply tools of motivation at work place, comprehend work organization and forms of organization.
<b>CO5</b>	Able to apply the tools of transactional analysis, to solve complex behavioral problems and develop leadership traits.
<b>CO6</b>	Able to develop awareness for environment sustainability and apply dynamic principles of social and ethical science.
<b>Department of Aeronautical Engineering</b>	
<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Aerothermodynamics</b> <b>Code: BEAE-302T</b>	
At the end of Course Students will	
<b>CO1</b>	Able to apply the basic concepts of thermodynamics to determine the work and heat transfer in various thermodynamics processes.
<b>CO2</b>	Able to implement the first law of thermodynamics to closed system and open system.
<b>CO3</b>	Able to apply the second law of thermodynamics to heat engine, heat pump refrigerator and will also evaluate entropy and availability of engineering systems.
<b>CO4</b>	Able to sketch P - v, T - s and h - s plot for the phase process and will also use steam table to determine the various properties of pure substances.
<b>CO5</b>	Able to analyze different air standard cycle viz. Otto Cycle, Diesel Cycle and Brayton Cycle and Vapour Cycle on the basis of different performance parameters.
<b>CO6</b>	Able to explain the application of Nozzle, Diffuser, Turbine, Compressor and Throttling Valve.
<b>Course Name: Fluid Mechanics and Machinery</b> <b>Code: BEAE-303T</b>	
At the end of Course Students will	

CO1	Get the idea about basic fluid properties, Newton's law of viscosity and its application & detailed idea about different pressure measuring device (like manometer, Bourdon's gauge)
CO2	Get basic idea about flow visualization techniques, Euler's equation of motion & Bernoulli's equation & its application
CO3	Able to get a clear idea about the types of flow depending on the Reynolds' number, Significance of Reynolds' and Mach number in the fluid flow, Phenomena for separation of flow and after the completion of this unit students will be able to find lift and drag force on an immersed body.
CO4	Able to Classify the hydraulic machines (such as turbines & pumps) understand about the working principle, Constructional features, Performance Characteristics, Governing & Selection criteria for- Impulse Turbines
CO5	Able to Classify the hydraulic machines (such as turbines & pumps) understand about the working principle, Constructional features, Performance Characteristics, Governing & Selection criteria for Reaction Turbines
CO6	Get the basic idea regarding the classification of pumps, Applications of pumps.

**Course Name: Computer Programming**

**Code:BEAE-304T**

At the end of Course Students will

CO1	Understand the programming concept of C Language.
CO2	Understand the concept of function, call by value and call by reference and how to use functions in programs and use of pointers.
CO3	Understand the concept of array, one dimension, two dimension and multi dimension.
CO4	Understand the concept of structure through programming, union and additional features of structure in C.
CO5	Understand the concepts of files and its different functions, random access of files by using functions.
CO6	Understand the use of ROM BIOS functions and TSR programming.

**Course Name: Elements of Aeronautics**

**Code:BEAE-305T**

At the end of Course Students will

CO1	Able to understand the basic concepts of aerospace engineering, historical revolution, early airplanes, biplanes and monoplanes.
CO2	Able to understand the evolution in the field of aerodynamics, materials, structures and propulsion over the years.
CO3	Able to explain about the major components of an airplane and their functions, Different types of flight vehicles, classifications, flight instruments for flying.
CO4	Able to understand the physical properties and structure of the atmosphere, Temperature, pressure and altitude relationships, Evolution of lift, drag and moment.
CO5	Able to understand different types of fuselage structures, wing structure and will be able to get the knowledge of various Metallic and non-metallic materials, Use of aluminium alloy, titanium, stainless steel and composite materials.

CO6	Able to understand different types of air breathing and non airbreathing engines, their comparative merits demrits..
Semester - 4 <sup>th</sup>	
Course Name: Manufacturing Process -I Code:BEAE-402T	
At the end of Course Students will	
CO1	The students will able to understand the basic concepts of Casting Process, types of Patterns, moulding process and various moulding machines
CO2	The students will able to understand the concepts of gating design process, various types of Melting furnaces and special casting processes.
CO3	The students will able to explain about the mechanics of forming processes, forging process, extrusion & wire drawing processes.
CO4	The students will able to understand the various kinds of metal joining processes, weldability of metals, defects & inspection of welding.
CO5	The students will able to understand different types of powder metallurgy processes, sintered carbide cutting tools and types of composite materials and its applications.
CO6	The students will able to explain different types of processing of plastics methods use for processing of plastic materials.
Course Name: Aircraft Materials Code:BEAE-403T	
At the end of Course Students will	
CO1	Able to understand classification, composition, properties heat treatments and applications of aerospace materials.
CO2	Enumerate the classification, advantages and applications of composite materials.
CO3	Describe preparation of moulding compounds, prepares and manufacturing of advanced composites.
CO4	Enumerate creep curve, various stages of creep, metallurgical factors influencing various stages.
CO5	Illustrate Various types of fracture,fatigue, oxidation and hot corrosion of aircraft materials .
CO6	Able to understand Iron base, Nickel base, Cobalt base super alloys and high temperature ceramics.
Course Name: Aircraft Structure-I Code:BEAE-404T	
At the end of Course Students will	
CO1	Understand the concept of simple stresses & strains,Torsion of circular shafts and Thin cylinders and spherical shells subjected to internal pressure.
CO2	Understand and analyse the Shear force & bending moment,Pure bending, deflection of beams and Shear stresses in beams concept.
CO3	Understand the Strain energy & impact loading and Statically indeterminate beams and frames.

CO4	Understand the Buckling of columns.
CO5	Establish relations for Principal stresses & strains and analyze member's subjected to different types of stresses simultaneously.
CO6	Analyze the derivation of maximum, minimum principle stresses & maximum shear stress induced in shaft when it is subjected to bending moment, torque & axial load.

**Course Name: Aerodynamics-I**

**Code:BEAE-405T**

At the end of Course Students will

CO1	Able to apply the knowledge in order to measure the lift and drag characteristics of an aerodynamic body
CO2	Able to apply the knowledge of potential flow theory in order to measure the lift and drag characteristics
CO3	Able to design and measure the lift and drag characteristics of an aerofoil
CO4	Able to determine the flow characteristics in a variable area duct and the flow across a shock wave
CO5	Able to determine the flow characteristics across a shock wave
CO6	Able to solve the boundary layer problems.

**Semester - 5<sup>th</sup>**

**Course Name: Heat Transfer**

**Code:BEAE-501T**

At the end of Course Students will

CO1	Able to understand the thermal response of engineering systems for application of Heat Transfer mechanism in both steady and unsteady state of conduction mode.
CO2	Able to apply the Dimensionless numbers into the free convection mode of heat transfer, Boiling and Condensation.
CO3	Able to apply the empirical correlations of the forced convection and also able to determine laminar and turbulent flow through ducts.
CO4	Able to apply the basic laws for radiation mode of heat transfer and also explain the concepts of black and gray body radiation heat transfer.
CO5	Able to explain the concept of heat exchanger and also apply the heat exchanger analysis for parallel, cross & counter flow by using NTU method.
CO6	Able to Remember the concepts to work out real time problems in Aerospace industry which involves the concepts of Heat Transfer mechanisms in the areas of gas turbine combustion chamber, rocket thrust chamber and ablative heat transfer

**Course Name: Aircraft Flight Mechanics**

**Code:BEAE-502T**

At the end of Course Students will

CO1	Understand the dimensional analysis, similarity laws and model laws with ISA for aircraft in various operating conditions.
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CO2	Understand and analyze the general Forces and moment distribution of aircraft for different flight conditions.
CO3	Analyze the performance of aircraft under steady straight level Flight conditions.
CO4	Analyze the performance of aircraft during climbing, gliding, turning and other maneuvers.
CO5	Understand the establishment of aircraft stability criteria and co-relate various stability aspects with aircraft control. Understanding case study of longitudinal static stability.
CO6	Analysis of longitudinal stability and control aspect due to aircraft components including fuselage, engine nacelle and control surface effectiveness.

**Course Name: Aerodynamics-II**

**Code:BEAE-503T**

At the end of Course Students will

CO1	Able to explain the formation of wing tip vortex and will able to measure the lift and induced drag characteristic using momentum theory.
CO2	Able to apply the knowledge of lifting line theory in order to measure the induced drag characteristics
CO3	Able to to measure the drag and moment characteristics of complete airplane using different theories.
CO4	Able to measure the lift and drag characteristics over an airfoil section at supersonic speed.
CO5	Able to explain the classification, construction and working of a wind tunnel will its application in Aerospace industry.
CO6	Able to explain the instrumentation part along with flow visualisation techniques used in Wind tunnel.

**Course Name: Aircraft Structure -II**

**Code:BEAE-504T**

At the end of Course Students will

CO1	Get idea about the symmetrical and unsymmetrical structural members of the aircraft structure, Section properties of the structural members and will be able to find the Neutral Axis Position, maximum bending stress position for the specified structural members
CO2	Able to find the shear centre and shear flow diagrams for the closed section and open section
CO3	Get the idea and knowledge of Membrane Analogy, Bredt - Batho formula application for Single and multi-cell structures. Shear flow in single and multicell structures under torsion and the overall understanding of Shear flow in single and multi cell under bending with walls effective and ineffective
CO4	Get the knowledge about Rectangular sheets under compression, Local buckling stress of thin walled sections, Crippling stresses by Needham's and Gerard's methods, thin walled column strength the theory Sheet stiffener panels, effective width, Inter rivet and sheet wrinkling failures which will give a clear idea to the students about aircraft structural failure.
CO5	Able to apply the knowledge of previous four units to solve the problem of the real aircraft structural components using the theory of bending, shear, torsion and buckling in the real aircraft structural components like wing and fuselage
CO6	Able to apply the knowledge of previous four units to solve the problem of the real aircraft structural components using the theory of bending, shear, torsion and buckling in the real aircraft structural components like wing and fuselage



<b>Course Name: Propulsion I</b>	
<b>Code:BEAE-505T</b>	
At the end of Course Students will	
CO1	Able to explain about different types of jet engine, their working principle and performance characteristics, apply basic concept of gas turbine cycle on jet engine and thrust augmentation methods
CO2	Able to explain about different types of inlets (mainly subsonic and supersonic), internal and external flow in terms of boundary layer separation and stall condition, diffuser performance and shock swallowing by area variation
CO3	Able to explain about various type of combustion chamber used in gas turbine cycle, and the factor affecting to design and performance parameters of combustion chamber, they can also able to apply the fundamental knowledge on different types flaming technique used in combustion chamber
CO4	Able to explain about the basic operating principle of convergent and divergent nozzles, the choking condition in nozzles, the various types of CD nozzles and thrust reversal methods
CO5	Able to explain about various types of compressor and turbine, their performance parameters, their efficiency and component characteristics
CO6	Able to explain about basic working principle of gas turbine components like: inlet, compressor, combustion chamber, turbine and nozzle, and able to apply fundamental concept on numerical technique
<b>Semester - 6<sup>th</sup></b>	
<b>Course Name: Propulsion II</b>	
<b>Code:BEAE-601T</b>	
At the end of Course Students will	
CO1	Able to explain about working principle and performance characteristics of Ramjet engine in terms of their subcritical, critical and supersonic operation and the combustion process in Ramjet engine, they can also able to apply the same on numerical concept
CO2	Able to explain about working principle and performance characteristics of scramjet engine and hypersonic propulsion, they also must be able to elaborate preliminary concept of supersonic combustion
CO3	Able to explain about the basic operating principle of rocket propulsion, Rocket nozzle classification, Rocket performance considerations and they able to apply the same of numerical concept
CO4	Able to explain about the solid propellant, Selection criteria of solid propellants, Important hardware components of solid rockets and Propellant grain design considerations
CO5	Able to explain about liquid propellant, Thrust control in liquid rockets, Cooling in liquid rockets, Limitations of hybrid rockets, Relative advantages of liquid rockets over solid rockets and must be able to apply the same on numerical problems
CO6	Able to explain about advanced propulsion technique like: Electric rocket propulsion, Ion propulsion techniques, Nuclear rocket, Types, Solar sail, Preliminary Concepts in nozzle less propulsion and their operating principle etc.
<b>Course Name: System Modeling and Simulation</b>	
<b>Code:BEAE-603T</b>	
At the end of Course Students will	
CO1	Get the basic knowledge of the mathematical representation of physical system and the solving those equations by block diagram algebra
CO2	Get the basic idea about systems modeling and various types of example of system modelling

CO3	Get a general idea about system studies specially about the corporate system model studies
CO4	Get knowledge about the mathematical formation of control system and finding the transfer function of various types of basic control systems
CO5	Get a basic overview of MATLAB by using SIMULINK
CO6	Study about avionics architecture in detail and different types of DATA bus system for commercial and fighter aircraft
<b>Course Name: Aircraft Design</b>	
<b>Course Code:BEAE605T</b>	
At the end of Course Students will	
CO1	Explain the Airplane design process including conceptual, preliminary & detail design phases, Classify the airplanes, list out the factors affecting the configuration, Merits of different airplane layouts
CO2	Outline the Principal features, Explain the aerodynamic and structural consideration, Weights and Strength considerations
CO3	Utilize the Data collection and make 3-View drawings, model the initial sizing, rubber engine sizing and fixed engine sizing, do the calculations of weight estimation, do the choice of wing loading and thrust loading,.
CO4	Examine the Wing design, List out the Airworthiness requirements, Relate V-n diagram with real problem, List out the Elements of wing design, explain the Structural features.
CO5	Examine the Fuselage design, explain Loads on fuselage, List out the Elements of fuselage design, Determination of tail surface areas, explain Structural features.
CO6	Examine the Landing gear design, explain Loads on Landing gear, perform the Preliminary landing gear design.
<b>Semester - 7<sup>th</sup></b>	
<b>Course Name: Aircraft System And Instrumentation</b>	
<b>Course Code:BEAE701T</b>	
At the end of Course Students will	
CO1	Able to understand airplane control systems
CO2	Able to describe aircraft hydraulic systems
CO3	Able to describe aircraft pneumatic & hybrid systems
CO4	Able to understand different Engine Systems
CO5	Able to explain auxilliary system of the aircraft
CO6	Able to identify different aircraft instruments and thire operation and principles.
<b>Course Name: Space Flight Mechanics</b>	
<b>Course Code:BEAE703T</b>	
At the end of Course Students will	
CO1	Explain the Solar System, Reference frames and coordinate systems, Celestial Sphere, Motion of Vernal Equinox, Sidereal, Solar and Standard time and the Earth's Atmosphere.

CO2	Outline the application and derive the Equations of The N-body problem, The two-body problem, Many body problems, The circular restricted three body problem, Lagrange-Jacobi identity, Satellite orbits and all the Orbital Elements.
CO3	Utilize and derive the equations for the Satellite orbit transfer, General aspects of satellite injections, Orbit deviations due to injection errors, Special and general perturbations, Cowell's and Encke's method.
CO4	Examine and derive the equations for the Two dimensional interplanetary trajectories, Fast interplanetary trajectories, Three dimensional interplanetary trajectories, Launch of interplanetary spacecraft, Trajectory about the target planet.
CO5	Derive and explain The boost phase, Ballistic phase and Re-entry.
CO6	Explain the Space environment and its peculiarities and the effect of space environment on the selection of materials of spacecraft.

**Course Name: AGEMP**

**Code:BEAE-705T**

At the end of Course Students will

CO1	Able to understand the aircraft ground handling techniques such as mooring, jacking, leveling, towing operations and also student will get aware of engine starting procedures.
CO2	Able to understand the ground servicing various sub systems such as air conditioning and pressurization system, oxygen and oil systems.
CO3	Able to understand the shop safety and environmental cleanliness precautions. And also student will get aware of hand tools identification terminology.
CO4	Able to understand how the problems are identified by troubleshooting aircraft structural, mechanical or electrical systems and also Discussing the types of documentation, Regular documentation, Airline generated documentation, ATA document standards
CO5	Able to understand the specification and correct use of various aircraft hardware, American and British systems of specifications, and identification of all types of fluid line fittings.
CO6	Able to understand the plumbing connector's cables swaging procedures, tests, Advantages of swaging over splicing.

**Semester - 8<sup>th</sup>**

**Course Name: Vibration and Aero-Elasticity**

**Code:BEAE-802T**

At the end of Course Students will

CO1	Able to determine the equation of motion of vibratory system by using Newton's Method, Energy Method and D' Alembert Principal.
CO2	Able to determine the natural frequency of single degree of freedom vibratory system for free and forced vibration .
CO3	Able to apply the concepts of vibration to multi degree of freedom system and also understand the concepts of static and dynamic coupling.
CO4	Able to solve different vibratory problem by using Hamilton's Theorem and Lagrange's Equation.
CO5	Able to apply the concepts of vibration of string to derive the equation of motion for lateral , longitudinal and torsional vibration of beam.
CO6	Able to explain different Aero elastic instabilities associated with vibration of different components of aircraft.

<b>Course Name: Reliability Centered Maintenance</b>	
<b>Code:BEAE-803T</b>	
At the end of Course Students will	
<b>CO1</b>	Able to understand reliability and apply it for the failure data analysis.
<b>CO2</b>	Able to apply systems reliability concepts and techniques to design problems.
<b>CO3</b>	Able to understand History, Evolution, Achievements and Methodologies of Reliability Centered Maintenance.
<b>CO4</b>	Able to understand Failure Mode and Effect Analysis (FMEA), Analysis & Categories of failure Mode.
<b>CO5</b>	Understand methods needed for RCM Maintainability
<b>CO6</b>	Able demonstrate understanding and application of RCM.

<b>Course Name: Computational Fluid Dynamics</b>	
<b>Code:BEAE-805T</b>	
At the end of Course Students will	
<b>CO1</b>	Get chance for reviewing the basic fluid dynamics governing equations ( continuity, energy and momentum) and get knowledge about Importance of CFD to various engineering streams.
<b>CO2</b>	Get the knowledge in depth for the Description and procedure used in Finite Difference, Finite Element and Finite Volume schemes for simple one dimensional conduction problems, Application to unsteady one-dimensional conduction problems.
<b>CO3</b>	Able to apply the knowledge of Finite Difference method to 1D & 2D steady and unsteady conduction problems and get idea about the use of different numerical schemes
<b>CO4</b>	Get the knowledge in depth for initial and boundary value problems and numerical methods like Runge Kutta and shooting method
<b>CO5</b>	Get the idea about the numerical and analytical solution methods for 1D and 2D Conduction and convection problems, application of Navier Stokes equations for incompressible flow. Pressure correction scheme, staggered grid, SIMPLE and SIMPLER schemes.
<b>CO6</b>	Get the knowledge about FVM method for compressible flow

**Department of Civil Engineering**

*Course Outcomes(CO)*

<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Applied Mathematics - III</b>	
<b>Code:BECVE301</b>	
At the end of course Students will	
<b>CO1</b>	Demonstrate the ability of using Fourier series in solving the Ordinary Differential Equations and Partial Differential Equations.
<b>CO2</b>	Solve the partial differential equations by separation variable methods.
<b>CO3</b>	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.
<b>CO4</b>	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.
<b>Course Name: Strength of Material</b> <b>Code:BECVE302</b>	
At the end of course Students will	
CO1	Understand the behavior of materials under different stress and strain conditions
CO2	Able to draw Axial Force, Bending Moment and Shear Force Diagram for beams under different conditions of loading.
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.
<b>Course Name: Environment Engineering -I</b> <b>Code:BECVE303</b>	
At the end of course Students will	
CO1	Able to understand the importance and necessity of water supply and able to determine the capacity of water supply scheme
CO2	Know the basic knowledge related to the conveyance systems and the appurtenances used
CO3	Understand characteristics of water, drinking water standards
CO4	Able to design various units of conventional water treatment plant
CO5	Equipped with the basic knowledge related to design of water supply system
CO6	Understand of necessity of treatment, types of treatment Processes and disposal methods for solid waste
<b>Course Name: Engineering Geology</b> <b>Code:BECVE304</b>	
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.

<b>Course Name: Concrete Technology</b>		<b>Code: BECVE305</b>
At the end of course Students will		
<b>CO1</b>	Understand the effect of process of manufacturing on different properties of concrete	
<b>CO2</b>	Recommend, check different constituent of concrete and control method of manufacture of concrete	
<b>CO3</b>	Test strength and quality of plastic and set concrete	
<b>CO4</b>	Understand application of admixture and its effect on properties of concrete	
<b>CO5</b>	Understand various environmental factors which affect durability of concrete, analyze cause of deterioration of concrete components and to suggest various preventive measures to it	
<b>CO6</b>	Test various strength of concrete by destructive and nondestructive testing methods	
<b>Semester – 4<sup>th</sup></b>		
<b>Course Name: Structural Analysis-I</b>		<b>Code: BECVE401</b>
At the end course of Students will		
<b>CO1</b>	Able to understand bending moment and shear force diagram for indeterminate structure such as beams and frames.	
<b>CO2</b>	Able to perform ILD analysis of determinate beams and trusses	
<b>CO3</b>	Able to apply strain energy method to redundant frame and truss	
<b>CO4</b>	Able to use Euler's and Rankine's formula for finding buckling of column and beam.	
<b>CO5</b>	Able to use slope deflection method for analysis of Indeterminate beam and frame	
<b>CO6</b>	Able to apply knowledge to determine forces in determinate and indeterminate structures by the force and matrix method.	
<b>Course Name: Geotechnical Engineering -I</b>		
		<b>Code: BECVE402</b>
At the end course of Students will		
<b>CO1</b>	Know the types of soils and understand the three phase system.	
<b>CO2</b>	Determine the index properties of the soil and classify the soils.	
<b>CO3</b>	Determine the engineering properties of the soil.	
<b>CO4</b>	Evaluate the stresses in the soil mass.	
<b>CO5</b>	Determine the suitability of foundation for a particular type of soil.	
<b>CO6</b>	Determine the shear strength of the soil.	
<b>Course Name: Transportation Engineering - I</b>		
		<b>Code: BECVE403</b>
At the end course of Students will		

CO1	Able to understand the broad vision and complete knowledge of design of highways pavement
CO2	Able to understand the construction practices in highway engineering and pavement.
CO3	Able to test the highway materials and draw appropriate conclusion.
CO4	Able to maintain and propose measurements of highways.
CO5	Able to undertake traffic studies on highways.
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	Able to measure distances and angles.
CO2	Able to undertake various civil engineering surveys work.
CO3	Able to do temporary and permanent adjustments.
CO4	Able to orient and draw the various maps.
CO5	Able to calculate areas and volumes of the civil engineering 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 should able to understand classification of bricks & different types of brickwork.
CO3	The students should able to understand types of stone masonry & damp proofing.
CO4	The students should able to understand different types & methods of construction of roof & floor.
CO5	The students should able to understand functional design of different types of staircase, door & window.
CO6	The students should able to understand plastering, pointing, centering & painting.

**Semester - 5<sup>th</sup>**

**Course Name: Structural Analysis-II** **Code: BECVE501**

At the end of course Students will

CO1	Apply the Kanis methods for analysis of frames
CO2	Apply MDM for analysis of Beam and frames and to understand the behavior of different structural members
CO3	Formulate the globe stiffness matrix, load matrix for analysis purpose for plan truss.

CO4	Formulate the global stiffness matrix, load matrix for analysis purpose for beam.
CO5	Formulate the stiffness matrix, transformation matrix, load matrix for analysis purpose for plan frame.
CO6	Apply the basics of finite element method in the analysis of structural components and understand the concepts related to structural dynamics.
<b>Course Name: Reinforced Cement Concrete (RCC) Code: BECVE502</b>	
At the end of course Students will	
CO1	Understand the basic concepts of RCC design with working stress method.
CO2	Understand the different method of prestressing of concrete. And analysis of prestress beam and slab.
CO3	Understand the basic concepts of limit state method. And design of beam for limit state of serviceability and limit state of collapse
CO4	Understand the limit state of collapse in compression. And analysis and design of axially loaded and uniaxial bending column.
CO5	Understand the behaviour of RCC to control cracking and design of beam for shear and bond.
CO6	Use the knowledge of structural design for design of various slab .
<b>Course Name: Fluid Mechanics - I Code: BECVE503</b>	
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 basic concepts related to laminar and turbulent flow.
CO4	Apply the Bernoulli's equation to solve the problems in fluid.
CO5	Understand and apply the concept of fluid measurement and its control through discharge
CO6	Understand the concepts of dimensional analysis use the dimensionless number suitably.
<b>Course Name: Geotechnical Engineering Code: BECVE504</b>	
At the end of course Students will	
CO1	Use the knowledge of different soil techniques to ascertain the properties of soil.
CO2	Analysis of stability of natural slope, safety and sustainability of slopes.
CO3	Design of retaining structure, reinforced earth wall.
CO4	Practice of ground improvement techniques.



CO5	Design of shallow foundation
CO6	Design of deep foundation.
<b>Course Name: Hydrology And Water Resources</b>	
<b>Code: BECVE505</b>	
At the end of course Students will	
CO1	Compute precipitation, rainguage network
CO2	Compute infiltration, evaporation and traspiration
CO3	Determine total runoff, Use the techniques of the Hydrographs to forecast flood discharge at various durations.
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	Understand concept of recharge, Rainwater harvesting, planning of water resources mini project
<b>Semester – 6<sup>th</sup></b>	
<b>Course Name: Steel Structures</b>	
<b>Code: BECVE601</b>	
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
<b>Course Name: Surveying-II</b>	
<b>Code: BECVE602</b>	
At the end of course Students will	
CO1	Carry forward the concepts of basic surveying techniques.
CO2	Set out the curves on the field by various surveying methods.
CO3	Set out the transition curve on the field.
CO4	Gain the knowledge of geodetic surveying and triangulation adjustment.

CO5	Gain the knowledge of photographic surveying.
CO6	Apply the concepts of modern surveying techniques & instrumentation.
<b>Course Name: Fluid Mechanics-II</b>	
<b>Code: BECVE603</b>	
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
<b>Course Name: Environment Engineering -II</b>	
<b>Code: BECVE605</b>	
At the end of course Students will	
CO1	Understand concept related to water & its quality, sewage, sewer, storm water, etc in its hydraulic design.
CO2	Apply the knowledge of different components of sewer in construction, testing & maintenance of sewers
CO3	Test the sample of waste water in the laboratory for physical & chemical characteristics.
CO4	Take up functional planning, layout and design of water treatment plant Components and 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.
<b>Semester -7<sup>th</sup></b>	
<b>Course Name: Advanced Concrete Structures</b>	
<b>Code: BECVE701</b>	
At the end of course Students will	
CO1	Understand the principles of analysis and design of circular and rectangular water tank.
CO2	Understand the behavior and failure modes of different concrete member .Analysis and design of columns.
CO3	Analyze and apply the results in designing of beam.
CO4	Design of retaining wall.
CO5	Understand the relevant software and use the same in analysis & design of concrete members.

CO6	Design of Combine footing.
<b>Course Name: Estimating And Costing</b>	
<b>Code: BECVE702</b>	
At the	end of course Students will
CO1	Prepare the preliminary estimate for administrative approval & technical sanction for a civil engineering project.
CO2	Estimate the bill of quantities using different techniques of preliminary & detailed estimation of buildings.
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	Arrive the exact value of the asset (movable & immovable) using different Valuation techniques.
<b>Course Name: Earthquake Resistant Design of Structures</b>	
<b>Code: BECVE703</b>	
At the	end of course Students will
CO1	Understand the different aspects related to seismology and terms related to it
CO2	Analyze earthquake loading effect on structures.
CO3	Perform the analysis and design of structures against earthquake loading.
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	Use the knowledge in practical situation.
<b>Course Name: Air pollution And Solid Waste Managements</b>	
<b>Code: BECVE703</b>	
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	Able to design controls methods for air pollution to reduce its impact on environment
CO3	Able to design 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	Able to understand problems arriving in its collection, transportation, and processing
CO6	Able to design safe collection and disposal methods.

<b>Course Name: Construction Management &amp; Law</b>	<b>Code: BECVE704</b>
At the end of course Students will	
<b>CO1</b>	Understand various types of projects and modern construction techniques.
<b>CO2</b>	Understand construction planning, scheduling and various controls.
<b>CO3</b>	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.
<b>CO4</b>	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.
<b>CO5</b>	Analyze the legal aspects in construction projects.
<b>CO6</b>	Understanding of various laws pertaining to civil engineering and architectural planning & sanctioning, labor & organizational welfare measure, provisions of arbitration and litigations.
<b>Course Name: Transportation Engineering - II</b>	<b>Code: BECVE705</b>
At the end of course Students will	
<b>CO1</b>	Understand the functions of various elements of railways.
<b>CO2</b>	Plan and design various elements of railways.
<b>CO3</b>	Understand the various principles traffic control in railways.
<b>CO4</b>	Understand the functions of various elements of airports.
<b>CO5</b>	Evaluate the plans, design and maintenance of various elements of airports, docks and harbour.
<b>CO6</b>	Understand the basic knowledge about various elements of Tunnels.
<b>Semester -8<sup>th</sup></b>	
<b>Course Name: Irrigation Engineering</b>	<b>Code: BECVE801</b>
At the end of course Students will	
<b>CO1</b>	Understand the importance of irrigation engineering, the methods of irrigation and crop water requirement.
<b>CO2</b>	Understand the planning, design and operation of storage reservoir and make use of it in the practical situation.
<b>CO3</b>	Understand the basic profile of dams and use the knowledge in checking stability of Gravity dams and Earth dams.
<b>CO4</b>	Gain the knowledge of types of spillways and design of diversion head works.
<b>CO5</b>	Understand the theories of canal design and apply the concept to design lined and unlined canals and detail out the cross sections.
<b>CO6</b>	Understand water logging and provide the solution to such problem.

<b>Course Name: Pavement Analysis And Design</b>		<b>Code: BECVE802</b>
At the	end of course Students will	
<b>CO1</b>	Able to understand design parameters of various pavements	
<b>CO2</b>	Able to analyz flexible pavements, conduct tests & experiments and interpret the data	
<b>CO3</b>	Able to design flexible pavements by IRC methods to meet desired needs within realistic constraints	
<b>CO4</b>	Able to analyz rigid pavements, conduct tests & experiments and interpret the data	
<b>CO5</b>	Able to design rigid pavements by IRC methods to meet desired needs within realistic constraints	
<b>CO6</b>	Able to understand strengthening and maintenance of pavements	
<b>Course Name: Advanced Reinforced Cement Concrete Design</b>		<b>Code: BECVE803</b>
At the	end of course Students will	
<b>CO1</b>	Analysis and design of overhead circular service reservoirs.	
<b>CO2</b>	Analysis and design of Intze service reservoirs.	
<b>CO3</b>	Design and understand behavior of special RC structure under IRC class AA track vehicle loading	
<b>CO4</b>	Design and understand behavior of special RC structure under IRC class A and class AA wheel vehicle loading	
<b>CO5</b>	Analysis and design of multi storied frame structure incorporating seismic forces.	
<b>CO6</b>	Analysis and design of cylindrical shells.	
<b>Course Name: Water and Waste Water Treatment</b>		<b>Code: BECVE803</b>
At the	end of course Students will	
<b>CO1</b>	Understand various concept realated to Water treatment plant , detail concept, design of aeration.	
<b>CO2</b>	Use the techniques, skills, and modern engineering tools necessary for environmental engineering practices.	
<b>CO3</b>	Designing of different units of water &waste water treatment plant.	
<b>CO4</b>	Understand knowledge about recent development in water &waste water treatment	
<b>CO5</b>	Procedure for Conduct a various test on water &waste water	
<b>CO6</b>	Understand modern methods of treatment.	
<b>Course Name: Construction Economics And Finance</b>		<b>Code: BECVE804</b>
At the	end of course Students will	
<b>CO1</b>	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 - 3<sup>rd</sup>**

**Course Name: Applied Mathematics-III**

**Code: BECT201**

At the end of course Students will

CO1	Understand Laplace Transform and should be able to solve differential equation
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	Apply concept of Z- transform for solving difference equation.
CO4	Understand the fundamental concept of complex analysis and also be able to evaluate some standerd integral using contour integrals
CO5	Setup and solve linear systems/ linear inequalities graphycally / geometrically and algebraically using matrices
CO6	Compute probablities and conditional probablities in appropriate ways and able to learn about mathematical expectation and apply them to predict expected behavior of any function

**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.

<b>Course Name: Digital Circuits and Microprocessors</b>		<b>Code:BECT203</b>
At the	end of course Students will	
<b>CO1</b>	Analyze Boolean Algebra and basics of digital logic circuits	
<b>CO2</b>	Analyze fundamentals of different combinational circuits	
<b>CO3</b>	Analyze and design of various sequential circuits	
<b>CO4</b>	Analyze the architecture and pin diagram of 8085	
<b>CO5</b>	Analyze the different types of instruction set of UP 8085	
<b>CO6</b>	Analyze the interrupt structure and Programming Technique of UP 8085	
<b>Course Name: Social &amp; Ethical aspects Of IT</b>		<b>Code:BECT204</b>
At the	end of course Students will	
<b>CO1</b>	Understand the concepts of ethics in business world and IT community.	
<b>CO2</b>	Understand cyber crimes and privacy laws.	
<b>CO3</b>	Understand the freedom of Expression issues.	
<b>CO4</b>	Understand intellectual property issues, trade secrets and software development process.	
<b>CO5</b>	Understand the impact of IT on productivity, health care cost and social networking issues.	
<b>CO6</b>	Understand the concept of contingent workers, outsourcing,whistle blowing, online virtual worlds.	
<b>Course Name: Computer Architecture &amp; Organization</b>		<b>Code:BECT205</b>
At the	end of course Students will	
<b>CO1</b>	Understand basic functional units, their functioning and their interconnection of a computer system.	
<b>CO2</b>	Apply Methodical treatment of machine instructions,addressing techniques, instruction sequencing and basic aspects of 2's complement arithmetic facilitates.	
<b>CO3</b>	Recognize Register-Transfer-level treatment of the instruction fetching and execution by Hardwired & Microprogrammed control unit.	
<b>CO4</b>	Examine Arithmetic unit of computer logic design for fixed-point operating hardware on 2's complement number.	
<b>CO5</b>	Describe Cache and multiple-module memory systems for increasing main memory bandwidth.	
<b>CO6</b>	Express large system uses many processor operating in parallel Interconnection networks for multiprocessors.	
<b>Semester - 4<sup>th</sup></b>		
<b>Course Name: Discrete Mathematics and Graph Theory</b>		<b>Code:BECT208</b>
At the	end of course Students will	

CO1	Able to apply standard logical equivalence and to be able to prove that two logical expressions are or not logically equivalent.
CO2	Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions and integers.
CO3	Able to discriminate. Identify and prove the properties of groups and subgroups.
CO4	Students will able to know some elementary concepts from the theory of rings such as zero divisor, division rings and fields.
CO5	Able to model and solve real world problems using graphs and trees, both quantitatively and qualitatively.
CO6	Able to apply diverse counting strategies to solve various problems involving strings, combinations, distribution and partitions.

**Course Name: Data Structure & Program Design**

**Code: BECT209**

At the end of course Students will

CO1	Understand basic concepts of Data structure and role of data structures in structuring and manipulating data like searching and sorting.
CO2	Understand the concepts of stack and queue along with their implementation of various operations and evaluation of expressions using stack.
CO3	Understand the concepts and types of Linked list and implementation of its various operations.
CO4	Understand Binary tree , its representations, traversals methods and searching techniques.
CO5	Understand the significance of graph , its implementations and applications of graphs.
CO6	Understand concept of file Storage structures and its various techniques.

**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.
<b>Course Name:Introduction to Mainframe Language</b>	
<b>Code:BECT212</b>	
<b>At the end of course Students will</b>	
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.
<b>Semester – 5 th</b>	
<b>Course Name: Object Oriented Modeling</b>	
<b>Code:BECT301</b>	
<b>At the end of course Students will</b>	
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.
<b>Course Name: Data Base Management System</b>	
<b>Code:BECT302</b>	
<b>At the end of course Students will</b>	
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.
<b>Course Name: Operating System</b> <b>Code:BECT303</b>	
At the end of course Students will	
CO1	Understand various techniques for solving Recurrences.
CO2	Understand asymptotic notations and implement , analyze Divide & Conquer Strategy.
CO3	Understand, implement and analyze Greedy Method.
CO4	Understand, implement and analyze Dynamic Programming Strategy.
CO5	Understand, implement and analyze Backtracking Strategy.
CO6	Understand the concepts of NP-Hard and NP-Completeness.
<b>Course Name: Design and Analysis of Algorithms</b> <b>Code:BECT304</b>	
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.
<b>Course Name: Data Communication</b> <b>Code:BECT305</b>	
At the end of course Students will	
CO1	Analyze and formulate various digital and analog signal modulation techniques to draw clear and reasonable ways of various data transmission methods.
CO2	Able to use mathematical and statistical methods to use various binary data coding techniques usually used for error free transmission of data.
CO3	Develop an ability to understand analog to digital signal conversion techniques to be able to transmit the data for long distance communication.
CO4	Exhibit knowledge of data communication to identify, formulate and solve engineering and social problems.

CO5	Exhibit the ability to analyze and interpret the data for successfully .
CO6	Develop an ability to design ,conduct and analyze.
<b>Semester – 6<sup>th</sup></b>	
<b>Course Name: Computer Graphics</b> <b>Code:BECT306</b>	
At the end of course Students will	
CO1	Understand basic concepts of computer graphics, Recognize the importance of computer graphics and exploring its wide spread applications.
CO2	Study and implement Basic Raster Graphics Algorithms for Drawing 2D primitives and various polygon filling algorithms.
CO3	Study and implement 2D Clipping algorithms for regular and irregular windows and various types of curves.
CO4	Understand and implement various 2D Transformations .
CO5	Understand 3D System Basics and 3D Transformations and to study various hidden surface removal algorithms.
CO6	Understand the basics of Graphics Programming using OPENGL and its <b>implementation.</b>
<b>Course Name: Computer Networks</b> <b>Code:BECT307</b>	
At the end of course Students will	
CO1	understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
CO2	apply knowledge of different techniques for error detection and correction during data transmission.
CO3	understand the concept of IP address, subnet mask and default gateway in a routed network .
CO4	understand and demonstrate the working of Transport layer protocols such as TCP and UDP.
CO5	understand and demonstrate application layer protocols such as HTTP, FTP, SMTP etc.
CO6	understand the organization of wireless LAN , ISDN Service &ATM ,Cellular Telephony ,Satellite Networks.
<b>Course Name: Software Engg. &amp; Project Management</b> <b>Code:BECT308</b>	
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.
<b>Course Name: Embedded System Design</b> <b>Code:BECT309</b>	
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.
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 <b>devices</b> .
<b>Course Name: Functional English</b> <b>Code:BECT310</b>	
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.
<b>Semester – 7<sup>th</sup></b>	
<b>Course Name: Compilers</b> <b>Code:BECT401</b>	
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.
<b>Course Name: Artificial Intelligence</b> <b>Code:BECT402</b>	
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.
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.
<b>Course Name: Advanced Data Base Management System</b> <b>Code:BECT403</b>	
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.
<b>Course Name: Advanced Operating System</b> <b>Code:BECT404</b>	
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.

<b>Course Name: DWM</b>		<b>Code:BECT405</b>
At the end of course Students will		
<b>CO1</b>	Understand the basic concepts of data warehouses, On-line Analytical Processing and data cube technology.	
<b>CO2</b>	Understand the fundamentals of Data Mining and discuss various techniques for Data Preprocessing.	
<b>CO3</b>	Understand and implement methods for Classification and Data Clustering.	
<b>CO4</b>	Understand and implement mining techniques for frequent itemset mining.	
<b>CO5</b>	Understand various techniques of Web, Temporal and Spatial data mining.	
<b>CO6</b>	Understand the concepts, challenges of big data and to analyze, manage the big data using Map-Reduce and Hadoop.	
<b>Course Name: Cloud Computing</b>		
		<b>Code:BECT406</b>
At the end of course Students will		
<b>CO1</b>	Understand the basic concept of cloud computing.	
<b>CO2</b>	Understand in detail the cloud computing architecture.	
<b>CO3</b>	Understand and implement big data analysis, Hadoop and Mapreduce.	
<b>CO4</b>	Understand various security concepts in cloud computing.	
<b>CO5</b>	Understand and implement Cloud based Application using C#.	
<b>CO6</b>	Study cloud application using Windows Azure.	
<b>Semester 8<sup>th</sup></b>		
<b>Course Name: CIS</b>		<b>Code:BECT407</b>
At the end of course Students will		
<b>CO1</b>	Understand the need of information security and study various encryption techniques.	
<b>CO2</b>	Understand and implement symmetric key cryptography algorithms.	
<b>CO3</b>	Understand and implement Asymmetric key cryptography algorithms.	
<b>CO4</b>	Understand and implement various message authentication, hash function and PKI Architecture.	
<b>CO5</b>	Understand Firewall Functionality and intrusion detection system (IDS).	
<b>CO6</b>	Understand various Software Vulnerability and Electronic Mail security System.	
<b>Course Name: WDM</b>		
		<b>Code:BECT408</b>
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.
<b>Course Name: Parallel Computing Code:BECT409</b>	
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.
<b>Department of Electronics Engineering</b>	
<b><u>Course Outcome</u></b>	
<b><u>Semester 3 rd</u></b>	
<b>Course Name: Applied Mathematics-III Code:BEENE301</b>	
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.
<b>Course Name: Electronic devices and circuits Code: BEENE302</b>	
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
<b>Course Name: Electronics Measurement and Instrumentation Code: BEENE303</b>	
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.
<b>Course Name: Object Oriented programming and Data Structure Code:BEENE304</b>	
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
<b>Course Name: Network Analysis and Synthesis Code: BEENE305</b>	
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
<b>Semester 4 th</b>	
<b>Course Name: M-IV</b> <b>Code:BEENE401</b>	
At the end of Course Students will	
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.
<b>Course Name:Power Drives and Machines</b> <b>Code:BEENE402</b>	
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
<b>Course Name: Electromagnetic Field</b> <b>Code:BEENE402</b>	
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.
<b>Course Name: Digital Circuit &amp; Fundamental of Microprocessor</b> <b>Code:BEENE404</b>	
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 - 5<sup>th</sup>**

**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	Elaborate 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.
<b>Course Name:ANALOG CIRCUIT AND DESIGN</b>	
<b>Code:BEENE503</b>	
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
<b>Course Name: communication electronics</b>	
<b>Code:BEENE504</b>	
At the end of Course Students will	
CO1	Describe the concept of Ampitude 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 Recievers,FM Detectors and their features.
CO6	Demonstrate the concept of Fundamental of Broadband Communication Links and Haul Systems.
<b>Course Name: Engg Eco &amp; ED</b>	
<b>Code:BEENE505</b>	
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 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.
<b>Semester - 6<sup>th</sup></b>	
<b>Course Name: Microwave Engineering</b>	
<b>Code:BEENE601</b>	
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.
<b>Course Name:Digital Signal Processing</b>	
<b>Code:BEENE602</b>	
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.
<b>Course Name: Control system engineering</b>	
<b>Code:BEENE603</b>	
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.
<b>Course Name: DCOM</b>	
<b>Code:BEENE604</b>	
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 .

<b>Course Name:Functional English</b>		<b>Code:BEENE60605</b>
At the end of Course Students will		
<b>CO1</b>	Apply English language proficiency seamlessly in professional careers.	
<b>CO2</b>	Identify the communication gaps and barriers to communication in professions and rectify them professionally.	
<b>CO3</b>	Write contents, prepare technical documents, legal documents, Board documents, Minutes of the Meetings, internal and external communication in a proficient English language.	
<b>CO4</b>	Build and develop a team of corporate communicators.	
<b>CO5</b>	Exploit the social digital media for effective corporate communication.	
<b>CO6</b>	Unleash public speaking/ presentation skills.	
<b>Semester - 7<sup>th</sup></b>		
<b>Course Name: DSP Processor &amp; Arch.</b>		<b>Code: BEENE701</b>
At the end of Course Students will		
<b>CO1</b>	Understand the fundamental of basic Programmable DSPs and data types.	
<b>CO2</b>	Describe the detailed architecture, bus structure and addressing modes of TMS320C5X DSP processor.	
<b>CO3</b>	Understand and make use of Assembly Language Instructions to design simple ALP and describe operations of DSP starter kit.	
<b>CO4</b>	Describe the detailed architecture and addressing modes of TMS320C54X DSP processor.	
<b>CO5</b>	Compare the various advanced Programmable DSPs and understand the Code Composer Studio.	
<b>CO6</b>	Design multi-rate filters and evaluate performance of DFT and FFT for filtering data sequences.	
<b>Course Name: Embedded System</b>		
		<b>Code: BEENE702</b>
At the end of Course Students will		
<b>CO1</b>	Know Design challenges, Applications and Recent trends in Embedded system.	
<b>CO2</b>	Understand the Hardware & Software architecture and Memory architecture of Embedded system.	
<b>CO3</b>	Design Embedded based system using ARM processor.	
<b>CO4</b>	Design Embedded system based on communication protocol.	
<b>CO5</b>	Design Embedded system based on RTOS.	
<b>CO6</b>	Understand the case study of Embedded system in various fields.	
<b>Course Name: Optical Communication</b>		
		<b>Code: BEENE703</b>
At the end of Course Students will		
<b>CO1</b>	Learn the basic elements of optical fiber.	
<b>CO2</b>	Understand the different kinds of losses, signal distortion in optical wave guides & othesignal degradation factors.	
<b>CO3</b>	Classify various optical source materials, LED structures, LASER diodes.	
<b>CO4</b>	Learn the fiber optic receivers such as PIN, APD diodes, receiver operation & performance.	
<b>CO5</b>	Understand the operational principal of WDM, SONET, measurement of attenuation, dispersion, refractive index profile in optical fibers.	
<b>Course Name: ADSD</b>		
		<b>Code: BEENE704</b>
At the end of Course Students will		
<b>CO1</b>	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 - 8<sup>th</sup>**

**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**

At the end of Course Students will be able to

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.
<b>Course Outcomes:Wireless sensor network</b>	
<b>Code: BEENE804</b>	
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.
<b>Course Outcomes: CMOS-VLSI</b>	
<b>Code: BEENE805</b>	
At the end of Course Students will be able to	
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.
<b>Department of Electrical Engineering</b>	
<b>Course Outcomes(CO)</b>	
<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Applied Mathematics-III</b>	
<b>Code: BEELE301</b>	
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.
<b>Course Name: Non-Conventional Energy Sources</b>	
<b>Code: BEELE302</b>	
At the end of course Students will	
CO1	Able to learn fundamentals of solar radiation geometry

CO2	Able to learn about Solar Energy Collectors & Solar Energy Storage
CO3	Able to learn application of solar energy
CO4	Able to learn about selection of sites for wind farm, different types of wind generators.
CO5	Able to understand the basics of ocean, tidal & wave energy
CO6	Able to understand the basics of small hydro and other Non-Conventional Energy Sources
<b>Course Name: Electrical Measurement and Instrumentation</b>	
<b>Code: BEELE303</b>	
At the end of course Students will	
CO1	Understood the details of different methods (Bridges) used for measurement of R,L,C
CO2	Understood the details of different electrical instrument used for electrical measurement And Instrumentation.
CO3	Understood the details of different types of potentiometers and CT and PT and measurement of Power and Energy.
CO4	Get idea about transducer and instrumentaion System
CO5	Get idea about measurement of acceleration, velocity, angular velocity, Torque and Power measurement, Torque meter
CO6	Get idea about measurement of temperature using thermistor, RTD and thermocouple and Two color pyrometers, Optical pyrometer; pressure and flow
<b>Course Name: Network Analysis</b>	
<b>Code: BEELE304</b>	
At the end of course Students will	
CO1	Apply Source transformation and loop (mesh) analysis
CO2	Apply node analysis and duality
CO3	Use various network theorems for analysis and design of electric circuits
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	Determine the response of a circuit excited by a waveform composed of various step and ramp components.
CO6	Characterize two-port networks by Z, Y, T, h parameters.
<b>Course Name: Electronic Devices and Circuits</b>	
<b>Code: BEELE305</b>	
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.
<b>Semester - 4<sup>th</sup></b>	
<b>Course Name: Applied Mathematics -IV</b> <b>Code:BEELE401</b>	
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.
<b>Course Name:Elements of Electromagnetics</b> <b>Code:BEELE402</b>	
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
<b>Course Name: Digital and Linear Electronic Circuits.</b> <b>Code:BEELE403</b>	
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
<b>Course Name: Electrical Machines-I</b>	
<b>Code:BEELE404</b>	
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.
<b>Course Name: Computer Programming</b>	
<b>Code:BEELE405</b>	
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.
<b>Semester 5 th</b>	
<b>Course Name: Electrical Power System-I</b>	
<b>Code:BEELE501</b>	
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
<b>Course Name: Utilisation of Electrical Energy</b> <b>Code:BEELE501</b>	
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 .
<b>Course Name: Electrical Machines Design</b> <b>Code:BEELE502</b>	
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.
<b>Course Name: Electrical Machines Design</b> <b>Code:BEELE503</b>	
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.

<b>Course Name: Microprocessor and Interfacing</b>	
<b>Code: BEELE504</b>	
At the end of course	Students will
<b>CO1</b>	Able to understand VLSI circuit concept and system bus concept of microprocessor based system.
<b>CO2</b>	Able to understand 8085 architecture and its working.
<b>CO3</b>	Able to understand Programming concept and stack operation
<b>CO4</b>	Able to understand software and hardware interrupts
<b>CO5</b>	Able to understand method of data transfer of different Peripherals chips.
<b>CO6</b>	Able to understand hardware considerations and interfacing of devices.
<b>Course Name: Electrical Machines-II</b>	
<b>Code: BEELE505</b>	
At the end of course	Students will
<b>CO1</b>	Understood principle , construction, laying of armature and field windings, types, generation of emf,
<b>CO2</b>	Understood steady state operation of synchronous machine
<b>CO3</b>	Understood synchronization and parallel operation of synchronous generators
<b>CO4</b>	Understood principle, construction, methods of starting of synchronous motor, its operation with variable load, operation with variable excitation, performance evaluation.
<b>CO5</b>	Understood Transient and sub- transient reactance's and their measurement
<b>CO6</b>	Understood special motors, like Repulsion, Hysteresis, Reluctance and Universal motors
<b>Semester - 6<sup>th</sup></b>	
<b>Course Name: Power Station Practice</b>	
<b>Code: BEELE601</b>	
At the end of course	Students will
<b>CO1</b>	Understand different source of Energy and factors (load survey) associated with energy generation
<b>CO2</b>	Understand the requirement for installation , estimation of thermal power plant (economics of generation) and to work in power plant
<b>CO3</b>	Understand the various types of hydro power plant ,their major components , to work in power plant
<b>CO4</b>	Understand the principal of nuclear energy, its components and to work in power plant
<b>CO5</b>	Understand voltage control of AC generators and calculation tariff
<b>CO6</b>	Understand technology of co-generation captive power generation and overcome energy problem
<b>Course Name: Economics and Industrial Management</b>	
<b>Code: BEELE602</b>	
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.
<b>Course Name:Electrical Drives and their Controls</b> <b>Code:BEELE603</b>	
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.
<b>Course Name: Power Electronics</b> <b>Code:BEELE604</b>	
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.
<b>Course Name: Control System-I</b> <b>Code:BEELE605</b>	
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.
<b>Course Name:Functional English</b> <span style="float:right"><b>Code:BEELE606</b></span>	
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.
<b>Semester 7</b>	
<b>Course Name: Control System-II</b> <span style="float:right"><b>Code:BEELE701</b></span>	
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.
<b>Course Name: Electrical Power System-II</b> <span style="float:right"><b>Code:BEELE702</b></span>	
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.
<b>Course Name: Flexible AC Transmission System (Elective-I) Code:BEELE703</b>	
<b>At the end of course Students will</b>	
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
<b>Course Name: Non Conventional Energy Sources (Elective-I) Code:BEELE703</b>	
<b>At the end of course Students will</b>	
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
<b>Course Name: High Voltage Engineering Code:BEELE704</b>	
<b>At the end of course Students will</b>	
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 varoius applications

CO5	Understand Different techniques to measure high voltage and current
CO6	Understand Non destructive and high voltage testing of electrical apparatus
<b>semester 8 th</b>	
<b>Course Name: Extra High Voltage AC and DC Transmission (Elective-II) Code:BEELE801</b>	
<b>At the end of course Students will</b>	
CO1	Student should able to know power handling capacity of transmission systems.
CO2	Student should able to know the effects of electrostatic fields in EHVAC lines .
CO3	Student should able to know the comparison between EHVAC/HVDC systems & kinds of DC link.
CO4	Student should 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.
<b>Course Name: Power Semiconductor Based Drives (Elective-III) Code:BEELE802</b>	
<b>At the end of course Students will</b>	
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
<b>Course Name: Switchgear and Protection Code:BEELE803</b>	
<b>At the end of course Students will</b>	
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
<b>Course Name: Computer Application in Power System</b> <b>Code: BEELE804</b>	
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.
<b>Department of Electronics &amp; Telecommunication Engineering</b> <i>Course Outcomes(CO)</i>	
<b>Semester - 3<sup>rd</sup></b>	
<b>Course Name: Applied Mathematics-III</b> <b>Code: BEETE 301</b>	
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.
<b>Course Name: Electronic Devices and Circuits</b> <b>Code: BEETE 302</b>	
At the end of course Students will	
CO1	Understand the relation between physical structure and circuit behavior of PN junction diode and analysis of its applications.
CO2	Characterize the electronic device (Bipolar Junction Transistor) in terms of appropriate external variables and differentiate different biasing techniques.
CO3	Use device parameters for Small signal and High frequency analysis along with principle of Negative feedback in electronic circuits.
CO4	Use electronic device (Transistor) as a circuit element in applications such as oscillators and Multivibrators.

CO5	Understand various types of power amplifiers and their applications.
CO6	Characterize the electronic device (Field Effect Transistor) in terms of appropriate external variables and differentiate different biasing techniques.
<b>Course Name: Electronics Measurement and Instrumentation Code: BEETE 303</b>	
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.
<b>Course Name: Object Oriented Programming and Data Structure Code: BEETE 304</b>	
At the end of course Students will	
CO1	Implement the concept of object oriented programming in any programming language.
CO2	Describe and apply principles of good program design like operator,function overloading and class template to the C++ language
CO3	Describe and apply various object oriented features like inheritance, pure virtual function to solve various computing problems using C++ language.
CO4	Understand and implement the basic search and sort algorithms
CO5	Implement and use linear and non-linear data structures like stacks, queues , linked list to solve various computing problems.
CO6	Describe and implement fundamental algorithmic problems including Trees--for solving complex programming problems.
<b>Course Name:Network Analysis and Synthesis Code: BEETE 305</b>	
At the end of course Students will	
CO1	Analyze the various Electrical and Electrical Networks using the mesh and nodal Techniques
CO2	Analyze the different circuits by using 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
<b>Semester - 4<sup>th</sup></b>	
<b>Course Name: Applied Mathematics IV Code: BEETE 401</b>	
At the end of course Students will	
CO1	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.
CO3	Demonstrate basic knowledge of Bessel's function, Legendre's polynomial and series solutions.
CO4	Understand concept of random variables and theory of probability to use in communication system.
CO5	Apply mathematical Expectations and use them to predict expected behavior of any function.

CO6	Understand thoroughly fundamentals of probability distributions and apply it to respective branch of engineering.
<b>Course Name: Power Devices and Machines</b> <b>Code: BEETE 402</b>	
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.
<b>Course Name: Electromagnetic Fields</b> <b>Code: BEETE 403</b>	
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.
<b>Course Name: Digital Circuit &amp; Fundamental of Microprocessor</b> <b>Code: BEETE 404</b>	
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.
<b>Course Name: SIGNALS AND SYSTEMS</b> <b>Code: BEETE 405</b>	
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
<b>Semester – 5 TH</b>	
<b>Course Name: Antennas and Wave Propagation</b> <b>Code: BEETE 501</b>	
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.
<b>Course Name: Microprocessor &amp; Microcontrollers</b> <b>Code: BEETE502</b>	
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.
<b>Course Name: Analog Circuit and Design</b> <b>Code: BEETE503</b>	
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 78x× and 79××, 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.
<b>Course Name: Communication Electronics</b> <b>Code: BEETE504</b>	
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

<b>Course Name: Industrial economics and entrepreneurship development</b> <b>Code: BEETE505</b>	
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.
<b>Semester – 6TH</b>	
<b>Course Name: Telecommunication switching systems</b> <b>Code: BEETE601</b>	
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
<b>Course Name: Digital Signal Processing</b> <b>Code: BEETE602</b>	
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.
<b>Course Name: Control System Engineering</b> <b>Code: BEETE603</b>	
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.
<b>Course Name: Digital Communication</b> <b>Code: BEETE604</b>	
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
<b>Course Name: Functional English</b> <span style="float: right;"><b>Code: BEETE605</b></span>	
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.
<b>Semester – 7TH</b>	
<b>Course Name: Television and Video Engineering</b> <span style="float: right;"><b>Code: BEETE702</b></span>	
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
<b>Course Name: DSP Processor and Architecture</b> <span style="float: right;"><b>Code: BEETE701</b></span>	
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.
<b>Course Name: Optical Communication</b> <span style="float: right;"><b>Code: BEETE703</b></span>	
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.

<b>Course Name: Advanced Digital System Design</b>	<b>Code: BEETE704</b>
At the end of course Students will	
<b>CO1</b>	Describe and understand VHDL development flow and Basic VHDL concepts.
<b>CO2</b>	Design the combinational & sequential circuit using VHDL
<b>CO3</b>	Develop the skills to become VLSI front end designers.
<b>CO4</b>	Implement the digital system.
<b>CO5</b>	perform experimentation on Hardware /Software co-design.
<b>Course Name: Data Compression and Encryption</b>	<b>Code: BEETE705</b>
At the end of course Students will	
<b>CO1</b>	Implement various text compression techniques.
<b>CO2</b>	Implement various audio compression techniques
<b>CO3</b>	Implement various Image and video compression techniques
<b>CO4</b>	Implement various security techniques in communication.
<b>CO5</b>	Provide various authentications using digital communication.
<b>CO6</b>	Gain the knowledge of encryption techniques application to digital.
<b>Course Name: VLSI Signal Processing</b>	<b>Code: BEETE705</b>
At the end of course Students will	
<b>CO1</b>	Implement pipelining and parallel processing for clock period minimization & \ or low power.
<b>CO2</b>	Perform retiming of DFG for clock period minimization.
<b>CO3</b>	Use unfolding algorithm for sample period reduction, parallel processing.
<b>CO4</b>	Use folding transform for register minimization and multirate system.
<b>CO5</b>	Implement convolution using fast convolution algorithm.
<b>CO6</b>	Solve convolution using cyclic & iterated convolution method.
<b>Semester 8 th</b>	
<b>Course Name: Microwave and Radar Engineering</b>	<b>Code: BEETE801</b>
At the end of course Students will	
<b>CO1</b>	Understand and analyze the use of active microwave devices like Klystron, TWT, BWO and magnetron.
<b>CO2</b>	Analyze and use different power distribution Tees and passive microwave devices using scattering parameter.
<b>CO3</b>	Understand and analyze different solid state microwave devices.
<b>CO4</b>	Measure various parameters like frequency, power, attenuation, VSWR, impedance, insertion loss, dielectric constant, Q of a cavity resonator, phase shift.
<b>CO5</b>	Understand and analyze fundamentals of Radar.
<b>CO6</b>	Demonstrate acquisition of technical competence in specialized areas of Radar Engineering.
<b>Course Name: Computer Communication Network</b>	<b>Code: BEETE802</b>
At the end of course Students will	
<b>CO1</b>	Understand the requirement of theoretical & practical aspect of computer network.
<b>CO2</b>	Understand the switching techniques of computer networks.
<b>CO3</b>	Understand the different wired & wireless LAN standards & hardware.
<b>CO4</b>	Describe various protocols and routing techniques used in network.
<b>CO5</b>	Describe various application protocols used in communication.
<b>CO6</b>	Describe the concept of computer network security and network administration.
<b>Course Name: Wireless &amp; Mobile Communication</b>	<b>Code: BEETE803</b>

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.
<b>Course Name: Wireless Sensor Network (Elective-2) Code: BEETE804</b>	
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.
<b>Course Name: Embedded System (Elective-2) Code: BEETE804</b>	
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
<b>Course Name: Robotics &amp; Automation (Elective-3) Code: BEETE805</b>	
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.
<b>Course Name: Satellite Communication (Elective-3) Code: BEETE805</b>	
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.



<b>Department of Information Technology Engineering</b>	
<b><u>Course Outcome</u></b>	
<b>Semester 3 rd</b>	
<b>Course Name: AMIII</b>	
<b>Code: BEIT301</b>	
At the end of Course	Students will
<b>CO1</b>	Understand Laplace Transform and should be able to solve differential equations.
<b>CO2</b>	Expand the function in periodic form using Fourier Transform.
<b>CO3</b>	Apply concept of Z- transform for solving difference equation and discrete signals.
<b>CO4</b>	Setup and solve linear systems/ linear inequalities graphically / geometrically and algebraically using matrices.
<b>CO5</b>	Know about random variables and theory of probability and compute probabilities in appropriate ways.
<b>CO6</b>	Learn about mathematical Expectations and apply them to predict expected behavior of Random Variables.
<b>Course Name: PLDC</b>	
<b>Code: BEIT302</b>	
At the end of Course	Students will
<b>CO1</b>	Understand and implement the programming concept of C Language.
<b>CO2</b>	Understand and implement the concepts of Function, pointers and arrays in C.
<b>CO3</b>	Understand and implement the concept of Strings and Structures in C.
<b>CO4</b>	Understand and implement console and file operations & functions.
<b>CO5</b>	Understand the programming concepts using Graphics in C.
<b>CO6</b>	Understand the advanced concepts in C.
<b>Course Name: EIT</b>	
<b>Code: BEIT303</b>	
At the end of Course	Students will
<b>CO1</b>	Have sound foundation of concepts of Ethics and understand basic need of Ethics in IT industry.
<b>CO2</b>	Know about various Computer and Internet crimes and understand what security measures are needed to handle them.
<b>CO3</b>	Understand about importance of privacy protection and the various laws associated with it, freedom of expression and the issues related to it.
<b>CO4</b>	Identify various ways to protect different types of intellectual properties and how to develop good quality software.
<b>CO5</b>	Implement Ethics in IT organizations regarding non-traditional, contingent and H1B visa workers and protection of whistle blowers.
<b>CO6</b>	Analyze the local and the global impact of Information Technology, Mobile and wireless technology on individuals, organizations and the society.
<b>Course Name: DEFM</b>	
<b>Code: BEIT304</b>	
At the end of Course	Students will
<b>CO1</b>	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.
<b>CO2</b>	Analyze, design and evaluate digital circuit of medium complexity.
<b>CO3</b>	Analyze and design various Combinational and Arithmetic circuits.
<b>CO4</b>	Evaluate the performance of various Flip-flops and sequential circuits.
<b>CO5</b>	Study fundamentals and Architecture of microprocessor.
<b>CO6</b>	Study different interrupt techniques, memory organization and build Assembly language programs.
<b>Course Name: DC</b>	
<b>Code: BEIT305</b>	
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.
<b>Course Name: EE</b> <span style="float: right;"><b>Code: BEIT306</b></span>	
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.
<b>Semester 4<sup>th</sup></b>	
<b>Course Name: DMGT</b> <span style="float: right;"><b>Code: BEIT401</b></span>	
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.
<b>Course Name: ADS</b> <span style="float: right;"><b>Code: BEIT402</b></span>	
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.
<b>Course Name: TOC</b> <span style="float: right;"><b>Code: BEIT403</b></span>	
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.
<b>Course Name: CAO</b>	
<b>Code: BEIT404</b>	
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.
<b>Course Name: Engineering Physics</b>	
<b>CODE: BESI-2T</b>	
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.
<b>Semester 5 th</b>	
<b>Course Name: SP</b>	
<b>BEIT501</b>	
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.
<b>Course Name: DAA</b>	
<b>BEIT502</b>	
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)
<b>Course Name: SE</b>	
<b>Code: BEIT503</b>	
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.
<b>Course Name: CG</b>	
<b>Code: BEIT504</b>	
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.
<b>Course Name: JP</b>	
<b>Code: BEIT505</b>	
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.
<b>Course Name: IEED</b>	
<b>Code: BEIT506</b>	
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.
<b>Semester 6 th</b>	
<b>Course Name: CN</b>	
<b>Code: BEIT601</b>	
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.
<b>Course Name: OS</b>	
<b>Code: BEIT602</b>	
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
<b>Course Name: DBMS</b> <span style="float: right;"><b>Code: BEIT603</b></span>	
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
<b>Course Name: IP</b> <span style="float: right;"><b>Code: BEIT604</b></span>	
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.
<b>Course Name: DWM</b> <span style="float: right;"><b>Code:BEIT701</b></span>	
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.
<b>Course Name: CSS</b> <span style="float: right;"><b>Code:BEIT702</b></span>	
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.
<b>Course Name: AI</b> <span style="float: right;"><b>Code:BEIT703</b></span>	
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.
<b>Course Name: MC</b> <span style="float: right;"><b>Code:BEIT704</b></span>	
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.
<b>Course Name: Multimedia</b> <span style="float: right;"><b>Code: BEIT705</b></span>	
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.
<b>Course Name: STQA</b> <span style="float: right;"><b>Code: BEIT706</b></span>	
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.
<b>Semester 8<sup>th</sup></b>	
<b>Course Name: Engineering Physics</b> <span style="float: right;"><b>CODE: BESI-2T</b></span>	
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.
<b>Course Name: GAP</b> <span style="float: right;"><b>Code:BEIT802</b></span>	
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 - 3<sup>rd</sup>**

**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 - 4 <sup>th</sup>	
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 probabily distribution

<b>Course Name: Machining Processes</b>		<b>Code: BEME404T/</b>
At the end of course Students will		
<b>CO1</b>	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.	
<b>CO2</b>	Develop an ability to study of various machine tools, time estimation for turning operation and to know center lathe and capstan and turret lathe.	
<b>CO3</b>	Students will be able to know working principles, and mechanism of machine tools like shaper planer and slotter and concept of quick return mechanism.	
<b>CO4</b>	Learn the principle of operation, specification of milling machine and indexing mechanism.	
<b>CO5</b>	Develop an ability to know various grinding operations and specifications of grinding wheels.	
<b>CO6</b>	Learn working principles, operations and capabilities drilling machines, and various drilling operations; such as reaming boring, broaching etc.	
<b>Semester - 5<sup>th</sup></b>		
<b>Course Name: Design Of Machine Element</b>		<b>Code: BEME502T</b>
At the end of course Students will		
<b>CO1</b>	Able to understand the basic introduction to machine design, criteria for selection of material for design purpose and failure of selected material.	
<b>CO2</b>	Students will be able to design of various joints, brackets, levers and its checking for failure under various loading conditions.	
<b>CO3</b>	Students will be able to understand the design of pressure vessel based on stresses induced in it.	
<b>CO4</b>	Students will be able to understand the design of power transmission shaft and keys and their ASME codes.	
<b>CO5</b>	Students will be able to design the helical, leaf and laminated spring under static and variable loading condition.	
<b>CO6</b>	Students will be able to understand terminology of power screw its design and design various types of breaks and clutches	
<b>Course Name: Mechanical Measurement &amp; Metrology</b>		<b>Code: BEME505T</b>
At the end of course Students will		
<b>CO1</b>	Able to understand generalized measurement system, static & dynamic characteristic of measuring system.	
<b>CO2</b>	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.	
<b>CO3</b>	Able to understand and handle measuring equipment for measurement of pressure, temperature, vacuum & flow.	
<b>CO4</b>	Able to understand basic standards of measurement, working standards and measuring equipment used for linear and angular measurements	
<b>CO5</b>	Able to understand various types of limits, fits, tolerances and design of limit gauges	
<b>CO6</b>	Framework where the students will be able to understand various types of comparators and measurement of gear tooth profile.	
<b>Course Name: Heat Transfer</b>		<b>Code: BEME504T</b>
At the end of course Students will		
<b>CO1</b>	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	
<b>CO2</b>	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 its analysis for the different types of fin, analytical and graphical method of unsteady state heat transfer	
<b>CO3</b>	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 ration Shield
CO6	students will understand the concept of heat exchanger and it's classification, analysis and design for parallel and counter flow heat exchanger
<b>Course Name: Advance production process</b> <b>Code: BEME503T</b>	
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
<b>Course Name: IEED</b> <b>Code: BEME501T</b>	
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 apply the knowledge of production function, laws of returns and cost concepts in applied engineering.
CO3	Students will be able 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 carryout market survey and project viability.
<b>Semester - 6<sup>th</sup></b>	
<b>Course Name: Control System Engg.</b> <b>Code: BEME602T</b>	
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.
<b>Course Name: Operation Research</b> <b>Code: BEME603T</b>	
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
<b>Course Name: Dynamic Of Machines</b> <span style="float: right;"><b>Code: BEME605T</b></span>	
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.
<b>Course Name: Mechatronics</b> <span style="float: right;"><b>Code:BEME604T</b></span>	
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.
<b>Course Name: Energy Conversion -I</b> <span style="float: right;"><b>Code:BEME601T /</b></span>	
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.
<b>Semester -7<sup>th</sup></b>	
<b>Course Name: Computer Aided Design</b> <span style="float: right;"><b>Code:BEME703T/</b></span>	
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.

<b>Course Name: Industrial Engineering</b>	
<b>Code: BEME701T</b>	
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.
<b>Course Name: Energy Conversion-II</b>	
<b>Code: BEME704T</b>	
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.
<b>Course Name: Design Of Mechanical Drives</b>	
<b>Code: BEME705T</b>	
At the end of course Students will	
CO1	Understand design procedure of flywheel and coupling and its practical utility.
CO2	Student will able to understand design procedure and practical utility of different ty6pes of bearing.
CO3	Student will be able to analysis 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.
<b>Course Name: Automobile Engg.</b>	
<b>Code: BEME702T3</b>	
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
<b>Semester - 8<sup>th</sup></b>	
<b>Course Name: Advanced IC Engine</b>	
<b>Code: BEME803T5</b>	
At the end of course Students will	
CO1	Students will 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
<b>Course Name: Finite Element Method</b>	
<b>Code: BEME802T1</b>	
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.
<b>Course Name: Automation In Production</b>	
<b>Code: BEME804T</b>	
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
<b>Course Name: Energy Conversion -III</b>	
<b>Code: BEME805T</b>	
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.
<b>Course Name: Refrigeration &amp; Air-conditioning</b>	
<b>Code: BEME802T5</b>	
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
<b>Course Name:Industrial Management</b>	
<b>Code:BEME801T</b>	
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































































































































































