

Course Outcomes

Department of Civil Engineering

Semester 3 & 4

Sr. No.	Subject	Code	Course Outcome
1	Applied Mathematics-III	BECVE301T	<p>CO [1]: Understand the use of Fourier and Laplace transforms and their simple properties, applications.</p> <p>CO [2]: Understand the use of Complex Variable like Analytic function, Cauchy-Riemen condition, conjugate, function, singularities, Taylor's and Laurent theorem</p> <p>CO [3]: To know about the various Calculus of Variations like Maxima and Minima variation and its properties Euler's-equation etc</p> <p>CO [4]: To understand the concept of various Fourier series.</p> <p>CO [5]: Understand the use of matrix algebra techniques this is needed by engineers for practical applications.</p> <p>CO [6]: Understand the use of matrix algebra Theorem such as Hamilton theorem, Sylvester's theorem, Association of matrices with linear differential equation of second order with a constant coefficient.</p>
2	Strength of Material	BECVE302T	<p>CO [1]: The students would be able to understand the behavior of materials under different stress and strain conditions.</p> <p>CO [2]: The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading and calculate the deflection.</p>

3	Environmental Engineering - I	BECVE303T	<p>CO [1] The students would be able to understand the importance and necessity of water supply.</p> <p>CO[2] The students would be able to determine the capacity of water supply scheme.</p> <p>CO [3] The students would have the basic knowledge related to the conveyance systems and the appurtenances used.</p> <p>CO [4] The students would have knowledge of characteristics of water, drinking water standards and necessity of treatment.</p> <p>CO [5] The students would be able to design various units of conventional water treatment plant.</p> <p>CO [6] The students would be equipped with the basic knowledge related to design of water supply system.</p> <p>CO [7] The students should be able to understand of necessity of treatment, types of treatment processes and disposal methods for solid waste.</p>
4	Engineering Geology	BECVE304T	<p>CO [1] To prepare students to learn about the geological formations.(Rocks, Minerals)</p> <p>CO [2] To learn the application of geological concept in Civil Engineering.</p> <p>CO [3] To understand the ground water and its impact on Civil Engineering.</p> <p>CO [4] To understand the impact of earth movement on Civil Engineering.</p>
5	Concrete Technology	BECVE305T	<p>CO [1] The students would be able to check and recommend different constituent of concrete.</p> <p>CO [2] The students would be able to control method of manufacture of concrete.</p> <p>CO [3] The students would be able to test strength and quality of plastic and set concrete.</p> <p>CO [4] The students would have the understanding of application admixture and its effect on properties of concrete.</p> <p>CO [5] The students would be able to understand the effect of process of manufacturing on different properties of concrete.</p> <p>CO [6] The students would be able to understand various environmental factors which affect durability of concrete, analyse cause of deterioration of concrete components and to suggest various preventive measures to it.</p> <p>CO [7] The students would be able to test various strength of concrete by destructive and non-destructive testing methods.</p>

4th SEM

6	Structural Analysis-I	BECVE401T	<p>CO [1] The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams, frames, trusses and columns under various loading conditions using different analysis methods.</p> <p>CO [2] The student would be able to apply knowledge to determine forces in determinate and indeterminate structures by the force and matrix method.</p> <p>CO [3] The students would be able to perform ILD analysis of determinate beams and trusses.</p>
7	Geotechnical Engineering - I	BECVE402T	<p>CO [1] Students would be able to determine the index and engineering properties of the soil.</p> <p>CO [2] Students would be able to determine the suitability of foundation for a particular type of soil.</p> <p>CO [3] Students will be able to classify the soils.</p> <p>CO [4] Students would be able to evaluate the stresses in the soil mass.</p>
8	Transportation Engineering - I	BECVE403T	<p>CO [1] A person with broad vision and complete knowledge of design and construction practices in highway engineering and pavement.</p> <p>CO [2] The student will be able to test highway materials and draw appropriate conclusion.</p> <p>CO [3] The student will be able to maintain and propose measurement.</p> <p>CO [4] The student will be able to undertake Traffic studies.</p>
9	Surveying - I	BECVE404T	<p>CO[1] The students would be able to do temporary and permanent adjustments.</p> <p>CO[2] The students would be able to measure distances and angles.</p> <p>CO[3] The students would be able to orient and draw the various maps.</p> <p>CO[4] The students would be able to calculate areas and volumes of the Civil Engg. work.</p> <p>CO[5] The student would be able to undertake various civil engineering surveys work.</p>

10	Building Construction and Material	BECVE405T	<p>CO [1]: The students are able to identify components of a building.</p> <p>CO[2]: The students are able to differentiate and identify types of building materials.</p> <p>CO[3]: The students are able to select appropriate material for building construction.</p> <p>CO[4]: The students are able to plan various construction related activities and their quality control.</p>
5th Semester			
11	Structural Analysis - II	BECVE501T	<p>CO[1]: Apply the different methods of analysis of frames in practical problems.</p> <p>CO[2]: Formulation of stiffness matrix, transformation matrix, load matrix for various structural components for analysis purposes.</p> <p>CO[3]: Understand the basics of finite element method in the analysis of structural components.</p> <p>CO[4]: Understand the concepts related to structural dynamics.</p>
12	Reinforced Cement Concrete (RCC) Structures	BECVE502T	<p>CO[1]: Understand the basic concepts of structural design Methods of RCC to the practical problem.</p> <p>CO[2]: Understand the composite action of reinforced steel and concrete in reinforced concrete structural members.</p> <p>CO[3]: Use the knowledge of the structural properties of materials i.e. steel and concrete in assessing the strength.</p> <p>CO[4]: Use the knowledge in structural planning and design of various components of buildings.</p> <p>CO[5]: Apply the concepts and applications of prestressed concrete in real problems.</p>

13	Fluid Mechanics - I	BECVE503T	<p>CO [1]: Measure and determine fluid pressures and forces on plates/surfaces, pipe bends, etc.</p> <p>CO[2]: Apply the Bernoulli's equation to solve the problems in fluid.</p> <p>CO[3]: Understand the concepts of dimensional analysis use the dimensionless number suitably.</p> <p>CO[4]: Understand the basic concepts related to laminar and turbulent flow.</p> <p>CO[5]: Apply the principles of hydrostatics and determine the forces.</p>
14	Geotechnical Engineering - II	BECVE504T	<p>CO[1]: Use the knowledge of different soil exploration techniques to ascertain the properties of soil.</p> <p>CO[2]: To analyze the stability of natural slopes, safety & sustainability of the slopes, design of retaining structures, reinforced earth walls, etc.</p> <p>CO[3]: . Practice Ground Improvement Techniques.</p> <p>CO[4]: Design the shallow & deep foundation.</p>
15	Hydrology and Water Resources	BECVE505T	<p>CO[1]: Use of knowledge of basics of hydrology in calculating infiltration, evaporation, total runoff.</p> <p>CO[2]: Use the techniques of the Hydrographs to forecast flood discharge at various durations.</p> <p>CO[3]: Apply the Statistical techniques to analyze the flood occurrence & frequency.</p> <p>CO[4]: Use the knowledge pertaining to the flood to plan flood routine & emergency plans.</p> <p>CO[5]: Apply the knowledge of geo-hydrology terms in planning, assessing & computation of ground water potential and its assessment using various techniques.</p> <p>CO[6]: Take-up planning of water resources mini project.</p>

6th sem

16	Steel Structure	BECVE601T	<p>CO[1]: Use the knowledge of structural properties in assessing its strength for the construction purpose.</p> <p>CO[2]: Apply the knowledge of various techniques in analyzing the steel structural components.</p> <p>CO[3]: Make use of knowledge of analysis in structural planning and design of various components of buildings.</p>
17	Surveying - II	BECVE602T	<p>CO[1]: Carry forward the concepts of basic surveying techniques.</p> <p>CO[2]: . Operate various survey instruments effectively with precision.</p> <p>CO[3]: Use different types of techniques in various surveying problems.</p> <p>CO[4]: Apply the concepts of modern surveying techniques & instrumentation.</p> <p>CO[5]: Take – up mini project using different surveying techniques.</p>
18	Fluid Mechanics - II	BECVE603T	<p>CO[1]: Understand the concepts related to boundary layer theory and determination of drag and lift forces.</p> <p>CO[2]: 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.</p> <p>CO[3]: Use the concepts of uniform and critical flow through open channels including design of efficient channel sections.</p> <p>CO[4]: Understand the different techniques of dimensional analysis and its use in model testing.</p> <p>CO[5]: Understand and apply basics related to Turbines & Pumps in Water Resources planning.</p> <p>CO[6]: Make use of specific energy concepts in the analysis of open channel flow.</p> <p>CO[7]: Undertake Gradually Varied Flow analysis and its computation.</p>

19	Environmental Engineering - II	BECVE604T	<p>CO[1]: Use the concept related to water & its quality, sewage, sewer, storm water, etc in its hydraulic design.</p> <p>CO[2]: Apply the knowledge of different components of sewer in construction, testing & maintenance of sewers.</p> <p>CO[3]: To test the sample of waste water in the laboratory for physical & chemical characteristics.</p> <p>CO[4]: Take-up functional planning, layout and design of water treatment plant components.</p> <p>CO[5]: Take-up functional planning, layout and design of sewage treatment plant components.</p> <p>CO[6]: Plan for rural sanitation provisions, perform functional design of septic tank.</p> <p>CO[7]: Analyze the industrial waste water for its treatment units.</p> <p>CO[8]: Make use of knowledge & effect of air pollution, solid waste in planning for its prevention and control.</p>
7th Semester			
20	Advanced Concrete Structures	BECVE701T	<p>CO[1] Understand the behavior and failure modes different concrete members.</p> <p>CO[2] Analyze and apply the results in designing various concrete member of structure.</p> <p>CO[3] Apply the knowledge & skills in practical problems.</p> <p>CO[4] Understand the relevant software and use the same in analysis & design of concrete members.</p>

21	Estimating and Costing	BECVE702T	<p>CO [1] Prepare the preliminary estimate for administrative approval & technical sanction for a civil engineering project.</p> <p>CO[2] Write the specification of the works to be undertaken, prepare the tender documents, fill the contracts and make use of knowledge of different contract submission & opening in awarding the work to the contractor.</p> <p>CO[3] Use the concept of SD, EMD, MAS, Running Bill, Final Bill during the entire project.</p> <p>CO[4] Schedule the project for its timely completion.</p> <p>CO[5] Use the technique of Rate analysis in estimating the exact cost of material & manpower and hence the entire project.</p> <p>CO [6] Estimate the bill of quantities using different techniques of preliminary & detailed estimation of buildings & roads.</p> <p>CO [7] Arrive the exact value of the asset (movable & immovable) using different Valuation techniques.</p>
22	Elective I:- Advanced Construction Materials	BECVE703T	<p>CO[1] Understand properties and utilities of cement, mortar, concrete ceramic materials.</p> <p>CO[2] Understand properties and its utilities of metals and various composites.</p> <p>CO[3] Study the importance of Construction chemicals.</p> <p>CO[4] Study shoring and formwork materials.</p> <p>CO[5] Understand the elementary concepts of smart materials.</p>
23	Elective I:-Air Pollution and Solid Waste Management	BECVE703T	<p>CO[1] Understand different aspects of air pollutants, its sources and effects on man and material etc.</p> <p>CO[2] Design controls methods and equipments for air pollution to reduce its impact on environment.</p> <p>CO[3] Understand problems arriving in handling large amount of solid waste generated ,its collection and transportation, processing and will be able to design safe collection and disposal methods.</p>

24	Construction Management and Law	BECVE704T	<p>CO[1] Demonstrate the understanding of various types of projects, modern construction techniques and will exhibit the mastery in construction planning, scheduling and various controls.</p> <p>CO[2] 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.</p> <p>CO[3] To 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.</p> <p>CO[4] Analyze the legal aspects in construction projects through the understanding of various laws pertaining to civil engineering and architectural planning & sanctioning, labor & organizational welfare measure, provisions of arbitration and litigations.</p>
25	Transportation Engineering - II	BECVE705T	<p>CO[1] Understand the functions of various elements of railways, airports, tunnels and docks and harbor.</p> <p>CO[2] Plan and design various elements of railways, airports, tunnels and docks and harbor.</p> <p>CO[3] Understand the various principles traffic control in railways, airports, tunnels and docks and harbor.</p> <p>CO[4] Understand layout, design and construction permanent way, runway, taxiways, tunnels, births and jetty.</p> <p>CO[5] Understand the maintenance of various elements of railways, airports, tunnels and docks and harbor.</p>
8th sem			

26	Irrigation Engineering	BECVE801T	<p>CO[1] Understand the importance and scope of irrigation engineering.</p> <p>CO[2] Understand fully the methods and efficiencies of irrigation, crop water requirement.</p> <p>CO[3] Understand the planning, design and operation of storage reservoir and make use of it in the practical situation.</p> <p>CO[4] Understand the basic profile of dams and use the knowledge in checking stability of Gravity dams and Earth dams.</p> <p>CO[5] Understand the theories of Canal design and apply the concept to design lined and unlined canals and detail out the cross sections.</p> <p>CO[6] Understand water logging and provide the solution to such problem.</p>
27	Elective-II: Pavement Analysis and Design	BECVE802T	<p>CO[1] Analyze and Design pavement and under different loading conditions for highways and airfields taking into consideration different characteristics.</p> <p>CO[2] Propose a pavement management system framework.</p> <p>CO[3] Design highway appurtenance and highway drainage.</p> <p>CO[4] Perform different tests considering field conditions and using the knowledge to increase the strength of pavements along with its economy point of view.</p>
28	Elective- III: - Advanced Reinforced Concrete Design	BECVE803T	<p>CO [1] Understand the principles of analysis and design of special RC structures viz bridge, deck, ESR, shell etc.</p> <p>CO [2] Understand the behavior of special RC structure under different loading conditions such as IRC, dynamic etc. as per the code provision.</p> <p>CO [3] Analysis and design of multistoried frame structure incorporating seismic forces.</p> <p>CO [4] Analysis and design of cylindrical shells.</p>
29	Elective- III: - Waster and Wastewater Treatment	BECVE803T	<p>CO[1] Understand composition of typical municipal solid wastes, their sources, collection, treatment and disposal methods.</p> <p>CO[2] Attain an ability to use the techniques, skills, and modern engineering tools necessary for environmental engineering practices.</p> <p>CO[3] Designing of different units of water &waste water treatment plant.</p> <p>CO[4] Give the knowledge about recent development in water &waste water treatment.</p>

30	Construction Economics and Finance	BECVE804T	<p>CO [1] Acquaint with various economic and financial aspects of construction industry.</p> <p>CO [2] Understand the tools and techniques of economic analysis for improving their decision making skills.</p> <p>CO [3] Understand the knowledge of economics and finance with special reference to construction industry.</p> <p>CO [4] Understand the concept of IRR, turnkey construction projects .</p> <p>CO [5] Apply knowledge of inflation, recession, financial ratios.</p>
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Department of Civil Engineering (M.Tech):

1st Semester

Sr.No	Subject	Code	Course Outcome
1	Matrix Analysis of Structures	PGST101T	<p>CO [1]: Students would be able to use modern structural analysis software.</p> <p>CO [2]: Students would be able to use structural codes and standards such as ASCE-7 and IBC to model dead, live, snow, wind, and earthquake loads on structures.</p> <p>CO [3]: Familiarity with professional and ethical issues and the importance of lifelong learning in structural engineering.</p> <p>CO [4]: Students would be able to determine deflections of beams and frames using classical methods.</p> <p>CO [5]: Students would be able to analyze statically determinate trusses, beams, and frames and obtain internal loading.</p> <p>CO [6]: Students would be familiar with contemporary issues in structural engineering.</p>
2	Theory of Elasticity & Elastics Stability	PGST102T	<p>CO [1]: Understand the importance of the concepts of theory of elasticity and plasticity.</p> <p>CO [2]: Understand the concept of geometric non-linearity and the difference between various failure mechanisms.</p> <p>CO [3]: Perform non-linear analysis on various structural members.</p>

3	Structural Dynamics	PGST103T	CO [1]: Students would be able to understand the difference between static and dynamic loads and analysis CO [2]: Students would be able to evaluate the response of SDOF and MDOF systems to different types of dynamic loads including ground motions. CO [3]: Students would be able to understand the basics of random vibrations and the application of this concept to analyze Linear SDOF systems.
4	Elective-I: Design of Earthquake Resistant Structures	PGST104T	CO [1]: Students would be able to understand the difference between static and dynamic analysis, types of dynamic loads, concept of damping CO [2]: Students would be able to evaluate the response of the structures subjected to different types of dynamic loads. CO [3]: Students would be able to understand earthquake phenomenon, concept of response spectrum, application of structural dynamics in the evaluation of structural response to Earthquake excitation and their codal provisions Students would be able to carry out Seismic analysis of structure.
5	Elective-II: Road Safety Engineering	PGOPEN105T	CO [1]: Students would be able to understand monitoring and evaluation of safety programs. CO [2]: Introduction to ISO39001 Road Traffic Safety Management. CO [3]: Learn about institutional management functions and coordination. CO [4]: Managing road safety in the workplace/fleet safety programs. CO [5]: Develop a results oriented approach
2nd SEM			
6	Finite Element Method	PGST201T	CO [1]: Understand and appreciate the importance and capabilities of finite element analysis methods. CO [2]: Understand the various kinds of non-linearity induced in a structure. CO [3]: Understand and implement finite element methods in selected real world problems.
7	Theory of Plates & Shell	PGST202T	CO [1]: Students would be able to analyze the plates and shells. CO [2]: Students would be able to study the evaluation of the response of such structures.

8	Foundation Design	PGST203T	<p>CO [1]: Students would be able to identify, formulate and solve geotechnical engineering problems.</p> <p>CO [2]: Students would be able to design a suitable foundation system from economic and safe aspects.</p> <p>CO [3]: Students would be able to design machine foundations.</p> <p>CO [4]: Students would be able to design of marine sub structures.</p> <p>CO [5]: Students would be able to relate easily to allied subjects such soil dynamics; advanced engineering geology, rock mechanics etc.</p>
9	Elective-III: High Rise Structures	PGST204T	<p>CO [1]: Simplify a complex structure into a number of idealised substructures, analyse and construct their load resisting mechanisms.</p> <p>CO [2]: Understand stability issues involved in high-rise buildings and long-span structures and appropriate structural solutions.</p> <p>CO [3]: Conceptualise and distinguish different structural forms and their applicability.</p> <p>CO [4]: Contextualise the idea of co-rational design fostering creative and responsive solutions to a given situation.</p>
10	Foundation Coarse-I: Research Methodology	PGFD205T	<p>CO [1]: Student would be able to prepare a preliminary research design for projects in their subject matter areas.</p> <p>CO [2]: Accurately collect, analyze and report data.</p> <p>CO [3]: Student would be able to present complex data or situations clearly.</p> <p>CO [4]: Student would be able to review and analyze research findings.</p>
3rd Semester			
11	Elective-IV: Disaster Management and Mitigation	PGOPEN301T	<p>CO [1]: Get to know natural as well as manmade disaster and their extent and possible effects on the economy.</p> <p>CO [2]: Plan of national importance structures based upon the previous history.</p> <p>CO [3]: Get acquainted with government policies, acts and various organizational structures associated with an emergency.</p> <p>CO [4]: Get to know the simple do's and don'ts in such extreme events and act accordingly.</p>

12	Foundation Coarse-II: Project Planning and Management	PGFD302T	<p>CO [1]: Apply selection criteria and select an appropriate project from different options.</p> <p>CO [2]: Write work break down structure for a project and develop a schedule based on it.</p> <p>CO [3]: Identify opportunities and threats to the project and decide an approach to deal with them strategically.</p> <p>CO [4]: Use Earned value technique and determine & predict status of the project.</p> <p>CO [5]: Capture lessons learned during project phases and document them for future reference.</p>
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Course Outcomes

Mechanical Engineering			
3rd Semester			
Sr.No	Subject	Code	Course Outcome
1	Applied Mathematics-III	BEME301T	CO[1]:To understand the use of Laplace Transform CO[2]:To understand the use Fourier Series & Fourier Transform CO[3]: To understand Calculus of Variations CO[4]: To understand Functions of Complex Variable CO[5]: To understand Partial Differential Equations CO[6]:To understand Matrices
2	KINEMATICS OF MACHINE	BEME302T	CO[1]: To understand the relationships between the geometry and the motions of the parts of a machine. CO[2]: To learn how to analyze the motions of mechanisms, design mechanisms to give desired motions. CO[3]: To learn relative motion analysis, design of gears. CO[4]: To learn gear trains, cams and linkages CO[5]: To learn graphical and analytical analysis of position, velocity and acceleration CO[6]: To learn graphical and analytical analysis of position, clutches, brakes & dynamometers
3	FLUID MECHANICS	BEME303T	CO [1] To develop an understanding of the behavior of fluids at rest or in motion. CO[2] To develop an understanding of the subsequent effects of the fluids on the boundaries CO [3] To deal with fluids in various applications CO [4] To develop analytical abilities related to fluid flow CO [5] To gain conceptual understanding of fluids and their properties CO [6] To solve different types of problems related to fluid & fluid flow

4	MANUFACTURING PROCESSES	BEME304T	<p>CO[1]: To provide an overview of a wide variety of manufacturing processes for processing of engineering materials.</p> <p>CO[2]: To learn principles, operations and capabilities of various moulding</p> <p>CO[3]: To learn metal casting, metal forming</p> <p>CO[4]: To learn press working, metal joining processes</p> <p>CO[5]: To learn processing on plastics</p> <p>CO[6]: To select suitable processes for an engineering product</p>
5	ENGINEERING METALLURGY	BEME305T	<p>CO [1] To develop fundamental concepts of crystallography, phase transformation and heat treatment processes</p> <p>CO [2] To learn the atomic structure of metals, imperfections, diffusion mechanisms</p> <p>CO [3] To learn mechanism of plastic deformation, various ferrous & non ferrous metals & their alloys</p> <p>CO [4] To understand equilibrium diagrams</p> <p>CO [5] To understand time-temperature transformation curves and heat treatment processes</p> <p>CO [6] To understand the concepts of crystal structure, microstructure and deformation</p>
4th SEM			
6	Applied Mathematics- IV	BEME401T	<p>CO [1] To understand Numerical Methods</p> <p>CO [2] To learn Numerical solution of ordinary differential equations</p> <p>CO [3] To learn Z-Transform</p> <p>CO [4] To learn Special Functions and Series Solution</p> <p>CO [5] To learn Random Variables & Probability Distributions</p> <p>CO [6] To learn Special Probability Distributions and Random Process</p>

7	ENGINEERING THERMODYNAMICS	BEME402T	<p>CO[1]: To gain the basic knowledge about Thermodynamic laws and relations</p> <p>CO[2]: To study the application to various processes</p> <p>CO[3]:To study the concept of entropy and availability,</p> <p>CO[4]: To study the thermodynamic relations</p> <p>CO[5]:To understand the various thermodynamic processes</p> <p>CO[6]: To understand the various thermodynamic cycles</p>
8	HYDRAULIC MACHINES	BEME403T	<p>CO[1]: To study the hydraulic turbines</p> <p>CO[2]: To study centrifugal pumps</p> <p>CO[3]: To study positive displacement pumps</p> <p>CO[4]: To study water lifting devices</p> <p>CO[5]: To understand practical applications of fluid</p> <p>CO[6]: To understand design parameters and performance characteristics of various hydraulic machines & devices.</p>
9	MACHINING PROCESSES	BEME404T	<p>CO[1]: To study the working of mechanisms of various machine tools and machining principles</p> <p>CO[2]: To learn the concept of theory of metal cutting & force analysis</p> <p>CO[3]: To understand the objectives of the various machine tools</p> <p>CO[4]: To study the constructional details and mechanisms involved in various machine tools</p> <p>CO[5]: To identify the machining parameters, different types of cutting tool materials</p> <p>CO[6]: To identify the cutting fluids and their properties</p>

10	MECHANICS OF MATERIAL	BEME405T	<p>CO[1]: To understand the basic concepts of stress, strain and their variations under different types of loading</p> <p>CO[2]: To study the basic concepts involved in mechanics of materials, bending moment,</p> <p>CO[3]: To study the shear force, stresses in beams</p> <p>CO[4]: To study the slope and deflection in beams under different loading and support conditions</p> <p>CO[5]: To understand torsional shear stress in shaft</p> <p>CO[6]: To understand crippling load in struts and columns</p>
5th Semester			
11	INDUSTRIAL ECONOMICS AND ENTREPRENEURSHIP DEVELOPMENT (Theory)	BEME501T	<p>CO[1]: To create awareness about economics terminology and business organization</p> <p>CO[2]: To understand relationship between business market and society</p> <p>CO[3]: To create awareness about entrepreneurship as a career avenue, financial agencies</p> <p>CO[4]: To create awareness about government support systems for entrepreneurship.</p> <p>CO[5]: To develop entrepreneurial orientation through innovation, creativity</p> <p>CO[6]: To get awareness about IPR and Patents</p>
12	DESIGN OF MACHINE ELEMENTS	BEME502T	<p>CO[1]: To understand the basic machine element design under various loading conditions</p> <p>CO[2]: To understand design of various mechanical joints</p> <p>CO[3]: To understand design of various machine components such as shaft, keys, brakes, clutches, power screws etc</p> <p>CO[4]: To learn spring design & pressure vessel design</p>

13	ADVANCED PRODUCTION PROCESSES	BEME503T	CO[1]: To make conversant with non conventional machining processes CO[2]: To make conversant with advanced Joining Processes CO[3]: To make conversant with Jigs CO[4]: To make conversant with Fixtures CO[5]: To make conversant with Super -finishing operations CO[6]: To make conversant with Machining centre
14	HEAT TRANSFER	BEME504T	CO[1]: To learn the various modes of heat transfer CO[2]: To learn the various laws associated with heat transfer CO[3]: To study steady state and unsteady state heat transfer CO[4]: To study dimensional analysis for forced and free convection CO[5]: To analyse radiation with and without radiation shield CO[6]: To analyse and design the heat exchangers.
15	MECHANICAL MEASUREMENT & METROLOGY	BEME505T	CO[1]: To study various measurement systems and their significance CO[2]: To study the characteristics and order of the instruments CO[3]: To study measurement of different parameters, tolerances CO[4]: To study advanced concepts involved in measuring technology CO[5]: To study use of precision measuring instruments. CO[6]: To study the importance of accuracy and its effects on results and its uncertainty.
6th sem			
16	ENERGY CONVERSION- I	BEME601T	CO[1] To expose about practical applications of thermodynamics CO[2] To study draught and its classification CO[3] To study various boilers CO[4] To study steam nozzles CO[5] To study steam turbines CO[6]: To study steam condensers

17	CONTROL SYSTEMS ENGINEERING	BEME602T	<p>CO[1]: To study the concepts related to the operation, analysis and stabilization of control systems</p> <p>CO[2]: To study transfer function system representation through Block Diagram and Signal Flow Graph</p> <p>CO[3]: To study system response & time domain response analysis</p> <p>CO[4]: To study control system analysis and Root locus plot</p> <p>CO[5]: To study frequency domain analysis and Bode & Polar plot</p> <p>CO[6]:To study state space representation of Continuous Time systems</p>
18	OPERATIONS RESEARCH	BEME603T	<p>CO[1] To provide a formal quantitative approach to problem solving</p> <p>CO[2] transportation model, Assignment Model</p> <p>CO[3] To study Game Theory, sequencing Model, Inventory Model</p> <p>CO[4] To study Network Model</p> <p>CO[5] To study Replacement Model</p> <p>CO [6] To study Queuing Theory, M/M/1 model and Simulations</p>
19	MECHATRONICS	BEME604T	<p>CO[1] To understand key elements of mechatronics systems</p> <p>CO[2] To identify various inputs and output devices in an automated system</p> <p>CO[3] To understand and draw ladder diagrams</p> <p>CO [4] To understand interfacing of input and output devices</p> <p>CO [5] To get awareness about actuating systems</p> <p>CO [6] To get awareness about microprocessors & microcontroller</p>
20	DYNAMICS OF MACHINES	BEME605T	<p>CO[1]: To understand the method of dynamic force analysis of machinery</p> <p>CO[2]: To understand the the concept of vibratory systems and their analysis</p> <p>CO[3]:To study the effect of undesirable effects of unbalances in rotors and engines.</p> <p>CO[4]: To study turning moment Vs crank angle diagram for single- cylinder and multiple-cylinder engines</p> <p>CO[5]: To study derivation of equation of motion for vibratory system</p> <p>CO[6]: To study equation of motion for two-degree-of-freedom system</p>

21	FUNCTIONAL ENGLISH	BEME606T	CO[1]: To learn Functional Grammar CO[2]:To study English for Competitive Exams & Interview Techniques CO[3]:To learn Formal Correspondence CO[4]:To learn Analytical comprehension CO[5]: To learn Technical & Scientific Writing
7th Semester			
22	INDUSTRIAL ENGINEERING	BEME701T	CO[1] To introduce the discipline and profession of industrial engineering. CO[2] To provides knowledge and skills for designing work system as a form of integrated system, planning and controlling of a production system CO[3] To design a facility lay out, problem and organization of design process and value engineering CO[4] Skill to apply methods in value engineering to improve the competitiveness of product/service CO[5] To apply ergonomics principles in industry CO [6]To apply ergonomics principles for planning and controlling and maintenance system.
23	ELECTIVE – I: AUTOMOBILE ENGINEERING	BEME702T3	CO [1] To understand the basic concepts of automobile and its components CO[2] To study Clutch, Gear Box CO[3] To study Transmission system, Brakes CO[4]To study Steering systems, Suspension systems CO[5] To study Electrical systems,Wheels and Tyres CO [6] To study Body and Safety Considerations and Modern Developments in Automobiles
24	ELECTIVE – I: POWER PLANT ENGINEERING	BEME702T4	CO[1] To study Economics and Power Generation CO[2] To study Steam Power Plant CO[3] To study Coal Combustion and Steam Generators CO[4] To study Hydroelectric Power Plant CO[5] To study Nuclear Power Plant CO [6] To study Gas turbine power plant,Diesel power plant,Emerging technologies (alternative plants)

25	COMPUTER AIDED DESIGN	BEME703T	CO[1] To study CAD, Difference between Conventional & CAD design CO[2]To study windowing & clipping, 2D transformation, 3D transformation CO[3] To study Techniques for Geometric Modeling, Assembly modeling CO[4] To study Finite Element Analysis CO[5] To study Truss & Two Dimensional FEM CO[6] To study Optimization in Design
26	ENERGY CONVERSION - II	BEME704T	CO[1] To study Reciprocating compressors CO[2] To study Rotary compressors, Centrifugal compressor, Axial flow compressor CO[3] To study Internal Combustion Engines CO[4] To study Testing of I. C. Engines CO[5] To study Refrigeration CO[6] To study Air conditioning
27	DESIGN OF MECHANICAL DRIVES	BEME705T	CO[1] To study design of Coupling, design of Flywheel, design of Bearings CO[2] To study design of Flat belt drive, design of V belt drive, design of Roller chain drive, design of wire rope drive CO[3] To study design of Gears, design of Bevel Gear Drive CO[4] To study design of Worm Gear Drive, design of I. C. Engine components
8th sem			
28	INDUSTRIAL MANAGEMENT	BEME801T	CO[1] To study principles of management CO[2] To study personal management CO[3] To study marketing management CO[4] To study financial management CO[5]To study plant management CO[6] To study recent trends in production and operation management

29	ELECTIVE – II : COMPUTER INTEGRATED MANUFACTURING	BEME802T2	CO[1] To study data bases and numerical analysis related to CIM CO[2] To study NC, CNC & DNC CO[3] To study Group Technology CO[4] To study flexible manufacturing systems CO[5] To study Manufacturing Planning CO[6] To study Manufacturing system control
30	ELECTIVE – II: REFRIGERATION AND AIRCONDITIONING	BEME802T5	CO[1] To study Refrigeration CO[2] To study Compound Vapour Compression Refrigeration system and multiple evaporator system CO[3] To study Air cycle refrigeration CO[4] To study Cryogenics CO[5] To study Advanced Psychometric & Heat Load Calculations CO[6] To study Air Transmission & Distribution
31	ELECTIVE-III: ADVANCED MANUFACTURING TECHNIQUES	BEME803T1	CO[1] To study Non Traditional Machining process CO[2] To study Abrasive Jet Machining CO[3] To study Electro-Chemical Machining CO[4] To study Unconventional welding techniques CO[5] To study Solid Phase welding techniques CO[6] To study Advance casting process
32	ELECTIVE-III: RENEWABLE ENERGY SYSTEMS	BEME803T3	CO[1] To study Solar Energy CO[2] To study Solar flat plate collectors CO[3] To study Concentric collectors CO[4] To study Biogas, Bio Mass CO[5] To study Wind and Ocean energy CO[6] To study Geothermal and MHD power generatio

33	ELECTIVE-III: ADVANCE INTERNAL COMBUSTION (IC) ENGINE	BEME803T5	CO[1] To study Engines types and their operation CO[2] To study Automotive fuels & Fuel injection CO[3] To study Combustion in S.I. Engine CO[4] To study Combustion in C. I. Engines CO[5] To study Air pollution & control CO[6] To study Engine testing and performance parameters
34	AUTOMATION IN PRODUCTION	BEME804T	CO[1] To study Automation CO[2] To study Numerical Control Production Systems CO[3] To study Industrial Robotics CO[4] To study Automated material handling & storage CO[5] To study Automated inspection & Group technology CO[6] To study Computer aided manufacturing, Flexible manufacturing systems, Computer aided process planning
35	ENERGY CONVERSION - III	BEME805T	CO[1] To study Gas Turbines CO[2] To study principles & working of turbojet, turboprop, Ramjet & pulse jet CO[3] To study principle of solar energy, wind generators & MHD generator CO[4] To study Energy Auditing CO[5] To study Hydraulic systems CO[6] To study pneumatic Systems

M.Tech (Heat and Power Engineering)

Sr.No	Subject	Code	Course Outcome
1	Advanced Heat and Mass Transfer	PGHPE101T	1) It gives exposure to the students to understand fundamental laws of heat transfer 2) Students may apply fundamental laws of heat transfer and its application in practical. 3) This Subject familiarize the students with numerical manipulation and order of magnitude of various parameters in the heat transfer subject. 4) Students come out with to apply the basic principle of heat transfer to new

			situation and develop their own equation to get the solutions.
2	ADVANCED THERMODYNAMICS AND COMBUSTION TECHNOLOGY	PGHPE102T	<ol style="list-style-type: none"> 1) It gives the law of thermodynamics to closed and open systems including thermodynamics cycle. 2) Analysis the gas power cycle and steam power cycle. 3) Understanding basics of combustion phenomena.
3	INTERNAL COMBUSTION ENGINES	PGHPE103T	<ol style="list-style-type: none"> 1) Apply thermodynamic analysis to IC engines and describe combustion phenomena in spark ignition and compression ignition engines. 2. Describe the working of major systems used in conventional and modern engines. 3. Summarize the methods used to improve engine performance and estimate performance parameters. 4. Describe engine emission control techniques and implement viable alternate fuels.
4	ADVANCED ENERGY TECHNOLOGIES	PGHPE104T	<ol style="list-style-type: none"> 1) This course is design to make the student conversant with non-conventional energy sources and their utilization to harness power. 2) The students will be learning solar energy utilization and its applications. The generation of power with use of wind energy. 3) Students can understand power generation thorough geothermal energy, ocean energy; magneto hydrodynamic power generation, fuel cell, biomass and also nuclear energy.
5	REFRIGERATION AND AIR CONDITIONING TECHNOLOGIES	PGHPE201T	<ol style="list-style-type: none"> 1) Ability to carry out thermodynamic analysis of multi pressure, cryogenic and other non conventional refrigeration systems. 2. To understand the selection and application of suitable / eco-friendly refrigerants. 3. Ability to carry out heat load calculations and design air conditioning systems. 4. To design air handling system.

6	THERMAL ENGINEERING	PGHPE202T	<p>1) To Understand the ideal and real thermodynamic cycles and gas turbines.</p> <p>2. This course gives the design of the combustion chamber of a gas turbine.</p> <p>3. Understand the power plant components and analysis to improve the performance.</p> <p>4) To Understand the ideal and real thermodynamic cycles and gas turbines.</p>
7	ADVANCED FLUID MECHANICS	PGHPE203T	<p>1) This course gives the basic fluid flow concepts.</p> <p>2) Fundamental equations of motion and continuity applied to fluid flow.</p> <p>3) It gives Introduction to Computational fluid dynamics.</p>
8	ELECTIVE-III THERMAL STORAGE SYSTEM	PGHPE204T	<p>1) It gives different method of thermal energy storage.</p> <p>2) Ability to design Food storage, Waste heat recovery, Solar energy storage, Drying and heating Applications.</p>

Course Outcomes

Department of B.E. First Year:

First Semester

Sr. No.	Subject	Code	Course Outcome
1	Applied Mathematics-I	BESI-1	<p>CO[1]: To equip student with a sufficient understanding of the scientific method so that they can use mathematics in other subjects.</p> <p>CO[2]: To expose students to the basic knowledge of mathematics.</p> <p>CO[3]: To make them aware about the applications of mathematics so that they apply that application to the various subject.</p> <p>CO[4]: To become a part of on-going technological revolution, today's engineering students has to acquaint himself with method of science.</p> <p>CO[5]: To have sufficient background in the area to do well in jobs, interviews for mathematical problem and effective quantitative.</p>
2	Engineering Physics	BESI-2T	<p>CO[1]: Explain the concept of quantum mechanics; differentiate classical mechanics and quantum mechanics.</p> <p>CO[2]: Describe wave nature of matter.</p> <p>CO[3]: Use Schrodinger time independent equations to apply in energy levels.</p> <p>CO[4]: Explain, classify seven crystal systems, unit cell characteristics & sketch Miller planes.</p> <p>CO[5]: Differentiate solids into conductor, semiconductor and insulator on the basis of band theory.</p> <p>CO[6]: Explain characteristics of diode, transistor & rectification. Make use of different diodes in different applications.</p> <p>CO[7]: Demonstrate the development of Hall voltage.</p>

3	Engineering Chemistry	BESI-3T	<p>CO[1]: Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.</p> <p>CO[2]: Apply their knowledge for protection of different metals from corrosion.</p> <p>CO[3]: Identify the functional role of ingredients of cement.</p> <p>CO[4]: Develop an awareness of the utilization of waste materials as novel innovative materials for use in concrete.</p> <p>CO[5]: Understand prevention of pollution by designing proper processes to reduce or eliminate the generation of hazardous by products.</p> <p>CO[6]: Understand working of different types of battery.</p>
4	Basic Electrical Engineering	BESI- 4T	<p>CO[1]: Ability to analyze circuits using Kirchoff's voltage & current laws, and node analysis.</p> <p>CO[2]: Ability to analyze different magnetic circuits and its analogous with Electric circuits.</p> <p>CO[3]: Ability to compute frequency responses of circuits containing capacitors and inductors of A.C circuits.</p> <p>CO[4]: Ability to analyze efficiency and regulation of system using Transformer.</p>
5	Basic Civil Engineering	BESI-5T	<p>CO[1]: The ability to practice civil engineering using up-to-date techniques, skills, and tools as a result of life-long learning ability to design and conduct experiments, as well as to analyze and interpret data. Describe the scientific terminologies related to construction and mechanical sciences.</p> <p>CO[2]: Students will gain the ability to identify, analyze, formulate, and solve different challenging of civil engineering problems. Students will develop professional skills that prepare them for immediate employment or postgraduate study in Civil Engineering disciplines.</p> <p>CO[3]: Students will develop abilities in the application of the necessary mathematical tools, scientific basics, and fundamental knowledge of civil Engineering. To produce graduates who are prepared for life-long learning and successful careers as civil engineers.</p> <p>CO[4]: Students will develop an understanding of the multidisciplinary</p>

			<p>approach and an ability to relate engineering issues to broader social and human context, in which their engineering contributions will be utilized. Students will learn to communicate their ideas to be effective in collaboration with other members of civil engineering teams.</p> <p>CO[5]: Familiarize with different components, equipments and technical standards. Know the purpose, procedures, and the materials. Be aware of the uses and standards adopted in industries. Understand the basic laws pertaining towards the subject.</p> <p>CO[6]: Understand the procedures for construction of several structures. Create working models or prototypes of the components. Gain knowledge in surveying, their types and the equipments used. Explain the principle, working and application of Engines and Power plants.</p> <p>CO[7]: Understand and apply the concepts of manufacturing and the technology related. Mention some of the applications of the manufacturing processes.</p> <p>CO[8]: An ability to design, implement, and evaluate a field program to meet desired needs, within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability.</p>
6	Engineering Graphics-I	BESI-6T	<p>CO[1]: To impart and inculcate proper understanding of the theory of projection. To improve the visualization skills.</p> <p>CO[2]: To enable the students with various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient. To impart the knowledge on understanding and drawing of simple residential/office buildings.</p> <p>CO[3]: Increase ability to communicate with people. Learn to sketch and take field dimensions.</p> <p>CO[4]: Learn to take data and transform it into graphic drawings. Learn basic engineering drawing formats and Prepare the student for future Engineering positions.</p> <p>CO[5]: Learn to draw the Isometric Views / Projections of the give figure.</p>
Second Semester			

7	Applied Mathematics-II	BESII-1	<p>CO[1] Compute a given integral using the most efficient method;</p> <p>CO[2] Use integrals to formulate and solve application problems in science and engineering;</p> <p>CO[3] Construct and plot parametric and polar curves;</p> <p>CO[4] Identify different types of series and determine whether a particular series converges;</p> <p>CO[5] Find the interval of convergence of a power series;</p> <p>CO[6] Apply Taylor series to approximate functions and estimate the error of approximation.</p>
8	Advanced Physics	BESII-2T	<p>CO[1]: Interpret the concept of Quantum transition. Explain the principle & working of LASER.</p> <p>CO[2]: Explain & demonstrate the interference of light.</p> <p>CO[3]: Analyze, compare the motion of charge particle in uniform electric & magnetic field.</p> <p>CO[4]: Explain & apply concept of velocity filter in Bainbridge mass spectrograph.</p> <p>CO[5]: Explain & illustrate the concept of CRO.</p> <p>CO[6]: Apply Total Internal Reflection in communication.</p> <p>CO[7]: Use optical fibre as sensor and detector.</p> <p>CO[8]: Explain nano-particles & apply it in different applications.</p>
9	Material Chemistry	BESII-3T	<p>CO[1]: Apply core concepts in material science to solve engineering problems.</p> <p>CO[2]: Understand processing of fossil fuels (coal, petroleum and natural gas) and necessity of harnessing alternate energy resources such as solar, wind, hydro etc.</p> <p>CO[3]: Understand mechanism of various types of lubricant.</p> <p>CO[4]: Select materials for design new techniques.</p>

10	Engineering Mechanics	BESII-4T	<p>CO[1] (a) The student will be able to trigonometric laws and apply to the addition and decomposition of vectors quantities.</p> <p>(b) The student will be able to determine the resultant of a system of forces.</p> <p>CO[2] (a) The student will be able to draw complete and correct free-body diagrams and write the appropriate equilibrium equations from the free-body diagram.</p> <p>(b) The student will be able to determine the connection forces in trusses and in general frame structures.</p> <p>(c) The student will be able to analyze systems that include frictional forces.</p> <p>CO[3] (a) The student will be able to locate the “centre of gravity”, and “moment of inertia” and compute their location for bodies of arbitrary shape.</p> <p>(b) The student will be able to calculate Principle of Virtual work applied to equilibrium of Mechanisms.</p> <p>CO[4] (a) The student will be able to attain an introduction to work Energy equation.</p> <p>(b) The student will be able to define and describe the impulse moment as well as principle of conservation of moment.</p>
11	Advanced Electrical Engineering	BESII-5	<p>CO[1]: Ability to compute power dissipation, power factor, and maximum power transfer.</p> <p>CO[2]: Ability to analyze different types of D.C Motor and its characteristics.</p> <p>CO[3]: Ability to compute tariff of residential and commercial building.</p> <p>CO[4]: Ability to analyze A.C Motors consisting Single phase and Three Phase I. M.</p>

Department of Computer Science & Engineering

3rd and 4th Sem

Sr. No.	Subject	Code	Course Outcome
1	Applied Mathematics	BECSE201T	CO[1]: Understand the use of Integral Transforms. CO[2]: Understand the use of Complex Variable like Analytic function, Cauchy-Riemen condition, conjugate, function, singularities, Taylor's and Laurent theorem CO[3]: To know about the various Calculus of Variations like Maxima and Minima variation and its properties Euler's-equation etc CO[4]: To understand the concept of various Fourier Series CO[5]: Understand the use of matrices, different types of matrices like Inverse of matrix CO[6]: Understand the use of matrix algebra Theorem such as Hamilton theorem, Sylvester's theorem, Association of matrices with linear differential equation of second order with a constant coefficient,
2	Advanced C Programming and Logic Design	BECSE202T	CO[1]: Introduction to array & Structures Union, bit-fields, enumerations, size, type def. CO[2]: Introduction to Introduction File handling. CO[3]: Introduction to Pointers. CO[4]: Introduction to Graphics. CO[5]: Introduction to problem solving and programming. CO[6]: Basics of imperative style programming.

3	Digital Circuits & Fundamentals Of Microprocessor	BECSE203T	<p>CO [1] Understand the basics of digital system .</p> <p>CO[2] Outline the basic features of Multiplexers, Demultiplexer and converter.</p> <p>CO [3] To understand the basic concepts of Storage elements, flip-flops and latches.</p> <p>CO [4] Basics of Counters, asynchronous and synchronous-design</p> <p>CO [5] Introduction of 8085, Addressing modes, Instruction Set of up 8085</p> <p>CO [6] Introduction of Interrupts of 8085, Programming of up 8085.</p>
4	Computer Architecture & Organization	BECSE205T	<p>CO[1]: Introduction to BASIC STRUCTURE OF COMPUTERS.</p> <p>CO[2]: Introduction to ARETHAMETIC</p> <p>CO[3]: General introduction to THE MEMORY SYSTEM</p> <p>CO[4]: Mappinf of INPUT / OUTPUT ORGANISATION</p> <p>CO[5]: Applications of RISC philosophy</p> <p>CO[6]: Basic Concepts in parallel processing & classifications of parallel architecture.</p>
5	ETHICS IN INFORMATION TECHNOLOG Y	BECSE204T	<p>CO [1] An overview of Ethics</p> <p>CO [2] Computer and Internet Crime</p> <p>CO [3] Privacy: The right of Privacy, Recent History of Privacy Protection,</p> <p>CO [4] Intellectual Property: Copyrights, Patents, Trade Secret Laws, Key Intellectual Property</p> <p>CO [5] Ethics of IT Organization</p> <p>CO [6] The Impact of Information Technology on the Quality of Life</p>
4th Sem			

6	Discrete Mathematics and Graph Theory	BECSE208T	<p>CO [1] Understand the fundamentals of Set Theory.</p> <p>CO [2] Understand the concepts of Mathematical Logic Proposition, predicate logic, formal mathematical system, algebra, Homomorphism, Automorphism</p> <p>CO [3] To familiar with various group.</p> <p>CO [4] Have base level knowledge of Rings, fields, lattices, Boolean Algebra.</p> <p>CO [5] Understand the Concept of Graph Theory</p> <p>CO [6] Understand the concepts of Combinators.</p>
7	Data Structure and Program Design in "C"	BECSE209T	<p>CO[1]: General concept and linear data structure.</p> <p>CO[2]: Introduction to Linked list.</p> <p>CO[3]: Introduction to Trees.</p> <p>CO[4]: Introduction to Hashing : Hash functions, Collision resolution, Expected behavior.</p> <p>CO[5]: Graphs and digraphs.</p> <p>CO[6]: Different types of Sorting & how it works.</p>
8	Operating System	BECSE210T	<p>CO[1]: Evolution of OS, Types of OS, Basic h/w support necessary for modern operatin systems,</p> <p>CO[2]: Introduction to File systems: File concept, Access methods, Disk space management and space allocation strategies,</p> <p>CO[3]: Process concept, process control block, Types of scheduler, context switch, threads, multithreading model, WINDOWS 2000 & LINUX.</p> <p>CO[4]: Basic fundamentals of Memory management: Contiguous allocation, Relocation, Paging, Segmentation,</p> <p>CO[5]: Process cooperation and synchronization.</p>

			CO[6]: Basic Concepts of the Deadlocks & Protection
9	Theoretical Foundations Of Computer Science	BECSE211T	<p>CO[1]: Introduction to Mathematical preliminaries to clear the basic concepts.</p> <p>CO[2]: Introduction to Finite state machine, regular language, deterministic finite automata, conversion deterministic automata , E- closures- regular expression finite automata, minimization of automata, Moore and Mealy machine and their equivalence..</p> <p>CO[3]: Introduction to closure properties of regular sets, CFG, CNF & GNF</p> <p>CO[4]: Introduction to Push –down Automata (PDA) & its conversion.</p> <p>CO[5]: Design & applications of Turing machines</p> <p>CO[6]: Introduction to recursive function theory.</p>
10	System Programming	BECSE212T	<p>CO[1]: Introduction to IBM 360/370 & Assembler- Introduction to System Programming & its components. M/C Architecture.</p> <p>CO[2]: Introduction to Microprocessor –concept of macro</p> <p>CO[3]: General introduction to Linker and Loader</p> <p>CO[4]: Common Object file format & System Utilities.</p> <p>CO[5]: Applications of Unix Device Drivers.</p> <p>CO[6]: To study the basic Concepts of Compiler- Phases of Compilers, LEX</p>

			&YACC.
5th & 6th Sem			
11	Data Communication	BECSE301T	<p>CO[1]: Introduction to analog and digital signal, transmission modes.</p> <p>CO[2]: Introduction to encoding and modulating,digital -to - digital conversion, digital -to- analog conversion.</p> <p>CO[3]: General introduction to interfaces and modems: digital data transmission, Modem standards</p> <p>CO[4]: Basic fundamentals of communication midia: guided media, unguided media</p> <p>CO[5]: Different types of MULTIPLEXING</p> <p>CO[6]: Basic Concepts of data compression, encoding, Image Compression.</p>
12	Object Oriented Programming	BECSE302T	<p>CO[1]: Introduction to OOP concept, Procedural vs OOP programming, OOP terminology</p> <p>CO[2]: Operator overloading: Overloading unary & binary operators. Data conversion.</p> <p>CO[3]: General introduction to Inheritance in C++: Derived class & base class, Derived class constructors, Function overloading, class hierarchies,</p>

			<p>CO[4]: Basic fundamentals of Virtual functions concepts, Abstracts classes & pure virtual functions. Virtual base classes.</p> <p>CO[5]: Streams & Files in C++: Stream classes, stream errors, disk file I/O with streams.</p> <p>CO[6]: Basic Concepts of Function Template, Class templates, Exception syntax, Multiple exceptions, exception with arguments</p>
13	Database Management System	BECSE303T	<p>CO[1]: General introduction to database systems.</p> <p>CO[2]: Relational Data Model, Keys, referential integrity and foreign keys, Relational algebra operators, Tuple relation calculus, Domain relational calculus.</p> <p>CO[3]: General concept of Physical and logical hierarchy. Concept of index, B-trees, hash index,</p> <p>CO[4]: Overview: Query Processing and Optimization,</p> <p>CO[5]: Transaction concepts, properties of transactions, serializability of transactions,</p> <p>CO[6]: Recovery System: failure classification, recovery and atomicity, log based recovery, checkpoints, buffer management, advanced recovery techniques. Introduction to Web databases, distributed databases, data warehousing and data mining, Data Security.</p>
14	Computer Graphics	BECSE304T	<p>CO[1]: Overview of Computer Graphics.</p> <p>CO[2]: Basic Raster Graphics Algorithms for Drawing 2D primitives, aliasing and ant aliasing, Polygon filling methods.</p> <p>CO[3]: Graphics Programming using OPENGL.</p> <p>CO[4]: 2D Clipping algorithms for regular and irregular windows.</p> <p>CO[5]: Normalized Device Coordinates and Viewing Transformations, 3D System Basics and 3D Transformations,</p> <p>CO[6]: Basic Ray tracing Algorithm, Curves and Surfaces.</p>

15	Design & Analysis of Algorithms	BECSE305T	<p>CO[1]: Introduction to Mathematical foundations.</p> <p>CO[2]: Introduction to Asymptotic notations of analysis of algorithms, Sorting networks, comparison networks,</p> <p>CO[3]: General introduction to Divide and conquer basic strategy, binary search, quick sort, merge sort, matrix operations, Greedy method- basic strategy, minimum cost spanning trees,.</p> <p>CO[4]: Dynamic Programming basic strategy, multistage graphs, all pairs shortest path, single source shortest paths, optimal binary search trees, traveling salesman problem, graph colouring.</p> <p>CO[5]: Basic Traversal and Search Techniques, breadth first search and depth first search</p> <p>CO[6]: NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, decision and optimization problems, graph based problems on NP Principle</p>
6th Sem			
16	Artificial Intelligence	BECSE306T:	<p>CO[1] Basic fundamentals of Scope of AI, AI problems, AI technique, Basics of problem solving.</p> <p>CO[2] Search Techniques: Problem size, complexity , approximation and search</p> <p>CO[3] Introduction to Knowledge representation.</p> <p>CO[4] To understand the Uncertainty Treatment.</p> <p>CO[5] Learning: What is learning?, Knowledge and learning, Learning in Problem Solving</p> <p>CO[6]:Expert Systems: Fundamental blocks, knowledge Engineering, knowledge Acquisition.</p>

17	Design Patterns	BECSE307 T	<p>CO[1]: Introduction to Design Patterns and Observer Pattern CO[2]: Creational Patterns: Abstract Factory, Builder, Factory Method CO[3]: Structural Pattern:Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy, Discussion of Structural Patterns</p> <p>CO[4]: Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns</p> <p>CO[5]: A Case Study: Designing a Document Editor</p> <p>CO[6]:Complexity Analysis of Design Patterns,</p>
18	Software Engineering & Project Management	BECSE309 T	<p>CO[1] Introduction: Software Characteristics, Software Engineering</p> <p>CO[2] Software engineering Principles and Practice</p> <p>CO[3] To understand the System Analysis: Structured Analysis, Data modeling,</p> <p>CO[4] Software Testing:Testing Fundamentals, Black-Box Testing, White-Box Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging.</p> <p>CO[5] Quality Management: Product Metrics, Metrics for Analysis & Design Models, Metrics for Source Code, Metrics for Testing & Maintenance.</p> <p>CO [6] Project management : Introduction to Software Project Management, Project Planning, Project scheduling, Risk management</p>
19	Computer Networks	BECSE310T	<p>CO[1] Understand the basics of to computer Networks, direction of data flow.</p> <p>CO[2] Physical Layer: Types of errors, framing</p> <p>CO[3] To understand the Point to point protocol, LCP, NCP, FDDI, token bus, token ring.</p> <p>CO [4] Routing : techniques, static vs. dynamic routing.</p> <p>CO [5] Protocols: ARP,RARP, IP, ICMP, IPV6; Unicast and multicast routing protocols.</p> <p>CO [6] Process to process delivery; UDP; TCP; Quality of service: techniques to improve Qos.ISDN services &ATM</p>

20	Functional English	BECSE310T	CO[1]: Functional Grammar CO[2]:English for Competitive Exams & Interview Techniques CO[3]:Formal Correspondence, Analytical comprehension CO[4]: Technical & Scientific Writing
7th & 8th Sem			
21	Data Warehousing & Mining	BECSE401T	CO[1] Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems CO[2] Data Warehouse and OLAP Technology for Data Mining CO[3] Mining Frequent Patterns, Associations and Correlations CO[4] To understand the Classification and Prediction CO[5] Cluster Analysis Introduction CO [6] Mining Streams, Time Series and Sequence Data.
22	Language Processors	BECSE402T	CO [1] Introduction to Compilers : Compilers and translators, Phases of compiler design , cross compiler, Bootstrapping, Design of Lexical analyzer, LEX. CO[2] Syntax Analysis: Specification of syntax of programming languages using CFG. CO[3] Study of syntax directed definitions & syntax directed translation schemes, CO[4]To understand the Table Management, Storage allocation & Error Handling CO[5] Importance of code optimization techniques. CO [6] Code generation – Problems code generation.

23	Elective I: TCP & IP	8 BECSE403T	<p>CO[1] Network architecture – Standards, TCP/IP Model Overview, Networking Technologies.</p> <p>CO[2] Classful Internet address, CIDR - Subnetting and Supernetting, ARP, RARP, OOTP, DHCP</p> <p>CO[3] Introduction to IP Datagram - IP Package - IP forwarding and routing algorithms, computing paths, RIPOSPF, ICMP, IGMP.</p> <p>CO[4] To understand the TCP header, services, Connection establishment and termination, Interactive data flow</p> <p>CO[5] Switching technology, MPLS fundamentals, signaling protocols, LDP, IP traffic engineering, ECMP, SBR, Routing extensions for traffic engineering</p> <p>CO [6] Introduction to IP security protocol - IPv6 addresses, Packet format, Multicast, Anycast, ICMPv6, Interoperation between IPv4 and Ipv6 - QoS, Auto configuration</p>
24	Elective I: Advanced Computer Architecture	10 BECSE403T	<p>CO[1] Basic fundamentals of Fundamentals of Computer Design.</p> <p>CO[2] Instruction - Level Parallelism: Concepts and challenges in ILP.</p> <p>CO[3] Introduction to Vector architecture: SIMD instruction set, extensions for multimedia, graphics processing units.</p> <p>CO[4] To understand the Memory Hierarchy Design: Cache performance: Eleven advanced cache optimizations, Protection via virtual memory and virtual machine.</p> <p>CO[5] Introduction to Message passing Architecture.</p>

			CO[6] Introduction to Storage Systems: Advanced topics in disk storage.
	8th Sem		
25	Distributed Operating System	BECSE406T	<p>CO[1] Basic fundamentals of Models and Features, Concept of Distributed Operating system.</p> <p>CO[2] Distributed Mutual Exclusion: Requirement of Mutual Exclusion Algorithm, Non Token Based Algorithms</p> <p>CO[3] Introduction to Distributed Deadlock Detection.</p> <p>CO[4] To understand the Distributed File system</p> <p>CO[5] Distributed Scheduling</p> <p>CO[6] Introduction to Failure Recovery: Recovery in concurrent systems.</p>
26	Information & Cyber Security	BECSE407T	<p>CO[1] Introduction to the Need of Information Security: Legal, Ethical and Professional Issues Attributes of security – authentication.</p> <p>CO[2] Introduction to Secret key and cryptography, Encrypt given messages using DES, AES, IDEA, Problems on cryptography algorithms,</p> <p>CO[3] Introduction to Public key and Cryptography</p> <p>CO[4] To understand the Message Authentication and Hash Functions</p>

			<p>CO[5] Introduction to Network, Transport and Periphery Security, Study of IPSEC, TLS, and SSL. Firewalls.</p> <p>CO[6] Software Vulnerability: Phishing, Buffer Overflow, Cross - site Scripting (XSS), SQL Injections.</p>
27	Elective -III: Pattern Recognition	BECSE408T	<p>CO[1] Introduction: Pattern Recognition Systems, Design Cycle, Applications of pattern recognition.</p> <p>CO[2] Probability: Introduction to Probability, Probability of events, Random variables, Probability Distributions,</p> <p>CO[3] Statistical Decision Making: Bayes' Decision Theory, Multiple Features,</p> <p>CO[4] Classifiers: Hidden Markov Model, Support Vector Machine, Artificial Neural network-back Propagation Algorithm and Fuzzy based classifiers.</p> <p>CO[5] Non Parametric Decision Making: Introduction, Histograms, Kernel and window Estimators</p> <p>CO[6] Clustering: Introduction, Hierarchical clustering, Partitional Clustering.</p>
28	Elective III: Soft Computing Techniques	BECSE408T	<p>CO[1] Introduction to Neuro: Fuzzy and Soft Computing</p> <p>CO[2] Fuzzy Inference Systems: Mamdani Fuzzy Models</p> <p>CO[3] Adaptive Networks: Introduction, Architecture; Feed-forward Network;</p> <p>CO[4] Unsupervised Learning and Other Neural Networks</p> <p>CO[5] Adaptive Neuro-Fuzzy Inference System</p> <p>CO[6] Rulebase Structure Identification</p>

29	Elective III: Optimization Techniques	BECSE408T	<p>CO[1] Introduction: Engineering applications of optimization. Design variables.</p> <p>CO[2] Optimal Point: Local optimal point, global optimal point and inflection point.</p> <p>CO[3] Single Variable Optimization Techniques</p> <p>CO[4] Multivariable Optimization Techniques</p> <p>CO[5] Constrained Optimization Algorithms</p> <p>CO[6] Linear Programming: Linear programming problems, Simplex method of linear programming techniques.</p>
30	Elective III: Clustering & Cloud Computing	BECSE408T	<p>CO[1] Introduction to Cloud Computing.</p> <p>CO[2] Cloud Computing Architecture.</p> <p>CO[3] Big Data Analysis, Hadoop and Map Reduce</p> <p>CO[4] Security in Cloud: Cloud Security Challenges, Infrastructure Security,</p> <p>CO[5] Application Development using C#</p> <p>CO[6] Creating Cloud Application using Azure</p>
31	Elective IV: Advanced Wireless Sensor Networks	BECSE409T	<p>CO[1] Introduction to Sensor networks</p> <p>CO[2] Operating systems and execution environments</p> <p>CO[3] Network Architecture:</p> <p>CO[4] Naming and Addressing</p> <p>CO[5] Routing protocols and content based networking</p> <p>CO[6] Application specific support</p>
32	Elective IV: Digital Image Processing	BECSE409T	<p>CO[1] Fundamental Steps in Digital Image Processing</p> <p>CO[2] Spatial Filtering: Histogram Processing</p> <p>CO[3] Filtering in Frequency Domain</p> <p>CO[4] Image Restoration and Reconstruction</p> <p>CO[5] Image Compression: Fundamentals</p>

			CO[6] Image Segmentation: Point, Line and Edge Detection
33	Elective IV: Natural Language Processing	BECSE409T	CO[1] Introduction: NLP tasks in syntax, semantics, and pragmatics, Key issues & Applications. CO[2] N-gram Language Models CO[3] Syntactic parsing: Grammar formalisms and tree banks, CO[4] Semantic Analysis: Lexical semantics and word-sense disambiguation, CO[5] Information Extraction (IE): Named entity recognition and relation extraction, CO[6] Machine Translation (MT): Basic issues in MT,
34	Elective IV: Digital Forensics	BECSE409T	CO[1] Introduction & evidential potential of digital devices CO[2]A seven element security model, A developmental model of digital systems, CO[3] Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, CO[4] Types of Military Computer Forensic Technology, Types of Law Enforcement CO[5] Homeland Security Systems, Occurrence of Cyber Crime, Cyber Detectives, CO[6] The violation of privacy during information words

