# KAVIKULGURU INSTITUTE OF TECHNOLOGY AND SCIENCE, RAMTEK

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# Department of Science and Humanities

The department of Science and Humanities has framed the following Course Outcomes in consultation with concerned stakeholder and corresponding committees.

| B.Tech. First Semester | |
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| | **Mathematics – I (BES1-1T)** |
| CO101.1 | Analyze real world scenarios to recognize when derivatives or integrals are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results. |
| CO101.2 | Appreciate ODE and system of ODEs concepts that are encountered in the real world, understand and be able to communicate the underlying mathematics involved to help another person gain insight into the situation. |
| CO101.3 | Apply knowledge of mathematics, physics and modern computing tools to scientific and engineering problems. |
| CO101.4 | Develop an ability to identify, formulate and/or solve real world problems. |
| CO101.5 | Understand the impact of scientific and engineering solutions in a global and societal context. |
| | **Applied Physics (BES1-2T)** |
| CO102.1 | Apply concepts in interface and diffraction to solve relevant numerical problems and to relate to relevant engineering applications. |
| CO102.2 | Learn the basic concept of dual nature of matter and wave packet and apply them to analyze various relevant phenomena and to solve related numerical. |
| CO102.3 | Recall the basic concept of crystal structure and apply them in solving numerical problems based on them and in relating to applications for determination of crystal structure. |
| CO102.4 | Relate the basic idea of total internal reflection to the propagation of light in an optical fibre and make use of the fibre concepts to solve numerical problems and relate to applications in engineering. |
| CO102.5 | Find how to extend the basic concepts of motion of charged particles in electric magnetic fields to solve numerical problems and to relate to applications in electron optic devices and CRO. |
| | **Applied Physics Practical (BES1-2P)** |
| CO102.1 | Data interpretation by using graphs, estimation of % error to arrive at the desires outcome of the experiment. |
| CO102.2 | Determine band gap energy value by various methods to gain an insight into the electrical properties of the semiconductors. |
| CO102.3 | To study electrical behavior of the p-n junction diode and BJT to understand their application. |
| CO102.4 | To study Hall effect in semiconductor to understand its significance. |

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| | **Energy and Environment (BES1-3T)** |
| CO103.1 | Solid fuels, CV, numericals |
| CO103.2 | Liquid and gaseous fuels, analysis of coal ICE |
| CO103.3 | Bio-energy, photolysis , nuclear fuels |
| CO103.4 | Industrial pollution and impacts, control |
| CO103.5 | Advanced materials, conducting polymers, adhesives etc |
| | **Energy and Environment Lab (BES1-3P)** |
| CO103.1 | The practical knowledge of handling chemicals. |
| CO103.2 | Analyzing a broad foundation in energy and environment that stresses scientific reasoning and analytical problem solving with a molecular perspective . |
| CO103.3 | Experimental techniques using modern instrumentation. |
| | **Communication Skills (BES1-4T)** |
| CO104.1 | Recollect various programming constructs and to develop C programs. |
| CO104.2 | Understand the fundamentals of C programming. |
| CO104.3 | Choose the right data representation formats based on the requirements of the |
| CO104.4 | Implement different Operations on arrays, functions, pointers, structures. |
| | **Communication Skills Lab (BES1-4P)** |
| CO104.1 | Student will be able to overcome listening barriers of communication. |
| CO104.2 | Student will be able to enhance their comprehending skills and speaking skills. |
| CO104.3 | Students will be able to give effective presentations and handle group situation professionally. |
| CO104.4 | Student will be able to use figurative language in their formal as well as informal communication. |
| | **Engineering Graphics (BES1-5T)** |
| CO105.1 | Draw the fundamental engineering objects using basic rules and able to construct the lines, simple geometries. Construct the various engineering curves using the drawing instruments. |
| CO105.2 | Draw two dimensional and three dimensional objects, precisely using drawing equipment. |
| CO105.3 | Draw the development of lateral surfaces for cut section of geometrical solids precisely using drawing equipment. |
| CO105.4 | Draw a simple isometric projection from given orthographic views precisely using drawing equipment. |
| | **Engineering Graphics Lab (BES1-5P)** |
| CO105.1 | The learner will able to understand the basic knowledge of engineering graphics such as instruments, lines, dimensioning techniques, scales, sheet layout. Construct the |
| CO105.2 | The learner will able to understand projections of different types planes (2D) and solids (3D) and will be able to draw different views of plane and solids. |
| CO105.3 | The learner will able to understand concept of sectioning and development of lateral surfaces of solid and will able to represent it. |

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| CO105.4 | Apply the visualization skill to draw a simple isometric projection/view from given orthographic views precisely using drawing equipment. |
| | **Basics of Civil & Mechanical Engineering (BES1-6T)** |
| CO105.1 | Introduction to what constitutes Civil Engineering. Identifying the various areas available to peruse and specialize within the overall field of CivilEngineering. Highlighting the depth of engagement possible within each of the areas. |
| CO105.2 | Exploration of the various possibilities of a career in this field. Understanding the vast interfaces this field has with the society at large. Providing inspiration for doing creative and innovative work. |
| CO105.3 | Showcasing the many monuments, heritage structures, nationally important infrastructure and impressive projects to serve as source of inspiration. Highlighting possibilities for taking up entrepreneur activities in this field. Providing foundation for the students launch off upon an inspired academic pursuit into this branch of engineering. |

| B.Tech. Second Semester | |
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| | **Mathematics – II ( BES2-1T)** |
| CO201.1 | Analyze real world scenarios to recognize when integrals are appropriate, formulate |
| CO201.2 | Define and understand the geometry of vector differential operators and line and surface integrals. |
| CO201.3 | Explain and apply principles of study design and data collection. |
| CO201.4 | Develop an ability to identify, formulate and/or solve real world problems. |
| CO201.5 | Understand the impact of scientific and engineering solutions in a global and societal |
| | **Advanced Engineering Materials (BES2-2T)** |
| CO202.1 | Apply the basic concepts of electrical conductivity and band theory to classify solids into conductors, semiconductors and insulator. |
| CO202.2 | Recall the basic ideas of semiconductor physics and relate them to devices such as diodes and transistors and their applications in engineering. |
| CO202.3 | Recall the basic concepts in magnetism and make use of them to classify magnetic materials in different types and to relate to their engineering |
| CO202.4 | Relate basic ideas of electrical conduction and magnetism to superconductors and apply them to classify superconductors in different types. |
| CO202.5 | Find how to extend the basic concepts of quantum transitions to explain the characteristics, working and applications of different lasers and to solve relevant numerical problems. |
| CO202.6 | Make us of quantum concepts to explain the properties and applications of different nanomaterials. |
| | **Applied Chemistry (BES2-3T)** |
| CO203.1 | Rationalize the periodic properties and analyze the Mircroscopic chemistry in terms f atomic and molecular orbital. |
| CO203.2 | Rationalize bulk properties and processes using thermodynamic processes. |
| CO203.3 | Understand the causes of corrosion, its consequences and method to minimize corrosion. |
| CO203.4 | Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques. |
| CO203.5 | Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation. |
| CO203.6 | Know about treatment of water and its applications in industry. |
| | **Applied Chemistry Lab (BES2-3P)** |
| CO203.1 | Measure molecular /system properties like, concentrations, surface tension, Conductance of Solutions etc. |
| CO203.2 | Estimate the soluble impurities present in the given water sample. |
| CO203.3 | Handle the different instruments used in chemistry laboratory. |

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| | **Computational Skills (BES2-4T)** |
| CO204.1 | Recollect various programming constructs and to develop C programs. |
| CO204.2 | Understand the fundamentals of C programming. |
| CO204.3 | Choose the right data representation formats based on the requirements of the problem. |
| CO204.4 | Implement different Operations on arrays, functions, pointers, structures. |
| | **Workshop Practices (BES2-5P)** |
| CO205.1 | Read and interpret job drawing and plan operations. |
| CO205.2 | Identify and select proper material, tools, equipments, machines and proper operational parameter. |
| CO205.3 | Set tools, work piece, and machines for desired operations. |
| CO205.4 | Complete job of Carpentry, Fitting, Welding and Smithy as per job drawing in allotted time. |
| CO205.5 | Use safety equipment and follow safety produces during operations. |
| CO205.6 | Inspect the job for confirming desired dimensions and shape. |
| | **Basic Electrical Engineering (BES2-6T)** |
| CO206.1 | Understand the basic knowledge of electrical quantities such as current, voltage, power, resistance, ideal/practical sources and its application. |
| CO206.2 | Understand the basic properties of magnetic material and its application to magnetic circuit. |
| CO206.3 | Understand AC fundamental, three phase circuit and its application in global world. |
| CO206.4 | To understand the principle, operation and testing of single phase transformer. |
| | **Engineering Mechanics (BES2-7T)** |
| CO207.1 | An ability to analyze 2D and 3D force system to determine resultant force, moment and couple of various force system. |
| CO207.2 | An ability to construct free-body diagrams and to calculate the reactions, forces in the member of trusses and in spatial force system . |
| CO207.3 | An ability to calculate centroid and M.I of various Laminas. Also analyze beam and frame by virtual work method. |
| CO207.4 | An ability to carry out the Dynamic analysis of various bodies using kinetic analysis, work energy method and method of momentum. |
| | **Indian Culture and Constitution (BES2-8T)** |
| CO208.1 | Student will become aware of Indian Culture and civilization and their role in development of Society. |
| CO208.2 | Student will understand Industrial work-culture. |
| CO208.3 | Student will sensitized towards professional ethics. |
| CO208.4 | Student will understand Indian Constitution and governance of country. |
| CO208.5 | Student will be able to understand the structure and system of work organizations. |

## Department of Civil Engineering

The Civil Engineering program subscribes to the following Program Specific Outcomes (PSOS):

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| PSO1 | To Apply the basic knowledge of construction aspect in civil engineering for planning, analysis, design, estimate, laboratory and site investigation. |
| PSO2 | To Design a system in Civil Engineering considering safety, economy, sustainability and social need of the community. |
| PSO3 | To Understand the basic concept of economics and leadership through consultancy services. |
| PSO4 | To Develop entrepreneurship for the services to the community and to pursue higher education and various career enhancing courses. |

| **B Civil Engineering Third Semester** | |
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| | **Mathematics-III (BTCVE301T)** |
| CO301.1 | ApplyFourierseriesintheanalysisofperiodicfunctionsnotintermssineandcosineencountered in engineering problems |
| CO301.2 | Solve Partial differential equations of first, higher and second order using elementary techniques; formulate mathematical models to simple problems of vibration of strings and beams in terms of Partial differential equations and solving with elementary solution techniques. |
| CO301.3 | Learn the concept off inding maxima and minima of definite integral involving unknown function and its derivatives. |
| CO301.4 | Learn Eigen value problem and its applications. |
| CO301.5 | Learn to find an approximate solution of algebraic and transcendental equations, system of linear equations and first order ordinary differential equations by various Numerical Methods |
| CO301.6 | Formulate simple optimization problem and learn to solve it by Graphical method and Simplex method. |
| | **Fluid Mechanics (BTCVE302T)** |
| CO302.1 | Understand the importance and practical significance of various fluid properties. |
| CO302.2 | Comprehend and estimate various forces acting on partially and fully submerged bodies. |
| CO302.3 | Evaluate the importance of various parameters on the fluid motion. |
| CO302.4 | Know various flow measuring devices with their practical applications. |
| CO302.5 | Illustrate the concept of impulse momentum principle, dimensional analysis and model analysis of a fluid phenomenon. |

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| | **Fluid Mechanics (BTCVE302P)** |
| CO302.1 | Understand the importance and practical significance of various fluid properties. |
| CO302.2 | Comprehend and estimate various forces acting on partially and fully submerged bodies. |
| CO302.3 | Evaluate the importance of various parameters on the fluid motion. |
| CO302.4 | Know various flow measuring devices with their practical applications. |
| CO302.5 | Illustrate the concept of impulse momentum principle, dimensional analysis and model analysis of a fluid phenomenon. |
| | **Solid Mechanics (BTCVE303T)** |
| CO303.1 | To determine the Mechanical behavior of the body by determining the stresses, strains produced by the application of load and to apply the fundamentals of simple stresses and strains. |
| CO303.2 | To determine the Shear Force and Bending Moment at a section for different condition. |
| CO303.3 | To facilitate the concept of bending and its theoretical analysis in a beam To determine the Bending and shear stress in a given beam. |
| CO303.4 | To develop slope and Deflection equations for beams subjected to various loads. |
| CO303.5 | To determine the torsion in circular section, Direct and Bending Stresses. |
| | **Solid Mechanics Lab (BTCVE303T)** |
| CO303.1 | To determine the Mechanical behavior of the body by determining the stresses, strains produced by the application of load and to apply the fundamentals of simple stresses and strains. |
| CO303.2 | To determine the Shear Force and Bending Moment at a section for different condition. |
| CO303.3 | To facilitate the concept of bending and its theoretical analysis in a beam To determine the Bending and shear stress in a given beam. |
| CO303.4 | To develop slope and Deflection equations for beams subjected to various loads. |
| CO303.5 | To determine the torsion in circular section, Direct and Bending Stresses. |
| | **Geotechnical Engineering (BTCVE304T)** |
| CO304.1 | Find the index and engineering properties of the soil. |
| CO304.2 | Determine properties & demonstrate interaction between water and soil. |
| CO304.3 | Analyze and compute principles of compaction and consolidation settlements of soil. |
| CO304.4 | Ability to analyze to calculate bearing capacity, earth pressure and foundation settlement. |
| CO304.5 | Study and identify different type's natural materials like rocks & minerals and soil. |
| | **Geotechnical Engineering Lab (BTCVE304P)** |
| CO304.1 | Find the index and engineering properties of the soil. |
| CO304.2 | Determine properties & demonstrate interaction between water and soil. |
| CO304.3 | Analyze and compute principles of compaction and consolidation settlements of soil. |

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| CO304.4 | Ability to analyze to calculate bearing capacity, earth pressure and foundation settlement. |
| CO304.5 | Study and identify different type's natural materials like rocks & minerals and soil. |
| | **Building Construction & Elementary Building Drawing (BTCVE305T)** |
| CO305.1 | Identify components of a building. |
| CO305.2 | Differentiate and identify types of building materials. |
| CO305.3 | Select appropriate material for building construction. |
| CO305.4 | Plan various construction related activities and their quality control. |
| CO305.5 | Know & identify the latest techniques and materials used. |
| | **Building Construction & Elementary Building Drawing (BTCVE305P)** |
| CO305.1 | Identify components of a building. |
| CO305.2 | Differentiate and identify types of building materials. |
| CO305.3 | Select appropriate material for building construction. |
| CO305.4 | Plan various construction related activities and their quality control. |
| CO305.5 | Know & identify the latest techniques and materials used. |
| | **Effective Technical Communication (BTCVE306T)** |
| CO306.1 | Participate effectively in groups with emphasis on listening and meta cognitive thinking. |
| CO306.2 | Prepare memorandum and report. |
| CO306.3 | Deliver an effective oral presentation. |
| CO306.4 | Acquire public speaking skills handling the audience professionally. |
| CO306.5 | Analyze causes of deterioration of concrete components |

| BE Civil Engineering Fourth Semester | |
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| | **Concrete Technology (BTCVE401T)** |
| CO401.1 | Think logically for development Concrete technology application in field of Civil Engineering. |
| CO401.2 | Gain an experience in the implementation of Concrete Materials on Engineering concepts which are applied on Construction Fields |
| CO401.3 | Understand the process of mix design of concrete. |
| CO401.4 | Differentiate special concrete from conventional concrete. |
| CO401.5 | Analyze causes of deterioration of concrete components |
| | **Structural Analysis (BTCVE402T)** |
| CO402.1 | Apply knowledge to analyse determinate and indeterminate structures. |
| CO402.2 | Apply knowledge to perform analysis of beams and frames using Slope Deflection Method and Moment Distribution Method. |
| CO402.3 | Apply knowledge of Influence Line Diagram to analyse structural members for rolling loads. |
| CO402.4 | Apply knowledge of Direct Stiffness Method to analyse Beams and Plane Frames. |
| CO402.5 | Apply knowledge of Direct Stiffness Method to formulate Stiffness Matrix, Transformation Matrix, Load Matrix to analyse Plane |
| | **Structural Analysis (BTCVE402P)** |
| CO402.1 | Apply knowledge to analyse determinate and indeterminate structures. |
| CO402.2 | Apply knowledge to perform analysis of beams and frames using Slope Deflection Method and Moment Distribution Method. |
| CO402.3 | Apply knowledge of Influence Line Diagram to analyse structural members for rolling loads. |
| CO402.3 | Apply knowledge of Direct Stiffness Method to analyse Beams and Plane Frames. |
| CO402.3 | Apply knowledge of Direct Stiffness Method to formulate Stiffness Matrix, Transformation Matrix, Load Matrix to analyse Plane |
| | **Environmental Engineering-I (BTCVE403T)** |
| CO403.1 | Have knowledge of characteristics of water,drinking water standards and necessity of treatment. |
| CO403.2 | Design various units of conventional water treatment plant. |
| CO403.3 | Understand the characteristics of waste water, necessity of treatment, types of treatment processes. |
| CO403.4 | Equip with the basic knowledge related to design of waste water treatment |
| CO403.5 | Understand of significance of air pollution, solid waste , climate change, geo environment etc. |

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| | **Environmental Engineering-I (BTCVE403P)** |
| CO403.1 | Have knowledge of characteristics of water,drinking water standards and necessity of treatment. |
| CO403.2 | Design various units of conventional water treatment plant. |
| CO403.3 | Understand the characteristics of waste water, necessity of treatment, types of treatment processes. |
| CO403.4 | Equip with the basic knowledge related to design of waste water treatment |
| CO403.5 | Understand of significance of air pollution, solid waste , climate change, geo environment etc. |
| | **Transportation Engineering-I (BTCVE404T)** |
| CO404.1 | Define and describe different objectives and requirements of Highway Development and Planning, Alignments. |
| CO404.2 | Explain, Discriminate and Design various Geometric Features of Highways & Pavement Design |
| CO404.3 | Understand, analyze, apply and evaluate the parameters of Traffic Engineering. |
| CO404.4 | Explain and describe various terms in railway engineering and should be able to explain, discriminate and design various geometric features of railway track. |
| CO404.5 | Understand the aircraft characteristics and terminal area functions, analyze, and evaluate the basic runway length, orientation of runway. |
| | **Transportation Engineering-I (BECVE404P)** |
| CO404.1 | The student will be able to understand the importance of shape (length, width, thickness) of aggregate as per the I.S. code. |
| CO404.2 | The student will be able to know as per I.S. code, impact test, crushing value test, abrasion and attrition of aggregate. |
| CO404.3 | The student will be able to know the bitumen properties as per I.S. code and case study of road failures and road signs. (warning, informatory, mandatory) |
| | **Surveying and Geomatics (BECVE405T)** |
| CO404.1 | Measurelengthandbearingoflinesusingvariousinstrumentsandcalculate area of given field. |
| CO404.2 | Use thet heodolite to measure angle and distances for traver singal so identify and correct the errors intraverse. Designandlay-out the various types of curves. |
| CO404.3 | Tocarryout levellingand contouringalso abletodeterminevolumeof earthwork. |
| CO404.4 | UsemoderninstrumentlikeTotalworkstation,GPS,DGPSforsurveyingandableto Prepare map sin CAD |
| CO404.5 | Use Remote Sensing and Geographical Information System(GIS), UAVD rone and LiDAR. |
| CO404.1 | Measurelengthandbearingoflinesusingvariousinstrumentsandcalculate area of given field. |

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| CO404.2 | Use the theodolite to measure angle and distances for traver singal so identify and correct the errors intraverse. Designandlay-out the various types of curves. |
| CO404.3 | Tocarryout levellingand contouringalso abletodeterminevolumeof earthwork. |
| CO404.4 | UsemoderninstrumentlikeTotalworkstation,GPS,DGPSforsurveyingandableto Prepare map sin CAD |
| CO404.5 | Use Remote Sensing and Geographical Information System(GIS), UAVD rone and LiDAR. |
| **BE Civil Engineering Fifth Semester** | |
| | **Structural Analysis – II (BECVE501T)** |
| CO501.1 | The student would have the knowledge of applying Kanis method for analyzing frame of multistoried building. |
| CO501.2 | The student would able to solve problem of analyzing the frames in practical problem by Moment distribution method. |
| CO501.3 | The knowledge of stiffness method and apply the concept of stiffness method for analyzing the truss problems for maximum three degree of freedom. |
| CO501.4 | Formulation of stiffness matrix, transformation matrix load matrix for analyzing beam problem. |
| CO501.5 | Evaluation of stiffness matrix of frame and solve frame analysis by stiffness matrix method. |
| CO501.6 | Learn the basic knowledge of finite element method. Define and study the structural dynamics. |
| | **Structural Analysis – II (BECVE501P)** |
| CO501.1 | The student would have the knowledge of solving analysis problem by Kanis method Moment distribution method and stiffness method. |
| CO501.2 | The student would able to do modeling and solve above problem by STADPRO software and compare answer. |
| CO501.3 | The student would able to solve stiffness method problem by MDM software and compare answer. |
| | **RCC Structures (BECVE502T)** |
| CO202.1 | Develop the concepts of working stress method based on classical elastic theory using knowledge of general science. He shall be able to analyze and design various structural members using RCC material. |
| CO202.2 | Understand the concepts of prestress concrete and modern anchorage systems. Student shall be able to design prestress members for various engineering uses and achieve economic solutions. |
| CO202.3 | Use probability and reliability knowledge to develop concepts of limit state method. Student shall be able to analyze and design singly and doubly reinforced sections. |
| CO202.4 | Analyse and design T and L beam section. He shall be able to formulate and analyse complex structural problems. He shall also be able to analyse design column and footing. |
| CO202.5 | Analyze members subjected to torsion and shear action. He shall be able to analyse complex engineering problems and members subjected to combined nature of stress. Student shall also be able to design economic, serviceable and durable structures for the society considering the local environment and loading. |

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| CO202.6 | Design one way, two way and cantilever slabs and be able to use engineering concepts and modern tools to develop economic and public building for the society having knowledge of project management and economics. He shall further be involved in consultancy, research work and lifelong learning. He shall refer literature and research work and shall continue learning. |

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| | **RCC Structures (BECVE502P)** |
| CO202.1 | Design singly reinforced, doubly reinforced and flanged beam and draw structural drawing sheet. |
| CO202.2 | Design columns subjected to axial load with and without bending moment and draw structural drawing sheet. |
| CO202.3 | Design one way, two way slab and isolated footing foundation and draw structural drawing sheet. |
| | **Fluid Mechanics-I (BECVE503T)** |
| CO503.1 | To know the importance of fluid fundamentals which are useful in engineering problems and formulate expression for various parameters. |
| CO503.2 | To study the principles and methodology to evaluate forces exerted on submerged body and to evaluate mathematical procedure to check stability of floating bodies analytically and experimentally so that it is beneficial for society. |
| CO503.3 | To know the fundamentals of fluid behavior with practical example and its mathematical and experimental representation. |
| CO503.4 | Apply continuity equation, Bernoulli's equation and momentum equation to solve Engineering problems in fluid mechanics in mathematical form for various flow measuring devices. |
| CO503.5 | Discuss Engineering application of flow measuring devices such as notches and weir to measure rate of flow through the canal system which is useful for water uses societies. |
| CO503.6 | Engineering application of dimensional analysis for designing of models and check dimensional homogeneity of mathematical expression. |
| | **Fluid Mechanics-I (BECVE503P)** |
| CO503.1 | Verification of Bernoulli's theorem along with its practical application in solving engineering problems. |
| CO503.2 | Calibration and engineering application of various flow measuring devices |
| CO503.3 | Demonstration of some phenomenon in flow measuring devices and understand their practical applications. |
| | **Geotechnical Engineering-II (BECVE504T)** |
| CO504.1 | The students shall be able to use the knowledge of different soil exploration techniques to ascertain the properties of soil. |
| CO504.2 | The students shall be able to analyze the stability of natural slopes, safety and sustainability of the slopes, design of retaining structures, reinforced earth walls. |
| CO504.3 | The students shall be able to apply the concept of Lateral Earth Pressure for Various types of soil below the ground Surface. |
| CO504.4 | The students shall be able to practice Ground Improvement Techniques to improve the soil properties. |
| CO504.5 | The students shall be able to Design the shallow foundation for different Bearing Capacity by Various Methods. |
| CO504.6 | The students shall be able to Design the Deep foundation by static, Dynamic and pile load test method. |

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| | **Hydrology and Water Resources (BECVE 505 T)** |
| CO505.1 | The students would have the knowledge of the fundamentals of hydrology and hydrological cycle in water resource engineering. Study the various instruments which are used to measure the precipitation which will be useful to the study of society and engineering work. |
| CO505.2 | Students would have the knowledge of water infiltration and evaporation which will be useful to perform engineering activities. |
| CO505.3 | The students would be able to understand the hydrograph theory in the analysis of runoff and determination of design discharge for various hydrological projects. |
| CO505.4 | The students would be able to exhibit the various statistical methods used in hydrological analysis, which may be useful in professional engineering practices. |
| CO505.5 | The students can apply the knowledge of ground water hydrology in terms of assessment and computing the ground water yield, which will be useful to the society and for professional engineering solutions. |
| CO505.6 | The knowledge of geo-hydrology the students can plan for artificial recharging of ground water by using various techniques. This may be useful for the society and for managing ground water related projects. |
| | **Communication English and Technical Writing (BECVE506P)** |
| CO506.1 | Student will become adept in using Grammar for communicating in English. |
| CO506.2 | Student would be able to write at workplaces |
| CO506.3 | Student will be able to draft technical report and write the proposal |
| CO506.4 | Student will be dexterous in presentation skills. |
| CO506.5 | Student will become well prepared to face job interviews. |
| CO506.6 | Student will be able to plan and carry out the research projects |
| **BE Civil Engineering Sixth Semester** | |
| | **Steel Structures (BECVE601T)** |
| CO601.1 | Apply knowledge of basic science and mathematics to understand various material properties of hot rolled and cold drawn steel sections. He shall be able to understand plastic analysis and failure mechanisms. |
| CO601.2 | Refer various texts, theories and research literatures to understand tension and compression analysis and design. Based on this learning he shall be able to assess loads on roof trusses for various environmental conditions. And be able to design industrial and public economic roofs for various needs of the society. |
| CO601.3 | Use fasteners like rivet, bolts and weld. He shall be able to analyse and design simple, semi-rigid and rigid joints. He shall be able to suggest design for complex engineering problem. To enhance knowledge, he shall involve in site visits and visits to resource persons. |
| CO601.4 | Design simple and built up beam, laterally restrained and unrestrained based on IS code, texts and research literature. He shall be able to understand complex plate behavior and design of plate girder. He shall also be able to provide economic design by suggesting prismatic and varying steel beam sections. |
| CO601.5 | Understand complex behavior of members subjected to combined nature of loading like beam column. He shall be able to design structural members using steel and composite material considering environmental condition. |
| CO601.6 | Student shall be able to design economic built up column members and column bases. He shall refer text and research literature to understand design of advanced |

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| | structures like communication and transmission towers, different bracing systems. He shall get involved in continuous learning, design and consultancy to suggest economic and engineering solutions for the society. |
| | **Steel Structures (BECVE601P)** |
| CO601.1 | Design tension member, compression members in roof trusses and draw structural drawing sheet. |
| CO601.2 | Design rolled and built up beams, rolled and built up column and draw structural drawing sheet. |
| CO601.3 | Design plate girder, beam to beam, beam to column connection and draw structural drawing sheet. |
| | **Surveying-II (BECVE602T)** |
| CO602.1 | The students shall be able to carry forward the concepts of basic surveying techniques by Tachometric Survey. |
| CO602.2 | The students shall be able to setting out the different types Simple, Compound, Reverse Curve by Various Methods. |
| CO602.3 | The students shall be able to setting out the different types Vertical and Transition Curve in the Field. |
| CO602.4 | The students shall be able to apply the concepts of modern surveying techniques and instrumentation by Geodetic Surveying and Triangulation Method. |
| CO602.5 | The students shall be able to Take – up mini project using different photographic surveying techniques. |
| CO602.6 | The students shall be able to apply the knowledge of GIS and GPS Techniques in Various Surveying methods. |
| | **Surveying-II (BECVE602P)** |
| CO602.1 | Students would be able to Setting out the Simple Curve, Compound and Reverse Curve in the Field. |
| CO602.2 | Students would be able to study the Topography Sheet using GIS and GPS Techniques. |
| CO602.3 | Students would be able to do the Road Project or Irrigation Project for in the Survey Camp. |
| | **Fluid Mechanics-II (BECVE603T)** |
| CO603.1 | Understand the concept and significance of boundary layer theory, drag and lift, and their formulation with mathematical approach to understand their practical utility. |
| CO603.2 | Analysis of flow through pipe system, formulation of expression, analysis and design of pipe network which is utilized to supply water to community. |
| CO603.3 | Use of concept and computation of uniform flow, design of most efficient section, analysis and Engineering concept of critical flow. |
| CO603.4 | To know the importance and basic principles of Hydraulic jump and gradually varied flow with mathematical formulation and discuss their practical utility for Engineers, designers and water users. |
| CO603.5 | Understanding the technique of dimensional analysis, concept of model testing with their Engineering and mathematical application. |
| CO603.6 | Understand the basic design principle of turbine and pumps with the study of their performance characteristics, so that their efficient functioning is obtained for the benefit of community in safe environment condition. |

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| | **Fluid Mechanics-II (BECVE603P)** |
| CO603.1 | Determination and verification of loss of energy in flow measuring devices. |
| CO603.2 | Performance characteristics of various hydraulic machines and check their suitability for practical application. |
| CO603.3 | Calibration of various structures, which are used in the actual field of fluid mechanics. |
| | **Building Design and drawing (BECVE604T)** |
| CO604.1 | The student would able to understand building byelaws and building code useful in planning of civil engineering structure, which will be useful in building construction and beneficial to community for avoiding haphazard development. |
| CO604.2 | The student would able to apply the principal of planning for planning of residential buildingto minimize wastage of space and pleasant appearance inside building and learn planning of public building which will helpful to society. |
| CO604.3 | Knowledge of submission drawing and able to draw manually and by using software helping for granting permission from Government authority. |
| CO604.4 | To make use of knowledge to give the layout on field as per given plan |
| CO604.5 | To visualize and draw prospective view of building to understand prospective view of building for professional practice. |
| CO604.6 | To know and draw detailing of building services for professional practice and helping in construction. |
| | **Environmental Engineering-II (BECVE605T)** |
| CO605.1 | To know the general concepts about sewage, sewer and sewerage system and their components this will be useful in Engineering problem and beneficial to community health for sustainable development. |
| CO605.2 | To have complete knowledge about the design of sewer analytically to compute their size, capacity and grades. |
| CO605.3 | To understand the philosophy and procedure for the construction of sewer, its testing and maintenance considering economic and social aspects. |
| CO605.4 | To analyze the characteristics of sewage through experimental studies and to design various units of conventional sewage treatment plant through analytical and mathematical computation. |
| CO605.5 | To study different methods of disposal of sewage and to discuss their practical utility for engineers and users in society by sewage farming in safe environmental conditions. Also to plan various provisions of sanitation for the community in rural areas. |
| CO605.6 | To study and understand the basic principles, significance of Industrial Wastewater Treatment. Also to understand Air Pollution, its sources and effect on human beings, materials, plants, animals in society and its preventive measures. |
| | **Site visit and Mini Project (BECVE606P)** |
| CO606.1 | Get an idea of various project details such as contracts, layout, planning, drawing, estimates, arbitration provision, license and license or architects |
| CO606.2 | Get an idea of various construction equipment, manpower and techniques used at site. |
| CO606.3 | Techniques of batching, mixing, transportation, and placement of different construction materials |
| CO606.4 | Get an overview on safety measures, basic amenities to provide, inventory |

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| | control. |
| CO606.5 | Write a legible, correct and technically sound report after the visit |
| CO606.6 | Ascertain the provisions and execution as per the working drawing |
| **BE Civil Engineering Seventh Semester** | |
| | **Advance Concrete Structures (BECVE701T)** |
| CO701.1 | Students will able to apply the basic knowledge of mathematic, engineering and IS code recommendations for planning, analysis and design of safe and economical water tanks resting on ground |
| CO701.2 | Students would able to understand the structural behavior of structural members and carry the analysis and design of beams by using modern techniques |
| CO701.3 | Student will able to understand the effect of backfill and select suitable type of retaining wall for the safety and convenience of society and carry out analysis, design and detailing of retaining wall as per IS Code provisions. |
| CO701.4 | Students will be able to plan the building and design the structural elements such as building frame and staircase as per the requirement of society. |
| CO701.5 | Students will able to interpret the soil - structural interaction and design suitable type of combined foundation using modern tools and techniques for the benefit of society. |
| CO701.6 | Students will able to interpret the soil - structural interaction and design suitable type of combined foundation using modern tools and techniques for the benefit of society. |
| | **Advance Concrete Structures (BECVE701P)** |
| CO701.1 | Students would able to understand the design concept of various RCC members. |
| CO701.2 | Students will able to apply the theoretical knowledge to design the RCC member for various structures. |
| CO701.3 | Students will able to use advance software for design of building |
| | **Estimating and Costing (BECVE702T)** |
| CO702.1 | To understand basic fundamentals of Estimates. Also to prepare preliminary estimates using different methods without much mathematical computations. Also to understand various approvals to be taken for the execution of project to understand their practical utility. |
| CO702.2 | To compute the quantities of various items of work of building using mathematical approach with formulation for detailed estimate. |
| CO702.3 | To know the basic principles and importance of earthwork in road estimate and to compute the quantities of earthwork in roads and canals and to discuss their practical utility for Engineers, designers and road users. |
| CO702.4 | To have detailed knowledge about execution process of carrying out works in Govt. Departments for its practical utility. Also to know types of tenders, contracts, legal aspects, etc. for Engineers and others in society. |
| CO702.5 | To know an importance and necessity of specification and draft detailed specification of items which are useful for Engineers on site and others. Also to calculate rate per unit item through mathematical computation and to include them in CSR which is useful to Engineers as well as owners in the society |
| CO702.6 | To discuss the various methods of valuation through mathematical representation so that it would be beneficial to the people in the society. Also to calculate the standard rent of building by formulation and mathematical expression and to |

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| | know the various types of cost and cost accounting useful for the community. |
| | **Estimating and Costing (BECVE702P)** |
| CO702.1 | To prepare preliminary estimates without much computations the quantities of various items of work using mathematical approach and formulations for detailed estimate. |
| CO702.2 | To compute the quantities of earthwork in roads and canals for the practical utility of engineers and others in society. |
| CO702.3 | To have detailed knowledge about execution process in Govt. departments for its practical utility and to calculate rate per unit item valuation and cost accounting through mathematical computations. |
| | **Earthquake Resistant Design ( Elective-I) (BECVE703T)** |
| CO703.1 | Idea on Engineering Seismology , Response Spectra, Strong Ground motion Characteristics, Earthquake Effects on RC Frame building |
| CO703.2 | Earthquake Analysis of Multistoried Building by Equivalent Lateral Load Procedure, Response Spectrum Method. Idea on Seismic Methods of Design |
| CO703.3 | Meaning of Single Degree of Freedom and Multi-degree of Freedom. What is Mathematical Modeling. Modeling of 2D and3D frameand with effect of shear wall. |
| CO703.4 | Idea on soil structure interaction. Winkler Model. What is Soft Storey? Shear Wall Concept. What is Capacity based design. |
| CO703.5 | Idea on Ductility. Types of ductility. What is beam to beam connection and beam to column connection? How to design beam for ductile detailing as per IS 13920 |
| CO703.6 | Introduction to Retrofitting. Methods of Retrofitting. Need of Retrofitting. Introduction to base isolation. Types of base isolation. Working principle. IS code Provisions. |
| | **Construction Management and Law (BECVE704T)** |
| CO704.1 | Demonstrate the understanding of various types of projects, Modern Construction Techniques, project analysis and feasibility, project financing. |
| CO704.2 | To analyze network analysis CPM and PERT, resource allocation leveling and resource smoothing construction planning. Crashing and time cost optimization to make project economic. |
| CO704.3 | To achieve the knowledge of various types of equipments used in the construction and to apply the principle of management for various types organization, organizational charts, duties and responsibilities of personal manager. To know various modern techniques used for material management quality checks, inventory control etc. |
| CO704.4 | To know the quality control aspects in quality management, safety provisions as per NBC. MIS in construction management and project management systems. |
| CO704.5 | To know the town planning requirements and knowledge of acts and codes of regional town planning, housing development act, highway act, and local rules will be understand legal importance. |
| CO804.6 | To know different laws, environmental (protection) act, forest conservation act water and air pollution act, transfer of property act, understand the social and environmental requirements and organizational welfare measures. |

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| | **Transportation Engineering-II (BECVE705T)** |
| CO705.1 | To understand the classification of railways, traction and tractive resistances, tractive efforts of locomotives, high speed track to apply the knowledge of Engineering for economical transportation system (mass transportation system) |
| CO705.2 | To conduct studies on rail functions, different rail fixtures, to design geometric design of railway track, super elevation. |
| CO705.3 | Planning and designing of points and crossing, turnouts modern technology used for track, signaling and controlling of railway. |
| CO705.4 | To know airport planning, zoning laws, imaginary surfaces, analyze wind direction runway orientation geometric design of runway taxiway, design standards of runway, taxiway, etc. |
| CO705.5 | To plan and design terminal area, aircrafts parking hangers, and to study international airport layouts, visual aids, airport markings and air traffic control modernization of landing by instrumental landing systems. |
| CO705.6 | To plan and design tunnels, ventilation economic transport by using tunnels. To know the classification of harbors, types of break waters, wharves, quays modern usage of water transportation systems. |
| | **Industrial Case Study (BECVE706P)** |
| CO706.1 | An ability to design and conduct experiments, as well as to analyze and interpret data |
| CO706.2 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. |
| CO706.3 | An ability to function on multidisciplinary teams. |
| CO706.4 | An ability to identify, formulates, and solves engineering problems |
| CO706.5 | An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. |
| CO706.6 | An understanding of the elements of Project Management, Construction and asset Management. |
| **BE Civil Engineering Eighth Semester** | |
| | **Irrigation Engineering (BECVE801T)** |
| CO801.1 | Understanding the methods, efficiency and application of Irrigation as an Engineering concept for the proper growth of crops to enhance the socio economic standard of farmers. |
| CO801.2 | Complete knowledge of planning, design and operational approach of storage reservoirs, computation of their capacity and life. |
| CO801.3 | Understanding of philosophy of large and small dams and engineering concept for analysis and design of such structures with consideration of economic and social aspects. |
| CO801.4 | Use of mathematical approach to check the stability, analysis and design of spillways with their engineering approaches to be adopted for energy dissipation below the spillways. |
| CO801.5 | Allocation of analysis and design approaches for various hydraulic structures with their engineering function, practical utility and socio economic considerations. |
| CO801.6 | Understanding design methodology for unlined and lined canal, selection of lining with engineering and economic consideration, methods and operation for efficient |

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| | use of water for the benefit of water user communities. |
| | **Water Transmission and Distribution System Elective-II (BECVE802T)** |
| CO802.1 | To know the purpose of various appurtenances used in distribution system and analysis, design consideration, working mechanics and engineering applications of such appurtenances. |
| CO802.2 | To do the planning of various distribution system and to analyze and design of such system by using various mathematical technique by formulating various equations. |
| CO802.3 | To know the concept and fundamentals of node flow analysis and design the network by mathematical approach |
| CO802.4 | Use of concepts of distribution reservoir to use of mathematical approach to calculate the capacity of reservoir by analytical and graphical solution and to understand design of rising main by the minimizing the total cost. |
| CO802.5 | To understand the design of single source balancing network using CPM, number of branching configuration of loop network using graph theory principle. |
| CO802.6 | To understand linear programming technique, non linear programming technique and also cost head loss criteria. |
| | **Applied Remote Sensing and GIS (Elective-III) (BECVE803T)** |
| CO803.1 | To know the fundamentals of remote sensing as a modern technique for surveying. |
| CO803.2 | To understand fundamental knowledge of Aerial photography which may solve engineering problems up to certain extent? |
| CO803.3 | To understand the appropriate techniques of interpretation of satellite images and aerial photographs. |
| CO803.4 | The knowledge of remote sensing and GIS for mapping and monitoring land cover and land use changes as a modern technique in environmental context. |
| CO803.5 | To apply knowledge of remote sensing and GIS in environmental studies. |
| CO803.6 | Use of satellite images as a new technique for site selection for civil engineering projects to overcome the complex civil engineering problems in environmental context. |
| | **Applied Remote Sensing and GIS (Elective-III) (BECVE803P)** |
| CO803.1 | Students will understand the basic concepts of stereoscopes to create three-D vision. |
| CO803.2 | Students will be able to interpret the aerial photographs and satellite images. |
| CO803.3 | Students will be able to interpret the digital satellite images on software. |
| | **Construction Management and materials (BECVE804T)** |
| CO804.1 | Acquaint with various economic and financial aspects of construction industry |
| CO804.2 | Understand the tools and techniques of economic analysis for improving their decision making skills. |
| CO804.3 | Understand the knowledge of economic analysis for improving their decision making skills |
| CO804.4 | Understand the Concept of IRR, Turnkey Construction Projects. |
| CO804.5 | Apply Knowledge of Inflation , Recession , Financial Ratios |
| CO804.6 | Idea on Working Capital. Structure of Working capital. Economic Analysis. |

| | **Project (BECVE805P)** |
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| CO805.1 | Engaged in professional practices, such as construction, environmental, geotechnical, structural, transportation, or water resources engineering by using technical, communication and management skills. |
| CO805.2 | Overseen the design and/or construction of a civil engineering project. |
| CO805.3 | Registered as a professional engineer or developed a strong ability leading to professional licensure. |
| CO805.4 | Demonstrated a commitment to continuing professional development by pursuing formal education in an advanced degree program or by maintaining technical currency through documented CPD activities. |
| CO805.5 | Served in a leadership position in any professional or community organization, or local/state engineering board. |
| CO805.6 | The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. |

## Department of Electronics Engineering

The Electronics Engineering program subscribes to the following Program Specific Outcomes (PSOS):

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| PSO1 | **Core and Design Competence-** To comprehend the technological advancements in the design of circuits leading to higher education and research inclination with the ability to associate the high impact learning from the courses related to Nanotechnology , Signal processing, Image processing, Embedded Systems, VLSI, Robotics and MEMS to arrive at solutions to real world problems with great finesse. |
| PSO2 | **Career Prospects with Collaborative Endeavour-** To appreciate an academic culture that ignites the spirit of excellence and passion by grafting the entrepreneurial paradigm onto the learning methodologies through projects with Government organizations inculcating the professional etiquettes, ownership, responsibility, accountability with impressive eloquence. |

| **BE Electronics Engineering Fifth Semester** | |
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| | **Switching Theory and Automata (BEENE501T)** |
| CO501.1 | Demonstrate basic tools for the design of digital circuits and fundamental concepts used in the design of digital systems. |
| CO501.2 | Find out structural properties by using Functional Decomposition and Symmetric functions. |
| CO501.3 | Describe designing aspects of logic circuits using threshold elements. |
| CO501.4 | Design sequential logic circuits. |
| CO501.5 | Describe behavior, capabilities and structure of finite state machines and sequential machines. |
| CO501.6 | Describe diagnosis of faults of switching circuits and methods of improving their reliability. |
| | **Microprocessor And Microcontroller (BEENE502T)** |
| CO502.1 | Describe internal organization of 8086/8088 microprocessors and 8051microcontrollers. |
| CO502.2 | Understand the basic idea about data transfer schemes and its applications and impart the knowledge about instruction set. |
| CO502.3 | Interface 8086 and 8051 with Keyboard/ Display, ADC/DAC, Stepper motor etc. |
| CO502.4 | Demonstrate the concept of interrupts and its use. Demonstrate the concept of Serial and parallel data communication |
| CO502.5 | Describe the concept of DMA and Pentium. Describe 8087 Numeric coprocessor and its use in practical application. |
| CO502.6 | Develop programming skills in assembly language for 8086MP, 8051MC and apply the fundamentals of assembly level programming of microprocessor and microcontroller. |
| | **Analog Circuit And Design (BEENE503T)** |
| CO503.1 | Be able to describe the basic differential amplifier using transistor and its operation and characteristics. |

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| CO503.2 | Design linear Op-Amp circuit such as voltage follower, summing amplifier, scaling and averaging amplifier, Instrumentation amplifier, Integrator circuit, Differentiator circuit, Log and Antilog Amplifier circuit for various practical applications. |
| CO503.3 | Design Non-linear Op-Amp circuit such as comparators, Schmitt trigger, Clipper, Clamper, Rectifiers, Sample and Hold circuit, A/D and D/A Convertor and Multivibrator using IC 555 for various practical applications. |
| CO303.4 | Design Regulated power supply such as SVR and SMPS. |
| CO503.5 | Design Wein bridge oscillator, Phase shift oscillator, Hartley and Colpitts oscillator and Function generator |
| CO503.6 | Design active filter of LPF, HPF, BPF, Butterworth filter, Relay driver circuit, stepper motor control circuit, Dc servo motor circuit |
| | **Communication Electronics (BEENE 504T)** |
| CO504.1 | Able to understand and analyze various forms of amplitude modulation, its bandwidth and power requirements |
| CO504.2 | Able to demonstrate FM techniques, evaluate the bandwidth requirements and Bessel's Function |
| CO504.3 | Able to learn sampling, quantization and various pulse modulation techniques, find bit rate and bandwidth requirements |
| CO504.4 | Able to understand various types of noise and solve numerical on noise. |
| CO504.5 | Able to understand detection techniques for AM and FM signals |
| CO504.6 | Able to learn multiplexing techniques and broadband communication links. |
| | **Industrial Economics and Entrepreneurship Development (BEENE505T)** |
| CO505T.1 | Subject makes the student understand and learn the basic concepts of Industrial Economics such as types of business structures, top and bottom line of |

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| | organization as economic analysis. |
| CO505T.2 | Students learn the basic concepts like market structures, pricing strategies, business integration, economies and diseconomies of scale and the new economic policies of the government |
| CO505T.3 | Students are familiarized with working of banking system, foreign direct investment, the concept of free trade, capital formation, inflation, inclusive growth and public private partnership |
| CO505T.4 | Students learn about entrepreneurship as career avenue and factors affecting entrepreneurial growth. Students learn about project formulation, market survey and research, techno economic feasibility assessment and project appraisal. |
| CO505T.5 | Subject enhances their understanding about needs and sources of finance, various types of loans, capital structures, break even analysis, network analysis techniques of PERT/CPM etc. |
| CO505T.6 | Students learn about role of small scale industries in the economy, problems of SSI,FDI as a threat to SSI, technical consultancy organizations, government policies for SSI and various incentives for SSI |
| **BE Electronics Engineering Sixth Semester** | |
| | **Microwave Engineering (BEENE 601T)** |
| CO601.1 | Able to describe and differentiate between klystron amplifier and TWT on different aspects |
| CO601.2 | Able to describe and analyze about magnetron and solve numerical based on it |
| CO601.3 | Able to describe about various transmission lines and their fabrication technologies |
| CO601.4 | Able to analyze various passive components with the help of scattering matrix |
| CO601.5 | Able to demonstrate about measurement of different microwave parameters |
| CO601.6 | Able to describe different solid state devices and discuss its applications |
| | **Digital Signal Processing (BEENE602T)** |
| CO602.1 | Represent discrete time signals analytically and visualize them in the time domain |
| CO602.2 | Design and implement digital filters for various applications |
| CO602.3 | Describe various transforms for analysis of signals and systems |
| CO602.4 | Understand the behavior of discrete time using Z-transform |
| CO602.5 | Explore the concept of multirate signal processing |
| CO602.6 | Acquire knowledge on DSP architecture |
| | **Control System Engineering (BEENE603T)** |
| CO603.1 | This is to understand the fundamental concepts control system and mathematical modeling of systems, transfer function of the control system |
| CO603.2 | To determine the Time response of different order systems for various inputs, steady stare error, Principles of controllers. |
| CO603.3 | To understand the fundamental concept of stability and to Analyze the stability of the system using Routh Hurwitz criteria, Root locus. |
| CO603.4 | To analyze the concept stability of in frequency domain. Polar plot, Bode plot, Nyquist plot |
| CO603.5 | Able to analyze the need for compensation and types of compensation for control systems |

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| CO603.6 | Able to understand concept of state space representation, Obtain transfer function of systems using signal flow graph. Apply the state variable approach in design |
| | **Digital Communication (BEENE604T)** |
| CO604.1 | Model digital communication system using appropriate mathematical techniques. |
| CO604.2 | Describe a random process in terms of its mean and correlation functions and characterize special Gaussian and Rayleigh distribution |
| CO604.3 | Describe digital modulation techniques. |
| CO604.4 | Demonstrate the concept of coding and decoding techniques. |
| CO604.5 | Explain the receiver techniques for detection of signals in AWGN channel |
| CO604.6 | Describe the spread spectrum analysis and analyze the performance of spreading code acquisition and tracking circuit. |
| | **Functional English (BEENE605T)** |
| CO605.1 | Will become adept in using functional grammar |
| CO605.2 | Would be able to write at workplaces |
| CO605.3 | Will be able to draft technical reports and write proposals |
| CO605.4 | Will be able to understand the planning and procedure of carrying out research work |
| CO605.5 | Will become well prepared to face competitive examinations and job interviews |
| CO605.6 | Dexterous in presentation skills |
| **BE Electronics Engineering Seventh Semester** | |
| | **DSP Processor and Architecture (BEENE701T)** |
| CO701.1 | Understand the fundamentals of programmable Digital Signal Processors (P-DSPs). |
| CO701.2 | Understand the architecture of TMS and Motorola processors. |
| CO701.3 | Understand the assembly language instructions and write simple assembly language programs for different processors. |
| CO701.4 | Write and execute the application programs for processing of real time signals. |
| CO701.5 | Interface DSP processors hardware to a software Integrated Development Environment (IDE) for execution of programs written in high level language. |
| CO701.6 | Implement different Digital Signal processing algorithms on DSP processors. |
| | **Embedded System (BEENE702T)** |
| CO702.1 | To give sufficient background for understanding embedded systems design and describe the difference between the general computing system and embedded system. |
| CO702.2 | Describe the hardware and software architecture of embedded system and different interrupt servicing mechanism. |
| CO702.3 | Describe the architecture of ARM processor and its programming aspects and to give knowledge of RISC processor. |
| CO702.4 | Describe the different communication protocols and buses required for an embedded system and to understand connections of various peripherals with microcontroller based system |
| CO702.5 | Describe the real time operating system concepts and different scheduling algorithms. |

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| CO702.6 | Describe the detail contextual analysis of a limited number of events and their relationship through different case studies. |
| | **Optical Fiber Communication (BEENE703T)** |
| CO703.1 | Understand the basic operating principles of physics, optical fiber communication system, optical fiber and its types. |
| CO703.2 | Understand the mechanism of optical fiber drawing apparatus, optical fiber manufacturing methods, signal degradation in optical fibers |
| CO703.3 | Classify various optical source materials, LED structures and LASER diodes. Splices and connectors |
| CO703.4 | Learn the fiber optic receivers, their operation and performances. |
| CO703.5 | understand the concept of analog and digital link, |
| CO703.6 | Learn optical network SONET/SDH, WDM, high speed optical network Such as GPON, FTTX, and High speed optical links. |
| | **Advance Digital System Design (BEENE704T)** |
| CO704.1 | Learn the VHDL development flow |
| CO704.2 | Explore the basic language constructs of VHDL |
| CO704.3 | Develop a formal test bench from informal system requirement |
| CO704.4 | Design the FSM and ASM using VHDL |
| CO704.5 | Understand the synthesis concepts in digital design |
| CO704.6 | Learn the basics of the programmable logic devices |
| | **Elective I-Digital Image Processing (BEENE705T)** |
| CO705.1 | Understand the fundamental of Digital image processing |
| CO705.2 | Define image transforms and filtering |
| CO705.3 | Understand the image compression techniques |
| CO705.4 | Explore advanced topics of color image processing |
| CO705.5 | Acquire the knowledge on segmentation methods |
| CO705.6 | Analyse different restoration techniques |
| **BE Electronics Engineering Eighth Semester** | |
| | **Micro-Electromechanical System (BEENE801T)** |
| CO801.1 | To understand Major classes, components, and applications of MEMS devices/systems and to demonstrate an understanding of the fundamental principles behind the operation of these devices/systems such as optical mems, bio mems, RF-mems. |
| CO801.2 | To understand Standard micro fabrication techniques and the issues surrounding them such as bulk, surface LIGA and different etching methods. |
| CO801.3 | To understand Major classes, components, and applications of MEMS devices/systems and to demonstrate an understanding of the fundamental principles behind the operation of these devices/systems like different types of sensors and transducers such as chemical sensor, molecule based bio-sensor, optical transducer, and thermal transducer. |
| CO801.4 | To understand micro fabrication techniques and applications to the design and Manufacturing of an MEMS device or a Microsystems like RF MEMS devices such as capacitor, inductor, switches, and its actuation mechanism. |
| CO801.5 | Describe different packaging methods for microelectronics and Microsystems. |
| CO801.6 | Describe Microsystems technology and core architecture for digital media. |

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| | **Computer Communication Network (BEENE802T)** |
| CO802.1 | To learn the design issues of various layers and architecture of networks |
| CO802.2 | Able to understand physical medias and switching concept |
| CO802.3 | Study of data link protocols and characteristic of different methods |
| CO802.4 | To understand various routing algorithms and data formats. |
| CO802.5 | Explain majority of application along with their working principle ,advantages and disadvantages |
| CO802.6 | study the concept to provide security and administration to the network |
| | **CMOS VLSI Design (BEENE803T)** |
| CO804.1 | To be aware about the trend in semiconductor technology ,MOS transistor |
| CO803.2 | To understand MOS (Metal Oxide Semiconductor)Transistor |
| CO803.3 | To design Combinational Logic Circuits using CMOS logic |
| CO803.4 | Analyze the switching characteristic and power dissipation of MOS inverter |
| CO803.5 | Able to draw layout , stick diagram |
| CO803.6 | Learn the fault coverage and design for testability |
| | **Elective 2-Nanotechnology(BEENE804T)** |
| CO804.1 | Understand the fundamental of nanotechnology |
| CO804.2 | Apply different tools for the measurements of nanotechnology |
| CO804.3 | Apply specific methodology for fabrication of nano devices for specific application |
| CO804.4 | Learn different nano materials and its applications |
| CO804.5 | Understand nano electronics for advanced computation |
| CO804.6 | Apply nanotechnology concepts in electronics engineering field |
| | **Robotics And Automation (BEENE805T)** |
| CO805.1 | Will get overview of robot technology, sensory perception categories and Artificial intelligence (AI). Students will be able to compare human brain and computer, represent and solve problems in AI |
| CO805.2 | Able to know and compare the different techniques used for knowledge representation. Also they will get idea about expert systems. |
| CO805.3 | Will get idea about different techniques used for speech synthesis and speech recognition. |
| CO805.5 | Will be able to find range of the object for the robot using different techniques. Also will get idea about robot operation using tactile sensing (touch). |
| CO805.6 | Explore various robot programming language, their characteristics and comparison |
| | **Data Compression And Encryption (BEENE805T)** |
| CO805.1 | Understand various text compression techniques and compare their performances. |
| CO805.2 | Understand various audio compression techniques and audio coding formats |
| CO805.3 | Understand various image and video compression techniques and image compression formats |
| CO805.4 | Understand various types of attacks on secrete messages and encryption measures to prevent the attacks. |
| CO805.5 | Gain knowledge of various public key encryption techniques. |
| CO805.6 | Gain knowledge of system security from intruders, viruses and warms |

## Department of Mechanical Engineering

The department of Mechanical Engineering has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

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| PSO1 | Graduates will be able to apply technical skills and modern engineering tools to design and develop the mechanical systems. |
| PSO2 | Graduates will be capable of developing Research Skills in utilization of unconventional Energy sources, IC engines and design. |

| **BE Mechanical Engineering Third Semester** | |
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| | **Applied Mathematics – III (BEME301T)** |
| CO301.1 | Apply Laplace Transform to solve ordinary differential equations, Integral equations and Integro-differential Equations. |
| CO301.2 | Apply Fourier series in the analysis of periodic functions in terms sine and cosine encountered in engineering problems and Fourier Transform to solve integral equations. |
| CO301.3 | Learn the concept of differentiating, integrating and expanding of analytic functions in complex numbers and their applications such as evaluation of integrals of complex functions |
| CO301.4 | Solve partial differential equations of first order, higher order with constant coefficients and of second order using method of separation of variables. |
| CO301.5 | Analyze real world scenarios to recognize when matrices are appropriate, formulate problems about the scenarios, creatively model these scenarios in order to solve the problems using multiple approaches. |
| | **Manufacturing Processes (BEME302T)** |
| CO302.1 | Understand the importance of manufacturing processes, techniques of pattern making and moulding with their properties. Design gating system along with selection of different types of melting furnaces and special casting process. |
| CO302.2 | Get acquainted with the basic concept of joining process, welding process and its types, defects and application. |
| CO302.3 | Get acquainted with the forming process for metal, mechanics of forming process along with different types of rolling machine. |
| CO302.4 | Understand and define press working process along with its classification, types and terminology, different types of dies and introduction to shaping operation. |
| CO302.5 | Understand introduction to plastics, ceramics and glasses, its properties, application, forming and its shaping. |
| | **Manufacturing Processes (BEME302P)** |
| CO302.1 | Think in core concept of their engineering application by studying various topics involved in branch specific applications. |

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| CO302.2 | Understand the relevance and importance of the Different manufacturing techniques and real life application in industry. |
| CO302.3 | Design the gating and riser system needed for casting and requirements to achieve defect free casting. |
| CO302.4 | Analyze the welding process behavior and requirements to achieve sound welded joint while welding different similar and dissimilar engineering material. |
| CO302.5 | Understand the plastic, glass and ceramic Processing |
| | **Engineering Thermodynamics (BEME303T)** |
| CO303.1 | **Explain** thermodynamics concepts, **relate** laws of the ideal gas, **identify** various thermodynamic processes and apply the laws to **determine** the energy transfer in terms of heat and work. |
| CO303.2 | **Explain** the first law of thermodynamics and **apply** the law to **evaluate** open, closed systems, thermal components and devices. |
| CO303.3 | **Interpret the** second law of thermodynamics, entropy, and apply the law to evaluate heat engine, heat pump, and refrigerator performance. |
| CO303.4 | **Relate** various steam properties, and **analyze** the different types of processes using steam as working fluid to **determine** the energy transfer in terms of heat and work. |
| CO303.5 | **Compare** various power cycles and **analyze** the cycles to **determine** the energy transfer in terms of heat, work and efficiency. |
| | **Kinematics of Machines (BEME304T)** |
| CO304.1 | Perform kinematic and dynamic analysis (Displacement, Velocity, acceleration, Inertia forces)of a given mechanism using analytical and graphical method. |
| CO304.2 | Understand the concept of compliant mechanisms. |
| CO304.3 | Contrive or synthesize new mechanisms for specific requirements and Perform computeraided analysis of simple mechanisms. |
| CO304.4 | Construct cam profiles and analyse the follower motion. |
| CO304.5 | Understand Geometry of gear, its types, analysis of forces and motions of gear teeth. Studyof gear trains and governors. |
| | **Machine Drawing and Solid Modeling (BEME305T)** |
| CO305.1 | Interpret and describe basic elements of standard machine drawing like lines,dimensions, tolerances,symbols etc. |
| CO305.2 | Create 2-D detailing, sectional views of machine elements from given isometric view. |
| CO305.3 | Understand and apply concepts of GD&T for creating part and assembly drawing. |
| | **Machine Drawing and Solid Modeling (BEME305P)** |
| CO305.1 | Create 2-D orthographic manual drawings as well as digital drawing using CADsoftware package of standard machine components |
| CO305.2 | Apply standard practices for creation of 2-D orthographic manual drawings as wellas digital drawing using CAD software package of assembly with |
| CO305.3 | Create 3-D solid model and 2-D detailing of simple parts using CADsoftware package and perform 2-D detaining. |

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| CO305.4 | Create production drawing and process sheet for standard machine components. |
| CO305.5 | Get hands on experience of reverse engineering process and concepts. |
| | **Computer Applications/Programming (BEME306P)** |
| CO306.1 | Understand and explore concepts in basic programming like data types, input/outputfunctions, operators, programming constructs and user defined functions. |
| CO306.2 | Develop capabilities of writing „C" programs in optimized, robust and reusable code. |
| CO306.3 | Apply appropriate concepts of data structures like arrays, structures implement programsfor various applications. |
| | **Sports (BEME307P)** |
| CO307.1 | Through sports, students should able to build a wide range of abilities and skills such asleadership, confidence, teamwork, patience, self-reliance, trust, and many more which facilitate the overall development of an individual. |
| CO307.2 | Students should learn to manage time between their lectures, sports, and personal life. |
| | **Yoga (BEME307P)** |
| CO307.1 | To introduce basic wellness principles and practices of Yoga to students. |
| CO307.2 | To bring awareness of the fundamentals of Yoga for wellness in their daily lives. |
| CO307.3 | To bring peace and harmony in the society at large by introducing the Yogic way of life. |
| | **NSS (BEME307P)** |
| CO307.1 | 1. Understand the community in which they work.<br>2. Understand themselves in relation to their community.<br>3. Identify the needs and problems of the community and involve them in problem-solving.<br>4. Develop among them a sense of social and civic responsibility.<br>5. Utilize their knowledge in finding practice solutions to individual and communityproblems.<br>6. Develop competence required for group-living and sharing of responsibilities.<br>7. Gain skills in mobilizing community participation.<br>8. Acquire leadership qualities and democratic attitudes<br>9. Develop capacity to meet emergencies and natural disasters.<br>10. Practice national integration and social harmony |
| | **NCC (BEME307P)** |
| CO306.1 | During the training of NCC, candidates should get the basic military training. This trainingshould be conducted to develop the interest of young students in all three forces; the army, the navy and the air force of India. Students should be able to check their abilities to join the Indian Defence Services. |

| BE Mechanical Engineering Fourth Semester | |
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| | **Machining Processes (BEME401T)** |
| CO401.1 | Understand fundamentals of metal cutting |
| CO401.2 | Understand basic construction and operations of lathe shaping, planning |
| CO401.3 | Understand basics of milling and milling cutters. slotting |
| CO401.4 | To know about the surface finishing processes. |
| CO401.5 | Understand the basic of drilling, boring, reaming and broaching. |
| | **Fluid Mechanics & Hydraulic Machines (BEME402T)** |
| CO402.1 | Classify and explain fluid their properties, fluid in rest condition, types of flow & flow measuring devices and mathematical application of equations on hydraulic components. |
| CO402.2 | Explain behavior of fluid in motion condition and application of Bernoullie's equation to fluid flow measuring devices. |
| CO402.3 | Apply dimensional analysis to design hydraulic machines and different losses of fluid flow through pipes. |
| CO402.4 | (i) classify different layout of hydro-electric power plant and<br>(ii) analyze design characteristics of hydraulic machines i.e. turbines (impulse and reaction), Pelton turbine , Francis turbine, propeller turbine and Kaplan turbine |
| CO402.5 | Explain the working principle & design of Centrifugal and reciprocating pump & practical application of similitude & model testing. |
| | **Fluid Mechanics & Hydraulic Machines (BEME402P)** |
| CO402.1 | Explain what is Stability condition of floating bodies, Law of conservation of Energy. |
| CO402.2 | Apply Frictional losses and Hydraulic co-efficient in the pipe flow. |
| CO402.3 | Estimate the Performance characteristics of Pelton Turbine |
| CO402.4 | Estimate the Performance characteristics of Francis Turbine & Kaplan Turbine. |
| CO402.5 | Estimate the Performance characteristics of Centrifugal Pump & Reciprocating Pump. |
| | **Material Science & Engineering (BEME403T)** |
| CO403.1 | Student will be capable to distinguish microstructure and analyze the effect of Crystalline nature of metals, construct and analyze Iron-Iron carbide equilibrium diagram. |
| CO403.2 | Student will be able to study the commercial steels. |
| CO403.3 | Student will be able to analyze and implement suitable heat treatment processes. |
| CO403.4 | Student will be able to analyze the Cast Iron. |
| CO403.5 | Student will be able to perceive the basics of powder Metallurgy for powder metallurgical |

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| | **Mechanics of Materials (BEME404T)** |
| CO404.1 | Demonstrate fundamental knowledge about various types of loading and stresses induced |
| CO404.2 | Draw the SFD and BMD for different types of loads and support conditions. |
| CO404.3 | Estimate the strain energy in mechanical elements. And analyse the deflection in beams. |
| CO404.4 | Can design shaft for various loading conditions. |
| CO404.5 | Understand theory of failure and effective designing of column and struct. |
| | **Material Testing Lab (BEME404P)** |
| CO404.1 | Analyze the Microstructure and investigate various properties of ferrorous and Non ferrousMaterials . Analyse the stress strain behaviour of materials |
| CO404.2 | Analyse the effect of tensile, shearing force and can utilized the gained while tackling real lifeengineering problems for different types of Materials |
| CO404.3 | Understand Microstructures and their Applications for various uses |
| CO404.4 | Measure torsional strength , hardness of material |
| CO404.5 | Incorporate the various important concepts learnt while designing components |
| | **Professional Ethics (BEME405T)** |
| CO405.1 | Understand basic purpose of profession, professional ethics and various moral and social |
| CO405.2 | Analyze various moral issues and theories of moral development |
| CO405.3 | Realize their roles of applying ethical principles at various professional levels |
| CO405.4 | Identify their responsibilities for safety and risk benefit analysis. |
| CO405.5 | Understand their roles in dealing various global issues |
| | **Sports (BEME406P)** |
| CO406.1 | Through sports, students should able to build a wide range of abilities and skills such asleadership, confidence, teamwork, patience, self-reliance, trust, and many more which facilitate the overall development of an individual. |
| CO406.2 | Students should learn to manage time between their lectures, sports, and personal life. |
| | **Yoga (BEME406P)** |
| CO406.1 | To introduce basic wellness principles and practices of Yoga to students. |
| CO406.2 | To bring awareness of the fundamentals of Yoga for wellness in their daily lives. |
| CO406.3 | To bring peace and harmony in the society at large by introducing the Yogic way of life. |
| | **NSS (BEME406P)** |

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| CO406.1 | 1. Understand the community in which they work.<br>2. Understand themselves in relation to their community.<br>3. Identify the needs and problems of the community and involve them in problem-solving.<br>4. Develop among them a sense of social and civic responsibility.<br>5. Utilize their knowledge in finding practice solutions to individual and communityproblems.<br>6. Develop competence required for group-living and sharing of responsibilities.<br>7. Gain skills in mobilizing community participation.<br>8. Acquire leadership qualities and democratic attitudes<br>9. Develop capacity to meet emergencies and natural disasters.<br>10. Practice national integration and social harmony |
| | **NCC (BEME406P)** |
| CO406.1 | During the training of NCC, candidates should get the basic military training. This training should be conducted to develop the interest of young students in all three forces; the army, the navy and the air force of India. Students should be able to check their abilities to join the Indian Defence Services. |
| **BE Mechanical Engineering Fifth Semester** | |
| | **Industrial Economics and Entrepreneurship Development (BEME501T)** |
| CO501.1 | Students will be able to understand Economics and its relation with Capitalism and Socialism, business integration and understanding difference between Proprietorship and Partnership. |
| CO501.2 | Students will be able to understand Demand Analysis and Law of return and Marginality, Customer satisfaction and Elasticity of Demand along with Demand Forecasting methods. |
| CO501.3 | Students will be able to understand factors of Production and their theories. Various associated costs. Stock exchange roles and Functions, Taxation, types of competition, Pricing methods and strategies, globalization issues. |
| CO501.4 | Students will be able to analyze the feasibility of new venture business concept. Evaluate his or her entrepreneur tendency and ability. Brainstorming Ideas for new and innovative Product and Services. |
| CO501.5 | Students will be able to use a variety of feasibility tests, assess and select prospective new ventures and concepts for further study. Conduct focus groups, surveys and other methods for researching customer reactions for various new venture concepts. |
| CO501.6 | Students will be able to conduct a variety of secondary research activities to analyze competition, market trends, industry structures and other issues relevant to specific new venture concepts. Examine and analyze issues related to intellectual property protection for specific new produ8ct concepts( patents and |

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| | trade name related) |
| | **Design of Machine Elements (BEME502T)** |
| CO502.1 | Students will be able to understand introduction to machine design, design methods, design procedure, various design considerations, modes of failures, material properties, design of knuckle, cotter and riveted joints |
| CO502.2 | Students will be able understand and design - welded and bolted joints, pressure vessel, lever |
| CO502.3 | Students will be able to understand introduction, types and design of helical and laminated springs; shaft material selection criterion, design of shafts |
| CO502.4 | Students will be able to understand introduction, terminology, applications and design of power screw; introduction, types, theories and design of clutch and brakes |
| | **Advanced Production Processes (BEME503T)** |
| CO503.1 | Student should able to understand Non-Conventional Machining processes and their applications. |
| CO503.2 | Student should able to understand various types of advanced joining processes and their applications. |
| CO503.3 | Student should able to understand various types of advanced machining processes and also micro-machining, Nano fabrication and High Energy Rate Forming (HERF). |
| CO503.4 | Student should able to understand various types of sheet metal operations. |
| CO503.5 | Student should able to understand various types of Jigs, Fixtures, Bushes and Clamps. |
| CO503.6 | Student should able to understand various types of super finishing processes and surface modification. |
| | **Heat Transfer (BEME504T)** |
| CO504.1 | Students will be able to understand and learn the concept of conduction heat transfer without uniform heat generation. Students will be able to analyze the conduction heat transfer for geometries like plane wall, cylinder and sphere. |
| CO504.2 | Students will be able to understand and learn the concept of conduction heat transfer with uniform heat generation, Fin and Transient Heat transfer. Students will be able to analyze the conduction heat transfer with uniform heat generation for geometries like plane wall, cylinder and sphere, also they will analyze the fin heat transfer and transient heat transient transfer. |
| CO504.3 | Students will be able to understand and learn the concept of Boundary layer thickness and forced convection. Students will be able to analyze the forced convection over flat plat, cylinder sphere, tube bank and flow though conduit. |
| CO504.4 | Students will be able to understand and learn the concept natural convection dimensional analysis. Students will be able to analyze the natural convection heat transfer, boiling and Condensation, also obtained dimensionless number. |
| CO504.5 | Students will be able to understand and learn the concept of radiation heat transfer, radiation laws and analyze the radiation heat transfer with and without radiation shield. |
| CO504.6 | Students will be able to understand and learn the concept of Heat exchangers and their classifications. Students will be able to analyze various heat exchangers. |

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| | **Mechanical Measurement and Metrology (BEMT505T)** |
| CO505.1 | The course is designed to study various measurement systems and their significance along with the characteristics and order of the instruments. Students will have an understanding on error and its measurement. |
| CO505.2 | Students will understand the functionality of various measuring instruments for measuring different physical parameters such as displacement, strain, speed, load, temperature, sound etc. |
| CO505.3 | Through the course students will gain understanding on different standards of measurement along with their allowances and tolerances. Moreover they would be exposed to different measurement using verrnier techniques. |
| CO505.4 | The course is oriented for understanding the working methodology of limits and fits. Numerical analysis through process planning sheet are also a part of study. |
| CO505.5 | Study of different comparators such as mechanical. Electrical, optical etc., for inspection along with optical profile projection is a part of curriculum. Course also focuses the importance of thread and gear measurement. |
| **BE Mechanical Engineering Sixth Semester** | |
| | **Energy Conversion -I (BEME601T)** |
| CO601.1 | The students will be able to understand and learn the concept of Power plant. Students will be able to understand the classification and working of Boilers. |
| CO601.2 | The students will be able to understand and learn the concept of Draught. Students will be able to analyze and design the chimney. Students can able to analyze the boiler. |
| CO601.3 | The students will be able to understand and learn the concept of fluidization and FBC boiler. They will also able to understand the cogeneration. |
| CO601.4 | The students will be able to understand and learn the concept steam nozzle. Students will be able to analyze various steam nozzles. Students will be able to understand and learn the concept steam turbines and their controlling. |
| CO601.5 | The students will be able to understand and learn the concept steam turbines, their controlling and analysis. |
| CO601.6 | The students will be able to understand and learn the concept of steam condensers and cooling towers also to analyze various steam condensers. |
| | **Control System Engineering (BEMT602T)** |
| CO602.1 | The course is designed to understand different control systems along with their types. In this systems, students will analyses and study various actuators govern by control system controls ex. Servo mechanism, robotic manipulators etc. |
| CO602.2 | The course is formulated to familiarize students with modeling of different type of systems, including mechanical, electrical, electromechanical etc. and there analysis. |
| CO602.3 | Through the course students will orient him with concepts related to the operation, analysis and stabilization of control systems. |
| CO602.4 | The course is objected towards the understanding of various control systems and its stability analysis using analytical and graphical technique. The understanding of concept related to time domain and frequency domain is also a part of the curriculum. |
| CO602.5 | Students will study responses for different types of signals and would cumulate analysis nature, through such type of course module. |

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| CO602.6 | At the end of the course student will gain up-to date knowledge in control system field through the study of industrial automatic controls and there operations through P, PI and PID type of controllers. |
| | **Operations Research (BEME603T)** |
| CO603.1 | To provide a formal quantity approach to problem solving by using mathematical model to solve linear programming such as linear programming problem formulation, graphical and simplex method, principle of duality that are used in industry. |
| CO603.2 | The students will have the knowledge of mathematical model techniques in Transportation model and Assignment model. |
| CO603.3 | The students will have the knowledge of mathematical model techniques in game theory, sequencing model and inventory control. |
| CO603.4 | The students will able to understand the concept of network model and use quantitative approach in project management such as CPM and PERT analysis, cost analysis. |
| CO603.5 | The students will use mathematical model in Replacement model such as replacement of items that deteriorate with time, items fail suddenly, group replacement. |
| CO603.6 | The students will use mathematical model such as Queuing theory. Simulation theory used in waiting line situation, inventory and network used in industry. |
| | **Mechatronics (BEME604T)** |
| CO604.1 | The course is designed to study basic elements of general mechatronics system. Students would understand the working of mechatronics system and acquire an insight to build the same. |
| CO604.2 | The students will understand different DAQ Systems, which are the key elements of any control system. In addition they will study the interfacing of different actuators with these DAQ's. |
| CO604.3 | Through the course students will gain understanding on different actuating systems including the study of different actuators such as mechanical, electrical and hydraulics and pneumatics etc. |
| CO604.4 | They will understand different logic elements and with this understanding, they study the functionality of micro-processor and micro-controller. |
| CO604.5 | Students will get up-to date knowledge on PLC and SCADA systems, which are heart of any industrial automation. Through the course module they would be oriented towards programming a PLC. |
| CO604.6 | Conceptual knowledge of MEMS and related systems are also studied, which are the future of mechatronics systems, where systems are smaller and with wide functionality. |
| | **Dynamics of Machines (BEME605T)** |
| CO605.1 | The students should be able to understand the concept of machine element dynamics and its application for simple two degree of freedom system, gyroscope & gyroscopic effect, etc. |
| CO605.2 | The students should be able to understand dynamic force analysis of four bar chain, reciprocating mechanism and cam dynamics. |
| CO605.3 | The students should be able to understand static and dynamic balancing in rotating and reciprocating mechanisms. |
| CO605.4 | The students should be able to understand turning moment Vs. crank angle |

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| | diagram for various engines, flywheels, governors and various types of governors. |
| CO605.5 | The students should be able to understand vibratory systems and their analysis in single degree of freedom systems. |
| CO605.6 | The students should be able to understand vibratory system analysis in two degree of freedom system. |
| | **Functional English (BEIT606T)** |
| CO606.1 | The students will become adept in using functional grammar. |
| CO606.2 | The students would be able to write at workplaces. |
| CO606.3 | The students will be able to draft technical reports and write proposals. |
| CO606.4 | The students will be able to understand the planning and procedure of carrying out research work. |
| CO606.5 | The students will become well prepared to face competitive examinations and job interviews. |
| CO606.6 | The students will become dexterous in presentation skills. |
| **BE Mechanical Engineering Seventh Semester** | |
| | **Industrial Engineering (BEME701T)** |
| CO701.1 | Define and recognize the concept of Productivity, Work study and Method study |
| CO701.2 | Various techniques of work measurement and calculate the standard time |
| CO701.3 | Human factor in engineering in the context of man machine system. |
| CO701.4 | Types of plant layouts and know the principles of material handling. |
| CO701.5 | The concept of value engineering and be aware of other productivity improvement techniques. |
| CO701.6 | Various types of maintenance and the concept of reliability and maintainability. |
| | **Automobile Engineering (BEME702T)** |
| CO702.1 | Student will be able to understand concept of Automobile Engineering and IC engine. |
| CO702.2 | Student will be able to understand concept of clutches and requirement and operation of clutches. |
| CO702.3 | Student will be able to understand concept of how transmission works and how it is designed also they will understand the concept of braking. |
| CO702.4 | Student will be able to understand concept of and need of steering and suspension system in automobile and its futuristic design. |
| CO702.5 | Student will be able to understand electrical system in automobile. |
| CO702.6 | Student will be able to understand concept of advances in automobile purpose. |
| | **Power Plant Engineering (BEME702T)** |
| CO702.1 | Students will be able to understand the Indian energy scenario and economics of power generation. |
| CO702.2 | Students will be able to understand thermal power plant operations, analyze steam cycle and will have ability to understand combined power generation and its advantages. |
| CO702.3 | Students will be able to understand basic combustion reactions, combustion equipment used in thermal power plant, component of steam generator, ash handling system, and cooling tower. |
| CO702.4 | Students will be able to understand electricity production from hydro power |

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| | plant, component of hydro power plant, types, site selection and advantages of hydro power plant over thermal power plant. |
| CO702.5 | Students will be able to understand binding energy, fission reactions, components and types of nuclear and environment safety aspects. |
| CO702.6 | Able to describe basic principle of gas turbine and diesel engine power plant and provides basic knowledge of non conventional power plant like solar, thermal, wind, andocean. |
| | **Computer Aided Design (BEME703T)** |
| CO703.1 | Students will be able to understand to develop a framework where the designers works with the computer to develop an engineering system and use of computer in design and drafting and use of algorithm to generate line, circle. |
| CO703.2 | Students will be able to understand concept of computer graphics, windowing, clipping, viewport and analyze transformation routine of 2D and 3D. |
| CO703.3 | Students will be able to understand and create 2D,3D,assembly modeling with the help of computer aided design software, student have knowledge of graphics standards, various types of geometric modeling and curves used in CAD application |
| CO703.4 | Students will be able to understand and analyze the one dimensional finite element analysis and properties of stiffness matrix, assembly global stiffness matrix, and load matrix. |
| CO703.5 | Students will be able to understand and analyze the two dimensional finite element analysis such as truss and CST |
| CO703.6 | Students will be able to understand and analyze optimization in design by using Johnson's method of optimum design for simple machine elements like bar, shaft, beam. |
| | **Energy Conversion - II (BEME704T)** |
| CO704.1 | Students will be able to understand the working principle of single and multistage reciprocating compressor, minimum work required to drive multistage compressor, applications and analyze the performance of reciprocating compressor. |
| CO704.2 | Students will be able to understand the working principle of blowers, rotary compressors and analyze the performance of rotary compressors. |
| CO704.3 | Students will be able to understand working principle of SI, CI, 2-S and 4-S Internal Combustion Engines, Combustion phenomenon, parameters affecting abnormal combustion, carburetion and fuel injection systems. |
| CO704.4 | Students will be able to calculate the performance parameters, preparation of heat balance sheet and interpret the performance curves of Internal Combustion Engines. |
| CO704.5 | Students will be able to analyze vapor compression refrigeration system, understand the working of VARS, air refrigeration systems, refrigerants, properties and nomenclature. |
| CO704.6 | Students will be able to find the psychrometric properties of air, analyze the psychrometric processes and its application to condition the air. |
| | **Design of Mechanical Drives (BEME705T)** |
| CO705.1 | Students will be able to understand Types of shaft coupling, Design of rigid coupling (Protective type), Bush pin type Flexible coupling, Flywheel rim and arms, Sliding and rolling contact bearings for various applications. |

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| CO705.2 | Students will be able to design Flat belt, V-belt, wire ropes, and chain drives for examples in practice. |
| CO705.3 | Students will be able to design Spur, helical and bevel gears for industrial applications. |
| CO705.4 | Students will be able to design worm and worm wheel and I.C. Engine parts like piston, cylinder, piston rings, cylinder head etc. |
| **BE Mechanical Engineering Eighth Semester** | |
| | **Industrial Management (BEME801T)** |
| CO801.1 | Students will get knowledge about evolution of management thoughts and the principles of scientific management. |
| CO801.2 | Students will understand the functions of personnel management and the related legislations. |
| CO801.3 | Students will know the different types of production system and the concept of production planning and control. |
| CO801.4 | Students will get knowledge about entrepreneurship, traits and competencies for the same and the factors affecting entrepreneurial growth. |
| CO801.5 | Students will get knowledge about the steps involved in setting up a business. |
| CO801.6 | Students will get overview of the marketing function and the various sources of finance. |
| | **Computer Integrated Manufacturing (BEME802T2) (Elective II)** |
| CO802.1 | Students will acquaint with data bases related to CIM. Its evolution and basic concept, also students will cultivate understanding about automation and CIM. |
| CO802.2 | Students will understand Computer Aided Manufacturing (CAM). The basic components, of NC Technology and operational features of NC, CNC and DNC. |
| CO802.3 | Students will explore and trained to understand part families and generating part codes. They will also understand concept of cellular manufacturing and Group Technology. |
| CO802.4 | Students will understand the concept of Flexible Manufacturing System, Its basic components and need. Further explore to basic components of FMS and types of layouts. |
| CO802.5 | Students will understand the algorithm and relevance of Computer Aided Process Planning (CAPP). They will also understand the details of Manufacturing Planning. |
| CO802.6 | Students will understand Manufacturing System Control, Computerized statistical process control, including Shop Floor Control. Further they will understand the concept of automated Inspection i.e. CMM. |
| | **Refrigeration and Air Conditioning (BEME802T) (Elective – II)** |
| CO802.1 | Illustrate the basic concepts of vapor compression and vapor absorption refrigeration systems. Analyze the performance of vapor compression refrigeration system and interpret the usage of refrigerants. |
| CO802.2 | Understand the components, controls and defrosting methods of vapor compression refrigeration system. Analyze the performance of multiple compressors and multiple evaporator refrigeration system. |
| CO802.3 | Understand air refrigeration system and can perform the analysis. Understand the concepts of non-conventional refrigeration systems. |
| CO802.4 | Understand the concept of cryogenics and its applications. Methods of |

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| | liquefaction of air and its analysis. |
| CO802.5 | Find the psychrometric properties of air; analyze the psychrometric processes and its application to condition the air. Understand the heat load calculations of an air conditioned space. |
| CO802.6 | Understand the principle of air transmission and distribution. Different components used for distribution of conditioned air. Understand the analysis of duct design and use of air conditioning controls. |
| | **Advance Internal Combustion (IC) Engine (BEME803T5) (Elective III)** |
| CO803.1 | Students will be able to differentiate between among different IC engine and will demonstrate the ability to perform a thermodynamic analysis of Otto, Diesel and Dual cyclemodels. |
| CO803.2 | Students will be able to understand the basic components of IC engine and role of lubrication and cooling in reducing friction and wear. Students will be able to understand the characteristics of different fuels. Students will be able to understand/demonstrate fuel supply management in SI and CI engine. |
| CO803.3 | Students will be able to understand combustion phenomenon and combustion chambers in SI engine. Students will be able to understand ignition systems used in SI engine. |
| CO803.4 | Students will be able to understand combustion and combustion chambers design of CI engine and the types and applications of supercharging/turbo charging. |
| CO803.5 | Students will be able to understand the generation of undesirable exhaust emissions and methods used to reduce them. |
| CO803.6 | Students will demonstrate the ability to analyze engine performance through various practical problems. |
| | **Advanced Manufacturing Techniques (BEME803T) (Elective-III)** |
| CO803.1 | In this unit is designed to provide students with an overview of a wide variety of nontraditional machining process for processing of Engineering Materials. |
| CO803.2 | Student will learn principles operations capability process parameters economics and applications of various mechanical machining processes and parameters which will control or affect the mechanical machining processes. |
| CO803.3 | In this unit student will learn principles, operation, capabilities, process parameter, economics and applications of electrochemical machining and thermal machining. |
| CO803.4 | In this unit student will learn various unconventional welding techniques, control parameter of all unconventional welding techniques factors govern the process. |
| CO803.5 | In this unit is designed to understand the solid phase welding techniques such as ultrasonic friction welding with recent developments and economics and application of nontraditional process for welding. |
| CO803.6 | In this unit student will understand the advanced casting processes such as metal casting continuous squeeze / Centrifugal and ceramic shell casting on completion of this unit student Shall understand the importance of advance advanced casting process for unconventional foreign conventional machining and be able and will be able to select and apply suitable process for an Engineering Product. |
| | **Renewable Energy Systems (BEME803T3) (Elective III)** |
| CO803.1 | Students will be able to understand spectral distribution of solar radiation, solar radiation geometry and its measurement. |
| CO803.2 | Students will be able to understand solar flat plate collector and its performance. |

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| CO803.3 | Students will be able to understand concentrating collector and application of solar energy. |
| CO803.4 | Students will be able to understand biomass, biogas, its generation and application. |
| CO803.5 | Students will be able to understand wind energy, ocean energy, tidal energy its generation and application. |
| CO803.6 | Students will be able to understand geothermal energy, magneto hydrodynamic generation. |
| | **Automation in Production (BEME804T)** |
| CO804.1 | Students will be able to understand arguments for and against automation, Types of production, Automation principles and strategies. Workpart transfer mechanisms, buffer storage, and analysis of flow line: general terminology and analysis of transfer line without storage and with buffer storage. Line balancing and related problems, Part delivery system. |
| CO804.2 | Types of NC system, Machine control unit, tape and tape readers. DNC, CNC, Adaptive control and their applications. APT (computer assisted part programming) NC Part programming and should able to make part programmes. |
| CO804.3 | Robot anatomy, work volume, joint notation system, robot control system. Characteristics of robot, robot programming, End effectors. Accuracy, repeatability of robot and Robot applications, work cell layout use of robots in material handling, processing, assembly and inspection. |
| CO804.4 | Automated material handling and storage-conveyor system Types of conveyors, Automated guided vehicle system, vehicle guidance technology, Analysis of AGVs and their applications to practical examples. |
| CO804.5 | Automated Inspection, sensor technology, radio frequency identification, Coordinate measuring machine, machine vision, image acquisition, digitization, image processing, analysis and interpretation. Concepts of Group Technology, production flow analysis. |
| CO804.6 | Computer aided manufacturing, Flexible manufacturing system, Computer aided process planning (CAPP) and their types e.g. Retrieval and generative. Basics of CIM. |
| | **Energy Conversion – III (BEME805T)** |
| CO805.1 | Students will be able to understand the basics, components, working principle, classification, applications of a gas turbine power plant and its analysis. |
| CO805.2 | Students will be able to understand the basics and analysis of jet propulsion systems; components and different types of nuclear power plant. |
| CO805.3 | Students will be able to understand the importance of renewable energy sources, solar energy collection systems, and wind energy conversion system. |
| CO805.4 | Students will be able to understand the role of energy conservation and its management in an industry; methods, procedure and instruments to conduct an energy audit. |
| CO805.5 | Students will be able to understand basic structure, working principle, various controlling components of hydraulic systems and industrial hydraulic circuits. |
| CO805.6 | Students will be able to understand basic structure, working principle, components of pneumatic systems, formation of different pneumatic circuits. |

## Department of Electronics and Communication Engineering

The department of ECE Engineering has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

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| PSO1 | Apply the basic knowledge acquired in Electronic Devices and Circuits, Electromagnetic fields, signal processing, communication engineering, VLSI circuits and Embedded Systems to provide efficient solutions to engineering problems. |
| PSO2 | Should acquire the skills to communicate and document the ideas with necessary road maps and demonstrating the practices of professional ethics for societal and environmental wellbeing. |

| **BE Electronics and Communication Engineering Third Semester** | |
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| | **Applied Mathematics III (BEETC301T)** |
| CO301.1 | Apply Laplace Transform to solve ordinary differential equations, Integral equations and Integro-differential Equations. |
| CO301.2 | Apply Fourier series in the analysis of periodic functions in terms sine and cosine encountered in engineering problems and Fourier Transform to solve integral equations. |
| CO301.3 | Learn the concept of differentiating, integrating and expanding of analytic functions in complex numbers and their applications such as evaluation of integrals of complex |
| CO301.4 | Solve partial differential equations of first order, higher order with constant coefficients and of second order using method of separation of variables |
| CO301.5 | Analyze real world scenarios to recognize when matrices are appropriate, formulate problems about the scenarios, creatively model these scenarios in order to solve the problems using multiple approaches. |
| CO301.6 | Understand the impact of scientific and engineering solutions in a global and societal context. |
| CO301.7 | Create the groundwork for post-graduate courses, specialized study, and research in mathematics. |
| | **Components for Electronics Circuit Design (BEETC302T)** |
| CO302.1 | Understand the principles of semiconductor physics |
| CO302.2 | Understand the principles of semiconductor diode. |
| CO302.3 | Understand and analyze the mathematical model of transistors. |
| CO302.4 | Understand and analyze the mathematical model of unipolar transistors |
| CO302.5 | Understand the process of Integrated Circuit Fabrication. |

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| | **Components for Electronics Circuit Design Lab (BEETC302P)** |
| CO302.1 | Explain the basic concepts of different semiconductor components. |
| CO302.2 | Understand the use of semiconductor devices in different electronic circuits. |
| CO302.3 | Calculate different performance parameters of transistors. |
| CO302.4 | Plot and study the characteristics of semiconductor devices |
| | **Digital System Design (BEETC303T)** |
| CO303.1 | Demonstrate the knowledge of: Logic gates, Boolean algebra including algebraic manipulation/simplification and Application of DeMorgan's Theorem, Karnaugh map reduction. |
| CO303.2 | Construct basic combinational circuits and verify their functionalities. |
| CO303.3 | Illustrate and apply the knowledge of different flip flops to build sequential digital circuits. |
| CO303.4 | Apply the fundamental knowledge about digital electronics so as to construct and analyze digital circuits like counters and sequence generators. |
| CO303.5 | Demonstrate and apply programming proficiency using the various addressing modes and instructions of the target microprocessor. |
| | **Digital System Design Lab (BEETC303P)** |
| CO303.1 | Demonstrate the different Boolean Laws & basics of K-map to realize combinational & sequential circuits. method. |
| CO303.2 | Identify the various digital ICs & understand their operation. |
| CO303.3 | Describe the operation & timing constraints for latches, registers, different sequential circuits. |
| CO303.4 | Solve basic binary math operations using microprocessor & explain the internal architecture & its operation within the area of manufacturing & performance. |
| CO303.5 | Select programming strategies & proper mnemonics & run their program on the training boards. |
| | **Network Theory (BEETC304T)** |
| CO304.1 | Apply mesh and node voltage method to model and analyze electrical circuits. |
| CO304.2 | Apply network theorems for the analysis of networks. |
| CO304.3 | Obtain the transient and steady-state response of electrical circuits |
| CO304.4 | Synthesize waveforms and apply Laplace transforms to analyze networks. |
| CO304.5 | Evaluate different Network Functions and Analyze two port network |
| | **Signal & Systems (BEETC305T)** |
| CO305.1 | Classify different types of signals and systems. |
| CO305.2 | Illustrate the concept of Linear Time Invariant (LTI) system and its properties. |
| CO305.3 | Analyze continuous time periodic and aperiodic signals. |

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| CO305.4 | Analyze continuous time systems using Laplace Transform. |
| CO305.5 | Analyze DT signals and systems in frequency domain using Fourier Transform. |
| | **Measurements and Instrumentation (BEETC306T)** |
| CO306.1 | Select and use precise/accurate instrument for measurement of various electrical Parameters and to understand its technical specifications. |
| CO306.2 | Identify and minimize errors in electrical/electronic measurement. |
| CO306.3 | Understand analog and digital measurement. |
| CO306.4 | Measure power and frequency with the help of function generators and different analyzers. |
| CO306.5 | Understand modern trends in telemetry systems. |
| | **Object oriented programming and data structure (BEETC307P)** |
| CO307.1 | Explain the Basic Concepts of Different Semiconductor Components with Their Usage Physically As Per Their Types |
| CO307.2 | Use Semiconductor Devices in Different Electronic Circuits and Projects. |
| CO307.3 | Calculate Different Performance Parameters of Active and Passive Devices and their Datasheets. |
| CO307.4 | Plot and Study the Characteristics of Semiconductor Devices. |

| BE Electronics and Communication Engineering Fourth Semester | |
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| | **Microcontroller and Applications (BEETC401T)** |
| CO401.1 | Demonstrate the programming model of various microcontrollers. |
| CO401.2 | Design and implement 8051 microcontroller-based systems for various applications. |
| CO401.3 | Illustrate & program AVR / RISC microcontrollers in Integrated Development environment. |
| CO401.4 | Design and implement advanced processor/controllers-based systems for various applications. |
| CO401.5 | Design and develop Arduino based embedded system applications. |
| | **Microcontroller and Applications Lab (BEETC401P)** |
| CO401.1 | Demonstrate the concept of Assembly languages and higher level language programming. |
| CO401.2 | Interface various peripherals with 8051,Atmega 32, MSP 430 and Arduino. |
| CO401.3 | Simulate the programs on different software platforms. |
| | **Analog and Digital Communication (BEETC402T)** |
| CO402.1 | Demonstrate a basic need of modulation and various types of amplitude and angle modulation techniques required for analog communication. |
| CO402.2 | Understand working principles, symbols and characteristics of power devices and its application in electronic circuit |
| CO402.3 | Explain the designing of digital communication systems by applying knowledge of the various pulse modulation techniques. |
| CO402.4 | Describe various digital modulation techniques and various parameters associated withit. |
| CO402.5 | Identify different types of channel coding techniques and analyze the different spread spectrum methods. |
| | **Analog and Digital Electronics Lab (BEETC403P)** |
| CO403.1 | Explain the practical aspects of linear and non-linear applications of OP-AMP. |
| CO403.2 | Design the various wave-shaping circuits, oscillators, signal conditioners and various application based circuits using OP-AMP and Transistors. |
| CO403.3 | Demonstrate various concepts of analog communication. |
| CO403.4 | Explain various concepts of digital communication. |
| CO403.5 | Develop an application based project using industry based OPAMP. |
| | **Analog System Design (BEETC404T)** |
| CO404.1 | Describe and explain the basic concepts of OPAMP. |
| CO404.2 | Demonstrate and analyze various linear applications of OPAMP. |
| CO404.3 | Demonstrate and analyze various non-linear applications of OPAMP |

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| CO404.4 | Examine and design DC Power Supply. |
| CO403.5 | Examine and design various types of oscillators and filters. |
| | **Data Structure and Algorithms (BEETC405T)** |
| CO405.1 | Student will be able to choose appropriate data structure based on the specified problem definition and analysis the algorithm. |
| CO405.2 | Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures |
| CO405.3 | Students will be able to apply concepts learned in various domains like Operating Systems, DBMS etc. |
| CO405.4 | Students will be able to use linear and non-linear data structures like stacks, queues, linked list, trees etc. |
| | **Numerical Mathematics and Probability using MATLAB (BEETC406T)** |
| CO406.1 | Learn and use MATLAB effectively in various applications as a simulation tool. |
| CO406.2 | Find an approximate solution of algebraic and transcendental equations, system of linear equations and first order ordinary differential equations by various numerical methods and MATLAB commands. |
| CO406.3 | Apply Z- transform to solve difference equations with constant coefficients. |
| CO406.4 | Analyze real world scenarios to recognize when probability is appropriate, formulate problems about the scenarios; creatively model these in order to solve the problems using multiple approaches. |
| CO406.5 | Understand the impact of scientific and engineering solutions in a global and societal context. |
| CO406.6 | Create the groundwork for post-graduate courses, specialized study, and research in mathematics. |
| | **Programming for Problem Solving (BEETC407T)** |
| CO407.1 | Student will be able to understand the basic concepts of Object Oriented Programming and design simple java programs. |
| CO407.2 | Student will be able to apply the knowledge of Inheritance in program development. |
| CO407.3 | Student will able to develop programs using polymorphism and interfaces. |
| CO407.4 | Student will be able to handle various exceptions using concepts of exception handling. |
| CO407.5 | Student will able to use multithreading concepts to develop inter process communication. |
| CO407.6 | Student will be able to understand and implement concepts on file streams and operations in java programming for a given application programs. |
| | **Programming for Problem Solving Lab (BEETC407P)** |
| CO407.1 | Able to choose appropriate data structure based on the specified problem definition and analysis the algorithm. |

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| CO407.2 | Able to handle operations like searching, insertion, deletion and traversing mechanism etc. on various data structures. |
| CO407.3 | Apply the knowledge of Inheritance in program development. |
| CO407.4 | Develop programs using polymorphism and interfaces. |
| CO407.5 | Handle various exceptions using concepts of exception handling. |
| | **Universal Human Values (BEETC408T)** |
| CO408.1 | Students are expected to become more aware of themselves, and their surroundings (family, society, nature) |
| CO408.2 | Students would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. |
| CO408.3 | Students would understand values in relationship. |
| CO408.4 | Students would understand the role of a human being in ensuring harmony in society and nature. |
| CO405.5 | Students would distinguish between ethical and unethical practices at work place and would contribute for making a value based society. |
| | **BE Electronics and Communication Engineering Fifth Semester** |
| | **Antenna and Wave Propagation (BEECE501T)** |
| CO501.1 | Understand the basic concepts of transmission line characteristics and use of smith chart. |
| CO501.2 | Ability to analyze wire antenna(Monopol, Dipoles, and Loop antenna) |
| CO501.3 | Understand the basic antenna array principles and Ability to analyze and design antenna arrays. |
| CO501.4 | Understand the basics concept of Micro strip antennas and Ability to analyze and design basic micro strip antennas |
| CO501.5 | Understand the operation of aperture and reflector antennas and ability to identify and analyze Frequency independent and different Horn antenna. |
| CO501.6 | Understand the effects of atmosphere on radio wave propagation. |
| | **Microprocessor and Microcontroller (BEECE502T)** |
| CO502.1 | Describe Architecture, Pin diagram, Features with operating modes, Memory organization and interfacing, Different Addressing modes and Instruction set of 8086/8088 microprocessor. |
| CO502.2 | Describe the concepts of Interrupts , Timing diagram , different I/O interfacing techniques and interfacing of 8086/8088 with 8255 PPI for key board,7 segment displays, ADC , DAC , Stepper motor ,8279 KBDI organization and interfacing. |
| CO502.3 | Interface of 8086/8088 with PIT 8254/8253, PIC 8259, USART 8251 and its working principle, Architecture and concepts of serial and parallel communication. |
| CO502.4 | Demonstrate the concepts of Multiprocessing, Coprocessor 8087 NDP and DMAC 8237, along with its architecture and interfacing and Introduction to Pentium processor. |
| CO502.5 | Describe the internal organization, architecture of 8051 microcontroller, concepts of its interrupt structure and memory interface. |
| CO502.6 | Describe the instruction set of 8051 microcontroller, addressing modes and programming examples along with Keyboard, LED, ADC, DAC and stepper motor interface. |

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| | **Microprocessor and Microcontroller (BEECE502P)** |
| CO502.1 | Understand the Architecture of 8086 microprocessor with pin diagram and demonstrate the concept of Assembly language structure and programming for 8086 microprocessor and 8051 microcontroller. |
| CO502.2 | Simulate the programs on different software platforms. |
| CO503.3 | Interface various peripherals with 8086. |
| | **Analog Circuit and Design (BEECE503T)** |
| CO503.1 | Understand and discuss the op-amp basic building blocks such as differential amplifier, its parameters and characteristics, inverting and non-inverting configuration. |
| C503.2 | Analyze and design various Op-amp based circuits such as Voltage Follower, Summing amplifier, Scaling amplifier, Averaging amplifier, Instrumentation amplifier and applications, Integrator and Differentiators, Log and Antilog amplifiers for linear practical applications. |
| CO503.3 | Analyze and design various op-amp based circuit such as Comparators, Schmitt trigger, PLL circuit, Clipper and Clamper circuit, Multivibrators, D/A and A/D Converter for non linear application. |
| CO503.4 | Analyze and design power supply circuit such as Series Voltage Regulator, IC regulator such as Switch ode power supply circuit. |
| CO502.5 | Analyze and design op-amp based and transistor based oscillator circuits and function generators. |
| CO503.6 | Analyze and design active filters, relay driver circuits, stepper motor control circuit and dc, servo motor control circuit. |
| | **Analog Circuit and Design (BEECE503P)** |
| CO503.1 | Gain a sound understanding of the operation, analysis and design of analog electronic circuits and systems. |
| CO503.2 | Design linear and nonlinear applications of operational amplifier. |
| CO503.3 | Design the oscillators and other complex circuits using op amp ICs and Demonstrate the gain-bandwidth concept and frequency response of basic amplifiers. |
| | **Communication Electronics (BEECE504T)** |
| CO504.1 | Demonstrate different amplitude modulation techniques used in electronic communication system. |
| CO504.2 | Study of angle modulation techniques with their comparison. |
| CO504.3 | Evaluate pulse modulation techniques necessary for various engineering applications. |
| CO504.4 | Explain noise, signal to noise ratio, noise figure, and its calculations. |
| CO504.5 | Study AM and FM radio receivers with their performance characteristics. |
| CO505.6 | Study and Comparison of multiplexing techniques and haul systems. |
| | **Communication Electronics (BEECE504P)** |
| CO504.1 | Demonstrate different modulation techniques used in electronic communication system. |
| CO504.2 | Use the modulation techniques and modern communication tools necessary for |

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| | various engineering applications. |
| CO504.3 | Evaluate fundamental communication system parameters, such as bandwidth power, signal to quantization noise ratio, data rate etc. |
| | **Industrial Economics and Entrepreneurship Development (BEECE505T)** |
| CO505T.1 | Subject makes the student understand and learn the basic concepts of Industrial Economics such as types of business structures, top and bottom line of organization as economic analysis. |
| CO505T.2 | Students learn the basic concepts like market structures, pricing strategies, business integration, economies and diseconomies of scale and the new economic policies of the government |
| CO505T.3 | Students are familiarized with working of banking system, foreign direct investment, the concept of free trade, capital formation, inflation, inclusive growth and public private partnership |
| CO505T.4 | Students learn about entrepreneurship as career avenue and factors affecting entrepreneurial growth. Students learn about project formulation, market survey and research, techno economic feasibility assessment and project appraisal. |
| CO505T.5 | Subject enhances their understanding about needs and sources of finance, various types of loans, capital structures, break even analysis, network analysis techniques of PERT/CPM etc. |
| CO505T.6 | Students learn about role of small scale industries in the economy, problems of SSI,FDI as a threat to SSI, technical consultancy organizations, government policies for SSI and various incentives for SSI |
| **BE Electronics and Communication Engineering Sixth Semester** | |
| | **Telecommunication Switching System (BEECE601T)** |
| CO601.1 | Describe the need for switching systems the working principles of switching systems From manual and electro- mechanical Systems to stored program control system and their Evolution from analogue to digital. |
| CO601.2 | Understand and Analyze basic telecommunication traffic theory. |
| CO601.3 | Design single stage, multistage switching structures involving time and space switching Stages. |
| CO601.4 | Describe public switched telephone network, Network Synchronization and Network Management. |
| CO601.5 | Learn about ISDN (Integrated Services Digital Network), Compare telephone network, Data network and ISDN. |
| CO601.6 | Learn about Data Communication Architecture and ISO-OSI Reference Model, cellular Telephone concepts. |
| | **Digital Signal Processing (BEECE602T)** |
| CO602.1 | Meet the requirement of the theoretical and practical aspects of DSP with respect to sampling and reconstruction. |
| CO602.2 | Represent discrete time signals analytically and visualize them in the time domain. |
| CO602.3 | Classify and analyze the discrete time signals and systems. |
| CO602.4 | Describe the various transforms for analysis of signals and systems. |
| CO602.5 | Design and implement digital filters for various applications. |
| CO602.6 | Describe the concept of multirate-signal processing and how to apply it for the |

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| | wavelet transform. |
| | **Digital Signal Processing (BEECE602P)** |
| CO602.1 | Analyze and process the signals in the discrete domain. |
| CO602.2 | Design the filters to suit requirements of specific applications. |
| CO602.3 | Apply the techniques, skills, and modern engineering tools like MATLAB and digital processors. |
| | **Control System Engineering (BEECE603T)** |
| CO603.1 | Students shall be able to represent the mathematical model of systems. |
| CO603.2 | Able to determine the system response of different order systems for various step inputs. |
| CO603.3 | To analyze the stability of the system using root locus, Bode plot and Nyquist plot. |
| CO603.4 | Obtain the transfer function of the system using SFG. |
| CO603.5 | Design the Controller and Compensator based on the requirement of the system. |
| CO603.6 | To apply the state variable approach in design and find the system condition. |
| | **Digital Communication (BEECE604T)** |
| CO604.1 | Explain the working principles of basic building blocks of a digital communication system and describe a random process in terms of its mean and correlation functions. Characterize special Gaussian and Rayleigh distributions. |
| CO604.2 | Study source and waveform coding techniques and describe optimum quantization theory. |
| CO604.3 | Study digital modulation techniques |
| CO604.4 | Study of Galois field, error control methods, error correction and detection methods. |
| CO604.5 | Study the different channel coding techniques |
| CO604.6 | Describe spread spectrum analysis. |
| | **Digital Communication (BEECE604P)** |
| CO604.1 | Describe the concept of the digital communication based design for testing and analyze the circuits. |
| CO604.2 | Design and conduct experiments for testing digital communication circuits and systems. |
| CO604.3 | Analyze the different coding technique for design and modeling of digital communication. Identify, formulate and solve digital communication circuits and systems problems. |
| | **Functional English (BEME606T)** |
| CO605.1 | Will become adept in using functional grammar. |
| CO605.2 | Would be able to write at workplaces. |
| CO605.3 | Will be able to draft technical reports and write proposals |
| CO605.4 | Will be able to understand the planning and procedure of carrying out research work. |
| CO605.5 | Will become well prepared to face competitive examinations and job interviews. |
| CO605.6 | Dexterous in presentation skills. |
| | **Electronics Workshop (BEECE606P)** |
| CO606.1 | To make students familiar with measuring instruments like CRO, DSO, and |

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| | Signal Generator. |
| CO606.2 | Design PCB using PCB designing software. |
| CO606.3 | To enable students to design and fabricate their own Hardware. |
| **BE Electronics and Communication Engineering Seventh Semester** | |
| | **DSP Processor and Architecture (BEECE701T)** |
| CO701.1 | Understand the fundamentals of programmable Digital Signal Processors (P-DSPs). |
| CO701.2 | Understand the architecture of TMS and Motorola processors. |
| CO701.3 | Understand the assembly language instructions and write simple assembly language programs for different processors. |
| CO701.4 | Write and execute the application programs for processing of real time signals. |
| CO701.5 | Interface DSP processors hardware to a software Integrated Development Environment (IDE) for execution of programs written in high level language. |
| CO701.6 | Implement different Digital Signal processing algorithms on DSP processors. |
| | **DSP Processor and Architecture (BEECE701P)** |
| CO701.1 | Understand the architecture of TMS and Motorola Processors. |
| CO701.2 | Implement different processing algorithms on DSP processors. |
| CO701.3 | Design different types of filters and study their characteristics. |
| | **Television and Video Engineering (BEECE702T)** |
| CO702.1 | Analyze and understand monochrome and color T.V. Systems. |
| CO702.2 | Understand fundamental techniques of different color T.V. standards. |
| CO702.3 | Understand Advance TV Technology – Digital T.V. and Video Compression techniques. |
| CO702.4 | Understand HDTV standards and Digital TV systems – CCTV, CATV, and DTH. |
| CO702.5 | Understand IPTV system, mobile TV and video transmission in 3G mobile system, video recording systems and video projectors. |
| CO702.6 | Understand different types of digital cameras, LED and LCD display systems CD/DVD players. |
| | **Television and Video Engineering (BEECE702P)** |
| CO702.1 | Analyze and synthesize TV Pictures, Composite Video Signal, and TV Receiver Picture Tubes. |
| CO702.2 | Develop an understanding of electronics, mechanical and environmental factors involved in maintaining television equipment. |
| CO702.3 | Study and classify the concept of troubleshoot and repair. |
| | **Optical communication (BEECE703T)** |
| CO703.1 | Able to understand the basic operating principles of physics, optical fiber, and its types, transmission characteristics of optical fibers. |
| CO703.2 | Able to understand the transmission characteristics of optical fibers. |
| CO703.3 | Able to learn the optical receiver fiber couplers and connectors |
| CO703.4 | Able to learn the optical source and detectors, optical receiver |
| CO703.5 | Able to understand the concept of analog and digital link, WDM concept and components |
| CO703.6 | Able to learn optical network SONET/SDH, WDM, high speed optical network |

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| | Such as GPON, FTTX, and High speed optical links. |
| | **Advanced Digital System Design (BEETE704T)** |
| CO704.1 | Understand the development flow of VLSI system. |
| CO704.2 | Design the combinational and sequential circuit using VHDL.<br>Understand the HDL. |
| CO704.3 | Test the system with test benches |
| CO704.4 | Design finite state machines and asynchronous state machine. |
| CO704.5 | Understand the synthesis process. |
| CO704.6 | Understand the architecture of programmable logic devices and its working. |
| | **Advanced Digital System Design (BEETE704P)** |
| CO704.1 | To model, simulate and verify the digital model with hardware description language. |
| CO704.2 | To design and prototype with programmable logic devices. |
| CO704.3 | To learn the modular design style to create large digital logic. |
| | **VLSI Signal Processing (BEECE705T) Elective –II** |
| CO705.1 | Various methodologies to optimize power delay and area of VLSI design. |
| CO705.2 | Transformation techniques used to generalize pipelining approach. |
| CO705.3 | Transformation techniques used to design parallel architectures. |
| CO705.4 | Build Real Time processing systems for area reduction. |
| CO705.5 | Design of algorithm structure for DSP algorithms based on algorithm transformation. |
| CO705.6 | Design of fast short length convolution algorithms. |
| **BE Electronics and Communication Engineering Eighth Semester** | |
| | **Microwave and Radar Engineering (BEECE801T)** |
| CO801.1 | Understand the use of active and passive microwave devices. |
| CO801.2 | Analyze Different UHF components with the help of scattering parameter. |
| CO801.3 | Understand and analyze different O-type and M-type microwave components: Klystrons, Magnetrons and TWT etc. |
| CO801.4 | Understand the working of Solid State Microwave Devices like PIN diode, Gunn diode, IMPATT, TRAPATT diodes, parametric amplifier etc. |
| CO801.5 | Acquire technical competence in specialized areas of Radar engineering. |
| CO801.6 | Able to identify, formulate and model problems and find Radar engineering solutions based on a system approach. |
| | **Microwave and Radar Engineering (BEECE801P)** |
| CO801.1 | Describe working of microwave bench. |
| CO801.2 | Measure power and VSWR of microwave component. |
| CO801.3 | Measure different losses like insertion loss, isolation loss of different passive microwave components. |
| | **Computer Communication Network (BEECE802T)** |
| CO802.1 | Understand the requirement of theoretical and practical aspect of computer network. Student*s* will be able to **define** and **describe** the services and features of the various layers of data network. |
| CO802.2 | Understand the network traffic in computer network. |

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| CO802.3 | Describe various protocols used in network. |
| CO802.4 | Describe the concept of computer network security. |
| CO802.5 | Understand the different wired and wireless LAN Standards. and Routers. |
| CO802.6 | Understand the Basics of Security Requirements/Services/Dimensions, Security attacks , Basics of Security mechanisms |
| | **Computer Communication Network (BEECE802P)** |
| CO802.1 | Understand various types of protocols working on various layers of OSI reference model |
| CO802.2 | Establish peer to peer computers as well as Local Area Network connectivity |
| CO802.3 | Effectively use available networking tools like NS2 in Computer Communication Network in UNIX environment |
| | **Wireless and Mobile Communication (BEECE803T)** |
| CO803.1 | Describe the evolution and history of wireless technology and improving capacity in cellular system. |
| CO803.2 | Understand mobile radio environment, causes and effects of path loss and signal fading on received signal characteristics. |
| CO803.3 | Define fundamentals of Equalization, Diversity and channel coding. |
| CO803.4 | To construct and analyze the GSM system. |
| CO803.5 | Understand difference between wireless and fixed telephone networks and fundamentals of various wireless protocols. |
| CO803.6 | Understand difference between wired LAN and wireless LAN technology and describe IEEE802.11 wireless LAN architecture. |
| | **Embedded System (BEECE804T) Elective - II** |
| CO804.1 | To understand embedded systems design and describe the difference between the general computing and embedded system, optimization and design metrics, its Applications and recent trends. |
| CO804.2 | Describe the hardware and software architecture of embedded system, memory architecture and interrupt service mechanism. |
| CO804.3 | Understand the concepts of RISC, CISC processors, ARM processor organization, programming modes, operating modes and programming methods along with detailed instruction set. |
| CO804.4 | Describe the different communication protocols and buses required for an embedded system like IEEE802.11, IEEE802.16, GPRS MODBUS CAN, I2C and USB. |
| CO804.5 | Understand the concepts of Real time operating system, Kernel architecture, different scheduling algorithms and Memory management. |
| CO804.6 | Describe the detail contextual analysis as a case study in different fields like Communication, Automation, security, Automobile. |
| | **Digital Image Processing (BEECE804T) Elective – II** |
| CO804.1 | Learn and understand the fundamental of digital image processing |
| CO804.2 | To learn and understand various image enhancement technique used in digital image processing |
| CO804.3 | To learn and understand various image transform used in digital image processing |
| CO804.4 | To learn and understand various image coding and compression used in digital image processing |

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| CO804.5 | To learn and understand various image analysis and segmentation used in digital image processing |
| CO804.6 | To learn and understand various image restoration technique and methods used in digital image processing |
| | **Satellite Communication (BEECE805T) Elective –III** |
| CO806.1 | To understand the basic concepts and working principle of satellite communication system |
| CO806.2 | To understand the orbital aspects and components of a satellite communication system. |
| CO806.3 | To analyze the link budget of a satellite communication system and study of satellite orbits and launching Mechanism |
| CO806.4 | To understand the Propagation effects and Signal attenuation |
| CO806.5 | To understand the concept and basics of Encoding and decoding on satellite links |
| CO806.6 | To get knowledge and relate different components in satellite communication and use them in projects. |
| | **CMOS VLSI Design (BEECE805T) Elective –III** |
| CO805.1 | Design of PMOS and NMOS transistor. |
| CO805.2 | Various types of CMOS Inverters. |
| CO805.3 | Implementation of different combinational logic circuits. |
| CO805.4 | Characterization and Performance estimation for CMOS transistor. |
| CO805.5 | To design layout for various circuits. |
| CO805.6 | To Detect and correct errors in VLSI Design. |

## Department of Computer Technology

The department of Computer Technology has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

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| PSO1 | Graduates should be able to demonstrate the understanding of the conceptual foundation in the core area of theoretical computer science. |
| PSO2 | Graduates should be able to develop and manage complex application and system software. |
| PSO3 | Graduates should to be able to adapt current and new developments in the field of computer technology. |

| B.Tech. Computer Technology Third Semester | |
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| | **Mathematics-III (BECT301T)** |
| CO301.1 | Understand the basics of Laplace, Fourier and Z-transforms and apply them for solving differential equations, integral equations and difference equations. |
| CO301.2 | Analyze real world scenarios to recognize when matrices and probability are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches. |
| CO301.3 | Organize, manage and present data in a clear and concise manner. |
| CO301.4 | Develop an ability to identify, formulate, and/or solve real world problems. |
| CO301.5 | Understand the impact of scientific and engineering solutions in a global and societal context. |
| CO301.6 | Create the groundwork for post-graduate courses, specialized study. and research in computational mathematics. |
| | **Problem Solving using Python (BECT302T)** |
| CO302.1 | Understand and implement the basic concept of python programming language. |
| CO302.2 | Develop Code and test conditional statement of moderate size using the python language. |
| CO302.3 | Implement the concept of Function and modules in programming language |
| CO302.4 | Understand and Implement the concept of object oriented programming in python programming language. |
| CO302.5 | Know and demonstrate the working of files for good program design using python language. |
| | **Digital Design and Fundamentals of Microprocessor(BECT303T)** |
| CO303.1 | Describe and compare various number systems, inter conversion of number systems, obtain and uptimes Boolean equations for variety of problems. |
| CO303.2 | Describe, design various combinational circuits such as Code Converters, Comparators. Multiplexers, Demultiplexer, Encoder, Decoder, Adders, etc. and analyses their performance. |

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| CO303.3 | Describe, design various sequential circuits such as Latches, Flip flops, counters, registers, and analyses their performance. |
| CO303.4 | To explain architectural components of a microprocessor 8085, issues involved memory related operations, intricacies of execution of various instructions. |
| CO303.5 | To explain various 8085 instructions, addressing modes, interrupt mechanism and their application to develop 8085 programs. |
| | **Computer Architecture and Organization (BECT304T)** |
| CO304.1 | Explain and illustrate basic functional units, operational concepts of a computer system and apply assembly language programming. |
| CO304.2 | Illustrate various instruction formats and interpret execution of complete instruction in the processing u1ut, control unit and sequencing. |
| CO304.3 | Analyze and apply logic circuits for implementing arithmetic operation. |
| CO304.4 | Compare and analyze various memory system including semiconductors, ROM, RAM. Cache and virtual memory |
| CO304.5 | Explain computer peripherals, classify advance processor and Processors Families system. |
| | **Theoretical Foundation of Computer Science (BECT305T)** |
| CO204.1 | Classify and design finite automata without output and with output to recognize regular languages. |
| CO204.2 | Compare and contrast regular grammar and context free grammar. |
| CO204.3 | Understand and design push down automata to recognize context free languages. |
| CO204.4 | Discriminate linear bounded automata and turing machine and design it to recognize unrestricted languages. |
| CO204.5 | Understand the basic concepts of Computability, Decidability, Solvability, Post |
| | **Universal Human Values (BECT306T)** |
| CO306.1 | Students are expected to become more aware of themselves. and their surroundings (family. society, nature). |
| CO306.2 | Students would become more responsible in life. and in handling problems with sustainable solutions. while keeping human relationships and bwnannah1re in mind. |
| CO306.3 | They would have better critical ability. |
| CO306.4 | They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). |
| | **Consumer Affairs (BECT308T)** |
| CO306.1 | Understand the basic concept and importance of Consumer Education. |
| CO306.2 | Grasp the concepts related to Consumer Education and Protection. |
| CO306.3 | Analyze the regulations and redressal mechanism system. |
| CO306.4 | Aware of consumer movements. |

| B.Tech. Computer Technology Fourth Semester | |
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| | **Discrete Mathematics and Graph Theory (BECT40JT)** |
| CO40J.1 | Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction. |
| CO40J.2 | Gain an introduction into how mathematical models for engineering are designed, analyzed and implemented in industry and organizations. |
| CO40J.3 | Reason mathematically about basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems; distinguish rigorous definitions and conclusions from merely plausible ones. |
| CO40J.4 | Analyze real world scenarios to recognize when Logic, sets, functions are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches. |
| CO40J.5 | Apply knowledge of mad1ematics, physics and modern computing tools to scientific and engineering problems. Apply their knowledge in life-long learning. |
| | **Social Ethics in Information Technology (BECT402T)** |
| CO402.1 | Define and explain the concepts of ethics in business \\Orld as well apply in IT community. |
| CO402.2 | Discuss the cyber crimes and privacy laws. |
| CO402.3 | Define and understand the freedom of Expression. |
| CO402.4 | Interpret and classify the intellectual property issues, understand the impact of IT on productivity, health care, social networking issues as well as determine the concept of contingent workers, outsourcing. |
| | **Object Oriented Programming using JAVA (BECT403T)** |
| CO403.1 | Explain various data types, operators, control flow statements, iterative statements and apply it to develop a Java program. |
| CO403.2 | Describe concepts of objects, classes, interface and apply it to develop an object-oriented Java program. |
| CO403.3 | Describe scope rules, storage classes, intricacies of constructors and apply it to develop a Java program. |
| CO403.4 | Describe polymorphism, inheritance, method overloading, function overloading and apply it to develop a Java program. |
| CO403.5 | Describe exception handling. input-output streams and apply it to develop Java program. |
| | **Data Structure and Program Design (BECT404T)** |
| CO404.1 | Describe abstract data types. types of data structures, characteristics of an algorithm, time and space complexity. |
| CO404.2 | Explain and carry out Lime and space complexity of various sorting, searching, hashing techniques. |

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| CO404.3 | Describe linear data structures, application of linear data structures to develop a program and their analysis. |
| CO404.4 | Describe nonlinear data structures, application of nonlinear data structures to develop a program and their analysis. |
| CO404.5 | Explain graphs as data structure, representation of graphs, graph traversal algorithms, applications of graph and analysis of these algorithms. |
| | **Computer Networks (BECT405T)** |
| CO405.1 | Define and illustrate the fundamentals of networks, different network models and various data transmission methods. |
| CO405.2 | Explain different techniques for error detection and correction during data transmission and apply various protocols. |
| CO405.3 | Summarize the inter-network layer with its protocols and apply various protocols in routing and congestion control. |
| CO405.4 | Recall and demonstrate the working of Transport layer protocols such as TCP and UDP. |
| CO405.5 | Recall and demonstrate application layer protocols such as HTTP, FTP, SMTP etc. |
| | **Operating Systems (BECT406T)** |
| CO406.1 | Describe different types of operating systems, structure of an operating systems, basic concepts of process, process scheduling and multithreading. |
| CO406.2 | Describe various process scheduling algorithms, performance analysis, selection of suitable algorithm To explain concepts of inter-process synchronization, inter-process communication and develop suitable solution. |
| CO406.3 | Describe deadlocks, deadlock prevention, detection, resolution techniques and explain need and mechanism of protection. |
| CO406.4 | Describe primary memory management issues, primary memory allocation methods, page replacement policies and performance analysis of various allocation methods, page replacement algorithms. |
| CO406.5 | Explain secondary memory management issues, secondary memory allocation methods and input- output systems. |
| | **Environmental Science (BECT408T)** |
| CO408.1 | Identify different types of air pollution's as well as explain their causes, detrimental effects on environment and effective control measures. |
| CO408.2 | Recognize various sources of water pollutants and interpret their causes and design its effective control measure |
| CO408.3 | Illustrate various types of pollutants and waste management. |
| CO408.4 | Analyze various social issues related to environment and challenges in implementation of environmental laws. |

| BE Computer Technology Fifth Semester | |
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| | **Object Oriented Modeling (BECT301T)** |
| CO301.1 | To understand fundamentals concepts of object oriented features and introduction of object oriented modeling. |
| CO301.2 | To perceive the concept of Basic Structural Modeling. |
| CO301.3 | To comprehend and construct various basic behavioral, advance behavioral modeling. |
| CO301.4 | To recognize abstractions of architectural modeling. |
| CO301.5 | To understand the Unified process and apply the unified process approaches (Analysis, design, implementation and testing) for software development. |
| CO301.6 | To realize the significance of Architecture centric process and to develop an architectural view. |
| | **Object Oriented Modeling Practical (BECT301P)** |
| CO301.1 | To understand fundamentals of Rational Rose software, SDLC, SRS. |
| CO301.2 | To construct use case view diagrams and component view diagrams using IBM Rational Rose. |
| CO301.3 | To learn the development model and practice the forward and reverse engineering process. |
| | **Database Management Systems (BECT302T)** |
| CO302.1 | To differentiate database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit. |
| CO302.2 | To demonstrate an understanding of the relational data model and normalization. |
| CO302.3 | To analyze an information storage problem and understand the concepts of procedural SQL. |
| CO302.4 | To present concept and technology relating to query processing and its query optimization. |
| CO302.5 | To understand the concepts of Transaction and Transaction processing. |
| CO302.6 | To present the different issues and technology relating to Concurrency and Recovery in multi user database environment. |

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| | **Database Management Systems Practical (BECT302P)** |
| CO302.1 | To understand Data Definition and Data Manipulation Languages of relational databases. |
| CO302.2 | To be able to design relational databases for various problems and fabricate queries using SQL. |
| CO302.3 | To be able to design and implement PL/SQL procedures for different problems. |
| | **Operating System (BECT303T)** |
| CO303.1 | To develop good understanding of the concepts, structure and design of operating Systems. |
| CO303.2 | To understand basic concepts process management, inter-process communication and to be able to propose algorithmic solution based on these concepts. |
| CO303.3 | To understand the concept of deadlocks. |
| CO303.4 | To master the concepts of main memory management and virtual memory management. |
| CO303.5 | To gain knowledge regarding issues related to file system interface and implementation, disk management. |
| CO303.6 | To understand basics of protection and security mechanisms, disk space management, storage structures. |
| | **Operating System Practical (BECT303P)** |
| CO303.1 | To make students able to learn different types of operating systems and to make them understand general architecture and functions of OS. |
| CO303.2 | To be able to write programs using UNIX system calls to implement basic file system related commands of UNIX such as ls, cp etc. To demonstrate the understanding of multithreading concept by developing a multithreaded C program using thread library. |
| CO303.3 | To demonstrate understanding of concept of CPU scheduling algorithms, page replacement algorithms and disk scheduling algorithms and their comparison based on performance. |
| | **Design Analysis and Algorithm (BECT304T)** |
| CO304.1 | To study and understand fundamental concepts of mathematics, recurrence relations and its use to analyze space and time complexity of algorithms. |
| CO304.2 | To understand divide and conquer strategy and develop algorithms based on this strategy. |
| CO304.3 | To study, understand and analyze standard greedy techniques based algorithms and apply it to solve different computational problems. |
| CO304.4 | To understand, design and analyze various dynamic strategies based algorithms. |
| CO304.5 | To develop the basic understanding of various problems based on backtracking algorithms. |
| CO304.6 | To know the limitations on the time complexity of algorithm and to learn basic concepts of non deterministic algorithms. |
| | **Design Analysis and Algorithm Practical (BECT304P)** |
| CO304.1 | To Implement different searching and sorting techniques and compare their time and space complexity. |
| CO304.2 | To implement and analyze various algorithms based on different algorithm design techniques such as divide and conquer, greedy approach, dynamic programming |

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| | and backtracking. |
| CO304.3 | To study various concepts of NP-Complete theory. |
| | **Data Communication (BECT305T)** |
| CO305.1 | To understand and study basic concepts of data transmission and data communication. |
| CO305.2 | To illustrate the signal conversions and analyze the mathematical problems with different signal conversion techniques. |
| CO305.3 | To get the knowledge of wired and wireless transmission media and its applications and study of cellular telephony, satellite networks in telecommunications |
| CO305.4 | To study the concepts and the applications of multiplexing and spread spectrum used in today's commercial data communication. |
| CO305.5 | To understand the use of real time protocol in multimedia application. |
| CO305.6 | To study and evaluation of different data compression techniques used in MP3, FAX, DVD technology, wireless telephony, networking etc. |
| **BE Computer Technology Sixth Semester** | |
| | **Computer Graphics (BECT306T)** |
| CO306.1 | To identify and explain the core concepts of computer graphics, understand terminologies used in the graphic design. |
| CO306.2 | To understand the concept of geometric, mathematical and algorithm concept for aliasing/antialiasing, polygon filling. |
| CO306.3 | To recognize and evaluate the 2D images and viewing transformation with numerical problems which are used in today's application. |
| CO306.4 | To understand 3D graphics, projection, hidden surfaces, line removal algorithms and viewing transformation. |
| CO306.5 | To understand the concept of line and polygon clipping about convex/concave region along with curves and surfaces. |
| CO306.6 | To understand OpenGL software and develop applications based on interactive computer graphics. |
| | **Computer Graphics Practical (BECT306P)** |
| CO306.1 | To implement the geometric, mathematical, polygon filling, and clipping algorithms. |
| CO306.2 | To develop programs based on image transformation, viewing transformation and curves. |
| CO306.3 | To understand OpenGL software and develop programs using interactive computer graphics. |
| | **Computer Network (BECT307T)** |
| CO307.1 | To analyze the basics of data communications and network architecture, and Analyze functions of each layer of a computer network. |
| CO307.2 | To evaluate essential features of specific protocols in the common protocol suite. |
| CO307.3 | To analyze the methodology and the rationale behind addressing, routing, and congestion control. |
| CO307.4 | To evaluate the various multiplexing and switching methods used in networks. |
| CO307.5 | To evaluate wireless LANs, high-speed digital access, such DSL and cable modem, cellular phone, and satellite networks |

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| CO307.6 | To design and build a network using routers. |
| | **Computer Network Practical (BECT307P)** |
| CO307.1 | To analyze the basics of data communications and network architecture, and Analyze functions of each layer of a computer network. |
| CO307.2 | To provide security using encryption/decryption algorithms. |
| CO307.3 | To design and build a network using Riverbed and NS2. |
| | **Software Engineering And Project Management (BECT308T)** |
| CO308.1 | To understand software characteristics and its various software process models. |
| CO308.2 | To understand and examine the various Software Engineering Principles and Practices. |
| CO308.3 | To analyze the software model and its design. |
| CO308.4 | To understand the concept of software testing fundamentals and debugging approaches. |
| CO308.5 | To identify the quality of software maintenance, project management spectrum and project scheduling. |
| CO308.6 | To identify the various risk management strategies. |
| | **Software Engineering And Project Management Practical (BECT308P)** |
| CO308.1 | To create SRS and test plan document for software development, draw UML diagrams for any system, and perform test cases on different testing forms. |
| CO308.2 | To demonstrate web testing tool on any test program and implement different test cases on entry and exit control loop. |
| CO308.3 | To evaluate cost estimation and function point of any software, also to draw entity relationship diagram for any project. |
| | **Embedded System Design (BECT309T)** |
| CO309.1 | To define and explain embedded systems and the different embedded system design technologies, explain the various metrics or challenges in designing an embedded system with tools used for designing embedded system. |
| CO309.2 | To express tasks and states, semaphores. Clarify about message queues, mailboxes, and pipes. Ability to solve shared data problems that may occur in embedded system products. |
| CO309.3 | To understand the concept and applications of Real Time Operating System (RTOS). Task scheduling in Real time operating system, the Real – Time Operating System architecture and its services. |
| CO309.4 | To understand the internal architecture of 8051 microcontroller, solve problems based on timers and counters. Interfacing of different peripheral devices with Microcontrollers. |
| CO309.5 | To study the use of RS-232 for communicating with 8051. The concept of hardware interrupts and interrupts programming. |
| CO309.6 | To interface some external peripherals like external memory, keyboard etc. with 8051. |
| | **Communicative English and Technical Writing (BECT310T)** |
| CO310.1 | will become adept in using functional grammar |
| CO310.2 | would be able to write at workplaces |
| CO310.3 | will be able to draft technical reports and write proposals |
| CO310.4 | will be able to understand the planning and procedure of carrying out research |

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| | work |
| CO310.5 | will become well prepared to face competitive examinations and job interviews |
| CO310.6 | will become dexterous in presentation skills |
| | **Mini project (BECT311P)** |
| CO311.1 | To develop an ability to identify, formulate, and design creative solution to real life engineering problems. |
| CO311.2 | To demonstrate the knowledge of standard software project management practices. |
| CO311.3 | To be able to demonstrate interpersonal skill. |
| CO311.4 | To develop an ability to work as an individual and in multidisciplinary teams in professional work environment. |
| CO311.5 | To develop recognition of the need for, and an ability to engage in life-long learning. |
| CO311.6 | To be able to effectively demonstrate technical communication skills. |
| **BE Computer Technology Seventh Semester** | |
| | **Compilers (BECT401T)** |
| CO401.1 | To understand different phases of a compiler and justify their relevance as well as their interdependencies. |
| CO401.2 | To learn the top-down and bottom-up parsers and also understand the design of parsers for context free languages |
| CO401.3 | To comprehend Syntax Directed Translation Schemes and different intermediate code generation techniques. |
| CO401.4 | To realize the importance of code optimization phase and the study of various code optimization techniques. |
| CO401.5 | To apprehend code generation algorithms and its implementation for the generation of object code. |
| CO401.6 | To learn different table management techniques and its usage in various phases of compiler. |
| | **Compilers Lab (BECT401P)** |
| CO401.1 | To implement lexical analyzer using LEX tool. |
| CO401.2 | To implement top-down and bottom-up parsing techniques. |
| CO401.3 | To implement intermediate code and object code generator using YACC tool |
| | **Artificial Intelligence (BECT402T)** |
| CO402.1 | To learn basic concept of AI and various AI search algorithms (Uninformed, Informed, Heuristic and Constraints Satisfaction). |
| CO402.2 | To be able to represent the knowledge into the knowledge base using different methods (Logic, Semantic Nets, Frames and Scripts). |
| CO402.3 | To understand the advanced Artificial Intelligence techniques (Artificial Neural Network and Genetic Algorithm). |
| CO402.4 | To be able to understand the learning strategies of the system and the processing of natural languages using Semantic and Syntactic processing method. |
| CO402.5 | To understand the working of basic working of Game Playing search programs (MINMAX procedure, Alpha-Beta cutoffs). |
| CO402.6 | To be able to analyze probability and fuzzy logic concept to solve a problem. |

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| | **Artificial Intelligence Practical (BECT402P)** |
| CO402.1 | To implement various AI search algorithms (Uninformed, Informed, Heuristic and Constraints Satisfaction). |
| CO402.2 | To implement medical diagnosis system using logic form to create knowledge base. |
| CO402.3 | To study basic concept of computational intelligence and robotics. |
| | **Advance Database Systems Elective-I (BECT403T)** |
| CO403.1 | To understand the concepts of Distributed Databases, types, and protocols to ensure atomicity and concurrency. |
| CO403.2 | To understand the need of Parallel Databases, various architectures, and query processing with parallelism. |
| CO403.3 | To be able to understand Object Oriented Databases, concepts of objects, and applications in complex problem solving with persistence. |
| CO403.4 | To be able to understand XML Databases as industry standard, data exchange using XML, query processing for XML using APIs in programming languages. |
| CO403.5 | To understand the evolution of Data Warehouses, concepts of schemas and data modeling, architecture and typical operations. |
| CO403.6 | To understand the need of security in Databases, types of threats, permissions, security in Statistical Databases, SQL |
| | **Advance Operating System Elective-II (BECT404T)** |
| CO404.1 | To understand the basic functions and fundamental concerns in design of distributed operating systems. |
| CO404.2 | To understand and analysis of different mutual exclusion algorithm and their comparative analysis. |
| CO404.3 | To study of various deadlock detection and handling techniques and agreement protocols and devising solution to agreement protocol. |
| CO404.4 | To understand architecture of distributed file system and shared memory and comparative study of coherence protocol |
| CO404.5 | To analyze the distributed scheduling algorithm for load balancing and load distribution in distributed system. |
| CO404.6 | To understand basic concepts of synchronous and asynchronous check pointing and their comparative study of fault tolerance protocols. |
| | **Project and Seminar (BECT405P)** |
| CO405.1 | To develop an ability to identify, formulate, and design creative solution to real life engineering problems. |
| CO405.2 | To demonstrate the knowledge of standard software project management practices. |
| CO405.3 | To be able to demonstrate interpersonal skill. |
| CO405.4 | To develop an ability to work as an individual and in multidisciplinary teams in professional work environment. |
| CO405.5 | To develop recognition of the need for, and an ability to engage in life-long learning. |
| CO405.6 | To be able to effectively demonstrate technical communication skills. |

| BE Computer Technology Eighth Semester | |
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| | **Data Warehousing and Mining (BECT406T)** |
| CO406.1 | To understand architecture and design related issues of data warehouse. |
| CO406.2 | To identify the data mining related common functionality and issues. |
| CO406.3 | To describe and use various classification and clustering algorithms to solve real life data mining problems. |
| CO406.4 | To understand and apply various Association rule mining techniques. |
| CO406.5 | To study the web data mining and analyze recent advances in web mining techniques. |
| CO406.6 | To demonstrate basic understanding of recent trend of big data technology and issues involved in it. |
| | **Data Warehousing and Mining Practical (BECT406P)** |
| CO406.1 | To understand the concept of different programming construct and data structures in python. |
| CO406.2 | To design various data warehouse schemas and implement different data mining algorithms. |
| CO406.3 | To study basics of big data technology recent trends and issues. |
| | **Cyber and Information Security (BECT407T)** |
| CO407.1 | To understand need of security in information world, legal and ethical issues, and basic techniques providing security to information. |
| CO407.2 | To demonstrate concepts of Secret Key cryptography, design principles, types of ciphers and their applications. |
| CO407.3 | To comprehend Public Key cryptographic architecture, prime number theory, theorems and modular arithmetic concepts in design of cipher systems, concepts of key management. |
| CO407.4 | To understand concept of message integrity and authentication, hash function design and applications, key distribution protocols. Digital certificates. |
| CO407.5 | To demonstrate concept of firewalls and types, systems to prevent or detect intrusion, techniques to detect malicious threats. |
| CO407.6 | To understand different types of software vulnerabilities, remedies, card transaction threats, email security |
| | **Cyber and Information Security (BECT407P)** |
| CO407.1 | To be able to design and implement encryption algorithms. |
| CO407.2 | To be able to design and implement message digest and key management techniques. |
| CO407.3 | To design and implement the software vulnerabilities and to be able to make use of modern tools |
| | **Parallel Computing Elective -III (BECT408T)** |
| CO408.1 | To understand parallel computing models, tools and its components. |
| CO408.2 | To understand various types of dependencies in parallel processing environment and investigate parallel algorithm for dependencies and the study of shared memory programming under UNIX. |
| CO408.3 | To understand and analysis of different parallel computing algorithms. |
| CO408.4 | To understand message passing technique and to develop ability to design |

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| | message passing programs under parallel programming architecture. |
| CO408.5 | To understand various debugging techniques for message passing and shared memory parallel programs. |
| CO408.6 | To understand the different techniques for memory and I/O subsystem and evaluation of parallel programming architecture and performance of parallel processors. |
| | **Cloud Computing Elective-IV (BECT409T)** |
| CO409.1 | To understand basic concepts of cloud computing technologies, architecture and different cloud models: IaaS, PaaS, and SaaS. |
| CO409.2 | To evaluate the key trade-offs between multiple approaches to cloud system design and identify appropriate design choices when solving real-world cloud computing problems. |
| CO409.3 | To perceive big data analysis and its application using Hadoop. |
| CO409.4 | To comprehend security in cloud, challenges in cloud computing and different cloud contracting Model |
| CO409.5 | To apprehend object oriented concepts in C#.NET, and application development using C#. |
| CO409.6 | To develop small cloud applications and understand deployment issues. |
| | **Project (BECT410P)** |
| CO410.1 | To develop an ability to identify, formulate, and design creative solution to real life engineering problems. |
| CO410.2 | To demonstrate the knowledge of standard software project management practices. |
| CO410.3 | To be able to demonstrate interpersonal skill. |
| CO410.4 | To develop an ability to work as an individual and in multidisciplinary teams in professional work environment. |
| CO410.5 | To develop recognition of the need for, and an ability to engage in life-long learning. |
| CO410.6 | To be able to effectively demonstrate technical communication skills. |

# Department of Information Technology

The department of Information Technology has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

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| PSO1 | An ability to define a problem, design an algorithm for it, identify input and output and Implement using programming language to analyze it. |
| PSO2 | Able to implement computer skills in the even related to software engineering, data communication and networking, web technologies and operating systems. |

| **BE Information Technology Third Semester** | |
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| | **Applied Mathematics-III (BEIT301T)** |
| CO301.1 | Understand the basics of Laplace and Fourier transform and apply them for solving differential equations and integral equations. |
| CO301.2 | Understand the basics of Z- transform and apply them for solving difference equations. |
| CO301.3 | Analyze real world scenarios to recognize when matrices are appropriate, formulate problems about scenarios. |
| CO301.4 | Develop an ability to identify, formulate and solve real world problems. |
| CO301.5 | Create the groundwork for post graduate courses, specialized study and research in computational mathematics. |
| | **Programming Logic and Design using 'C' (BEIT302T)** |
| CO302.1 | Acquire fundamental knowledge of C programming. |
| CO302.2 | Apply Array, Function and Pointer technique in program development. |
| CO302.3 | Able to implement program on sub routine/function, structure, union. |
| CO302.4 | Apply knowledge of console programming for file handling and real time applications. |
| CO302.5 | Apply knowledge of memory management related research and graphics for business application and area. |
| | **Programming Logic and Design using 'C' (BEIT302P)** |
| CO302.1 | Able to implement basic operations using operators and control structures. |
| CO302.2 | Able to implement the concept of functions and arrays on various scenarios. |
| CO302.3 | Able to develop basic file and graphic operations. |
| | **Digital Electronics and Fundamental of Microprocessor (BEIT303T)** |
| CO303.1 | The students would be able to understand the importance and necessity of logic gates and also determine and solve the Boolean expression. |
| CO303.2 | The students would be able to solve various types of K-map in SOP and POS form. |
| CO303.3 | The students would be equipped with the basic knowledge related to design of Combinational Circuits. |
| CO303.4 | The students would be equipped with the basic knowledge related to design of Sequential Circuits, Flip-flop and counters. |
| CO303.5 | The students should be able to understand of necessity of Instructions, types of addressing modes and instruction sets and programming for microprocessor. |

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| | **Emerging Trends in Information Technology (BEIT304T)** |
| CO304.1 | Create a business case for an emerging information technology |
| CO304.2 | Identify factors affecting the successful adoption of new information technologies. |
| CO304.3 | Identify the key attributes, business benefits, risks and cost factors of a new technology. |
| CO304.4 | Know how to effectively use advanced search and selection metrics for identifying and selecting new technology. |
| CO304.5 | Describe technology trends that presently drive or are expected to drive the selection of new technologies over the next decade. |
| | **System Programming (BEIT305T)** |
| CO305.1 | To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and MACRO. |
| CO305.2 | To understand & Design of object code generation through translator(assembler). |
| CO305.3 | To understand the interlinking functions in program with MACRO and it's processing. |
| CO305.4 | To understand how linker and loader create an executable program from an object module created by assembler and compiler. |
| CO305.5 | To understand the various phases of compiler and various drivers in UNIX and difference between Unix and Windows operating system. |
| CO305.6 | Able to get various hardware devices used in networking along with different types of networks. |
| | **Software Lab – I (BEIT306P)** |
| CO306.1 | Understand the Basic Organization, Working and applications of personal computers. |
| CO306.2 | Apply the different tools and utilities of the operating system. |
| CO306.3 | Student can demonstrate the working of computer system & its peripheral. |
| CO306.4 | Student can design the networking. |
| CO306.5 | Student should be able to assembled Computer System. |
| CO306.6 | To understand the different types Viruses, Spyware and Malware. |
| | **Universal Human Values (BEIT307T)** |
| CO307.1 | Students are expected to become more aware of themselves, and their surroundings (family, society, nature) |
| CO307.2 | Students would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. |
| CO307.3 | They would have better critical ability. |
| CO307.4 | They would also become sensitive to their commitment towards what they have understood (human values, human relationship, human society). |
| | **Environmental Science (Audit) (BEIT308T)** |
| CO308.1 | Identify different types of air pollutions as well as explain their causes, detrimental effects on environment and effective control measures. |
| CO308.2 | Recognize various sources of water pollutants and interpret their causes and design its effective control measures. |
| CO308.3 | Illustrate various types of pollutants and waste management. |

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| CO308.4 | Analyze various social issues related to environment and challenges in implementation of Environmental laws. |
| **BE Information Technology Fourth Semester** | |
| | **Discrete Mathematics and Graph Theory (BEIT401T)** |
| CO401.1 | Apply graph theory models of the data structures and state machines to solve problems of connectivity and constraint satisfaction. |
| CO401.2 | Gain an introduction into how mathematical models for engineering are designed, analyzed and implemented in industry and organizations. |
| CO401.3 | Reason mathematically about basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems; distinguish rigorous definitions and conclusions from merely plausible ones. |
| CO401.4 | Analyze real world scenarios to recognize when Logic, sets, functions are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches. |
| CO401.5 | Apply knowledge of mathematics, physics and modern computing tools to scientific and engineering problems. |
| | **Data Structures and Program Design (BEIT402T)** |
| CO402.1 | Understand the concept of Dynamic memory management, data types, algorithms, Big O notation and various sorting algorithms. |
| CO402.2 | Understand basic data structures such linked lists, stacks and queues. |
| CO402.3 | Implement stacks and queues using linked list. |
| CO402.4 | Solve problem involving graphs, trees and heaps. |
| CO402.5 | Describe the hash function and concepts of collision and its resolution methods. |
| | **Object Oriented Programming System (BEIT403T)** |
| CO403.1 | Understand the basic concept & properties /features of OOP |
| CO403.2 | Understand and implement concept of constructor & destructor in C++ |
| CO403.3 | Implement concept Inheritance using C++ |
| CO403.4 | Understand & Implement concept polymorphism using C++ |
| CO403.5 | Implement file handling in C++ |
| CO403.6 | Understand concept of Exception handling & STL |
| | **Computer Architecture and Organization (BEIT404T)** |
| CO404.1 | Identify the basic functional units, various buses and addressing modes |
| CO404.2 | Apply fundamental concept for executions and sequencing of control signals |
| CO404.3 | Compare Hardwired and Micro programmed Control unit and write the control steps/ sequence of microprogramming. |
| CO404.4 | Apply the knowledge of computer arithmetic algorithm and solve the problems. |
| CO404.5 | Design and implement various memory IC's, evaluate the main memory address |

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| | **Introduction to Computer Network (BEIT405T)** |
| CO405.1 | Understand the fundamental of computer network. |
| CO405.2 | Comparison of the OSI and the TCP/IP Reference Models |
| CO405.3 | Student will be able to distinguish between the different types of bit errors and can explain the concept of bit redundancy and how it is generally achieved in the facilitation of error detection and the main methods of error correction. |
| CO405.4 | Understand routing principal and algorithms, such as distance vector and link state and inter-networking principles and how the Internet protocols IP, IPv6 and ICMP operate. |
| CO405.5 | Demonstrate an understanding of the significance and purpose of protocols and standards and their key elementsand use in networking and Transport layer protocol. |
| | **Operating System (BEIT406T)** |
| CO406.1 | Describe the important computer system resources and the role of operating system in their management policies and algorithms. |
| CO406.2 | Understand the process management policies and scheduling of processes by CPU. |
| CO406.3 | Evaluate the requirement for process synchronization and coordination handled by operating system. |
| CO406.4 | Describe and analyze memory management and its allocation policies |
| CO406.5 | Identify use and evaluate the storage management policies with respect to different storage management technologies |
| | **Software Lab-II (BEIT407P)** |
| CO407.1 | Able to apply the principles python programming. |
| CO407.2 | Write clear and effective python code. |
| CO407.3 | Create applications using python programming. |
| CO407.4 | Implementing database using SQLite. |
| CO407.5 | Access database using python programming. |
| CO407.6 | Develop web applications using python programming. |
| | **Consumer Affairs (Audit) (BEIT408T)** |
| CO408.1 | Understand the basic concept and importance of Consumer Education. |
| CO408.2 | Grasp the concepts related to Consumer Education and Protection. |
| CO408.3 | Analyze the regulations and redressal mechanism system. |
| CO408.4 | Aware of consumer moments. |

| BE Information Technology Fifth Semester | |
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| | **System Programming (BEIT501T)** |
| CO501.1 | Understanding on how to write assembly language program and differentiate between machine-ops and pseudo-ops able to process them if present in assembly language program. |
| CO501.2 | Understanding on General machine structure, its function of components and instructions, data formats used by IBM 360/30 machine. |
| CO501.3 | Able to understand working of assemble and different tables generated by assembler in pass1 and pass2. |
| CO501.4 | To have clear idea about the number of phases of compiler and role of each phase. |
| CO501.5 | Understanding on function of loader and types. Also, advantages and disadvantages of different types of loaders and able to generate ESD cards, TXT cards and so on by loader. |
| CO501.6 | Better understanding on macro processor, table generation by macro processor and working, installation of device driver and understanding of various types of device drivers. |
| | **Design and Analysis of Algorithms (BEIT502T)** |
| CO502.1 | Argue the correctness of algorithms using recurrence relation. |
| CO502.2 | Analyze worst-case running times of algorithms using asymptotic analysis. Explain what amortized running time is and what it is good for. Describe the different methods of amortized analysis (aggregate analysis, accounting, and potential method). Perform amortized analysis. |
| CO502.3 | To understand the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Synthesize greedy algorithms, and analyze them. |
| CO502.4 | To understand the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Synthesize dynamic-programming algorithms, and analyze them. |
| CO502.5 | Explain what an approximation algorithm is, and the benefit of using approximation algorithms. |
| CO502.6 | Analyze the approximation factor of an algorithm. Analyze NP-hard and NP-complete problems. |
| | **Software Engineering (BEIT503T)** |
| CO503.1 | Plan and deliver an effective software engineering process, based on knowledge of widely used development lifecycle models. |
| CO503.2 | Employ group working skills including general organization, planning and time management and inter-group negotiation. |
| CO503.3 | Capture, document and analyze requirements. |
| CO503.4 | Make effective use of UML, along with design strategies such as defining software architecture, separation of concerns and design patterns. |
| CO503.5 | Formulate a testing strategy for a software system, employing techniques such as unit testing, test driven development and functional testing. |
| CO503.6 | Understand the process of risk management, change management, evaluate the |

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| | quality of the requirements, analysis and design work done during the module and reengineering process. |
| | **Software Engineering (BEIT503P)** |
| CO503.1 | Students shall be able to get exposure of Rational Rose software. |
| CO503.2 | Students shall be to understand Software requirement specification (SRS). |
| CO503.3 | Students can able to design all diagrams during software project development. |
| | **Computer Graphics (BEIT504T)** |
| CO504.1 | To understand the basic concepts of graphics and algorithms to draw line, circle in 2-Dimensional space. |
| CO504.2 | To understand 2D transformation and algorithms to fill a polygon. |
| CO504.3 | To understand the segment tables and various algorithms for polygon clipping. |
| CO504.4 | To understand 3D transformations and algorithms for removal of hidden surfaces and lines. |
| CO504.5 | To understand the curves and surface rendering algorithms. |
| CO504.6 | To understand the various color models and their applications, steps involved in animation. |
| | **Computer Graphics (BEIT504P)** |
| CO504.1 | To learn various graphics primitives and its applications. |
| CO504.2 | To understand and implement various algorithms for line and circle generation, polygon filling and line clipping. |
| CO504.3 | To understand and implement 2D, 3D transformations and animations. |
| | **Java Programming (BEIT505T)** |
| CO505.1 | To understand about data types, operators, classes and objects, where object oriented programming concept will used. |
| CO505.2 | To understand about the vectors and generics with the String, String Buffer and String Builder classes with their operations. |
| CO505.3 | To understand about object classes, packages and various exception handling techniques. |
| CO505.4 | To understand the multithreading concept with their life cycle. |
| CO505.5 | To understand about file system where reading, writing by using transient or volatile modifiers. |
| CO505.6 | To understand about java applet application used for creating user interface with their different controls. |
| | **Java Programming (BEIT505P)** |
| CO505.1 | To learn the object oriented programming language and its application. |
| CO505.2 | To understand the use of applets in creating the web sites. |
| CO505.3 | To understand the concept of packages in solving the real world problems. |
| | **Industrial Economics and Entrepreneurship Development (BEIT506T)** |
| CO506.1 | Subject makes the student understand and learn the basic concepts of Industrial Economics such as types of business structures, top and bottom line of organization as economic analysis. |
| CO506.2 | Students learn the basic concepts like market structures, pricing strategies, business integration, economies and diseconomies of scale and the new economic policies of the government |

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| CO506.3 | Students are familiarized with working of banking system, foreign direct investment, the concept of free trade, capital formation, inflation, inclusive growth and public private partnership |
| CO506.4 | Students learn about entrepreneurship as career avenue and factors affecting entrepreneurial growth. Students learn about project formulation, market survey and research, techno economic feasibility assessment and project appraisal. |
| CO506.5 | Subject enhances their understanding about needs and sources of finance, various types of loans, capital structures, break even analysis, network analysis techniques of PERT/CPM etc. |
| CO506.6 | Students learn about role of small scale industries in the economy, problems of SSI,FDI as a threat to SSI, technical consultancy organizations, government policies for SSI and various incentives for SSI |
| **BE Information Technology Sixth Semester** | |
| | **Computer Networks (BEIT601T)** |
| CO601.1 | To understand about computer networks and internet, with layered architecture of OSI and TCP/IP networks. |
| CO601.2 | To understand about data link layer where using error correcting or detecting techniques used to control the error. |
| CO601.3 | To understand the importance of network layered in OSI and TCP/IP model, also various routing algorithm used. |
| CO601.4 | To understand the role of transport and application layered, with client-server model. |
| CO601.5 | To understand the various servers are used to resolve the problems of internet. |
| CO601.6 | To understand the mobile IP with their addressing, also various techniques are used for security purpose over the internet. |
| | **Operating Systems (BEIT602T)** |
| CO602.1 | To make students able to learn different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system. |
| CO602.2 | To understanding file system interface and implementation, disk management. |
| CO602.3 | Understand and analyse theory and implementation of various process management concepts including scheduling, synchronization. |
| CO602.4 | Understand and analyse concepts of memory management including virtual memory. Compare and contrast paging and contiguous blocks in memory allocation. |
| CO602.5 | Able to Compare and contrast semaphores and mutex locks. |
| CO602.6 | To provide students' knowledge of memory management and deadlock handling algorithms. |
| | **Database Management Systems (BEIT603T)** |
| CO603.1 | Understand database concepts and structures and terms related to database design and management. |
| CO603.2 | Understand the objectives of using data, information system, data modeling and database development process. |
| CO603.3 | Able to construct, normalize conceptual data models and able to develop logical data models. |
| CO603.4 | Implement a relational database into database management system using SQL PLUS. |

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| CO603.5 | Students become proficient in using database query language such as SQL. |
| CO603.6 | Understand the issues related to database performance. |
| | **Database Management Systems (BEIT603P)** |
| CO603.1 | One will able to understand the data and creation of data base and tables inside the database. |
| CO603.2 | One will able to write the queries using DDL and DML and execute the same using SQL. |
| CO603.3 | One will able to perform aggregate functions and advanced operations on created databases. |
| | **Internet Programming (BEIT604T)** |
| CO604.1 | To learn how the CSS is implemented. |
| CO604.2 | To create dynamically generated web pages based on DHTML. To learn how to create scripts for static web pages. |
| CO604.3 | To learn processing of XML and how to use its elements. |
| CO604.4 | Learn the Servlet programming for distributed enterprise application development. |
| CO604.5 | Learn the Java Server Pages programming for distributed enterprise application development. |
| CO604.6 | Learn how to develop basic android application with all details. |
| | **Internet Programming (BEIT604P)** |
| CO604.1 | Students can able to create and develop HTML/DHTML/XHTML pages with usage of CSS and Java Scripts. |
| CO604.2 | Students can able to create XML files with required specifications and also Develop Java Servlet. |
| CO604.3 | Students can able to create and develop server side JSP's and also can be able to configure and develop basic android applications. |
| | **Functional English (BEIT605T)** |
| CO605.1 | will become adept in using functional grammar |
| CO605.2 | would be able to write at workplaces |
| CO605.3 | will be able to draft technical reports and write proposals |
| CO605.4 | will be able to understand the planning and procedure of carrying out research work |
| CO605.5 | will become well prepared to face competitive examinations and job interviews |
| CO605.6 | dexterous in presentation skills |
| | **Mini Project and Industrial Visit (BEIT606P)** |
| CO606.1 | Able to acquire practical knowledge within the chosen area of technology for project development |
| CO606.2 | Able to identify, analyze, formulate and handle programming objects with comprehensive and systematic approach |
| CO606.3 | Able to develop a design solution for a set of requirements |
| CO606.4 | Able to express technical ideas, strategies and methodologies in written form and test the functionalities of the project |
| CO606.5 | Able to contribute as an individual or in a team in development of technical projects |

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| CO606.6 | Develop effective communication skills for presentation of project related activities and generate solutions, compare them and select optimum one |
| **BE Information Technology Seventh Semester** | |
| | **Data Warehousing and Mining(BEIT701T)** |
| CO701.1 | Students should get the knowledge of data preprocessing for data warehouse and data mining. |
| CO701.2 | Students will be able to understanding of the fundamental theories and concepts of data warehouse. |
| CO701.3 | Students can understand online analytic processing (OLAP) is used for business analysis. |
| CO701.4 | Students should get the knowledge of data mining functionalities and applications. |
| CO701.5 | Students can be able to work on association rule mining for market basket analysis. |
| CO701.6 | Students should get the knowledge of business intelligence used in business from the past data and they can understand big data and Hadoop technologies. |
| | **Data Warehousing and Mining (BEIT701P)** |
| CO701.1 | Students can able to design and perform data warehouse schemas and online analytical processing operations. |
| CO701.2 | Students can able to perform data mining techniques such as classification, clustering and association rule mining using WEKA and PYTHON. |
| CO701.3 | Students can able to install Hadoop single node cluster and its commands. |
| | **Computer System Security (BEIT702T)** |
| CO702.1 | Students can understand security concepts, Ethics in Network Security. |
| CO702.2 | Students can understand security services and mechanisms and can implement the security algorithms like DES, IDEA etc. |
| CO702.3 | Students can comprehend and apply relevant cryptographic techniques like RSA algorithm, Diffie-Hellman key exchange etc. |
| CO702.4 | Students can comprehend various authentication services and mechanisms like digital signature, Kerberos etc. |
| CO702.5 | Students can understand email security services and mechanisms like PGP, S/MIME. |
| CO702.6 | Students can understand meaning of virus, worms, and firewalls and different web security services and mechanisms. |
| | **Computer System Security (BEIT702P)** |
| CO702.1 | Able to implement the concept of encryption and decryption using various symmetric key algorithms. |
| CO702.2 | Able to implement the concept of encryption and decryption using various asymmetric key algorithms. |
| CO702.3 | Able to implement the concept of various authentication and digital signature algorithms as well as password protection mechanism. |
| | **Artificial Intelligence (BEIT703T)** |
| CO703.1 | To understand the basic concepts of Artificial Intelligence, AI techniques and AI Problems to analyze and formalize (as a state space, graph etc.) |

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| CO703.2 | To understand concept of Informed and Uninformed search strategies. |
| CO703.3 | To understand issues, approaches of knowledge representation and logical form of knowledge. |
| CO703.4 | To understand different representations scheme of knowledge in knowledge base. |
| CO703.5 | To understand the different development phases of expert system and rule based expert system. |
| CO703.6 | To understand concepts of certainty, uncertainty factors and fuzzy logic. |
| | **Elective-I Multimedia Systems (BEIT704T2)** |
| CO704.1 | Students will gain the knowledge on different technologies and architecture of Multimedia Systems. |
| CO704.2 | Students will understand the concepts of multimedia tools |
| CO704.3 | Students able to know various elements of multimedia |
| CO704.4 | Students will able to apply image and video compression in mini real-time applications |
| CO704.5 | Students will get the concepts of Storage models and Access Techniques of Multimedia devices |
| CO704.6 | Students will get the concepts of developing multimedia applications and delivering the multimedia products. |
| | **Elective-I Compiler Design (BEIT704T4)** |
| CO704.1 | To acquire the knowledge of modern compiler and its features. |
| CO704.2 | To learn and use the new tools and technologies used for designing a compiler |
| CO704.3 | Demonstrate the phases of the compilation process and be able to describe the purpose and implementation approach of each phase. |
| CO704.4 | Proficiently explain the aspects of theoretical computer science including Languages, Grammars, and Machines. |
| CO704.5 | Providing the student with skills and knowledge (such as lexical analysis and parsing) which are applicable to a broad range of computer science application areas (such as text editors, information retrieval, etc |
| CO704.6 | To learn new code optimization techniques to improve the performance of program in terms of memory space and speed. |
| | **Elective-II Cluster and Grid Computing (BEIT705T2)** |
| CO705.1 | Understanding the basic requirement of evolution of Grid from a Cluster. |
| CO705.2 | Be familiar with the fundamental components of Grid environments, such as authentication, authorization, resource access, and resource discovery. |
| CO705.3 | Be able to design and implement Grid computing applications using Globus or similar toolkits. |
| CO705.4 | Be able to justify the applicability, or non-applicability of Grid technologies for a specific application. |
| CO705.5 | Understand the suitable topology and design to set up an initial grid for research and data processing. |
| CO705.6 | Know what a grid is and what it can do for whom uses it is essential when planning to use this technology to tackle the most demanding computational problems. |

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| | **Seminar on Project (BEIT706P)** |
| CO706.1 | Able to improve oral and presentation skills in their project domain. |
| CO706.2 | Able to apply mathematics and scientific method in computational problems |
| CO706.3 | Able to use latest tools and methods in the computing practice |
| CO706.4 | Gains knowledge on the process involved in team work of computing environment |
| CO706.5 | Able to design and implement systems on the various social needs. |
| CO706.6 | Understand the importance of various process models of the project |
| **BE Information Technology Eighth Semester** | |
| | **Distributed Systems (BEIT801T)** |
| CO801.1 | Students will gain the models of distributed systems which help in developing client server applications. |
| CO801.2 | Students will understand the concepts of Inter process communication using RPC models. |
| CO801.3 | Students will know how the processes are synchronized in distributed systems. |
| CO801.4 | Students will know how the deadlocks are occurred, detected and resolved in distributed systems. |
| CO801.5 | Students will gain the knowledge about how the data is shared in distributed systems. |
| CO801.6 | Students will know the structure of file systems in distributed systems. |
| | **Distributed Systems (BEIT801P)** |
| CO801.1 | Students will able to create communication between systems. |
| CO801.2 | Students will able to migrate the code from one system to another. |
| CO801.3 | Students can implement synchronization between the systems with respect to sharing resources. |
| | **Gaming Architecture and Programming (BEIT802T)** |
| CO802.1 | Design, analyze, implement and evaluate computer games. |
| CO802.2 | Appreciate computer games designs and complexities. |
| CO802.3 | Demonstrate understanding of game production process through developing a computer game in a team starting from ideas. |
| CO802.4 | Demonstrate understanding of technical components in realizing a 2D and 3D game Category. |
| CO802.5 | Collaborate, organize and communicate with others in effective team work. |
| CO802.6 | Realize the interdisciplinary nature in computer games development and appreciate importance of collaboration, be creative and critical to game and play design. |
| | **Gaming Architecture and Programming (BEIT802P)** |
| CO802.1 | Students are able to design and implement the basic concept of game using unity tool. |
| CO802.2 | Students are able to implement the animation concept of game. |
| CO803.3 | Students are able to implement, integrate and test the game with animation, scenes and scripts for 2D and 3D games. |

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| | **Elective-III Pattern Recognition (BEI803T3)** |
| CO803.1 | Students can understand pattern, pattern classifier and pattern recognition with parametric estimation. |
| CO803.2 | Students should get the knowledge of Bayes theorem and usefulness in pattern classification. |
| CO803.3 | Students can understand clustering and different clustering techniques. |
| CO803.4 | Students can understand feature extraction process with KL transform in pattern recognition. |
| CO803.5 | Students able to use hidden markov model and support vector machine in pattern recognition. |
| CO803.6 | Students can understand the concepts of fuzzy logic and genetic algorithm in pattern recognition. |
| | **Elective-IV Wireless Sensor Networks (BEIT804T4)** |
| CO804.1 | Introduce students to the characteristics, challenges, standards and applications of wireless sensor networks. |
| CO804.2 | To provide the knowledge of architecture and structure of wireless sensor network. To understand various layers of protocol stack of WSN. |
| CO804.3 | Provide the depth knowledge of contention based and contention free MAC protocols and hoe it is different from fundamental MAC protocols. |
| CO804.4 | To understand the general principles of routing and its challenges. To make them aware of specific routing protocols used for wireless sensor networks. |
| CO804.5 | To understand security concepts in WSN using Message authentication code, Signature. To provide knowledge of transport protocol design issues. |
| CO804.6 | Make the students aware of network management design issues, operating system design issues and OS used specifically for wireless sensor network. |
| | **Project (BEIT805P)** |
| CO805.1 | Able to develop applications in real life. |
| CO805.2 | Able to identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach. |
| CO805.3 | They can acquire practical knowledge within the chosen area of technology for project development. |
| CO805.4 | They can learn new tools, algorithms, and/or techniques that contribute to the software solution of the project. |
| CO805.5 | Able to test the functionalities of the project by different testing methodologies. And they can improve effective communication skills for presentation of project related activities. |
| CO805.6 | They can express technical ideas, strategies and methodologies in written form. |

## Department of Electrical Engineering

The department of Information Technology has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

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| PSO1 | Identify, analyze, design lay out and provide engineering solution in the area related to electrical power system, power electronics and drives. |
| PSO2 | To gain the skills of utilization and maintenance of electrical systems and develop the confidence to achieve position in the career path ethically. |

| **BE Electrical Engineering Third Semester** | |
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| | **Electrical Engineering Mathematics (BTCHEE301T)** |
| CO301.1 | Analysis of variation using different method, solution of partial differential equation of first order first degree, numerical solution to ordinary differential equations. |
| CO301.2 | Formulation and solving the system using complex variables. |
| CO301.3 | Applications of differential equation and Laplace transform for mathematical model formulation of physical system, understanding the concept of transfer function. |
| CO301.4 | Understanding of linear and orthogonal transformation, solution to second order differential equation. |
| CO301.5 | Understanding the concept of Stochastic analysis and its applications. |
| | **Network Analysis (BTCHEE302T)** |
| CO302.1 | Apply mesh current and node voltage method to analyze electrical circuits. |
| CO302.2 | Apply network theorem for the analysis of networks. |
| CO302.3 | Obtain transient and steady state responses of electrical circuits. |
| CO302.4 | Synthesize wave form and apply laplace transforms to analyze networks. |
| CO302.5 | Evaluate different network functions and understand two port network behavior. |
| | **Electrical Measurement and Instrumentation (BTCHEE303T)** |
| CO303.1 | Various aspects of measurement and Instrumentation. |
| CO303.2 | Different active and passive component measurement methods. |
| CO303.3 | Power and energy measurement. |
| CO303.4 | Instrument transformer |
| CO303.5 | Aspects and size of transducers |
| | **Analog Devices & Circuits (BTCHEE304T)** |
| CO304.1 | Design and analyze rectifier circuits. |
| CO304.2 | Understand the characteristics and the use of transistor as amplifiers. |

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| CO304.3 | Apply the knowledge of transistor for the analysis of power amplifier and oscillators. |
| CO304.4 | Understand OP-AMPs. |
| CO304.5 | Analyze and utilize OP-AMPs. |
| | **Renewable Energy Studies (BTCHEE305T)** |
| CO305.1 | Memorize the fundamental of solar radiation geometry. |
| CO305.2 | Identify and analyze the process of power generation through solar photovoltaic. |
| CO305.3 | Highlighting the various applications of solar energy. |
| CO305.4 | Outline the site requirement criteria for wind farm and compare different types of wind generator. |
| CO305.5 | Indentifying Non-conventional energy sources such as Geothermal, MHD, Biomass, Fuel cell, Tidal, Ocean for generating Electricity. |
| | **Introduction to Python Programming (BTCHEE306T)** |
| CO306.1 | Identify Different operators and Execute different programs using loops. |
| CO306.2 | Analyze strings, lists, Tuples, Dictionary and Sets. |
| CO306.3 | Illustrate functions and utilize date time in programming language. |
| **B.Tech. Electrical Engineering Fourth Semester** | |
| | **Signal and Systems (BTCHEE401T)** |
| CO401.1 | Understanding the basic of signal space theory. |
| CO401.2 | Understanding the concept of state space representation. |
| CO401.3 | Understand convolution sum of two signals. |
| CO401.4 | Apply Fourier and Laplace transforms, understand the duality. Apply DFT, DTFT and z-transform. |
| CO401.5 | Understand the concept of sampling and reconstruction. |
| | **Digital Electronics (BTCHEE402T)** |
| CO402.1 | Understand number system, logic gates and logic families. |
| CO402.2 | Design and implement, combinational digital circuits. |
| CO402.3 | Design and implement sequential logic circuits. |
| CO402.4 | Understand the process of analog to digital conversion and digital to analog conversion. |
| CO402.5 | Understand memories and PLDs to implement given logic. |
| | **Electrical Machines-I (BTCHEE403T)** |
| CO403.1 | Determine Equivalent circuit parameter, Efficiency and Regulation of Single Phase Transformer and to Explain the Phasor groups of Three Phase Transformer. |
| CO403.2 | Analyze different Characteristics of D.C. Motor and Speed Conctrol of D.C. Motor. |
| CO403.3 | Explain Different types of Three Phase Induction Motor and Analyze the Characteristics at different value of Slip. |

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| CO403.4 | Know Voltage Regulation of Three Phase Synchronous Generator and Behaviour of Synchronous Motor with Different Excitations. |
| CO403.5 | Understand Single Phase Machines and Special Machines. |
| | **Power System (BTCHEE404T)** |
| CO404.1 | Understand the basic structure of power system, smart grid and microgrid. |
| CO404.2 | Model and represent the power system components in its per unit value. |
| CO404.3 | Learn the parameters of transmission linesand cables. |
| CO404.4 | Evaluate the performance of transmission lines. |
| CO404.5 | Acquaint with the method of load flow analysis and the concept of voltage stability. |
| | **Electromagnetic Fields (BTCHEE405T)** |
| CO405.1 | Recognize and apply the knowledge of different co-ordinate systems. |
| CO405.2 | Evaluate the physical quantities of electromagnetic fields in different media and apply Gauss Law. |
| CO405.3 | Describe static electric fields boundary conditions, nature of dielectric materials and evaluate potential fields. |
| CO405.4 | Explain steady magenetic fields, their behavior in different media, associated laws and inductance. |
| CO405.5 | Understand Maxswell's equations in different forms and different media. |
| | **Programming Techniques & Simulation (BTCHEE406T)** |
| CO406.1 | Learn the basics of C programming and apply the knowledge for developing small programs including Function. |
| CO406.2 | Apply the knowledge of C language for developing simple programs using variables, arrays, structures etc. for applications like searching and sorting, use of pointers & File handling functions. |
| CO406.3 | Understand the basics of C++. |
| CO406.4 | Study the basic of MATLAB and apply fundamental knowledge for analysis of basic engineering problems. |
| CO406.5 | Apply knowledge of MATLAB, Toolboxes and Simulink to solve matrix equations, plot graphs, build and analyze simple electrical circuits. |

| BE Electrical Engineering Fifth Semester | |
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| | **Electrical Power System-1 (BEELE501T)** |
| CO501.1 | Modeling power system component and concept of real and reactive power. |
| CO501.2 | Per unit representation of power system components to facilitate calculation of fault current and calculation of parameter. |
| CO501.3 | Various types of distribution system and concept of insulator string efficiency. |
| CO501.4 | Concept of designing of transmission line (Short, Medium, and Long) and performance of transmission lines using circle diagram. |
| CO501.5 | The basics concept of load flow analysis. |
| CO501.6 | Real and reactive power control of alternator connected in parallel. |
| | **Utilization of Electrical Energy (BEELE502T)** |
| CO502.1 | Understand applications for heating using different techniques and their designing. |
| CO502.2 | Understand applications for electric welding using different methods. |
| CO502.3 | Understand illumination and it's designing with various locations. |
| CO502.4 | To get an overview of the refrigeration and air conditioning systems. |
| CO502.5 | Understand fans, pumps and their utilization in efficient way. |
| CO502.6 | Understand about compressors and diesel generating sets along with energy saving measures. |
| | **Electrical Machine Design (BEELE503T)** |
| CO503.1 | To select the material for making the machine and able to calculate temperature rise , heating time constant and short time rating of the machine. |
| CO503.2 | To design the transformer and able to calculate all the dimension. To understand the relation between electrical quantiles and physical dimension of the transformer. To understand the different method of transformer cooling. |
| CO503.3 | To find the operating characteristics of the transformer, leakage reactance and able to design cooling system for transformer. |
| CO503.4 | To calculate the main dimension of rotating machine and able to calculate electric and magnetic loading. |
| CO503.5 | To design the stator and rotor of the induction motor. Able to calculate operating characteristics. |
| CO503.6 | To design field coil for salient pole machine and for turbo generator rotor and able to calculate the main dimension and understand the cooling method for generator. |
| | **Microprocessor and Interfacing (BEELE504T)** |
| CO504.1 | Types of integrated circuit and how to design them using microprocessor 8085. |
| CO504.2 | The basics of 8085 architecture with addressing modes and software instruction which will be helpful for writing assembly language programs. |
| CO504.3 | Represent each instruction graphically using timing diagrams. |
| CO504.4 | Concept of stack, subroutines with programs. |
| CO504.5 | Interrupt structure and their programming. |
| CO504.6 | The architecture of 8255 peripheral device and interface 8085 with device like ADC, DAC, Stepper motor and design the hardware application by creating awareness about microcomputer system. |
| | **Electrical Machine-II (BEELE505T)** |
| CO505.1 | Understood principle, construction, laying of armature and field windings, types, generation of EMF. |

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| CO505.2 | Understand the concept of voltage regulation methods to determine voltage regulation steady state performance |
| CO505.3 | Understand Synchronization and parallel operation of synchronous generators. Positive, Negative and zero sequence reactance and its measurements. |
| CO505.4 | Understood principle, construction, methods of starting of synchronous motor, its operation with variable load, operation with variable excitation, performance evaluation. |
| CO505.5 | Understand transient behavior of machine on sudden short circuit, hunting and damper winding. |
| CO505.6 | Understood special motors like Repulsion, Hysteresis, Reluctance, Universal and Schrage motors. |
| **BE Electrical Engineering Sixth Semester** | |
| | **Power Station Practice (BEELE601T)** |
| CO601.1 | Different fuel used for generation of electrical energy in different power plant and able to learn different factor connected with generating station, connected load, load curve, load duration curve, base load and peak load station. |
| CO601.2 | Site selection for thermal power plant, layout, size and number of unit. Operation of thermal power plant, different auxiliaries, electric supply to the auxiliaries, economics of thermal power plant. |
| CO601.3 | Site selection and operation of hydro station. Type of hydro power plant, different type of turbine, hydrology, pumped storage plant and utility. |
| CO601.4 | To learn principal and operation of nuclear power plant and nuclear material required for generation of electricity. Different type of nuclear reactor, material for moderator and control rods. Economics of nuclear power plant. |
| CO601.5 | Able to learn exciter instability and different method of stabilizing exciter voltage. |
| CO601.6 | Able tolearn captive and cogeneration and its economics . Energy problem, prospect of change in energy supply, agenda for sustainable development. |
| | **Engineering Economics and Industrial Management (BEELE602T)** |
| CO602.1 | Understand the concept of economics regarding demand, supply, and production process. |
| CO602.2 | Learn the basic laws of the economics such as laws of returns. Also learn about cost concept, price and output determination under various competitive situations in market. |
| CO602.3 | Understand the working of banking system, types of taxation, role of inflation and economic policies of the government. |
| CO602.4 | Understand nature and scope of management in industrial arena and learn the various functions of management such as planning, organizing, directing, controlling, and communicating. |
| CO602.5 | Understand the concepts of marketing, channel of distribution, advertising and sale promotion. |
| CO602.6 | Learn about the nature and scope of financial management which includes topics such as profit and loss account, balance sheet, importance of budget and principle of costing. |

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| | **Electrical Drives And their Control (BEELE603T)** |
| CO603.1 | Speed-torque characteristics, starting ,running and braking of electric drive |
| CO603.2 | Solve numerical on power capacity with effect, heating and cooling. |
| CO603.3 | Basic idea of PLC and its programming and application. |
| CO603.4 | Operation of DC,AC contactors and relays and their application for protection of electrical drives. |
| CO603.5 | Operation of traction motor, traction characteristics. |
| CO603.6 | The numerical on traction system and digital control of electric drive. |
| | **Power Electronics (BEELE604T)** |
| CO604.1 | Basic operation of various power semiconductor devices. |
| CO604.2 | Basic principal of switching devices. |
| CO604.3 | Analyze and design an AC/DC rectifier circuit. |
| CO604.4 | Analyse DC/DC converter circuit. |
| CO604.5 | DC/AC Inverter circuit. |
| CO604.6 | Role of power electronics in improving energy usage efficiency and the development of renewable energy technologies. |
| | **Control System-I (BEELE605T)** |
| CO605.1 | Modeling of liner system and transfer function calculation. |
| CO605.2 | Feedback effects and electrical components. |
| CO605.3 | Time response and various controllers. |
| CO605.4 | Absolute stability and root locus method. |
| CO605.5 | Frequency response tools as Bode plot, Nyquist plot. |
| CO605.6 | Elementary concepts of state variable approach. |
| | **Functional English (BEELE607T)** |
| CO607.1 | Will become adept in using functional grammar |
| CO607.2 | Would be able to write at workplaces |
| CO607.3 | Will be able to draft technical reports and write proposals |
| CO607.4 | Will be able to understand the planning and procedure of carrying out research work |
| CO607.5 | Will become well prepared to face competitive examinations and job interviews |
| CO607.6 | Will become dexterous in presentation skills |
| **BE Electrical Engineering Seventh Semester** | |
| | **Control System-II (BEELE701T)** |
| CO701.1 | To know the different compensation technique of single input single output system linear time invariant control system. |
| CO701.2 | To analyze the practical system for desired specification through the variable approach and concept of Eigen values and vectors with the diagonalization technique. Solution of sate equation with the determination of STM by different method. |
| CO701.3 | To Controllability and observability and test on the design of control system in state space and design and effect of state feedback. |
| CO701.4 | To design the optimal control with and without constraints. |
| CO701.5 | To function of non linear system and analysis the nonlinear system with phase plane and describing function method. |
| CO701.6 | To analyze the linear time invariant discrete time system with the help of Z-transform and analyze of stability of discrete time systems. |

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| | **Electrical Power System-II (BEELE702T)** |
| CO702.1 | Understand and analyze symmetrical component and sequence network. |
| CO702.2 | Analyze the system with symmetrical fault and select circuit breakers. |
| CO702.3 | Analyze the system with unsymmetrical faults. |
| CO702.4 | Study power system stability. |
| CO702.5 | Study economics operation and distributions of load between units. |
| CO702.6 | Understand importance and types of grounding and compensation. |
| | **Flexible AC Transmission System (BEELE703T)** |
| CO703.1 | To understand the constraints offered by transmission line related with transient stability, dynamic stability, voltage stability, thermal limit, frequency stability, etc. |
| CO703.2 | To understand the importance of FACTS controller devices to improve the stability limit and maximize the power transfer capability. |
| CO703.3 | Ability to understand and indentify the problem associated with large interconnected system like voltage instability, power oscillation, transient instability, power flow. |
| CO703.4 | Based on the problem, students are able understand to apply suitable controller (series, shunt, shunt-series, series-series) to overcome the problem in the interconnected system. |
| CO703.5 | Ability to understand different types of converter regulator and compensator. |
| CO703.6 | To understand harmonic reduction and voltage control technique and its analysis. |
| | **High Voltage Engineering (BEELE704T)** |
| CO704.1 | Students will understand about breakdown mechanism in gaseous, liquids and solid dielectric materials. |
| CO704.2 | Learn about lightening and switching over-voltages and its protection. |
| CO704.3 | Study about insulation coordination, BIL, reduced BIL, SIL and Travelling waves. |
| CO704.4 | Study different methods of generation high voltage and currents. |
| CO704.5 | Study different methods measurement of high voltage and currents in laboratory. |
| CO704.6 | Learn different methods of non destructive and High Voltage testing of apparatus. |
| | **Electrical Installation and Design (BEELE705T)** |
| CO705.1 | Concept of load forecasting, solve problems based load assessment. |
| CO705.2 | Draw single line diagram with specification distribution network, motor and power control centers for industrial installation. |
| CO705.3 | Construction, installation, types and selection of PVC/XLPE cables and overhead conductors. |
| CO705.4 | Design 11 KV and 33 KV substation layouts. |
| CO705.5 | Determine fault level at various locations in power system and understand complete transformer testing. |
| CO705.6 | IE rule for low, medium and .high voltage installation and understand provision for system and equipment earthing as per IS 3043 |
| | **BE Electrical Engineering Eighth Semester** |
| | **Power Quality (EL-II) (BEELE801T)** |
| CO801.1 | Knowledge of various power quality phenomenons. |
| CO801.2 | Impact of poor power quality on various equipment of power system and domestics appliances. |
| CO801.3 | Various causes and origin of power quality problem. |

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| CO801.4 | Controlling of various power quality phenomenon to improve performance of overall power system. |
| CO801.5 | Monitoring of power quality phenomenon in order to protect and minimize damage caused by them. |
| CO801.6 | Assessment of power quality problem and phenomenon on line as well as offline assessment. Mitigation techniques to minimize power quality problem. |
| | **Electrical Distribution System (EL-III) (BEELE802T)** |
| CO802.1 | To understand the different load factor, classification of load. |
| CO802.2 | To understand different feeders, engineering consideration for voltage level and loading. |
| CO802.3 | To understand calculation of power loss and voltage drop. Method of solution of different network and load flow study. |
| CO802.4 | To understand equipment for voltage control, effect of different equipment like series capacitor, reactive power requirement and its compensation. |
| CO802.5 | To understand the automation in distribution system, data acquisition control and protection of control panel. |
| CO802.6 | To understand layout, equipment of the substation. |
| | **Switchgear and Protection (BEELE803T)** |
| CO803.1 | Classify the faults in power system. |
| CO803.2 | Design the operating time of over current relays including backup protection. |
| CO803.3 | Understand necessity of protection in power system. |
| CO803.4 | Choose the proper protection system for various equipment like transformer, alternators, busbar, feeders, transmission line. |
| CO803.5 | Select circuit breakers for different voltage application. |
| CO803.6 | Plot the characteristics of various distance relays and relay classification. |
| | **Computer Application in Power System (BEELE804T)** |
| C0801.1 | Understand the fundamental concepts of graph theory. Determine Admittance matrix (required for Load flow) by graphically, Inspection and building algorithm without mutual coupling. |
| C0804.2 | Bus Impedance matrices(required for Short circuit Studies) for system without mutual coupling |
| C0804.3 | Three phase balance network elements with balanced and unbalanced excitation, incidence and network matrices *for* three phase element. |
| C0804.4 | Load flow study of a power system by Newton-Raphson and Gauss-Seidal Iterative Method and fast decoupled methods with and without voltages buses. |
| C0804.5 | Three phase Short circuit studies for balanced and unbalanced faults. |
| C0804.6 | Transient stability by using Euler's, Modified Euler's and RK-4th order differential method. |

# Department of Architecture

The objectives of the Bachelor of Architecture program are translated into a number of learning outcomes. These outcomes are directly related to the profession of architecture, the way in which it is practiced, and the knowledge components necessary for such a practice. The following list of outcomes represents the minimum learning outputs expected and therefore they are not exclusive. Specific exercises and individual and group projects may achieve additional learning outcomes:

1. An ability to conceptualize and coordinate designs, addressing social, cultural, environmental and technological aspects of architecture
2. An ability to recognize the dialectic relationship between people and the built environment
3. An ability to apply and integrate computer technology in design processes and products. An ability to utilize cutting edge building technology in design.
4. An ability to apply visual and verbal communication skills at various stages of architectural design and project delivery processes.
5. An ability to critically analyze building designs and conduct post occupancy evaluation studies.
6. An ability to employ architectural research methods including data collection and analysis to assess and propose improvements in existing built environments.
7. An ability to work collaboratively with teams of architects and various interdisciplinary design teams involved in the building industry.
8. An ability to recognize diversity of needs, values, behavioral norms, social patterns as they relate to the creation of the built environment.

| **Bachelor of Architecture First Semester** | |
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| | **Basic Design and Visual Arts (1S-A-1)** |
| 1S-A-1.1 | To have basic knowledge about historical review of development of fine arts and visual arts. As well as the basic knowledge of architectural design. |
| 1S-A-1.2 | Students got to know about basic elements of design and composition out of it which is showing expression of design |
| 1S-A-1.3 | Students got to know about Principles of Design and its role in architecture through different composition and its expression |
| 1S-A-1.4 | Students learned about representation of form in a various ways. |
| 1S-A-1.5 | Students get comfortable in outdoor free hand sketching of natural and manmade things with different mediums |
| 1S-A-1.6 | Students got to know about detailed knowledge of artists colour theory. |
| | **Construction technology and materials – I(1S-A-2)** |
| 1S-A-2.1 | Students got to know about various elements of building from foundation to roof. And also learned about basic building materials such as stone, wood, concrete, steel etc. |
| 1S-A-2.2 | Students got to know about basic about “construction” as a subject and its relevance to architectural design. E.g.-concept of span , etc |
| 1S-A-2.3 | Students understood the basic construction principles with respect to structural stability and its applications/ extensions /manifestations in terms structural systems and then building elements |

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| 1S-A-2.4 | Students got the knowledge about general conditions at site level such as site topography, climatic conditions and soil conditions and its implications on construction techniques, building materials, building elements, construction systems to be adopted. |
| 1S-A-2.5 | Students got to know about basic structural systems such as load bearing and frame structure through drafting exercise of it. |
| | **Structural design and systems – I (1S-A-3)** |
| 1S-A-3.1 | Students got to know types of coplanar and non- coplanar forces. |
| 1S-A-3.2 | Students understood about co-planer forces – resolution and resultants – lami's theorem – application |
| 1S-A-3.3 | Students understood about equilibrium of 2d elements: basic principles, condition of equilibrium, free body diagram |
| 1S-A-3.4 | Students understood about equilibrium of 3d elements, understanding of basic principles of resolution and equilibrium of 3d force system no mathematical calculation. |
| 1S-A-3.5 | Students learned about types of structural supports and support reactions, theoretical and practical study of reactions of simple support, hinge support, roller support and fixed support, study of types of beams and types of loads. |
| 1S-A-3.6 | Students learned about static friction: basic principles: application for elements on horizontal plane, inclined planes and ladders. |
| 1S-A-3.7 | Students understood the properties of plane sections<br>A) centre of gravity<br>B) Moment of inertia (second moment of area) – section modulus, radius of gyration, polar moment of inertia. |
| 1S-A-3.8 | Students learned application for<br>C) Perfect frames (method of joints, method of sections and graphical methods.)<br>D) simply supported beams – analytical and graphical<br>E) weight less cables / strings |
| | **History of Art and Architecture –I (1S-A-4)** |
| 1S-A-4.1 | Students learned basic about Art, Culture, Society, Civilization and Architecture. |
| 1S-A-4.2 | Earlier attempts of man for shelter during the prehistoric period |
| 1S-A-4.3 | Students learned about Indian Art and Architecture. |
| 1S-A-4.4 | Students learned about Western Art and Architecture. |
| 1S-A-4.5 | Students got to know the Elements of Art and Principles of Design studied from historic examples. |
| | **Architectural Graphics –I (1S-A-5)** |
| 1S-A-5.1 | Students learned basic understanding in object drawing, light and shade of simple, natural and geometric forms. Outdoor sketches of simple bldg. forms. Through simple exercises. |
| 1S-A-5.2 | Basic understanding of an Architectural symbols like trees, hedges, foliage, human figure in different postures, vehicles, furniture etc. their integration to presentation drawings. |
| 1S-A-5.3 | Students learned scales, their use in practice and construction of Plain and Diagonal scale. |
| | **Workshop Practice- I (1S-A-6)** |
| 1S-A-6.1 | Students got knowledge about various basic tools used for carpentry joinery and fabrication. |

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| 1S-A-6.2 | Students got to know workshop rules, safety norms and care in handling various manually operated and motorized tools. |
| 1S-A-6.3 | Students got to know basic understanding of wooden joints, evolution of joints, needs of joints, making simple wooden joinery parts. |
| 1S-A-6.4 | Students got knowledge of various building materials and their tools used for cutting, joining and extension. Handling materials like wood, marble, steel, MS, plywood, POP, Aluminumetc. |
| 1S-A-6.5 | Students understood about nailing, screwing, riveting and their various conditions and types of applications. |
| | **Computer Application(NG) (1S-A-7)** |
| 1S-A-7.1 | Students got to know about various basic software used in a 5 year architecture course e.g.- power point presentation, Microsoft word and Microsoft excel. |
| | **Presentation Skills (ELE A) (1S-AA-1)** |
| 1S-AA-1.1 | To develop the presentation of the submissions through software like Microsoft Word and PowerPoint. |
| | **Numerical Abilities (ELE B) (1S-AA-2)** |
| 1S-AA-2.1 | After successful completion of course students built their mathematical knowledge and develop the ability to use it in architecture design. |
| **Bachelor of Architecture Second Semester** | |
| | **Architectural Design-I (2S-A-1)** |
| 2S-A-1.1 | Students understood about anthropometry in that they studied human dimensions, concept of percentile in Indian standards, space required for various simple activities, circulation spaces. |
| 2S-A-1.2 | Students understood about form and space : Volumes, enclosure of space, semi enclosed spaces, defining space by elements, light as a factor of shape, color, texture and form, view, visual relationship. Properties of forms and their impact on spatial experience. |
| 2S-A-1.3 | Students understood about elements of built form through some exercise of making plan and all. |
| 2S-A-1.4 | Students understood about principles of design : Through exercises spatial organization, symbiosis of form and function concept generation convergent and divergent thinking in design |
| 2S-A-1.5 | Students understood about furniture and facilitation placement. |
| 2S-A-1.6 | Students understood about integration of climatic factors in design. |
| | **Construction Technology and Materials –II (2S-A-2)** |
| 2S-A-2.1 | Students got to know about understanding of basic building materials, such as brick, stone, cement, lime, concrete, glass with respect to classification, composition and general idea about their chemical, physical properties |
| 2S-A-2.2 | Students got to know about different type of masonry |
| 2S-A-2.3 | Students studied about lintel and arches. |
| 2S-A-2.4 | Students studied about basic types of joints and its applications in various building elements such as timber doors, windows and timber roofs. |

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| | **Structural Design and Systems- II (2S-A-3)** |
| 2S-A-3.1 | Students understood about stability of masonry structural elements |
| 2S-A-3.2 | Students understood about simple stresses and strains : concept and application Relationship. |
| 2S-A-3.3 | Students understood about thermal stresses and strains: simple and composite section, concept and application. |
| 2S-A-3.4 | Students understood about elastic constants: definitions, Poisson's ratio, bulk modulus, modulus of elasticity, modulus of rigidity. |
| 2S-A-3.5 | Students understood about bending stresses – circular bending: concept and application |
| 2S-A-3.6 | Students understood about Torsional stresses concept and application |
| | **History of Art and Architecture –II (2S-A-4)** |
| 2S-A-4.1 | Students got to know Progression of art and architecture of the River valley Civilizations. |
| 2S-A-4.2 | Students understood about Study of visual art principles, scale and proportions of various period like Greek and all |
| 2S-A-4.3 | Students got to know Role of culture and art on architecture in Indian context |
| | **Architectural Graphics II (2S-A-5)** |
| 2S-A-5.1 | Students understood orthographic projections in detail through exercises |
| 2S-A-5.2 | Students understood complex projections in detail through exercises |
| 2S-A-5.3 | Development of drafting skills for architectural drawings. |
| | **Workshop Practice – II (2S-A-6)** |
| 2S-A-6 | Developing understanding of various material and efficiency in technique in students. Through various exercises like model making, product designing, etc. |
| | **Elective A - Presentation Skills – II (2S-AA-1)** |
| 2S-AA-1.1 | Development of communication and public speaking skills in students. |
| | **Elective B -Fundamentals of Drawing Techniques (2S-AA-2)** |
| 2S-AA-2.1 | Students got to know about correct drawing techniques and its fundamentals through exercises |
| **Bachelor of Architecture Third Semester** | |
| | **Architectural Design – II (3S-A-1)** |
| 3S-A-1.1 | To understand Complexity in circulation- and pattern of horizontals as well as vertical movement. |
| 3S-A-1.2 | To understand Integration in terms of facilitation, planform, volume, concept and space organization. |
| 3S-A-1.3 | To know the Application of basic building materials to evolve a design with their aesthetic appeal, functional quality and elementary structural concepts to evolve specific form. |
| 3S-A-1.4 | To understand Climatic consideration for the design, orientation of building on site, simple concepts of sun shading devices, their application in elevations as functional / aesthetic solutions. |

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| | **Construction Technology And Material – III (3S-A-2)** |
| 3S-A-2.1 | To understand about the use of materials i.e Tiles, Steel, Aggregate, Reinforcement Bars. |
| 3S-A-2.2 | To know Concept of vertical connector – Study of staircases. |
| 3S-A-2.3 | To understand the Concept of spanning and its extension in formation of roofs and floors. |
| 3S-A-2.4 | To understand Principle of framed structure: R.C.C. as a building material and all R.C.C. elements, steel framed structures. |
| | **Structural Design And System III (3S-A-3)** |
| 3S-A-3.1 | To understand stress strain curve for concrete and steel. |
| 3S-A-3.2 | To know Euler's and Rankin's theory and its concept and applications. |
| 3S-A-3.3 | To understand concept and applications of direct and bending stress. |
| 3S-A-3.4 | To draw shear force and bending moment diagram of simply supported beam, cantilever and overhanging beam. |
| 3S-A-3.5 | To understand stress at base, minimum base width of retaining wall. |
| 3S-A-3.6 | To know principle stresses and strains, applications of Mohr's circle, study of concept by analytical method. |
| | **History of Art and Architecture-III (3S-A-4)** |
| 3S-A-4.1 | The student shall be able to understand the Islamic Architecture and Architectural forms conceived by Qutub Dynasties at Delhi. |
| 3S-A-4.2 | The student shall be able to understand the Islamic Architecture of Provinces such as Bengal, Jaunpur, Gujrat and Central India. |
| 3S-A-4.3 | The student shall be able to understand about Architecture under Mughals - Humayun, Akbar, and Shahjahan. |
| 3S-A-4.4 | The student shall be able to learn about the Contemporary Architecture |
| 3S-A-4.5 | The student shall be able to understand the city planning of Chandigarh, Delhi and study of its important Administrative buildings. |
| 3S-A-4.6 | The student shall be able to understand various schools of thoughts and philosophies of modern architects |
| 3S-A-4.7 | The student shall be able to understand Industrial revolution in Europe |
| | **Architectural Graphics III (3S-A-5)** |
| 3S-A-5.1 | To understand the Perception and registration of an object when viewed. |
| 3S-A-5.2 | To know the Types perspective views such as one point, two point, three point, worm's eye view, Bird's eye view, normal view, etc. |
| 3S-A-5.3 | To know how to draw the Measured Drawing and Measurement techniques of existing object (such as building, plot, etc.) Chain survey, methods and compass and instruments used, plotting and adjustment of closing error. |
| 3S-A-5.4 | To understand Levelling, methods of levelling -dumpy level and its uses. Contour survey Contours, use of theodolite. Planimeter and its use. |
| | **Surveying and Levelling (3S-A-6)** |
| 3S-A-6.1 | To surveying and levelling, types of surveying methods and application. |
| 3S-A-6.2 | To know how to use survey instruments for Chain survey, methods and compass and instruments used, plotting and adjustment of closing error. |

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| 3S-A-6.3 | To understand how to do Plane table survey, method and instruments used, Levelling, methods of levelling -dumpy level and its uses, contour survey Contours, use of theodolite, Planimeter and its use. |
| | **Climate and Architecture (3S-A-7)** |
| 3S-A-7.1 | The student shall be able to learn Study of traditional / vernacular architecture |
| 3S-A-7.2 | The student shall be able to understand the climate data, its analysis and method of presentation.. |
| 3S-A-7.3 | The student shall be able to learn the passive cooling techniques, techniques of solar radiation control and heat transfer and insulation. |
| 3S-A-7.4 | The student shall be able to understand effect of orientation, topography, vegetation, form, building materials and surfaces on the building design in response to the climate |
| 3S-A-7.5 | The student shall be able to learn Approach to climate responsive built environment. |
| | **Vernacular Architecture (ELE A) (3S-AA-1)** |
| 3S-AA-1.1 | Students got to know about various styles of veracular architecture among the world. |
| | **Architectural Documentation (3S-AA-2)** |
| 3S-AA-2.1 | To know how to document an as built structures and make presentation drawings |
| **Bachelor of Architecture Fourth Semester** | |
| | **Architectural Design II (4S-A-1)** |
| 4S-A-1.1 | To understand Complexity in circulation- and pattern of horizontals as well as vertical movement. |
| 4S-A-1.2 | To understand Integration in terms of facilitation, planform, volume, concept and space organization. |
| 4S-A-1.3 | To know the Application of basic building materials to evolve a design with their aesthetic appeal, functional quality and elementary structural concepts to evolve specific form. |
| 4S-A-1.4 | To understand Climatic consideration for the design, orientation of building on site, simple concepts of sun shading devices, their application in elevations as functional / aesthetic solutions. |
| | **Construction Technology And Material - III (4S-A-2)** |
| 4S-A-2.1 | To understand about the use of materials i.e. Metals: Aluminium, copper, steel, titanium etc. |
| 4S-A-2.2 | To know about the types of Doors Windows – Steel, aluminium and sliding doors, sliding and folding doors, revolving doors, revolving shutters, collapsible gates and its construction details. |
| 4S-A-2.3 | To understand and design different types of Partitions – Aluminium, timber, steel. |
| 4S-A-2.4 | To know and understand how Timbering to trenches, formwork, centering, shoring and underpinning. Is done with Temporary Structures and temporary supports |
| | **Structural Design and System-IV (4S-A-3)** |
| 4S-A-3.1 | Analysis and draw bending moment and shear force diagrams for fixed beam under different loading condition. |

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| 4S-A-3.2 | Apply the concept of three moment theorem for analysis and to drawing bending moment and shear force diagrams for continuous beam under different loading condition. |
| 4S-A-3.3 | Apply the concept of moment distribution for analysis and to drawing bending moment and shear force diagrams for continuous beam and portal frame under different loading condition. |
| 4S-A-3.4 | Apply the Macaulay's method for determination of deflection for simply supported and cantilever beam under different loading condition. |
| 4S-A-3.5 | Have the knowledge about determinate and indeterminate structure. |
| 4S-A-3.6 | Have the knowledge about the arches and apply the knowledge to analysis the three hinged arches. |
| 4S-A-3.7 | Have the knowledge about loading conditions and unit weights of various material used in construction work. |
| 4S-A-3.8 | Have the concept of load distribution system in suspension cable system, one-two way slab and arches |
| | **Building Services – I (4S-A-4)** |
| 4S-A-4.1 | The students will know about importance, installation and working of essential services in buildings, and a way building services help in generating a cleaner and healthier built environment. The students should also be made familiar with I.S. codes related to services. To understand the basic aspects of water supply, sewage disposal, refuse and storm water disposal in buildings. |
| | **Architectural Graphics IV (4S-A-5)** |
| 4S-A-5.1 | To understand the effect of combination of shades and shadows using Complex problems on-buildings, building projections, louvers, chajjas, canopies etc. rendered in appropriate medium |
| 4S-A-5.2 | To know the effect of shades and shadows cast by artificial light on built forms. |
| 4S-A-5.3 | To know how to make Perspective of interior of buildings rendered suitably ,Parallel and angular exterior perspective views of objects of buildings |
| 4S-A-5.4 | To know how to make Bird's eye view showing a building or any object with surrounding landscape, buildings etc. rendered |
| | **Theory of Architecture-I (4S-A-6)** |
| 4S-A-6.1 | To understand the definition of Architecture; Elements of Architecture backed by need and followed by fulfillment of need. |
| 4S-A-6.2 | To know about Architectural Design and the Integration of aesthetic and function |
| 4S-A-6.3 | To know about Mass and space, Visual and emotional effects of geometric forms and their derivate |
| 4S-A-6.4 | To know about Aesthetic Components of Design |
| 4S-A-6.5 | To know about effect in of colour architecture |
| | **Theory of Landscape Architecture (4S-A-7)** |
| 4S-A-7.1 | Through this subject the students shall be aware of architecture beyond buildings, in the outdoor environment and spaces, and, the role and importance of landscaping and site planning in enhancing and improving the quality of building |

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| | environs, functionally and aesthetically |
| | **Elective A Computer Application I (4S-AA-1)** |
| 4S-AA-1.1 | The student shall be able to understand Auto cad 2D Implementation . |
| | **Elective B Product Design (4S-AA-2)** |
| 4S-AA-2.1 | Through this subject the students shall be aware of architecture beyond buildings, in the outdoor environment and spaces, and, the role and importance of landscaping and site planning in enhancing and improving the quality of building environs, functionally and aesthetically |
| **Bachelor of Architecture Fifth Semester** | |
| | **Architectural Design-IV (5S-A-1)** |
| 5S-A-1.1 | The student shall be able to understand the Effect of sun, rain and wind on buildings. |
| 5S-A-1.2 | The student shall be able to understand the Functional organization of activities with respect to site, its topography and surroundings. |
| 5S-A-1.3 | The student shall be able to learn about the Development control rules, building byelaws and standard codes |
| 5S-A-1.4 | The student shall be able to learn about the Functioning of building services like drainage, water supply and electricity |
| 5S-A-1.5 | The student shall be able to learn about the Form to suit the purpose of building. |
| | **Construction Technology and Materials –V (5S-A-2)** |
| 5S-A-2.1 | The student shall be able to understand the Cement, paints, various types of plasters, paints, varnishes and finishes. |
| 5S-A-2.2 | The student shall be able to understand the Plasters and finishes. . |
| 5S-A-2.3 | The student shall be able to learn about the Expansion Joints, Water-Proofing, earthquake resistant structures. |
| 5S-A-2.4 | The student shall be able to learn about the False Ceiling, Suspended ceilings, roofs. |
| 5S-A-2.5 | The student shall be able to understand the Foundations, footings and all advanced foundations. |
| | **Structural Design and System-V (5S-A-3)** |
| 5S-A-3.1 | The student would be able to apply knowledge of Design component of Building using Indian Standard code |
| 5S-A-3.2 | The student would be able to apply Design of Beam using Various component of Building. |
| 5S-A-3.3 | The student would be able to apply knowledge of IS code for various Component of Building. |
| 5S-A-3.4 | The student would be able to apply the concept of T and L Beam using various method |
| 5S-A-3.5 | The student would be able to apply knowledge to analyze concept of Beam for various method |
| 5S-A-3.6 | The student would be able to apply knowledge to Design component. |
| | **Building Services –II (5S-A-4)** |
| 5S-A-4.1 | The student shall be able to understand the Electrical services, various wiring |

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| | systems detailed layout of electrical services in a residence. |
| 5S-A-4.2 | The student shall be able to understand the Schematic water distribution system from treatment plants to town, group housing etc. |
| 5S-A-4.3 | The student shall be able to learn about the Hot water supply in high-rise buildings, boilers, furnaces, solar water heaters, computing a special demands of water for swimming pools, air conditioning plants, fire fighting, street washing, fountains and gardens etc. and their systematic layouts. |
| 5S-A-4.4 | The student shall be able to learn about the sewage collection and disposal for large campuses, complexes. |
| 5S-A-4.5 | The student shall be able to understand the Rain water harvesting. |
| | **Architectural Graphics-V (5S-A-5)** |
| 5S-A-5.1 | The student shall be able to learn Submission drawing as per the local building bye laws. |
| 5S-A-5.2 | The student shall be able to understand the Working drawings required for carrying out actual construction work. |
| 5S-A-5.3 | The student shall be able to learn the graphics of the drawings will be with specific reference to the code of practice for Architectural and Structural drawings as laid down in B.I.S. No.962 of 1960. |
| | **Theory of Design-II (5S-A-6)** |
| 5S-A-6.1 | The student shall be able to understand Organization of Forms and Spaces a) Spacial relationships b) Spacial Organization c) Articulation of Forms and Space |
| 5S-A-6.2 | The student shall be able to understand the Character and Style in Building |
| 5S-A-6.3 | The student shall be able to learn about the Principles of Composition |
| 5S-A-6.4 | The student shall be able to learn about the Harmony and specific qualities of design |
| 5S-A-6.5 | The student shall be able to Study of circulation pattern |
| | **Specifications (5S-A-7)** |
| 5S-A-7.1 | The student shall be able to understand importance of specifications building construction activity. |
| 5S-A-7.2 | The student shall be able to understand Specifications of basic building materials such as bricks, stones, aggregate, cement, steel, timber etc. |
| 5S-A-7.3 | The student shall be able to learn about the Specifications of works for a residential building of load bearing type or R.C.C. framed type. |
| 5S-A-7.4 | The student shall be able to learn about the Specifications for items of services such as drainage, wafer supply, electrical installation. |
| 5S-A-7.5 | The student shall be able to study Specifications for demolition-work, temporary construction like sheds, exhibition stalls, gateways. |
| | **Computer Application II Elective A (5S-AA-1)** |
| 5S-AA-1.1 | The student shall be able to understand AutoCAD 2D Implementation. |
| 5S-AA-1.2 | The student shall be able to understand AutoCAD 3D |
| 5S-AA-1.3 | The student shall be able to learn 3D model. |

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| | **Appropriate Technology Elective B (5S-AA-2)** |
| 5S-AA-2.1 | The student shall be able to understand the concept of appropriate technology, its relevance in present day context , scope etc |
| 5S-AA-2.2 | The student shall be able to understand. Study of soil and its composition and properties |
| 5S-AA-2.3 | The student shall be able to learn about the Specifications of works for a residential building of load bearing type or R.C.C. framed type. |
| 5S-AA-2.4 | The student shall be able to learn about Wattle and daub walls, Rammed earth walls and adobe walls. |
| 5S-AA-2.5 | The student shall be able to study. Walls, vaults, Domes using soil cement blocks, compressed mud blocks, Nubian arch roof. |
| 5S-AA-2.6 | The student shall be able to understand Use of bamboo as building material |
| 5S-AA-2.7 | The student shall be able to understand Burnt clay tile roofing, Ferro cement roofing units, Doubly curved tile roofing, precast joists etc |
| **Bachelor of Architecture Sixth Semester** | |
| | **Architectural Design V (6S-A-1)** |
| 6S-A-1.2 | The student shall be able to understand the Functional organization of activities with respect to site, its topography and surroundings. |
| 6S-A-1.3 | The student shall be able to learn about the Development control rules, building byelaws and standard codes |
| 6S-A-1.4 | The student shall be able to learn about the Functioning of building services like drainage, water supply and electricity |
| 6S-A-1.5 | The student shall be able to learn about the Form to suit the purpose of building. |
| | **Construction Technology and Materials –VI (6S-A-2)** |
| 6S-A-2.1 | The student shall be able to understand the Cladding Materials |
| 6S-A-2.2 | The student shall be able to understand Bamboo, mud, Ferro-cement, vault domes, flat slabs etc. |
| 6S-A-2.3 | The student shall be able to learn High rise construction |
| 6S-A-2.4 | The student shall be able to learn Advanced R.C.C. Structures |
| | **Structural Design and Systems- VI (6S-A-3)** |
| 6S-A-3.1 | The students would have the knowledge of the earthquake resistant structure. |
| 6S-A-3.2 | The students would be able to design the one way slab, two way slab and continuous slab. |
| 6S-A-3.3 | The students would be able to understand the design of different types of columns. |
| 6S-A-3.4 | The students would be able to design the independent column footing. |
| 6S-A-3.5 | The students can apply the knowledge to design the RCC Grid Structure. |
| 6S-A-3.6 | The students would have the knowledge of the RCC building frame and its structural behavior. |
| 6S-A-3.7 | The students would be able to design the RCC section of retaining wall by considering different support conditions. |
| 6S-A-3.8 | The students would be able to understand the structural behavior of large span RCC system like portal frame, arches, open web sections, shell roofs etc. |

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| | **Building Services -II (6S-A-4)** |
| 6S-A-4.1 | The student shall be able to understand the Communication systems in buildings |
| 6S-A-4.2 | The student shall be able to understand the building automation systems, components and application of BAS, Architectural implications. |
| 6S-A-4.3 | The student shall be able to learn about the Causes of fire in buildings, Fire safety and preventive measures. |
| 6S-A-4.4 | The student shall be able to learn Fire fighting regulations with reference to National Building code etc. |
| 6S-A-4.5 | The student shall be able to learn about of Fire detection systems |
| 6S-A-4.6 | The student shall be able to learn Ventilation of buildings |
| | **Architectural Graphics VI (6S-A-5)** |
| 5S-A-5.1 | The student shall be able to learn Submission drawing as per the local building bye laws. |
| 5S-A-5.2 | The student shall be able to understand the Working drawings required for carrying out actual construction work. |
| 5S-A-5.3 | The student shall be able to learn the graphics of the drawings will be with specific reference to the code of practice for Architectural and Structural drawings as laid down in B.I.S. No.962 of 1960. |
| | **Design of Humanities and Settlement (6S-A-6)** |
| 6S-A-6.1 | The study aims at introducing students to the development of planning thought from that of historic to present age. It also gives emphasis on stressing broad principles of settlement in such period. The study of this subject continues with emphasis on planning philosophies and the student to carry out the further studies in the specialized field of Urban Planning |
| | **Estimating and Costing (6S-A-7)** |
| 6S-A-7.1 | The student shall be able to understand the Purpose of Estimating, types of estimates |
| 6S-A-7.2 | The student shall be able to understand the Bill of quantities for single story structures |
| 6S-A-7.3 | The student shall be able to study about the IS-l200. |
| 6S-A-7.5 | The student shall be able to learn Estimation of quantities for R.C.C. structural members. |
| 6S-A-7.6 | The student shall be able to learn Estimation for electrification, water supply and sanitation. |
| 6S-A-7.7 | The student shall be able to learn rate analysis. |
| 6S-A-7.8 | The student shall be able to learn brief specifications and schedule of rates. |
| | **Project Management (6S-AA-1)** |
| 6S-AA-1.1 | Students shall be able to understand the need of project management in architecture professional practices. |
| 6S-AA-1.2 | Students shall be able to work out the project planning, scheduling and implementation management. |

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| | **Advanced Spatial Analysis (6S-AA-2)** |
| 6S-AA-2.1 | Students shall be able to understand the spatial grid and density of activity spaces in an urban area. |
| 6S-AA-2.2 | Students hall be able to analyse the requirements of development through surveys and analytical study under urban area development. |
| **Bachelor of Architecture Seventh Semester** | |
| | **Architectural Design-VII (7S-A-1)** |
| 7S-A-1.1 | The student shall be able to understand the Design orientation of advance and specialized buildings and environmental services, climate and acoustical system oriented buildings, their appropriate structural buildings and construction techniques. |
| 7S-A-1.2 | The student shall be able to understand the Orientation on development control rules |
| 7S-A-1.3 | The student shall be able to learn about the study of urban environment, complex building forms, their design including positive and negative space relationship, Parking Provision, Precincts concept and pedestrian movement. |
| | **Construction Technology and Materials –VII (7S-A-2)** |
| 7S-A-2.1 | The student shall be able to understand the space structures, types of space structures |
| 7S-A-2.2 | The student shall be able to understand the Grid structures and Skeletal structures, space frames, domes etc. |
| 7S-A-2.3 | The student shall be able to learn about the Pre-cast concrete, Design considerations and constraints, advantages over cast-in-situ construction. |
| 7S-A-2.4 | The student shall be able to learn about the methods of pre-stressing, advantages and disadvantages and applications. |
| 7S-A-2.5 | The student shall be able to understand the Temporary structures design and detailing problems on small temporary structures. |
| 7S-A-2.6 | The student shall be able to understand the various external cladding materials and systems, curtain walling in various materials. |
| | **Building Services-IV (7S-A-3)** |
| 7S-A-3.1 | The student shall be able to understand the Principles of Psychometrics and heat transfer, Study of Air conditioning systems |
| 7S-A-3.2 | The student shall be able to understand the Components of A.C. systems. Calculation of A.C. loads and Air distribution systems, ducts and ducting layouts, space requirement, Water demand for A.C |
| 7S-A-3.3 | The student shall be able to learn about the Electric supply and distribution for group housing projects, urban complexes, high-rise building etc. |
| 7S-A-3.4 | The student shall be able to learn about the Importance and functions of bus bar, set up, step up and step down transformers, electrical substation, lightning conductors, stand by generators, automatic relays, invertors, circuit breakers etc. |
| 7S-A-3.5 | The student shall be able to understand the Electromechanical means of vertical transportation in buildings. |
| 7S-A-3.6 | The student shall be able to understand the Escalators and Trav-o-lators |

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| | **Structural Design and System-VII (7S-A-4)** |
| 7S-A-4.1 | To know about the steel connections, types of welds, concentric section, eccentric section, section in bending and section in torsion. |
| 7S-A-4.2 | To have complete knowledge about IS 800-2007 Design considerations. |
| 7S-A-4.3 | To understand the Design of Tension members. |
| 7S-A-4.4 | To understand the Design of Compression members like Struts or Independent. |
| 7S-A-4.5 | To know about the Design in columns |
| 7S-A-4.6 | To know about the Design of section in bending |
| 7S-A-4.7 | To know about the Design of section subjected to biaxial bending |
| 7S-A-4.8 | To study and understand about the structural behaviours of types of large span steel structure like arches, open web section, bow string girders, suspension structure, geodesic dome and space structure. |
| | **Research Skills and Project Introduction (7S-A-5)** |
| 7S-A-5.1 | The student shall be able to learn about the investigation to be done in research, methodology in sequence to achieve to Acquire desired results. |
| 7S-A-5.2 | The student shall be able to understand the Assessment of data to be used in formation of the total thesis profile. |
| 7S-A-5.3 | The student shall be able to learn the Data collection |
| 7S-A-5.4 | The student shall be able to understand the Concluding part of research comprising of the data |
| | **Acoustics and Illumination (7S-A-6)** |
| 7S-A-6.1 | The student shall be able to understand about the sounds. |
| 7S-A-6.2 | The student shall be able to understand the Components of A.C. systems. Calculation of A.C. loads and Air distribution systems, ducts and ducting layouts, space requirement, Water demand for A.C |
| 7S-A-6.3 | The student shall be able to learn about the Electric supply and distribution for group housing projects, urban complexes, high-rise building etc. |
| 7S-A-6.4 | The student shall be able to learn about the Importance and functions of bus bar, set up, step up and step down transformers, electrical substation, lightning conductors, stand by generators, automatic relays, invertors, circuit breakers etc. |
| 7S-A-6.5 | The student shall be able to understand the Electromechanical means of vertical transportation in buildings. |
| 7S-A-6.6 | The student shall be able to understand the Escalators and Trav-o-lators. |
| | **Interior Design (7S-AA-1)** |
| 7S-AA-1.1 | To how to make presentation drawings, working drawings details and 3d views of various interior projects ranging from industrial to commercial to residential Projects. |
| 7S-AA-1.2 | An understanding of interior design as an interdisciplinary as well as allied field related to Architecture. |
| | **Valuation (7S-AA-2)** |
| 7S-AA-2.1 | To understand the Different methods of valuation for land and building Application of valuation and consideration of valuables in Town Planning regarding the plots and development. |
| 7S-AA-2.2 | To know the Application of valuation, tables Valuation |

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| **Bachelor of Architecture Eighth Semester** | |
| | **Practical Training (8S-A-1)** |
| 8S-A-1.1 | To receive hands on Office experience in respect of preparation of working drawing, detailing drawings of perspective, preparation of architectural models, study of filing systems of documents, drawings, ammonia prints and preparation of tenderdocument.<br>To have on Site experience, in respect of supervision of the construction activity, Observation, layout on site, study of the staking methods of various building, materials, taking the measurement and recording. |
| **Bachelor of Architecture Ninth Semester** | |
| | **Practical Training (9S-A-1)** |
| 9S-A-1.1 | To receive hands on Office experience in respect of preparation of working drawing, detailing drawings of perspective, preparation of architectural models, study of filing systems of documents, drawings, ammonia prints and preparation of tenderdocument.<br>To have on Site experience, in respect of supervision of the construction activity, Observation, layout on site, study of the staking methods of various building, materials, taking the measurement and recording. |
| **Bachelor of Architecture Tenth Semester** | |
| | **Practical Training (10S-A-1)** |
| 10S-A-1 | To design a research project based on the synthesis of total experience and knowledge gained from the core and allied subjects with an effective design solution/s. |
| | **Construction Technology and Materials - VIII (10S-A-2)** |
| 10S-A-2 | To understand the advanced construction Techniques for long span structure by using various materials.<br>Students shall be able to understand the design and construction requirements for high rise and critical building designs |
| | **Professional Practice (10S-A-3)** |
| 10S-A-3.1 | Students shall be able to understand the process of contract and tender bidding. |
| 10S-A-3.2 | Students shall be able to understand the legislation pertaining to arbitration, easement rights, land acquisition and urban ceiling |
| | **Elective – A – Housing (10S-AA-1)** |
| 10S-AA-1.1 | To know about the housing programmes/Schemes by Government of India. |
| 10S-AA-1.2 | To know about the status of housing in India and housing mission. |