#### **PROGRAM OUTCOMES:**

#### PO 1: Engineering knowledge:

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

#### PO 2: Problem analysis:

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

#### PO 3: Design/development of solutions:

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

#### PO 4: Conduct investigations of complex problems:

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

#### PO 5: Modern tool usage:

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

#### PO 6: The engineer and society:

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

#### PO 7: Environment and sustainability:

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

#### PO 8: Ethics:

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

#### PO 9: Individual and team work:

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

#### PO 10: Communication:

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

#### PO 11: Project management and finance:

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

#### PO 12: Life-long learning:

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

#### **Program Specific Outcomes:**

**PSO 1:** Exposure to Industry and inculcate skills to solve mechanical engineering Problems.

**PSO 2:** Application to rural and social development.

# Course Name: BES101T (Applied Mathematics - I) Students shall be able to:

BES101.1T	apply Differential Calculus by using indeterminate forms, Taylor's and
	Maclaurin's Series.
BES101.2T	apply Partial Differentiation by the use of Euler's theorem, chain rule, Jacobian's
	and Lagrange's method of multipliers.
BES101.3T	Students shall be able to exhibit the inverse of a Matrix and Rank of a Matrix.
BES101.4T	construct the first order differential equations and can be solved.
BES101.5T	exhibit the Higher order differential equations with constant coefficients and
	its applications.
BES101.6T	exhibit the Complex numbers by using De Moivre's theorem and can Separate
	the real and imaginary parts

# Course Name: BES102T (Engineering Physics)

# Students shall be able to:

BES102.1T	learn the concept of Dual Nature of light and micro-particle with theoretical and
	experimental support. Also able to analyze the problem related to the topics
BES102.2T	understand Uncertainty Principle as well as application of Schrodinger's equation
	in one dimensional potential well. Also able to analyze the problem related to the
	topics
BES102.3T	learn properties of cubic crystal structures and Bragg law for X-ray diffraction. Also
	able to analyze the problem related to the topics
BES102.4T	understand formation of Bands in solids, properties of semiconductor devices,
	their testing and utility in small projects.

# Course Name: BES102 P (Engineering Physics)

# Students shall be able to:

BES102.1P	learn the band gap of semiconductor material and V-I characteristics of diodes and
	transistor by analysis from graph.
BES102.2P	understand the technique of measurement of refractive index of material of prism
	and wavelength of monochromatic light using Spectrometer.
BES102.3P	learn basic functions of CRO and its use for measurement of fundamental Physical
	quantities i.e. voltages and frequency.
BES102.4P	understand the identification of N-type and P-type specimens and calculation of
	charge carrier density using Hall effect set up.

# Course Name: BES103T (Engineering Chemistry)

BES103.1T	Differences between hard & soft water, studies of various softening methods & its applications, also able to analyze boiler troubles.
BES103.2T	Electrochemical Fundamentals, corrosion prevention methods & environmental induced methods.
BES103.3T	Different types of cements & its manufacturing process. They also understand microscopic constituents of cement.
BES103.4T	Applications of SCF, concept of green chemistry & carbon credit. Different types, operating principles & mechanisms of batteries & fuel cells.

# Course Name: BES103P (Engineering Chemistry) Students shall be able to:

BES103.1P	Analyze the quality of water based on impurities in terms of hardness, alkalinity, free chlorine etc.
BES103.2P	To determine the metal contents present in ore such as copper, Nickel & Iron.
BES103.3P	Analyze Waste water in terms of pH, COD, DO
BES103. 4P	Analyze capacities of resins & heat of neutralization.

# Course Name: BES104T (Basic Electrical Engineering)

#### Students shall be able to:

BES104.1T	Design and verify laws of DC Electric Circuits .
BES104.2T	Understand basic term and analyzed composite Magnetic Circuits.
BES104.3T	Understand basic fundamental of polyphase AC Circuits .
BES104.4T	Understand fundamental of single phase transformer and its testing.

# Course Name: BES104P (Basic Electrical Engineering)

#### Students shall be able to

BES104.1P	verify laws of DC Electric Circuits .
BES104.2P	Understand and verify B H Curve of Magnetic Circuits.
BES104.3P	Measurement of R,L and C of AC Circuits .
BES104. 4P	Understand fundamental of single phase transformer testing.

# Course Name: BES105T (Basic Civil Engineering)

# Students shall be able to:

BES105.1T	Introduction to various field of Civil Engineering and the role of Engineer in
	Infrastructural Development.
BES105.2T	Introduction to various types of buildings ,its components & various building
	materials used.
BES105.3T	Introduction to surveying & modern survey methods.
BES105.4T	Introduction to water supply & water management.
BES105.5T	Introduction to various modes of transportation & classification of highways.
BES105.6T	Introduction to various instruments & tools used in civil engineering & role of
	Engineers in sustainable development.

# Course Name: BES106T (Engineering Graphics – I)

BES106.1T	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, types of lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engineering applications.
BES106.2T	The concept of orthographic projection, co-ordinate plane, first and third angle method of projection and their conventional representations.
BE106.3T	The concept of projections by projecting image of point placed in all possible positions with respect to reference planes, similarly. the projections of.lines placed in first quadrant
BES106.4T	The concept and applications of projection of planes and solids and can able to draw
BES106.5T	Conversion of pictorial view into multi view orthographic projection and can able to draw
BES106.6T	The concept of Isometric projection and develop the imagination power to convert multi-view orthographic into three dimensional pictorial one view projection.

#### Course Name: BES106.1P (Engineering Graphics – I) Students shall be able to

BES106.1P	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, types of lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engineering applications.	
BES106.2P	The concept of orthographic projection, co-ordinate plane, first and third angle method of projection and their conventional representations.	
BES106.3P	The concept of projections by projecting image of point placed in all possible positions with respect to reference planes, similarly. the projections of lines placed in first quadrant	
BES106. 4P	The concept and applications of projection of planes and solids and can able to draw	
BES106. 5P	Conversion of pictorial view into multi view orthographic projection and can able to draw	
BES106.6P	The concept of Isometric projection and develop the imagination power to convert multi-view orthographic into three dimensional pictorial one view projection.	

# Course Name: BES107P (Communication Skill)

#### The Student shall be able to :

BES107.1P	acquire language skills required to write their business, Job Correspondence and
	technical writings.
BES107.2P	gain knowledge of grammar to face competitive examinations to pursue master
	degree.
BES107.3P	organize their thoughts in English and hence face job interviews more confidently.
BES107. 4P	acquire the skills of comprehension.

# Course Name: BES107P (Computational Skills)

# The Student shall be able to :

BES108.1P	Identify and understand the key componants of computer System.
BES108.2P	Understand the basic terminology used in C-langauge and Compile, Debug a C-
	Program.
BES108.3P	Understand and Devolop the program based on Decision control and loop control
	structures.
BES108 4P	Understand and Devolop the C-program based on Array.
BES108.5P	Understand and Devolop the C-program using Function and Pointers.

# SECOND SEMESTER

#### Course Name: BES201T (Applied Mathematics - II) Students shall be able to :

BES201.1T	solve the Beta and Gamma Functions and Root Mean square Values in	
	Integral Calculus.	
BES201.2T	trace the curves and can find Areas and Volumes of curves.	
BES201.3T	solve Multiple Integrals and apply it to find mass, area and volume	
BES201.4T	exhibit Vector Algebra and Vector Differential calculus and also	
	Gradient, Divergence and Curl.	
BES201.5T	exhibit Vector Integral Calculus by Gauss Divergence Theorem, Stoke's and	
	Green's theorem.	
BES201.6T	solve fitting of a straight line, parabola, lines of regression in Statistics and	
	Langrange's interpolation formula for unequal intervals in Finit Differences.	

#### Course Name: BES202T (Advance Physics) Students shall be able to

BES202.1T	The student shall able to learn the concept of interference of light in thin film,
	Basics of LASER, their types and various engineering applications.
BES202.2T	The student shall able to understand the motion of charged particle in Uniform
	electric and magnetic field and various devices. Also able to analyze the problems
	related to the topic.
	The student shall able to learn the phenomenon of total internal reflection,
BES202.3T	construction of optical fiber and its applications in communication and different
	sensors .Also able to analyze the problems related to the topic.
BES202.4T	The student shall able to learn the methods of synthesis of nanomaterials and their
	drastic change in properties and their impact on society and environment.

# Course Name: BES202P (Advance Physics)

# Students shall be able to

BES202.1P	The student shall able to learn the different Lissajeous Figures and frequency
	measurement using CRO.
BES202.2P	The student shall understand measurement of conductivity of semiconductor
	material using four-probe setup.
BES202.3P	The student shall able to understand the diffraction pattern shown by He-Ne laser
	and measurement of wavelength of laser in simple way.
BES202.4P	The student shall able to understand the interference pattern in Newton's ring

# Course Name: BES203T (Material Chemistry)

#### Students shall be able to

BES203.1T	Different properties &, types of fuel, able to analyze the fuel for various
	application, also studies alternative energy sources and their significance.
BES203.2T	Liquid fuel its chemical properties and applications. They also able to perform
	combustion calculations.
BES203.3T	Different types of lubricants, mechanisms, properties and applications. They also
	able to select lubricant for different engineering applications.
BES203.4T	Various types of polymers its property and applications. They also understand
	concept composites and nonmaterial & their engineering applications.

# Course Name: BES203P (Material Chemistry)

#### Students shall be able to

BES203.1P	Analyze the fuel both qualitatively as well as quantitatively in terms of ash, volatile matter, calorific value.
BES203.2P	Determination of physical and chemical properties of lubricant such as viscosity, flash point, acid value etc.
BES203.3P	Know Preparation of biodiesel.
BES203. 4P	Determine saponification of Acetic Acid

# Course Name: BES204T (Engineering Mechanics)

BES204.1T	study plane and space force system
BES204.2T	analyze the plane and space structure considering equilibrium of structure
BES204.3T	study different types of loads and its equilibrium
BES204.4T	study centroid and moment of inertia of plane lamina
BES204.5T	Apply knowledge of kinematic and kinetic analyses and energy and momentum
	methods

# Course Name: BES204P (Engineering Mechanics)

#### Students shall be able to

BES204.1P	Determine the components of a force in rectangular or nonrectangular
	coordinates and the resultant of a system of forces by graphically.
BES204.2P	Draw complete and correct free-body diagrams and write the appropriate
	equilibrium equations from the free-body diagram.
BES204.3P	To determine the support reactions on a structure.

# Course Name: BES205T (Advance Electrical Engineering)

#### Students shall be able to

BES205.1T	Understand basic term and protection device of Electrical Power System.
BES205.2T	Understand fundamental of DC Machines
BES205.3T	Calculate the domestic electricity charges, illumination and design of wiring system
BES205.4T	Understand fundamental of different type induction motors

#### Course Name: BES206P (Engineering Graphics – II)

#### Students shall be able to

BES206.1P	The use Computer Aided Drafting packages, its applications use of commands
	used for drawing.
BES206.2P	Type of section planes, sectional multi view orthographic projection when solid in
	different position is cut by section plane obtain true shape of the section and can
	draw.
BES206.3P	Importance an d application of development of lateral surfaces, method of
	development and development of cut solids, and can draw.
BES206. 4P	How to identify edge obtain by intersection of surfaces, imagination and
	visualization o missing orthographic view and can draw.

# Course Name: BES207P (Work Shop)

#### Students shall be able to

BES207.1P	Study of Different Workshop Tools and Equipments : Approach to use different tool and equipments of Fitting, Carpentry, Welding and Blacksmithy to complete the specified job with understanding of practical constraints.
BES207.2P	Teamwork: Work effectively in teams to accomplish the assigned responsibilities in an integral manner.
BES207.3P	Technical Communication: Communicate effectively about laboratory work both orally and in writing journals/technical reports.
BES207.4P	Ethics and safety awareness: Behave with highest ethical standards with concern to global, environmental, economic, social issues, safety requirement with lifelong learning and awareness of contemporary issues.

# Course Name: BES208P (Ethical Science)

# Student shall able to : BES208.1P understand the Culture and Civilization, and acquire the knowledge of right to Information, Public Interest Litigation. BES208.2P expand knowledge of industrial Psychology and Sociology (Fatigue, Selection and Training of workers) BES208.3P the professional ethics and importance of leadership in Industry.

BES208.4P	acquire the knowledge of Indian Constitution and Federal system and learn fundamental right of different positional.
BES208.5P	understand the concept of Industrial Democracy and work organization.

# THIRD SEMESTER

# Course Name: BEME301T (Applied Mathematics - III)

#### Students shall be able to

BEME301.1T	apply Laplace transforms to solve ordinary differential Equations arising in engineering
	problems
BEME301.2T	calculate the Fourier sine and cosine transforms
BEME301.3T	solve to Isoperimetric problem, Boundary value problem by using Calculus of Variations
BEME301.4T	solve the integral in given region, expansion of function by using Taylor's and Laurent's
	Series , verify function is analytic or not in given region and also able to find Analytic
	function by using functions of complex variable
BEME301.5T	solve certain problems in Calculus of Variation by using Partial Differential Equation
BEME301.6T	find any power of matrix.

# Course Name: BEME302T (Kinematics of Machine)

#### Students shall be able to:

BEME302.1T	understand the basic concepts of mechanisms and machines.
BEME302.2T	perform Quantitative kinematics analysis of mechanism.
BEME302.3T	understand the basic concepts of tooth profile and tooth geometry of different type of
	gears and kinematics of gear trains.
BEME302.4T	synthesis of planer mechanism for various motion requirements.
BEME302.5T	design of cam profile for different types of follower motion.
BEME302.6T	understand effect of friction as useful agent to analyze and design of machine
	components like brakes, dynamometer and clutches.

# Course Name: BEME303T (Fluid Mechanics)

BEME303.1T	Understand basic concept of fluid properties and able to apply this to simple engineering cases
BEME303.2T	Demonstrate and understand the concepts such as fluid static, buoyancy, stability of floating and submerged bodies to various problems
BEME303.3T	Apply the concept of Bernoulli's Equation to various cases
BEME303.4T	Understand and demonstrate the application of various flow measuring devices
BEME303.5T	Apply the concept of dimensional analysis and dimensional homogeneity to various problems
BEME303.6T	
	Understand the concept of drag and lift and apply it to simple engineering cases

# Course Name: BEME304T (Manufacturing Processes) Students shall be able to:

BEME304.1T	understand different Pattern making, Core making and Moulding processes and its sand properties
BEME304.2T	understand the Gating system , elements of gating system , various melting furnaces and different casting processes.
BEME304.3T	acquire the knowledge of different Joining processes and its defects.
BEME304.4T	understand the different forming processes ,rolling , forging, extrusion, Drawing and its properties.
BEME304.5T	understand the press working ,classification and its types, press terminology and cutting operation.
BEME304.6T	understand the knowledge of plastics, properties and types, application, forming and shaping of plastics and various methods

# Course Name: BEME304P(Manufacturing Processes)

# Students shall be able to:

BEME304.1P	identify need of single point cutting tool, multiple point cutting tool and various forces acting on single point cutting tool.
BEME304.2P	identify the lathe machine part, types, principle and able to perform different operations on lathe.
BEME304.3P	identify shaper machine part, types, principle, mechanism and able to find out the applications of these machines in manufacturing.
BEME304.4P	identify the milling machine and skilled to used the milling machine for different purposes.
BEME304.5P	identify different grinding operation and super finishing processes and able to apply these for finishing of different engineering product.
BEME304.6P	identify the different operations like drilling, boring, broaching machine and able to operate these machine to get required hole design in engineering product.

#### Course Name: BEME305T (Engineering Metallurgy)

Students shall be able to:

BEME30	able to understand the properties of material, concepts of crystal structure, Micro and	
5.1T	macro structure and structural deformation.	
BEME30	Understand Solidification, solid solution & phase/Equilibrium diagram	
5.2T	Understand Solidification, solid solution & phase/Equilibrium diagram.	
BEME30	Understand heat treatment process and TTT Curve	
5.3T	onderstand heat treatment process and TTT Curve.	
BEME30	Understand various ferrous (steel and cast iron) and non ferrous metals and alloys with	
5.4T	engineering applications.	
BEME30	Understand various non destructive tests, hardness test	
5.5T	onderstand various non-destructive tests, nardness test	
BEME30	Understand the concents of newder motally ray with applications	
5.6T	Understand the concepts of powder metallurgy with applications	

# Course Name: BEME305P (Engineering Metallurgy)

BEME305.1P	able to understand the Metallurgical Microscope, Specimen Preparation process & Metallography of Ferrous material
BEME305.2P	Understand the study and Drawing of microstructure of steel with respect to Iron-

	Iron Carbide Equilibrium diagram.
BEME305.3P	Understand heat treatment process on specimen and concept of hardenability.
BEME305.4P	Understand the concept of measurement of hardness on Brinell & Rockwell Hardness test.

## Course Name: BEME306P(Machine Drawing) Students shall be able to:

BEME306.1P	Drawing standards, standard components, standard features, machining symbols, welding symbols, surface finish symbols, heat treatment, manufacturing instructions, allowances, materials and other conventions in order to develop the capability to read, interpret, understand and draw machine and production drawings.
BEME306.2P	Principle orthographic projection, type of sections and sectional views, missing views, multi-view projections, profiles, references alignment and dimensioning to read, interpret, understand and draw machine and production drawings with detailing.
BEME306.3P	To develop the capability of qualitative selection of type / size and standard practices used for threads, bolts, nuts, washers , rivets, welds, keys & keyways, splines and Couplings.
BEME306.4P	Principles of assembly and disassembly, tools used for it, ts and tolerances standards and bearing and assembly by fastening.
BEME306.5P	How prepare assembly drawings and principles, techniques and standards for preparing components drawings, subassembly drawings, and Exploded Views.
BEME306.6P	How to prepare production drawing, name plates, part list, revisions etc. Essential Parts / Formats required for production drawing, Process Sheet.

# Course Name: BEME307P(Technical Report & Seminar)

# Students shall be able to:

BEME307.1P	To inculcate the habit of independent learning.
REME207 2D	Understand the process of review of literature for identification of Technical
DEIVIESU7.2P	topic beyond curriculum.
BEME307.3P	Understand the process of writing technical report.
BEME307.4P	Ability to deliver the technical presentation by using modern tools like ppt,videos.

## FOURTH SEMESTER

# Course Name: BEME401T (Applied Mathematics - IV)

BEME401.1T	Students shall be able to find approximate solution of algebraic and transcental
	equation by numerical method
BEME401.2T	Student shall be able to find approximate solution of first order first degree
	differential equation at certain points by using several method
BEME401.3T	Students shall be able to compute Z-transform.
BEME401.4T	Students shall be able to learn formal definition of the variance and standard
	deviation of discrete random variable.
BEME401.5T	Student shall be able to apply the basic concepts and method of probability theory.

#### Course Name: BEME402T (Engineering Thermodynamics) Students shall be able to:

BEME402.1T	Demonstrate and understanding of concept such as thermodynamic systems,
	thermodynamic equilibrium, energy and law of conservation of energy, work
	transfer, heat transfer and 1 <sup>st</sup> law of thermodynamics
BEME402.2T	Understand the application of first law of thermodynamics to closed system and
	open system
BEME402.3T	Apply the concept of second law of thermodynamics to design simple system such
	as heat engine, heat pump and refrigerator.
BEME402.4T	Demonstrate and understand the concept such as entropy, change in entropy for
	different thermodynamics process.
BEME402.5T	Analyze properties of steam and demonstrate the application of properties of steam
	to various thermodynamic processes
BEME402.6T	Understand the working principal of various vapor a power cycle

# Course Name: BEME403T (Hydraulic Machines)

Students shall be able to:

BEME403.1T	understand Compressible Flow and its application to real world problems
BEME403.2T	understand design parameters and working and performance characteristics of
	Impulse turbine
BEME403.3T	understand design parameters and working and performance characteristics of
	Reaction Turbine
BEME403.4T	understand design parameters and working and performance characteristics of
	Centrifugal Pumps
BEME403.5T	understand design parameters and working and performance of Reciprocating pump
	with introduction to other positive displacement pumps
BEME403.6T	understand Similitude with its application to Model testing

# Course Name: BEME403P (Hydraulic Machines)

Students shall be able to:

BEME403.1P	Understand and verify basic principle of fluid mechanics
BEME403.2P	Understand and verify the effect of friction to fluids
BEME403.3P	Understand working and performance characteristics of Impulse turbine
BEME403.4P	Understand working and performance characteristics of Centrifugal Pumps
BEME403.5P	Understand working and performance of Reciprocating pump
BEME403.6P	Understand and verify basic principle of floating bodies

# Course Name: BEME404T(Machining Processes

Students shall be able to:

BEME404.1	the concept of machining process and shall able to identify operations and tools required for given component.
BEME404.2	the lathe machin epart, types, principle and able to perform different operations on lathe
BEME404.3	the need of shaper, slotter, planner machine and able to find out the applications of these machines in manufacturing.
BEME404.4	the milling machine and skilled to used the milling machine for different purposes.
BEME404.5	the grinding operation and super finishing processes and able to apply these for finishing of different engineering product.
BEME404.6P	the drilling, reaming, boring, broaching machine and able to operate these machine to get required hole design in engineering product.

# Course Name: BEME404P (Machining Processes)

#### Students shall be able to:

BEME404.1P	Identify need of single point cutting tool, multiple point cutting tool and various forces acting on single point cutting tool.
BEME404.2P	identify the lathe machine part, types, principle and able to perform different operations on lathe.
BEME404.3P	identify shaper machine part, types, principle, mechanism and able to find out the applications of these machines in manufacturing.
BEME404.4P	identify the milling machine and skilled to used the milling machine for different purposes.
BEME404.5P	identify different grinding operation and super finishing processes and able to apply these for finishing of different engineering product.
BEME404.6P	identify the different operations like drilling, boring, broaching machine and able to operate these machine to get required hole design in engineering product.

# Course Name: BEME405T (Mechanics of Material)

Students shall be able to:

BEME405.1T	analyze different stresses, strains
BEME405.2T	analyze the Shear force, Bending moment & Stresses in beam
BEME405.3T	analyze the deflections in beams
BEME405.4T	analyze the torsional shear stress in shaft, crippling load in struts and columns
BEME405.5T	understand the fracture mechanics, Strain energy & impact loading
BEME405.6T	design simple mechanical element subjected to variable loads

# Course Name: BEME405P (Mechanics of Material)

#### Students shall be able to:

BEME405.1P	analyze different stresses, strains
BEME405.2P	analyze the Shear force, Bending moment & Stresses in beam
BEME405.3P	analyze the deflections in beams
BEME405.4P	analyze the torsional shear stress in shaft, crippling load in struts and columns
BEME405.5P	understand the fracture mechanics, Strain energy & impact loading
BEME405.6P	design simple mechanical element subjected to variable loads analyze different
	stresses, strains

# **Course Name: BEME406T (Environmental Studies)**

Students shall be able to:

BEME406.1T	To understand the role of public awareness for equitable use of natural resources
	for sustainable lifestyle
	Understand ecosystem behavior , energy flow in ecosystem and ecological
DEIVIL400.21	succession
BEME406.3T	Understand the biodiversity and its significance and threats to biodiversity
BEME406.4T	Understand the concept and phenomenon of pollution, its types & effects on
	ecosystem. Also able to understand the role of individual and institutions in
	pollution control and disaster management
BEME406.5T	Understand the role of society in conservation of resources and profound values of
	environmental ethics for sustainable lifestyle
BEME406.6T	To understand the role of public awareness for equitable use of natural resources
	for sustainable lifestyle

Course Name: BEME407P (Mini Project) Students shall be able to:

BEME407.1P	Able to develop an idea or concept into a simple working physical model.
BEME407.2P	Able to learn regarding fabrication/construction of a simple mechanical or electro-
	mechanical working model using various manufacturing processes.
BEME407.3P	Able to write a technical report about the Mini Project.

# **FIFTH SEMESTER**

# Course Name: BEME501T (Industrial Economics & Entrepreneurship Development) Students shall be able to:

BEME501.1T	to understand demand and its analysis.
BEME501.2T	to understand economics terminology related to production activity.
BEME501.3T	to understand terminology used in the market
BEME501.4T	Understand the procedure of copyright, patent to reserve an innovative and creative
	idea of an engineering students.
BEME501.5T	to understand does and donts of Entrepreneurship career option.
BEME501.6T	to understand government schemes, projects preparation etc to set small scale
	industries.

# Course Name: BEME502T (Design of Machine Element)

#### Students shall be able to:

BEME502.1T	the basic machine element design process.
BEME502.2T	the design of various mechanical joints&pressure vessels.
BEME502.3T	the design of power transmission shaft & springs.
BEME502.4T	the design of power screw, clutches and brakes.

# Course Name: BEME503T (Advance Production Processes)

#### Students shall be able to:

BEME503.1T	understand the importance of non-conventional machining processes.
BEME503.2T	understand the advanced joining processes and welding techniques used in industry.
BEME503.3T	understand advanced machining, micromachining, nanofabrication, high energy
	rate forming process.
BEME503.4T	understand, select and apply suitable sheet metal working techniques for an
	engineering product.
BEME503.5T	acquire the knowledge of principles of different jigs and fixtures. manufacturing
	processes selection and optimization.
BEME503.6T	understand the role, process selection and application of super finishing process

# Course Name: BEME504T (Heat Transfer)

BEME504.1T	Understand the modes of heat transfer.
BEME504.2T	Analyze the problem involving steady state heat conduction for simple geometries.
BEME504.3T	Design and analyze performance fins or extended surfaces for various cases.
BEME504.4T	Evaluate heat transfer coefficient for natural convection and forced convection.
BEME504.5T	Analyze heat exchanger performance for various cases.
BEME504.6T	Calculate radiation heat exchange between different bodies.

# Course Name: BEME504P (Heat Transfer) Students shall be able to:

BEME504.1P	Understand to determine Thermal Conductivity of various materials.
BEME504.2P	To introduce students different modes of heat transfer like conduction, convection & Radiation
BEME504.3P	Estimation of heat transfer through composite walls & transient temperature state HT to sudden change
BEME504.4P	The students should understand how Heat transfer on various surfaces can be calculated.
BEME504.5P	To determine various parameters related with heat transfer
	To study heat exchanger and evaluate performance parameters of heat exchanger
BEME504.6P	Understand to determine Thermal Conductivity of various materials.

# Course Name: BEME505T (Mechanical Measurement & Metrology) Students shall be able to:

BEME505.1T	Students will able to understand the Generalized MM system & its elements. Static & dynamic characteristics of the system.
BEME505.2T	Students will able to understand the Working of different instruments for MM of linear & angular displacement, speed, load, strain, force, torque & power.
BEME505.3T	Students will able to understand the Working of different instruments for mm of pressure, vaccum, sound, light & temp.
BEME505.4T	Students will able to understand the Standards of MM, interchangeability, selective assembly, allowance & tolerance, MM of straightness & flatness. Instruments for linear and angular MM.
BEME505.5T	Students will able to understand the Limits & fits, & its tolerance analysis, types of limit gauges, types of fits, shaft & hole basis system, design of limit gauges & process planning sheets. Students will able to understand the Comparators & its types, study & use of optical profile projectors, MM of screw thread & gear tooth.
BEME505.6T	Students will able to understand the Generalized MM system & its elements. Static & dynamic characteristics of the system.

# Course Name: BEME505P (Mechanical Measurement & Metrology)

_	Studer	nts sh	all be	e able	to:

BEME505.1P	Students will able to understand the Generalized MM system & its Static characteristics .
BEME505.2P	Students will able to understand the Static calibration of Measurement System.
BEME505.3P	Students will able to understand the Working of different instruments and will able to measure different parameters
BEME505.4P	Students will able to understand the Standards of MM, be able to measure linear and angular measurement with Instruments
BEME505.5P	Students will able to design limit gauges.

BEME505.6P

# Course Name: BEME506T (Computer Application – I)

#### Students shall be able to:

BEME506.1P	Design the algorithm and flowchart for the program for problem solving.
BEME506.2P	Develop the array and vector sorting algorithm for data sorting operations.
BEME506.3P	Develop the program based on linked lists, stacks and queues for real world applications
BEME506.4P	Develop the program based on trees for searching operations on data.
BEME506.5P	Understand the file handling techniques.
BEME506.6P	Understand the basics of OOPs and model it to real world applications.

# Course Name: BEME507P (Industrial Visit)

Students shall be able to:

BEME507.1P	To have extensive on Site exposure to various Mechanical Engineering aspects.
BEME507.2P	To develop managerial skill of student.
BEME507.3P	To expose student to practical problem and learn troubleshooting methods
BEME507.4P	To develop an understanding of modern material and techniques.
BEME507.5P	To expose student to take up product design and construction challenges.
BEME507.6P	To develop confidence to take up project activity independently.

# SIXTH SEMESTER

# Course Name: BEME601T (Energy Conversion - I)

#### Students shall be able to:

BEME601.1T	Understand the working principle of boilers.
BEME601.2T	Apply fundamental knowledge of fuels, combustion and coal handling systems.
BEME601.3T	Demonstrate the working of steam turbine, steam condenser and steam nozzle
BEME601.4T	Understand the concept of fluidized bed combustion methods.

# Course Name: BEME602T (Control System)

BEME602.1T	Control system components /elements of Control System, modeling of physical		
	system and its Transfer Function.		
BEME602.2T	System representation through Block diagram and SFG, T.F. by block reduction		
	techniques and Masson's Gain formula.		

BEME602.3T	Order and Type of system, type of inputs and system response to various inputs.	
	Basic control action and industrial controller.	
BEME602.4T	Stability of the system & Root locus concept and its construction	
BEME602.5T	Frequency Domain analysis. Determination of GM, PM, and stability from Bode plot	
	& Polar plots.	
BEME602.6T	State space representation & concept of controllability & observability	

# Course Name: BEME603T (Operation Research)

# Students shall be able to:

BEME603.1T	Understand the concept of Mathematical Modeling and optimal utilization of resources by using Liner Programming technique.
BEME603.2T	Understand the optimum allocation of resources by using transportation, transshipment and assignment model technique.
BEME603.3T	Minimize the cycle time of the product by proper sequencing of job on machines.
BEME603.4T	Understand the application of PERT and CPM Techniques for Project Management .
BEME603.5T	Understand replacement policies for Items deteriorated with time and items fail suddenly.
BEME603.6T	Find optimal solution of real life problem like waiting line, inventory etc by using simulation techniques.

# Course Name: BEME604T (Mechatronics)

Students shall be able to:

BEME604.1T	understand key elements of mechatronics system.
BEME604.2T	understand system interfacing.
BEME604.3T	have an awareness about various actuating systems.
BEME604.4T	demonstrate digital logic circuit.
BEME604.5T	understand and draw ladder diagram of PLC.
BEME604.6T	have knowledge of SCADA and MEMS.

# Course Name: BEME604P (Mechatronics)

Students shall be able to:

BEME604.1P	To identify and test different types of solid state electronics devices.		
BEME604.2P	To implement various logic circuits using logic gates.		
BEME604.3P	To understand switching operation of transistor and data conversion.		
BEME604.4P	Demonstrate an automated system using basic electronic components		
BEME604.5P	To design ladder diagram using programmable logic controllers for automation.		
BEME604.6P	Demonstrate working of electro pneumatic and electro hydraulic system.		

# Course Name: BEME605T (Dynamics of Machine) Students shall be able to:

BEME605.1T	understand concept of gyroscope & gyroscopic effect airplane, ship, vehicles & grinding mills	and its application in
BEME605.2T	understand D'Alembert's principle & to perform dyna	amic force analysis of

	different mechanisms and cam dynamics.
DEMEGOE OT	understand the concept of static & dynamic unbalance and balancing of
DEIVIEOUS.SI	rotating & reciprocating. Masses particularly in I C Engine.
	understand the turning moment diagram of engines and engine stabilization
DEIVIEOUS.41	using flywheel. Flywheel applications in different machines.
BEME605.5T	able to understand the concept of speed controlling devices like Governor
	with their operating characteristics.
BEME605.6T	understand the concept of free & forced vibration and their effect in the
	design of vibration isolation and measurement of vibration.

# Course Name: BEME605P (Dynamics of Machine)

Students shall be able to:

BEME605.1P	understand concept & principle of gyroscope and gyroscopic effect & its performance characteristics
BEME605.2P	understand D'Alembert's principle & to perform dynamic force analysis of four bar mechanism, single slider mechanism and cam dynamics.
BEME605.3P	understand the concept of static & dynamic unbalance and balancing of rotating Masses particularly in I C Engine.
BEME605.4P	understand the turning moment diagram of engines, Flywheel selection and parametric design for multi cylinder engines
BEME605.5P	understand the concept of speed controlling devices like Governor with their performance characteristics.
BEME605.6P	understand the concept of free & forced vibration and their effect and measurement of vibration.

# Course Name: BEME606T (Functional English )

# Students shall be able to:

BEME606.1T	have enough knowledge to face competitive examination to pursue master degree.
BEME606.2T	organize their thoughts in English and hence face job interviews more confidently.
BEME606.3T	produce a set of documents related to technology and writing in the workplace and shall have improved their ability to write clearly and accurately.
BEME606.4T	acquire the skill of comprehension
BEME606.5T	also acquire language skills required to write their Reviews, Projects, and Reports.
BEME606.6T	understand how to critically analyze data from research, incorporate it into assigned writing clearly, concisely, and logically and attribute the source with proper citation.

# Course Name: BEME607P (Computer Application - II)

BEME607.1P	Understand basics fundamentals of DBMS and real world applications of DBMS.
BEME607.2P	Design entity relationship diagrams related to real world examples.

BEME607.3P	Identify SQL queries and implement common SQL Statements including DDL, DML and DCL statements to perform different database management operations in mechanical related management operations.
BEME607.4P	Implement consistency constraints to maintain data integrity in data handling operations and understand need of normalization in database design.
BEME607.5P	Understand indexing and hashing techniques in data searching process and query processing.
BEME607.6P	Understand the fundamental concepts of computer networking.

# Course Name: BEME608P (Industrial Case Study)

Students shall be able to:

BEME608.1P	Understand the various industrial problems.
BEME608.2P	Ability to solve complex industrial problem by using principles of mechanical
	engineering.
BEME608.3P	To inculcate the habit of data collection and its analysis to solve problem.
BEME608.4P	Ability to deliver the technical presentation by using modern tools like ppt,
	videos

# **VII SEMESTER**

# Course Name: BEME701T (Industrial Engineering)

#### Students shall be able to:

BEME701.1T	the concept of productivity and shall able to apply the tools and techniques for improvement and management of productivity in all the areas of manufacturing and management
	diu indiagement.
BEME701.2T	design, manufacturing and production engineering.
BEME701.3T	the need of forecasting and able to apply forecasting techniques in pre-planning
	the industrial management activities.
BEME701.4T	the significance of maintenance activity and able to plan and manage the
	maintenance of machine, system and process within the industry.
BEME701.5T	the concept of quality and apply various tools and techniques for quality control
	at various stages of industrial engineering function.
BEME701.6T	the important of SQC and TQM, and able to apply it for quality assurance at the
	various stages of industrial engineering function.

# Course Name: BEME702T (E –I Automobile Engineering)

#### Students shall be able to:

BEME702.1T	Understand different chassis and frame structures, engines and systems related
	to automobiles.
BEME702.2T	Understand different clutches and gear box mechanisms related to automobiles.
BEME702.3T	Understand different brakes, differential and transmission system.
BEME702.4T	Understand different steering and suspension systems.
BEME702.5T	Understand different electrical systems wheels and tyres.
BEME702.6T	Understand safety considerations and recent developments in automobiles.

# Course Name: BEME702T (E –I PPE)

#### Students shall be able to:

BEME702.1T Student shall able to Understand basic power generation techniques and

	steam cycle.
BEME702.2T	Student shall able to understand concepts related with gas turbine and Rankine
	cycle.
BEME702.3T	Student shall able to Compare various power generation unit and can able to
	choose one that meets desired economic and social requirements.
BEME702.4T	Student shall able to Analyze concept of super charging of diesel engine,
	combined cycle power plant and issues related to nuclear waste disposal.
BEME702.5T	Student shall able to understand Nuclear power plant and various types of
	Nuclear reactor.
BEME702.6T	Student shall able to understand various emerging technologies like solar
	thermal conversion, fuel cell, wind energy.

# Course Name: BEME703T (Computer Aided Design)

# Students shall be able to:

BEME703.1T	Understand effective use of computers in the entire design process
BEME703.2T	Understand effective use of Numerical method (Algorithmand the
	Transformation) for the computer graphics
BEME703.3T	Understand effective use various techniques for geometrical modeling of
	engineering objects using modeling software.(PROE,CATIA,CREO,etc.)
BEME703.4T	Understand effective use of Numerical method for designing & analysis of
	mechanical components (FEM Tool like ANSYS)
BEME703.5T	Understand effective use of Johnson Optimization tools for designing & analysis
	of mechanical components.

# Course Name: BEME703P(Computer Aided Design)

# Students shall be able to:

<b>DEME702 1D</b>	The effective use of computers in the entire engineering graphic
DEIVIE/US.1P	The energy use of computers in the entire engineering graphic
	development.
BEME703.2P	The effective use of Numerical method (Algorithm and the
	Transformation) for the computer graphics.
BEME703.3P	The effective use various techniques for geometrical modeling of
	Engineering objects using Analytical method & modeling software.(Auto
	Cad, PROE CREO, CATIA, Unigraphics etc.)
BEME703.4P	The effective use of Numerical method for designing & analysis of
	mechanical components (FEM Tool like ANSYS, HYPERMESH)
BEME703.5P	The effective use of Johnson Optimization tools for designing & analysis
	of Mechanical components

# Course Name: BEME704T (Energy Conversion - II )

#### Students shall be able to:

BEME704.1T	Demonstrate the working of compressors and able to design various
	parameters of compressors.
BEME704.2T	Analyze the performance of various types of compressors.
BEME704.3T	Analyze the performance of IC engines and preparation of heat balance
	sheet.
BEME704.4T	Demonstrate the knowledge of types of gas turbine, their thermodynamic
	analysis and performance evaluation.

Course Name: BEME704P (Energy Conversion - II) Students shall be able to:

BEME704.1P	Demonstrate the working of compressors and able to design various		
	parameters of compressors.		
BEME704.2P	Analyze the performance of various types of compressors.		
BEME704.3P	Analyze the performance of IC engines and preparation of heat balance		
	sheet.		
BEME704.4P	Demonstrate the knowledge of types of gas turbine, their		
	thermodynamic analysis and performance evaluation.		

## Course Name: BEME705T (Design of Mechanical Drives)

#### Students shall be able to:

BEME705.1T	the Coupling, Flywheel, Rolling contact bearing & Sliding contact bearing.
BEME705.2T	theBelt drive, Chain drive, and Wire rope
BEME705.3T	theGear drive
BEME705.4T	the IC engine components

# Course Name: BEME705P (Design of Mechanical Drives)

Students shall be able to:

BEME705.1P	the Coupling, Flywheel, Rolling contact bearing &Sliding contact bearing
BEME705.2P	theBelt drive, Chain drive, and Wire rope
BEME705.3P	theGear drive
BEME705.4P	the IC engine components

# Course Name: BEME706P (Project Seminar)

Students shall be able to:

BEME706.1P	Inculcate the habit of learning & work execution
BEME706.2P	Student shall able to work in team
BEME706.3P	Student shall able to identify the project topic & finalize the methodology
BEME706.4P	Student shall able to search and collect the literature
BEME706.5P	Student shall able to prepare the schedule and report writing
BEME706.6P	Student shall able to deliver the seminar using audio visual aids.

#### EIGHTH SEMESTER:

# Course Name: BEME801T (Industrial Management)

Students shall be able to

BEME801.1T	Understand basic functions and Principles of management
BEME801.2T	Understand functions of personal management
BEME801.3T	Understand Marketing management
BEME801.4T	Understand finance management, various sources of generating the
	finance
BEME801.5T	Understand the principle and practice Plant management, Material
	handling and Industrial safety
BEME801.6T	Understand Recent treads in production and operation management

Course Name: BEME802T (E- II CIMS ) Students shall be able to:

BEME802.1T	Understand the application of Computer Aided Design & Manufacturing
	(CAD/CAM) and concepts of Concurrent Engineering for customized Product
	development in order to achieve corporate goal and objectives.
BEME802.2T	Understand NC,CNC and DNC manufacturing and generate manual part
	program for CNC machining.
BEME802.3T	Understand the Group Technology philosophy for cellular manufacturing.
BEME802.4T	Cultivate understanding about Automated Material Handling Systems and
	Flexible Manufacturing Systems (FMS).
BEME802.5T	Understand the concept of Computer Aided Process Planning (CAPP) and
	Production Planning.
BEME802.6T	Develop the ability of application of computer in shop-floor control, shop floor
	data collection technique, Inventory control, Quality control and different
	types of automated inspection devices.

# Course Name: BEME802P (E- II CIMS )

# Students shall be able to:

BEME802.1P	Understand the Computer Integrated Manufacturing system concept for product design, Development and deployment in order to achieve corporate goal and objectives
BEME802.2P	Cultivate the concept of Flexible Manufacturing Systems (FMS) and use of different quality measurement tools.
BEME802.3P	Able to write manual part programs independently for CNC machining.
BEME802.4P	Understand the Group Technology philosophy.
BEME802.5P	Understand the concept of Computer Aided Process Planning (CAPP)

# Course Name: BEME802T (E- II RAC)

#### Students shall be able to:

BEME802.1T	Demonstrate and apply the basic knowledge of refrigeration cycles and
	equipments
BEME802.2T	Analyze the VCRS cycle and to solve problems encountered in its applications.
BEME802.3T	Demonstrate and analyze the various air refrigeration systems.
BEME802.4T	Understand the concepts of cryogenics and its application to various processes
BEME802.5T	Analyze the performance parameters of psychometric and air conditioning
BEME802.6T	Design the air conditioning plants and air distribution system for air
	conditioning plants

# Course Name: BEME802P(E- II RAC)

#### Students shall be able to:

BEME802.1P	Demonstrate and apply the basic knowledge of refrigeration cycles and
	equipments.
BEME802.2P	Analyze the VCRS cycle and to solve problems encountered in its applications.
BEME802.3P	Demonstrate and analyze the various air refrigeration systems.
BEME802.4P	Understand the concepts of cryogenics and its application to various processes.
BEME802.5P	Analyze the performance parameters of psychometric and air conditioning.
BEME802.6P	Design the air conditioning plants and air distribution system for air
	conditioning plants.

# Course Name: BEME802T (E- II MIS)

BEME802.1T	Students shall able to understand System component, types of systems
	Character function & applications, system life cycle design.
BEME802.2T	System planning, Information gathering, Structure analysis tools, Feasibility

	study, cost/benefit analysis.	
BEME802.3T	Stages of system design, Input/Output & form design, Database design, Design	
	documentation.	
BEME802.4T	System testing, implementation, detailed evaluation, System maintenance.	
BEME802.5T	Systems Development, Business Information Systems, Data Warehousing and	
	Decision Support Systems. Concepts & Philosophy of DSS, Deterministic System,	
	Artificial Intelligence(AI), Knowledge Based Expert system(KBES). Business	
	Intelligence Systems, CRM.	
BEME802.6T	M IS Tools & Packages/Areas of MIS: ERP (Enterprise Resource Planning), SCM	
	(Supply Chain Management), CRM (Customer Relationship Management)	
	Concept of data ware housing and data mining, SAP	

# Course Name: BEME802P (E- II MIS)

# Students shall be able to:

BEME802.1P	Students shall able to understand System component, types of systems
	Character function & applications, system life cycle design.
BEME802.2P	System planning, Information gathering, Structure analysis tools, Feasibility
	study, cost/benefit analysis.
BEME802.3P	Stages of system design, Input/Output & form design, Database design, Design
	documentation.
BEME802.4P	System testing, implementation, detailed evaluation, System maintenance.
BEME802.5P	Systems Development, Business Information Systems, Data Warehousing and
	Decision Support Systems. Concepts & Philosophy of DSS, Deterministic System,
	Artificial Intelligence(AI), Knowledge Based Expert system(KBES). Business
	Intelligence Systems, CRM.
BEME802.6P	M IS Tools & Packages/Areas of MIS: ERP (Enterprise Resource Planning), SCM
	(Supply Chain Management), CRM (Customer Relationship Management)
	Concept of data ware housing and data mining, SAP

# Course Name: BEME803T (E – III Advanced IC Engine)

# Students shall be able to:

BEME803.1T	Understand the types and application of IC engine.
BEME803.2T	Analyze the combustion phenomenon in SI and CI engines.
BEME803.3T	Find out the thermal efficiency and ways to minimize losses from actual engine.
BEME803.4T	Compare various automotive fuels and their rating values.
BEME803.5T	Analyze the issues related to exhaust gas emission problems and to apply
	remedial action to reduce the air pollution.
BEME803.6T	Understand the types and application of IC engine.

# Course Name: BEME803T (E – III AMT)

BEME803.1T	understand the importance non-traditional machining processes.
BEME803.2T	understand the Mechanics, Parameters and control of AJM, USM and
	WJM.
BEME803.3T	understand the process of Electro chemical machining and grinding.
BEME803.4T	select and apply suitable processes of unconventional welding techniques
	for an engineering product.
BEME803.5T	acquire the knowledge of non-traditional processes of welding and the role
	of economic consideration in manufacturing processes selection and
	optimization.
BEME803.6T	understand the role and application of non conventional casting process

# Course Name: BEME804T (Automation in Production)

BEME804.1T	Implement automation techniques and to analyze the transfer lines.
	Understand NC,CNC and DNC manufacturing and generate manual part
BEME804.2T	program for CNC machining and demonstrate APT part programming
	methods
BEME804.3T	Analyze industrial robot anatomy, control system and its applications
BEME804.4T	Implement automated guided vehicle systems and ASRS system for
	material handling in industries
BEME804.5T	Understand the concept of automated inspection and different types of
	automated inspection devices and group technology.
BEME804.6T	Develop the ability of application of computer in shop-floor control, shop
	floor data collection technique & Understand the concept of Computer
	Aided Process Planning (CAPP) and Production Planning and the concept of
	various types of FMS layout

# Course Name: BEME804P (Automation in Production)

Students shall be able to:

BEME804.1P	Understand the Automation system in order to achieve corporate goal and
	objectives & Case Study of Automated System.
BEME804.2P	Cultivate the concept of NC System
BEME804.3P	Able to write, Perform & Simulate manual part programs independently on
	CNC machining (CNC lathe & CNC milling)
BEME804.4P	Practice Programming on APT.
BEME804.5P	Understand the Robot philosophy & its configuration.
BEME804.6P	Understand the concept of Part Coding and Group Technology

# Course Name: BEME805T (Energy Conversion - III)

#### Students shall be able to:

BEME805.1	Understand the basic concept of refrigeration and Air Conditioning.
BEME805.2	Able to design air conditioning and refrigeration system.
BEME805.3	Understand the concept of Energy saving and energy Audit.
BEME805.4	Demonstrate the actual working of Hydraulic and pneumatic system
BEME805.5	understand the basic concept of solar and their application

#### Course Name: BEME805P (Energy Conversion - III) Students shall be able to:

# BEME805.1Understand the basic concept of refrigeration and Air Conditioning.BEME805.2Able to design air conditioning and refrigeration system.BEME805.3Understand the concept of Energy saving and energy Audit.BEME805.4Demonstrate the actual working of Hydraulic and pneumatic systemBEME805.5understand the basic concept of solar and their application

# Course Name: BEME806P (Project)

BEME806.1	Inculcate the habit of independent learning
BEME806.2	Inculcate the habit of work execution.
BEME806.3	achieve the final intended objective as a member of group.
BEME806.4	apply the acquired knowledge for solving real life engineering problems.

# M. TECH. (CAD/CAM) NON CBS

# **FIRST SEMESTER**

# **Course Objective**

1PGCC05-CNC and Robotics:	
Student shall be able to	
1PGCC0501	Understand evolution and principle of CNC machine tools
1PGCC0502	Describe constructional features of CNC machine tools also explain drives
	and positional transducers used in CNC machine tools
1PGCC0503	Generate CNC programs for rite simple programs for CNC milling, turning
	and machining centers.
1PGCC0504	To introduce the basic concepts, parts of robots and types of robots
1PGCC0505	To make the student familiar with the various drive systems for robot,
	sensors and their applications in robots and programming of robots.
1PGCC0506	To discuss about the various applications of robots, justification and
	implementation of robot

#### **1PGCC05-CNC and Robotics:** Student shall be able to

1PGCC0501	Understand working principle of CNC machine tools
1PGCC0502	Describe constructional features of CNC machine tools and drives .
1PGCC0503	Generate CNC programs for rite simple programs for CNC milling, turni
1PGCC0504	To introduce the basic concepts, parts of robots and types of robots
1PGCC0505	To make the student familiar with the various sensors and their ap robots and programming of robots.

# 1PGCC04-Computer Graphics for CAD/CAM Student shall be able to

1PGCC0401	create the different wireframe primitives using parametric
	representations.
1PGCC0402	create surface primitives using parametric modeling.
1PGCC0403	create the different solid primitives using the different representation
	schemes.
1PGCC0404	Apply geometric transformations on the created wireframe, surface and

solid	models.
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# 1PGCC04-Computer Graphics for CAD/CAM (Practical)

Student will be able to

1PGCC0401	Draw the different wireframe primitives using CAD software.
1PGCC0402	Draw surface primitives using parametric modeling.
1PGCC0403	Draw the different solid primitives using the different software.
1PGCC0404	Apply geometric transformations on the created wireframe, surface and
	solid models.

# **1PGCC03-ELECTIVE- I Total Quality System & Engineering Student shall be able to**

1PGCC0301	Select and apply appropriate techniques in identifying customer needs,
	as well as the quality impact that will be used as inputs in TQM
	methodologies;
1PGCC0302	Measure the cost of poor quality and process effectiveness and efficiency
	to track performance quality and to identify areas for improvement;
1PGCC0303	Understand proven methodologies to enhance management processes,
	such as benchmarking and business process reengineering
1PGCC0304	Choose a framework to evaluate the performance excellence of an
	organization, and determine the set of performance indicators that will
	align people with the objectives of the organization

# 1PGCC02-CIM Computer Integrated Manufacturing System

Student shall	be able to
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1PGCC0201	solve the design problems of different type of transfer mechanism
1PGCC0202	perform design and analysis of automatic storage and retrieval system.
1PGCC0203	evaluate the space requirements of different storage system
1PGCC0204	design the workstation requirement for unattended operations and
	automated production system.
1PGCC0205	optimize the number of machines required for machine cell in a given
	production system

#### **1PGCC01-Data Structures and Algorithms** Student shall be able to

1PGCC0101	Student will be able to choose appropriate data structure as applied to
	specified problem definition
1PGCC0102	Student will be able to handle operations like searching, insertion,
	deletion, traversing mechanism etc. on various data structures
1PGCC0103	Students will be able to apply concepts learned in various domains like
	DBMS, compiler construction etc.
1PGCC0104	Students will be able to use linear and non-linear data structures like
	stacks, queues , linked list etc

# **Course Objective**

# 2PGCC01- Artificial Intelligence

# Student will be able to

2PGCC0101	Students will be able to learn about the fundamentals of artificial
	intelligence
	and application tools
2PGCC0102	Students will be able to know about the implementation of artificial
	intelligence
	in Industry and the suspected problems
2PGCC0103	Solving engineering problems through AI approach
2PGCC0104	Developing solutions to nonlinear or uncertainty issue related or
	optimization problems
2PGCC0105	Developing intelligent decision making systems

# 2PGCC02- Modelling & Simulation.

# Student shall be able to

2PGCC0201	model of rigid bodies, structural systems, hydraulic systems, thermal
	systems, electronic and mechatronic systems.
	understand and model mechanisms, manipulators, vehicles etc
2PGCC0202	analyze and model of different control strategies in physical domain.
2PGCC0203	Engineering analysis skills
2PGCC0204	Mathematical formulation solution skill
2PGCC0205	Understand the system concept and apply functional modeling method
	to model the activities of a static system
2PGCC0206	Simulate the operation of a system and make improvement according to
	the simulation results

# 2PGCC03- Product data Management

#### Student shall be able to

2PGCC0301	Understand database models and languages
2PGCC0302	Develop Entity relationship diagrams of different oranisations
2PGCC0303	Understand different applications of DBMS
2PGCC0304	Develop product design database

# 2PGCC04- FEM

2PGCC0401	Students can study the fundamentals of finite element method.
2PGCC0402	Students can apply finite element method for solving one dimensional
	and two dimensional structural and thermal problems
2PGCC0403	Students can apply finite element method fir nonlinear and structural
	dynamic problems
2PGCC0404	Solve structural, thermal, fluid flow problems

#### 2PGCC04- FEM (Practicals)

#### Student shall be able to

2PGCC0401	Apply the fundamentals of finite element method.
2PGCC0402	Apply finite element method for solving one dimensional and two
	dimensional structural and thermal problems using analysis software
2PGCC0403	Apply finite element method fir nonlinear and structural dynamic
	problems using analysis software
2PGCC0404	Solve structural, thermal, fluid flow problems using analysis software

# Plastics and Composites 2PGCC05- Elective II

#### Student shall be able to

2PGCC0501	Understand properties and moulding process of different plastics
2PGCC0502	Understand machining properties of different plastics
2PGCC0503	Understand properties and moulding process of different plastics
2PGCC0504	Identify the properties of fiber and matrix materials used in commercial
	composites

# Plastics and Composites 2PGCC05- Elective II (Practicals)

#### Student shall be able to

SR. NO	Description of POs
2PGCC0501	Study properties and moulding process of different plastics materials
2PGCC0502	Study machining properties of different plastics materials
2PGCC0503	Understand properties and moulding process of different plastics
2PGCC0504	Study the properties of fiber and matrix materials used in commercial
	composites

#### THIRD SEMESTER

# **Course Objective**

# 3PGCC01- Manufacturing System Integration & Management

#### Student shall be able to

3PGCC0101	Students would know about the Production management System
3PGCC0102	Students would learn the Manufacturing strategies and compositeness.
3PGCC0103	Students would understand the Production Control System
3PGCC0104	Students would gain knowledge on Inventory systems, MRP and
	information control systems

# **3PGCC02- Product Design & Development**

SR. NO	Description of POs
3PGCC0201	Design the products as per the customer/industry requirements
3PGCC0202	Apply creatively new technologies and sciences in the design of solutions

	that are usable and functional for various applications.
3PGCC0203	Recognize the problems of conception and creation of products and systems which are appropriate with regards to the form, content,
	functionality and the value for human use and action

# M. TECH. (CAD/CAM) CBS

#### FIRST SEMESTER

# **Course Objective**

# PGCC101T Computer Integrated Manufacturing (CIM)

#### Student shall be able to

PGCC10101	Understand the effect of manufacturing automation strategies and derive
	metrics.
PGCC10102	Analyze automated flow lines and assembly systems, and balance the line.
PGCC10103	Students will have an introduction to Computer Aided Process Planning (CA
	Robotic Systems, Group Technology and Cellular Manufacturing Systems
PGCC10104	Students will cultivate understanding about Automated Material Handli
	Automated Inspection Systems, Flexible Manufacturing Systems( FMS )

# PGCC102T Computer Graphics for CAD/CAM

# Student will be able to

PGCC10201	Understand the engineering design process and its role in graphic
	communication process.
PGCC10201	Generate and interpret engineering technical drawings of parts and
	assemblies according to engineering design standards.
PGCC10202	Use CAD software to generate a computer model and technical drawing
	for a simple, well-defined part or assembly.
PGCC10203	Fluent application of engineering techniques, tools and resources
PGCC10204	Effective oral and written communication in professional and lay domains

# PGCC102P Computer Graphics for CAD/CAM

# Student will be able to

PGCC102P1	Study the Programs for generation of entities like Line, Circle, Ellipse
	using Bressenham's algorithms
PGCC102P2	Study the Programs for 2-D & 3-D transformations
PGCC102P3	Generate at least two simple solid models showing geometric properties
	using any CAD software
PGCC102P4	Generate any Assembly model along with animation
PGCC102P5	Program for synthetic Curve generation like Bezier, spline etc

PGCC103T CNC & Robotics Student shall be able to

PGCC10301	apply the concepts of machining for the purpose of selection of
	appropriate machining centers, machining parameters, select
	appropriate cutting tools for CNC milling and turning
PGCC10302	create and validate NC part program data using manual data input for
	manufacturing of required component using CNC milling or turning
	applications
PGCC10303	apply the concepts of coordinate transformations for development of
	arm equation and subsequently the inverse kinematics model for given
	serial manipulator
PGCC10304	apply the concepts of robotic workspace analysis for design of robotic
	manipulator for required work cell applications
PGCC10305	apply robotics and visual sensing technologies to engineering applications

# PGCC103P CNC & Robotics

# Student shall be able to

PGCC103P1	Understand the Concepts of NC, CNC, DNC. Classification of CNC
	machines
PGCC103P2	Study Practical based on part programming and operation of a turning
	center and milling centre
PGCC103P3	Perform Practice in APT based NC programming languages
PGCC103P4	Understand Fundamental of robot, anatomy, configuration, control,
	sensor, and gripper
PGCC103P5	Practice in robot programming and its languages

# PGCC104T 2. Design for Manufacturing & Assembly

# Student shall be able to

SR. NO	Description of POs
PGCC10401	Student will have knowledge of basic manufacturing processes and their
	capabilities
PGCC10402	Student will select appropriate material, process and features for a
	design
PGCC10403	Student will design products which are easy for assembly &
	manufacturing
PGCC10404	Student will evaluate the design for alternatives of manufacturing

# Elective-II Total Quality System & Engineering

PGCC10501	Select and apply appropriate techniques in identifying customer needs, as quality impact that will be used as inputs in TQM methodologies;
PGCC10502	Measure the cost of poor quality and process effectiveness and efficien performance quality and to identify areas for improvement;
PGCC10503	Understand proven methodologies to enhance management processe benchmarking and business process reengineering;

Choose a framework to evaluate the performance excellence of an organization, and determine the set of performance indicators that will align people with the objectives of the organization.

#### SECOND SEMESTER

# Course objective

## PGCC201T ADVANCED FINITE ELEMENT ANALYSIS

Student will be able to

PGCC201T1	apply the procedure involved to solve a problem using Finite Element Methods.
PGCC201T2	develop the element stiffness matrices using different approach.
PGCC201T3	analyze a 2D problem using line, triangular, axisymmetric and quadrilateral element.
PGCC201T4	analyze a 3D problem using tetrahedral and hexahedral elements.

# PGCC201P ADVANCED FINITE ELEMENT ANALYSIS Student shall be able to

PGCC201P	Connect with the Finite Element Analysis fundamentals,
PGCC201P	formulate the design problems into FEA
PGCC201P	understand the ethical issues related to the utilization
	of FEA in the industry
PGCC201P	Solve problems using truss element

# PGCC202T: Product Design and Development

#### Student shall be able to

PGCC20201	Students should be able to design a product using computer aided design.
PGCC20202	Students should be able to carry out product development and planning
	process.
PGCC20203	Students should be able to understand the concept of prototyping.

# PGCC203T MECHATRONICS

PGCC20301	Students will be able to learn the Mechatronics systems such as controls
	and drives, real time interfacing, data acquisition system, sensors for
	condition monitoring, mechanical controlling, automated manufacturing.
PGCC20302	Students will be able to understand the basic concepts, properties and
	interfacing of controls and drives in the Mechatronics System Design.
PGCC20303	Students should be able to design a product using computer aided
	design.
PGCC20304	Students should be able to carry out product development and planning

#### PGCC203P MECHATRONICS

Student shall be able to		
<b>PGCC203P</b> 1	Identify & study of solid state electr	

<b>PGCC203P</b> 1	Identify & study of solid state electronic devices.	
<b>PGCC203P</b> 2	Identify study & demonstration of different sensors.	
<b>PGCC203P</b> 3	Study programming of microprocessor using 8085 instructions	
PGCC203P 4	Demonstration of working of various digital to analog and analog to	
	digital Converters	

#### PGCC204T 2. Plastic and Composites Student shall be able to

SR. NO	Description of POs
PGCC20401	Understand properties and moulding process of different plastics.
PGCC20402	Understand machining properties of different plastics.
PGCC20403	Understand properties and moulding process of different plastics.
PGCC20404	Identify the properties of fiber and matrix materials used in commercial
	composites,

# Foundation Course-I Research Methodology

#### Student shall be able to

SR. NO	Description of POs	
PGCC20401	identify appropriate research topics	
PGCC20402	select and define appropriate research problem and parameters	
PGCC20403	prepare a project proposal (to undertake a project)	
PGCC20404	organize and conduct research (advanced project) in a more appropriate manner	
PGCC20401	write a research report and thesis	
PGCC20402	write a research proposal (grants)	

#### THIRD SEMESTER

# Manufacturing System Integration & Management (Elective-4) Student shall be able to

SR. NO	Description of POs
PGCC30101	Students would know about the Production management System.
PGCC30102	Students would learn the Manufacturing strategies and compositeness.
PGCC30103	Students would understand the Production Control System.
PGCC30104	Students would gain knowledge on Inventory systems, MRP and
	information control systems.

# Foundation Course-II: Project Planning & Management Student shall be able to

PGCC30201	To acquire knowledge on project planning, implementation and analysis.
PGCC30202	To give an exposure on network analysis and Project scheduling.
PGCC30203	On completion of the course the student will be able to plan, schedule,
	analyze
	and execute the project effectively.

# CIVIL ENGINEERING

## **Program Outcomes (PO's)**

Graduates shall exhibit following outcomes by the time of graduation from Civil engineering programme:

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

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

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

#### **PROGRAM SPECIFIC OUTCOMES :**

- Graduates of civil engineering shall demonstrate:
- 1. To analyze, evaluate & design building structures and foundation system.
- 2. To understand the principle of surveying, remote sensing, design transportation system and their components, design water supply and water pollution control systems.
- 3. To start the career as an entrepreneur such as civil engineering project manager/consultant.
- 4. The need for lifelong learning & the impart of civil engineering activities on society.

#### FIRST SEMESTER

On completion of the course, the Students shall be able to:

BESI-1 T Applied Mathematics – I
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СО	STATEMENTS
BESI – 1.1	Differential Calculus by using indeterminate forms, Taylor's and Maclaurin's Series.
BESI – 1.2	Partial Differentiation by the use of Euler's theorem, chain rule, Jacobian's and Lagrange's method of multipliers.
BESI – 1.3	Exhibit the inverse of a Matrix and Rank of a Matrix.
BESI – 1.4	Construct the first order differential equations and can be solved.
BESI – 1.5	Exhibit the Higher order differential equations with constant coefficients and its applications.
BESI – 1.6	solve fitting of a straight line, parabola, lines of regression in Statistics and Langrange's interpolation formula for unequal intervals in Finite Dfferences.

On completion of the course, the Students shall be able to:

СО	STATEMENTS
BESI – 2.1	learn the concept of Dual Nature of light and micro-particle with
	theoretical and experimental support. Also able to analyze the
	problem related to the topics
BESI – 2.2	understand Uncertainty Principle as well as application of
	Schrodinger's equation in one dimensional potential well .Also able
	to analyze the problem related to the topics
BESI – 2.3	learn properties of cubic crystal structures and Bragg law for X-ray
	diffraction. Also able to analyze the problem related to the topics
BESI - 2.4	understand formation of Bands in solids, ,properties of
	semiconductor devices, their testing and utility in small projects.

On completion of the course, the Students shall be able to:

BESI-2 P Engineering Physics

СО	STATEMENTS
BESI – 2.1	learn the band gap of semiconductor material and V-I characteristics of diodes and transistor by analysis from graph.
BESI – 2.2	understand the technique of measurement of refractive index of material of prism and wavelength of monochromatic light using Spectrometer.
BESI – 2.3	learn basic functions of CRO and its use for measurement of fundamental Physical quantities i.e. voltages and frequency.
BESI - 2.4	understand the identification of N-type and P-type specimens and calculation of charge carrier density using Hall effect set up

On completion of the course, the Students shall be able to:

# BESI-3 T Engineering Chemistry

СО	STATEMENTS
BESI – 3.1	Differences between hard & soft water, studies of various softening methods & its applications, also able to analyze boiler troubles.
BESI -3.2	Electrochemical Fundamentals, corrosion prevention methods & environmental induced methods.
BESI – 3.3	Different types of cements & its manufacturing process. They also understand microscopic constituents of cement.
BESI – 3.4	Applications of SCF, concept of green chemistry & carbon credit. Different types, operating principles & mechanisms of batteries & fuel cells.

On completion of the course, the Students shall be able to:

BESI-3 P Engineering Chemistry

СО	STATEMENTS

BESI – 3.1	Analyze the quality of water based on impurities in terms of hardness, alkalinity, free chlorine etc.
BESI -3.2	To determine the metal contents present in ore such as copper, Nickel & Iron.
BESI – 3.3	Analyze Waste water in terms of pH, COD, DO
BESI – 3.4	Analyze capacities of resins & heat of neutralization.

On completion of the course, the Students shall be able to:

#### BESI-4 T BASIC ELECTRICAL ENGINEERING

СО	STATEMENTS
BESI -4.1	Design and verify laws of DC Electric Circuits .
BESI- 4.2	Understand basic term and analyzed composite Magnetic Circuits.
BESI – 4.3	Understand basic fundamental of polyphase AC Circuits .
BESI – 4.4	Understand fundamental of single phase transformer and its testing.

On completion of the course, the Students shall be able to:

#### **BESI-4 P BASIC ELECTRICAL ENGINEERING**

СО	STATEMENTS
BESI -4.1	1 verify laws of DC Electric Circuits .
BESI- 4.2	2 Understand and verify B H Curve of Magnetic Circuits.
BESI – 4.3	3 Measurement of R,L and C of AC Circuits .
BESI – 4.4	4 Understand fundamental of single phase transformer testing.

On completion of the course, the Students shall be able to:

#### BESI-5 T BACIS OF CIVIL ENGINEERING

СО	STATEMENTS
BESI – 5.1	Able to utilize basic knowledge of different fields of civil engineering.
BESI – 5.2	Have basic knowledge of various building components.
BESI – 5.3	Able to apply the knowledge of mathematics, science and engineering to identify, formulate and solve engineering problems.
BESI – 5.4	Able to use basic knowledge of various materials used for construction.
BESI – 5.5	Able to understand the basic knowledge of tools & equipments used in fields of civil engineering.

On completion of the course, the Students shall be able to:

BESI-6 T Engineering Graphics – I

СО	STATEMENTS
BESI -6.1	1 ) Students ability to hand letter will improve.
BESI -6.2	2) Students ability to perform basic sketching techniques will improve.
BESI – 6.3	3) Students will be able to draw orthographic projections and isometric projections.
BESI – 6.4	4) Students will be able to draw projection of planes and solids .
BESI – 6.5	5) Student's ability to use architectural and engineering scales will increase.
BESI – 6.6	6) Student's ability to produce engineered drawing will improve.

On completion of the course, the Students shall be able to:

BESI-7 T Communication Skills

СО	STATEMENTS
BESI – 7.1	language skills required to write their business, Job Correspondences and technical writings.
BESI – 7.2	gain knowledge of grammar to face competitive and entrance examinations to pursue master's degree.
BESI – 7.3	Student shall able to organize their thoughts in English and hence face job interviews more confidently.
BESI – 7.4	Student shall able to acquire the skills of comprehension.

On completion of the course, the Students shall be able to:

СО	STATEMENTS
BESI – 8.1	Identify and understand the key componants of computer System.
BESI – 8.2	Understand the basic terminology used in C-langauge and Compile, Debug a C-Program.
BESI – 8.3	Understand and Devolop the program based on Decision control and loop control structures.
BESI – 8.4	Understand and Devolop the C-program based on Array.

#### SECOND SEMESTER

On completion of the course, the Students shall be able to:

СО	STATEMENTS
BESII – 1.1	Solve the Beta and Gamma Functions and Root Mean square Values in Integral Calculus.
BESII – 1.2	Trace the curves and can find Areas and Volumes of curves.
BESII – 1.3	Solve Multiple Integrals and apply it to find mass, area and volume
BESII – 1.4	Exhibit Vector Algebra and Vector Differential calculus and also Gradient, Divergence and Curl.
BESII – 1.5	Exhibit Vector Integral Calculus by Gauss Divergence Theorem, Stoke's and Green's theorem.
BESII – 1.6	Solve fitting of a straight line, parabola, lines of regression in Statistics and Langrange's interpolation formula for unequal intervals in Finite Differences.

On completion of the course, the Students shall be able to:

BESII – 2T Advanced Physics

СО	STATEMENTS
BESII – 2.1	learn the concept of interference of light in thin film, Basics of LASER, their types and various engineering applications
BESII – 2.2	understand the motion of charged particle in Uniform electric and magnetic field and various devices. Also able to analyze the problem related to the topics
BESII – 2.3	learn the phenomenon of total internal reflection, construction of optical fiber and its applications in communication and different sensors Also able to analyze the problem related to the topics
BESII – 2.4	learn the methods of synthesis of nanomaterial and their drastic change in properties and their impact on society and environment

On completion of the course, the Students shall be able to:

BESII – 2P Advanced Physics

СО	STATEMENTS
BESII – 2.1	learn the different Lissajeous Figures and frequency measurement using CRO.
BESII – 2.2	understand measurement of conductivity of semiconductor material using four-probe setup.
BESII – 2.3	understand the diffraction pattern shown by He-Ne laser and measurement of wavelength of laser in simple way.
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BESII – 2.4	understand the interference pattern in Newton's ring apparatus and its use for measurement of radius of curvature of plano-convex lens

### BESII – 3T Materials Chemistry

СО	STATEMENTS
BESII – 3.1	Different properties &, types of fuel, able to analyze the fuel for various application, also studies alternative energy sources and their significance.
BESII – 3.2	Liquid fuel its chemical properties and applications. They also able to perform combustion calculations.
BESII – 3.3	Different types of lubricants, mechanisms, properties and applications. They also able to select lubricant for different engineering applications.
BESII – 3.4	Various types of polymers its property and applications. They also understand concept composites and nonmaterial & their engineering applications.

On completion of the course, the Students shall be able to:

### BESII – 3P Materials Chemistry

СО	STATEMENTS
BESII – 3.1	Analyze the fuel both qualitatively as well as quantitatively in terms of ash, volatile matter, calorific value.
BESII – 3.2	Determination of physical and chemical properties of lubricant such as viscosity, flash point, acid
BESII – 3.3	Know Preparation of biodiesel.
BESII – 3.4	Determine saponification of Acetic Acid.

On completion of the course, the Students shall be able to:

## **BESII – 4T ENGINEERING MECHANICS**

СО	STATEMENTS
BESII – 4.1	Solve three-dimension force and moment problems.
BESII – 4.2	Solve problems dealing with forces in a plane or in space and equivalent force systems.
BESII – 4.3	Solve beam & truss problems and understand distributed force systems.

BESII – 4.4	Determine centroid & moments of Inertia.
BESII – 4.5	Apply knowledge of kinematic and kinetic analyses and energy and momentum methods

#### BESII – 4P ENGINEERING MECHANICS

СО	STATEMENTS
BESII – 4.1	Determine the components of a force in rectangular or nonrectangular coordinates and the resultant of a system of forces by graphically.
BESII – 4.2	Draw complete and correct free-body diagrams and write the appropriate equilibrium equations from the free-body diagram.
BESII – 4.3	To determine the support reactions on a structure.
BESII – 4.4	To determine the forces in trusses of various nature.
BESII – 4.5	To analyze systems that include frictional forces.

On completion of the course, the Students shall be able to:

### BESII – 5T Advanced Electrical Engineering

СО	STATEMENTS
BESII – 5.1	Understand basic term and protection device of Electrical Power System.
BESII – 5.2	Understand fundamental of DC Machines.
BESII – 5.3	Calculate the domestic electricity charges, illumination and design of wiring system.
BESII – 5.4	Understand fundamental of different type induction motors

On completion of the course, the Students shall be able to:

BESII – 6P	Engineering	Graphics – II
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СО	STATEMENTS
BESII – 6.1	The use Computer Aided Drafting packages, its applicationsand use of commands used for drawing.
BESII – 6.2	Type of section planes, sectional multi view orthographic projection when solid in different position is cut by section plane obtain true shape of the section and can draw.

BESII –6.3	Importance an d application of development of lateral surfaces, method of development and development of cut solids, and can draw.
BESII –6.4	How to identify edge obtain by intersection of surfaces, imagination and visualization o missing orthographic view and can draw.

#### BESII – 7P WORKSHOP

СО	STATEMENTS
BESII – 7.1	Approach to use different tool and equipments of Fitting, Carpentry, Welding and Black smithy to complete the specified job with understanding of practical constraints.
BESII –7.2	Teamwork: Work effectively in teams to accomplish the assigned responsibilities in an integral manner.
BESII –7.3	Technical Communication: Communicate effectively about laboratory work both orally and in writing journals/technical reports.
BESII –7.4	Ethics and safety awareness: Behave with highest ethical standards with concern to global, environmental, economic, social issues, safety requirement with lifelong learning and awareness of contemporary issues.

On completion of the course, the Students shall be able to:

# BESII – 8T Ethical Science

СО	STATEMENTS
BESII – 8.1	Student shall able to understand the implications of Culture and Civilization and acquire the knowledge of socio-legal terms.
BESII – 8.2	Student shall be able to understand industrial Psychology and Sociology.
BESII – 8.3	Student shall able to acquire professional ethics.
BESII – 8.4	Student shall able to understand Indian political system.
BESII – 8.5	Student shall able to understand Industrial Democracy and work organization with dynamics of Industrial leadership.

#### THIRD SEMESTER

On completion of the course, the Students shall be able to:

#### MATHEMATICS- III

C301.1T	Identify and solve problems on periodic, even and odd functions and half
	range expansion

C301.2T	To solve linear homogeneous equations with constant coefficients and shall have knowledge of the application to simple problems of vibration of strings.
C301.3T	Solve isoperimetric problem, boundary value problem by using calculus of variations.
C301.4T	Verify linear dependence and independence of given set of vectors, apply Caley Hamilton theorem, Sylvester theorem and solve second order linear differential equation with constant coefficient.
C301.5T	Solve algebraic and transcendental equations, linear simultaneous equations and first order differential equations by using different methods.
C301.6T	Form linear programming problem and have knowledge of solving it by using Graphical and simplex method.

#### BECVE 302 T STRENGTH OF MATERIALS

СО	STATEMENTS
BECVE302.1	Understand the behavior of materials under different stress and strain conditions.
BECVE 302.2	Understand the behavior of materials under torsion.
BECVE 302 .3	Draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading and calculate the deflection.
BECVE 302 .4	Study the fundamental issues of elasto-mechanics, i. e. The mechanics of deformable bodies
BECVE 302 .5	Analyze structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.
BECVE 302 .5	Calculate the various stresses and strains for different loading conditions of structures.

On completion of the course, the Students shall be able to:

#### BECVE 302 P STRENGTH OF MATERIALS

СО	STATEMENTS
BECVE 302 .1	Evaluate Young Modulus of given specimens
BECVE 302 .2	Evaluate torsional strength of given specimens
BECVE 302 .3	Evaluate hardness of given specimens
BECVE 302 .4	Evaluate impact value of given specimens of given specimens
BECVE 302 .5	Find the compressive strength of bricks

#### BECVE 303 T ENVIRONMENTAL ENGINEERING I

СО	STATEMENTS
BECVE 303 .1	Aware of the importance and need of water supply.
BECVE 303 .2	Find out the capacity of water supply scheme.
BECVE 303 .3	Have the knowledge of characteristics of water, drinking water standard and necessity of treatment.
BECVE 303 .4	Design various units of conventional water treatment plant.
BECVE 303 .5	Understand the collection & disposal methods of solid waste management.

On completion of the course, the Students shall be able to:

#### BECVE 303 P ENVIRONMENTAL ENGINEERING I

СО	STATEMENTS
BECVE 303 .1	1. find out the pH, turbidity, acidity and alkalinity of given sample
BECVE 303 .2	2. find out the hardness of given sample
BECVE 303 .3	3. find out dissolved oxygen in given sample
BECVE 303 .4	4. know the concept of turbidity of water
BECVE 303 .5	5. find out solid, chlorine and chloride in given sample

On completion of the course, the Students shall be able to:

#### BECVE 304 T ENGINEERING GEOLOGY

СО	STATEMENTS
BECVE 304 .1	Identify different types of rocks, minerals and their properties.
BECVE 304 .2	Understand the significant role of science and geology in today's modern society.
BECVE 304 .3	Identify the causes of earthquake and landslide.

BECVE 304 .4	Determine the direction and amount of outcrop, dip and strike of rock bed.
BECVE 304 .5	Study the process of underground openings in rock.
BECVE 304 .6	Apply geologic concepts to engineering projects such as dams, landfills, rock quarries, roads, tunnels and slopes.

#### BECVE 304 P ENGINEERING GEOLOGY

СО	STATEMENTS
BECVE 304.1	1. identify the various types of rocks
BECVE 304 2	2. identify the various types of minerals
BECVE 304 .3	3. understand the concept of contour map
BECVE 304 .4	4. draw the geological section and describe topography

On completion of the course, the Students shall be able to:

#### BECVE 305 T CONCRETE TECHNOLOGY

СО	STATEMENTS
BECVE 305 .1	Check the properties of ingredients of concrete
BECVE 305 .2	Understand the test strength and quality of plastic and set concrete
BECVE 305 .3	Understand the effect of process of manufacturing on different properties
	of concrete
BECVE 305 .4	Test various strength of concrete by destructive& non-destructive
	method.
BECVE 305 .5	Understand the application of admixture & its effect.

On completion of the course, the Students shall be able to:

#### BECVE 305 P CONCRETE TECHNOLOGY

СО	STATEMENTS
BECVE 305.1	1. Find out the normal consistency and initial, final setting time by Vicat's
	apparatus
BECVE 305 .2	2.find out the fineness of cement
BECVE 305 .3	3.perform various tests of cement
BECVE 305 .4	4.find out workability of concrete by various tests
BECVE 305 .5	5.know the concept of non-destructive test on hardened concrete

СО	STATEMENTS
BECVE 401.1	Apply various classical methods for analysis of indeterminate structures and find out the effect of support settlements for indeterminate structures.
BECVE 401 2.	Relate the concepts of ILD and moving loads on determinate structures.
BECVE 401 .3	Determine forces in redundant frames and trusses.
BECVE 401 .4	Understand concept of buckling of column and express the behavior of arches and their methods of analysis.
BECVE 401 .5	Analyze multistory frames subjected to gravity loads and lateral loads.
BECVE 401 .6	Express the concept of matrix analysis of indeterminate structures.

#### BECVE 401 T STRUCTURAL ANALYSIS – 1

On completion of the course, the Students shall be able to:

#### BECVE 401 P STRUCTURAL ANALYSIS – 1

СО	STATEMENTS	
BECVE 401 .1	1. Find out the slope and deflection of beam	
BECVE 401 .2	2. Find out the value of Flexural rigidity (EI) for a given beams and	
	compare with theoretical value	
BECVE 401 .3	3. know the concept of various strain gauges	
BECVE 401 .4	4. find out the stress on beam by photo-elastic method	
BECVE 401 .5	5. to know the behaviour of different types of struts and calculate the	
	Euler's Buckling load for each case	

On completion of the course, the Students shall be able to:

#### BECVE 402 T GEOTECHNICAL ENGINEERING-1

СО	STATEMENTS
BECVE 402.1	To introduce soil as three-phase system, index properties and engineering classification methods of soils.
BECVE 402.2	To study flow through soils (permeability) and influence of presence of water on engineering properties of soil.
BECVE 402.3	To study compressibility characteristics (compaction and consolidation) of soils and estimate settlements. To study variation of geostatic stresses and stress due external load in soils.
BECVE 402.4	To study methods of determination of shear strength of soils and factors influencing its magnitude.
BECVE 402.5	Determine the suitability of foundation for a particular type of soil.

On completion of the course, the Students shall be able to:

BECVE 402 P GEOTECHNICAL ENGINEERING-1

СО	STATEMENTS
BECVE 402.1	1. Find out the specific gravity of soil sample by pycnometer bottle
BECVE 402 2.	2. find out the moisture content of soil
BECVE 402 3	3. find out the shrinkage limit, liquid limit and plastic limit of soil sample
BECVE 402 .4	4. find out the bulk density and dry density of soil sample by core cutter method and sand replacement method
BECVE 402 .5	5. find out the permeability of soil sample

BECVE 4	103 T T	ranspo	ortation	Engine	ering – 1	
01011		1 0110 01	51 64 61011			

СО	STATEMENTS
BECVE 403.1	Perform geometric design of highways and expressways.
BECVE 403 2.	Perform analysis and design of flexible and rigid pavements.
BECVE 403 .3	Understand fundamentals of traffic studies.
BECVE 403 .4	Understand basic requirements and mechanisms for highway maintenance, drainage, economic, and environment.
BECVE 403 .5	Discuss basic definitions, types, and components of bridges.
BECVE 403 .6	Discuss sub-surface investigations required for bridge construction

On completion of the course, the Students shall be able to:

BECVE 403 P Transportation Engineering – 1

СО	STATEMENTS
BECVE 403.1	1. find out impact value, crushing value of aggregate
BECVE 403 2.	2. find out the flakiness and elongation index of aggregate
BECVE 403 .3	3. find out the CBR value of given sample
BECVE 403 .4	4. find out the flashpoint, firepoint and ductility value of bitumen sample
BECVE 403 .5	5. find out the specific gravity of aggregate.

On completion of the course, the Students shall be able to:

СО	STATEMENTS
BECVE 404.1	To introduce concepts of surveying and leveling.
BECVE 404 .2	To undertake experiments in the field by different techniques and under different circumstances.
BECVE 404 .3	To have a field exposure.
BECVE 404 .4	plan a survey, taking accurate measurements, field booking, plotting and adjustment of traverse
BECVE 404 .5	use various conventional instruments involved in surveying with respect to utility and precision
BECVE 404 .6	undertake measurement and plotting in civil engineering

BECVE 404 P Surveying – 1

СО	STATEMENTS
BECVE 404.1	use the theodolite along with chain/tape, compass on the field
BECVE 404 .2	apply geometric and trigonometric principles of basic surveying calculations
BECVE 404 .3	plan a survey, taking accurate measurements, field booking, plotting and adjustment of errors
BECVE 404 .4	apply field procedures in basic types of surveys, as part of a surveying team

On completion of the course, the Students shall be able to:

BECVE 405 T	BUILDING	CONSTRUCTION	& MATERIAL
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СО	STATEMENTS
BECVE 405.1	To understand and identify the components of buildings
BECVE 405 .2	To select proper materials which are used for construction of structure.
BECVE 405 .3	To develop techniques and methodologies for retrofitting.
BECVE 405 .4	To impart knowledge of various construction related activities and to expose various quality control aspects.
BECVE 405 .5	To understand various constructional techniques.

#### **FIFTH SEMESTER**

On completion of the course, the Students shall be able to:

#### BECVE 501 T STRUCTURAL ANALYSIS II

СО	STATEMENTS
BECVE 501.1	Draw SFD and BMD of beam and frame by kani's method.
BECVE 501 .2	Draw SFD and BMD of beam and frame by moment distribution method.
BECVE 501 .3	Analysis the beam by column analogy method.
BECVE 501 .4	Solve the problem of principle strains or strain rossets.

On completion of the course, the Students shall be able to:

### BECVE 501 P STRUCTURAL ANALYSIS II

СО	STATEMENTS
BECVE 501.1	Draw SFD and BMD of beam and frame by kani's method.
BECVE 501 .2	Draw SFD and BMD of beam and frame by moment distribution method.
BECVE 501 .3	Analysis the beam by column analogy method.
BECVE 501 .4	Solve the problem of principle strains or strain rossets.

On completion of the course, the Students shall be able to:

#### BECVE 502 P RCC STRUCTURES

СО	STATEMENTS
BECVE 502.1	Understand the basic concepts of structural design Methods of RCC to the practical problem
BECVE 502.2	Understand the composite action of reinforced steel and concrete in reinforced concrete structural members
BECVE 502.3	Use the knowledge of the structural properties of materials i.e. steel and concrete in assessing the strength.
BECVE 502.4	Use the knowledge in structural planning and design of various components of buildings.

BECVE 502.5	Apply the concepts and applications of prestressed concrete in real problems.
BECVE 502 6	Know the importance and use of IS code 456-2000.

## BECVE 502 P RCC STRUCTURES

СО	STATEMENTS
C502.1P	1.design of one way slab
C502.2P	2.design of column and design of footing
C502.3P	3.design of circular water tank

On completion of the course, the Students shall be able to:

#### BECVE 503 T FLUID MECHANICS I

СО	STATEMENTS
BECVE 503.1	Determine fluid pressures and forces on plates & pipe bends.
BECVE 503 .2	Apply the principles of hydrostatics.
BECVE 503 .3	Solve the problems in fluid by applying the Bernoulli's equation
BECVE 503 .4	Understand the basic concepts of various types of flow.
BECVE 503 .5	Determine the discharge through Venturimeter & Orificemeter.
BECVE 503 .6	Understand the concepts of dimensional analysis use the dimensionless number suitably.

On completion of the course, the Students shall be able to:

#### BECVE 503 P FLUID MECHANICS I

СО	STATEMENTS
BECVE 503.1	1. find out the discharge of venchurimeter, orificemeter, rectangular notch and v-notch.
BECVE 503 .2	2. verify Bernaulli's equation
BECVE 503 .3	3. find out the flow types by Renold's number apparatus

BECVE 503 .4	4. find out the metacentric height by Buoyancy and floatation
BECVE 503 .5	5. find out the impact force by impact jet

BECVE 504 T GEOTECHNICAL ENGINEERING – 2

СО	STATEMENTS
BECVE 504.1	undertake design and analysis problems related to pile foundations
BECVE 504 .2	Introduce purposes, extent and methods of soil exploration.
BECVE 504 .3	undertake design and analysis problems related to shallow foundations
BECVE 504 .4	Understand analysis of lateral earth pressure for design of earth retaining structures.
BECVE 504 .5	introduce concepts to assess stability of natural/man-made slopes

On completion of the course, the Students shall be able to:

BECVE 505 T Hydrology and Water Resources

СО	STATEMENTS
BECV	To understand the essential components and function of the hydrologic cycle
E	including precipitation, evaporation/ evapotranspiration, overland flow and
505.1	surface storage, groundwater flow and storage, and channel flow, storm water
	runoff and water quality.
BECV	To compute hydrologic mass balance in a closed basin.
E	
505.2	
BECV	To develop unit hydrographs based on stream flow data, and conduct basic unit
E	hydrograph analysis Also to determine return period or recurrence interval.
505.3	
BECV	To understand basic concepts of hydrologic simulation modeling to evaluate
E 505	potential impacts of management decisions.
.4	
BECV	To compute groundwater drawdown based on water well withdrawal. To
E 505	compute critical flow and critical depth in flood plain hydraulics.
.5	
BECV	Students can perform hydrologic and hydraulic routing using governing equations
E 505	for hydraulic river routing.
.6	

On completion of the course, the Students shall be able to:

СО	STATEMENTS
BECVE 506.1	produce a set of documents related to technology and writing in the workplace and will have improved their ability to write clearly and accurately.
BECVE 506.2	acquire language skills required to write their Reviews/Projects/Reports.
BECVE 506.3	have enough confidence to face competitive examinations to pursue masters degree.
BECVE 506 .4	organize their thoughts in English and hence face job interviews more confidently.

#### BECVE 601 T STEEL STRUCTURES

СО	STATEMENTS
BECVE 601.	Understanding design philosophies and behavior of structural steel as a individual member and structure as a whole.
BECVE 601.2	Know the method of design i.e. working state method
BECVE 601.3	Ability to analyze and design of tension members and compression member such as column beam and joint by working state method
BECVE 601.4	Ability to analyze and design of simple bolted and welded connections by working state method
BECVE 601.5	Familiarity with structural steel fabrication process and construction through field trip and/ or speaker presentation
BECVE 601.6	Know the importance and use of IS code 800-1984.

On completion of the course, the Students shall be able to:

#### BECVE 601 P STEEL STRUCTURES

СО	STATEMENTS
BECVE 601.1	1. Design of tension member and compression member
BECVE 601.2	2.design of beams
BECVE 601 .3	3.design of built-up column
BECVE 601 .4	4.detail of column base

BECVE 601 .5	5.design of plate girders

#### BECVE 602 T SURVEYING-II

SURVEYING-II	
СО	STATEMENTS
BECVE 602.1	Understand the different methods to set out curves
BECVE 602.2	Understand the concept of geodetic survey.
BECVE 602.3	Understand the concept of tacheometric surveying.
BECVE 602.4	Understand the concept of photographic surveying
BECVE 602.5	Apply the concepts of modern surveying techniques & instrumentation.
BECVE 602.6	Invoke advanced surveying techniques over conventional methods in the field of civil engineering.

On completion of the course, the Students shall be able to:

#### BECVE 602 P SURVEYING-II

СО	STATEMENTS
BECVE 602.1	Determine the multiplying and additive constant of tachometer
BECVE 602.2	Determine the elevation of point by tachometric surveying
BECVE 602.3	Determine the horizontal distance between points by tachometric surveying
BECVE 602.4	Determine gradient of road tachometric surveying
BECVE 602.5	Set out curve (simple & combine curve)

On completion of the course, the Students shall be able to:

BECVE 603 T FLUID MECHANICS II

СО	STATEMENTS
BECVE 603.1	Determine drag and lift forces and understand the concepts of boundary layer theory.
BECVE 603.2	Analyze and design the pipe network systems and its components including.
BECVE 603.3	Design the efficient channel sections using the concepts of uniform and critical flow through open channels.
BECVE 603 .4	Analyze Gradually Varied Flow and its computation.
BECVE 603 .5	Analyze of open channel flow by using specific energy concepts.
BECVE 603.6	Perceive basics related to Turbines & Pumps.

# BECVE 603 P FLUID MECHANICS II

СО	STATEMENTS
BECVE 603.1	1. obtain the complete characteristics of reciprocating pump and pelton wheel turbine
BECVE 603.2	2. determine Darcy's friction factor for pipes of different diameter
BECVE 603.3	3. determine Manning's or Chezy's constant for an open channel
BECVE 603 .4	4. develop specific energy diagram for the flow in rectangular channel.
BECVE 603 .5	5. verify different parameters of hydraulic jump

On completion of the course, the Students shall be able to:

# BECVE 604 T BUILDING DESIGN & DRAWING

СО	STATEMENTS
BECVE 604.1	Impart the knowledge of building bye laws & building code
BECVE 604.2	Apply the principles of building planning and design.
BECVE 604.3	Draw submission/working drawing using suitable software.

BECVE 604.4	Know the knowledge about how to give the layout plan on the field.
BECVE 604.5	Draw simple perspective drawings.
BECVE 604.6	Understand drawings and detailing of building services

# BECVE 605 T ENVIRONMENTAL ENGINEERING II

СО	STATEMENTS
BECVE 605	Understand the concept of sewage, sewer, and storm water.
BECVE 605.1	Understand the Laying, construction, testing & maintenance of sewers.
BECVE 605.2	Have the knowledge of characteristics of Sewage, and necessity of treatment.
BECVE 605.3	Design Sewage treatment plant units.
BECVE 605.4	Understand the concept of rural sanitation & design of septic tank,
BECVE 605.5	Understand Effect of air pollution.

On completion of the course, the Students shall be able to:

#### BECVE 606 T SITE VISIT & MINI PROJECT

SUBJECT CODE	STATEMENTS
BECVE 606.1	Get an idea of various project details such as contracts, layout, planning, drawing, estimates, Arbitration provision, licensee & licensor, architects, structural designer, etc.
BECVE 606.2	Get an idea of various construction equipment, manpower & techniques used at site, techniques of batching, mixing, transportation, and placement of different constructionmaterials.
BECVE 606.3	Get an overview on safety measures, basic amenities to provide, inventory control.
BECVE 606.4	Write a legible, correct and technically sound report after the visit.
	Ascertain the provisions and execution as per the working drawing.

#### SEVENTH SEMESTER

*On completion of the course, the Students shall be able to:* 

#### BECVE 701 T ADVANCED CONCRETE STRUCTURES

СО	STATEMENTS
BECVE 701.1	Understand the fundamentals of design analysis and proportioning of reinforced element as individual and structure as a whole.
BECVE 701.2	Accomplish this objective the following topic – behavior of beam, one way slab column.
BECVE 701.3	Method for analysis and design of these element under flexure, axial, shear, torsion be examined.
BECVE 701.4	Know the importance and use of IS code 456-2000.

On completion of the course, the Students shall be able to:

#### BECVE 701 P ADVANCED CONCRETE STRUCTURES

СО	STATEMENTS
BECVE 701.1	Understand the fundamentals of design analysis and proportioning of reinforced element as individual and structure as a whole.
BECVE 701.2	Accomplish this objective the following topic – behavior of beam, one way slab column.
BECVE 701.3	Method for analysis and design of these element under flexure, axial, shear, torsion be examined.
BECVE 701.4	Know the importance and use of IS code 456-2000.

On completion of the course, the Students shall be able to:

#### BECVE 702 T ESTIMATING & COSTING

СО	STATEMENTS
BECVE 702.1	Prepare the preliminary estimate for administrative approval & technical sanction for a civil engineering project and estimate the bill of quantities for roads and canals.

BECVE 702.2	Estimate the bill of quantities using different techniques of detailed estimation of buildings.
BECVE 702.3	Prepare the tender documents, fill the contracts and make use of knowledge of different contract submission & opening in awarding the work to the contractor.
BECVE 702.4	Write the specification of the works to be undertaken, calculate different charges of a structure using classification of costs.
BECVE 702.5	Use the technique of Rate analysis in estimating the exact cost of material & manpower and hence the entire project.
BECVE 702.6	Get the exact value of the asset (movable & immovable) using different Valuation techniques and calculate net income and rent fixation.

#### BECVE 702 P ESTIMATING & COSTING

СО	STATEMENTS
BECVE 702.1	1. Estimate the quantity of load bearing structure
BECVE 702.2	2.Estimate the quantity of frame structure
BECVE 702.3	3.analyze the rates of materials
BECVE 702.4	4. Estimate the earthwork in road and canal
BECVE 702.5	5.find the valuation of any structure

On completion of the course, the Students shall be able to:

# BECVE 703 T E – 1 (TRAFFIC ENGINEERING)

СО	STATEMENTS
BECVE 703.1	Use the knowledge to carry out traffic studies and give solutions to planning of transportation system.
BECVE 703.2	Apply basic principles for the geometric design of roads
BECVE 703.3	Understand the parking systems, riding quality standards, traffic safety

	and accident study and suggest the solutions to the practical problems.
BECVE 703.4	Understand traffic control devices

#### BECVE 704 T CONSTRUCTION MANAGEMENT & LAW

СО	STATEMENTS
BECVE 704.1	Demonstrate the understanding of various types of projects, modern construction techniques and will exhibit the mastery in construction planning, scheduling and various controls.
BECVE 704.2	Achieve the knowledge of various types' of equipments to be used in the construction and its operational cost estimates, understand manpower requirement, planning, resources utilization and management.
BECVE 704.3	To know the quality control aspects in planning & management, modern trends project management, application of information system in management of construction projects, safety provisions and equipments.
BECVE 704.4	Analyze the legal aspects in construction projects through the understanding of various laws pertaining to civil engineering and architectural planning & sanctioning, labor & organizational welfare measure, provisions of arbitration and litigations.

On completion of the course, the Students shall be able to:

#### BECVE 705 T TRANSPORTATION ENGINEERING – 2

BECVE 705.1	To undertake the problems regarding the geometric design of the railway track.
BECVE 705.2	To discuss the concepts of the various signaling systems, the safety aspects and the modernization of the Indian Railway.
BECVE 705.3	To discuss the concepts of Runway Orientation and the Geometric Design of the Runway and the Taxiway.

BECVE 705.4	To identify, analyze, and solve problems related to structural design of the flexible and the rigid runway and taxiway pavements.
BECVE 705.5	Understand the relationship between the environmental and transportation infrastructure and the importance the environmental plays in project development of transportation projects
BECVE 705.6	To understand concepts of traffic engineering including traffic control, control aids, regulations, highway capacity, and design of intersections.

со	STATEMENTS
BECVE 706.1	Have extensive on-site exposure to various civil engineering aspects.
BECVE 706.2	Develop managerial skills of the Students.
BECVE 706.3	ExposeStudents to practical problems and learn troubleshooting methods.
BECVE 706.4	expose Students to a minor problem (academic) related any one of the following components viz. design of structures, geotechnical investigations, water supply distribution system, irrigation engineering and highway design.
BECVE 706.5	expose Students to a minor problem (academic) related any one of the following components viz. design of structures, geotechnical investigations, water supply distribution system, irrigation engineering and highway design.
BECVE 706.6	Develop confidence to take up a project activity independently.

BECVE 706 P Industrial Case Study and Project Seminar

#### EIGHTH SEMESTER

On completion of the course, the Students shall be able to:

# BECVE 801 T IRRIGATION ENGINEERING

СО	STATEMENTS
BECVE 801.1	Derive the expression for determining base width for stress and sliding criteria.

BECVE 801.2	Determine the storage capacity required to flow
BECVE 801.3	Design the earthen dam
BECVE 801.4	Design an irrigation canal with bed slope

# BECVE 802 T E – 2 (PAVEMENT DESIGN)

СО	STATEMENTS
BECVE 802.1	Analyze and Design pavement and under different loading conditions for highways and airfields taking into consideration different characteristics.
BECVE 802.2	Perform different tests considering field conditions and using the knowledge to increase the strength of pavements along with its economy point of view.
BECVE 802.3	Understand pavement testing and evaluation
BECVE 802.4	Do case studies of highway pavement projects.

On completion of the course, the Students shall be able to:

# BECVE 803 T E – 3 (ADVANCED STEEL DESIGN)

СО	STATEMENTS
BECVE 803.1	Understand the analysis and design of tension members, bolted connections, welded connections,compression members and beams,supporting component such as bearing, rakers, shear connectors.
BECVE 803.2	Understand the basic concepts and to incorporate the same in the analysis and design of specialstructures such as gantry girders, foot bridges, railway bridges, storage vessels etc.
BECVE 803.3	Understand the basic concepts of composite sections, its analysis and design
BECVE 803.4	Understand the analysis and design of industrial building frame and its connection.

# BECVE 803 P E – 3 (ADVANCED STEEL DESIGN

СО	STATEMENTS
BECVE 803.1	Understand the analysis and design of tension members, bolted
	connections, welded connections, compression members and
	beams, supporting component such as bearing, rakers, shear
	connectors.
BECVE 803.2	Understand the basic concepts and to incorporate the same in the
	analysis and design of specialstructures such as gantry girders, foot
	bridges, railway bridges, storage vessels etc.
BECVE 803.3	Understand the basic concepts of composite sections, its analysis and
	design
BECVE 803.4	Understand the analysis and design of industrial building frame and its
	connection.

On completion of the course, the Students shall be able to:

#### BECVE 804 T Construction Economics and Finance

СО	STATEMENTS
BECVE 804.1	Acquaint with various economic and financial aspects of construction industry
BECVE 804.2	Understand the tools and techniques of economic analysis for improving their decision making skills
BECVE 804.3	Understand the knowledge of economics and finance with special reference to construction industry
BECVE 804.4	Understand the concept of IRR, turnkey construction projects
BECVE 804.5	Apply knowledge of inflation, recession, financial ratios

On completion of the course, the Students shall be able to:

#### BECVE 805 P PROJECT

СО	STATEMENTS
BECVE 805.1	Have extensive on-site exposure to various civil engineering aspects.

BECVE 805.2	Develop managerial skills of the students.
BECVE 805.3	Expose students to practical problems and learn troubleshooting methods.
BECVE 805.4	Develop an understanding of modern construction materials and techniques.
BECVE 805.5	Expose students to take up complex structural design and construction challenges.
BECVE 805.6	Develop confidence to take up a project activity independently.

# M.Tech Structural Engineering

#### **First Semester**

On completion of the course, the Students shall be able to:

PGST101T	Matrix Analysis of Structures
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СО	STATEMENTS
PGST101.1	Graduates will be able to understand the concept of stiffness matrix
	method and its application to plane truss, beams and plane frames.
PGST101.2	Graduates will be able to understand the application of stiffness matrix
	method to space frames and plane grid.
PGST101.3	Graduates will be able to analysis member with different loading,
	inclined supports, lack of fit, initial joints displacements.
PGST101.4	Graduates will be able to solve solve structures with effect of shear
	deformation. Internal member end releasese.
PGST101.5	Graduates will be able to find solution technique with banded &
	skyline technique, band minimization, frontal techniques.

On completion of the course, the Students shall be able to:

#### PGST101P Matrix Analysis of Structures Lab

СО	STATEMENTS
PGST101.1	Generate the global stiffness matrix by assembling the element stiffness matrices.
PGST101.2	Analyze the continuous beams, portal frames and trusses by stiffness method.
PGST101.3	Solve the continuous beams, portal frames and trusses by flexibility method.
PGST101.4	Analyze the shear walls by approximate methods.

On completion of the course, the Students shall be able to:

#### PGST102T Theory of Elasticity & Elastics Stability

СО	STATEMENTS

PGST102.1	Identify and analyse the stress problems in an elastic body
PGST102.2	The student will be able to execute the stress state, stresses and strains analysis
PGST102.3	Acquire the concepts on theory of elasticity and theory of plasticity
PGST102.4	To be able to use the numerical methods for the problem of the theory of elasticity in practice

#### **PGST103T Structural Dynamics**

СО	STATEMENTS
PGST103.1	To understand basic concepts of structural dynamics
PGST103.2	To calculate the response of building to dynamic loading
PGST103.3	To generate the response spectrum for dynamic loading
PGST103.4	To understand IS codes related to dynamic loading

On completion of the course, the Students shall be able to:

СО	STATEMENTS
PGST103.1	The graduates will have detailed knowledge about dynamic forces and
	loadings caused due to earthquake, vibrations etc.
PGST103.2	The graduates will be able to understand and apply various clauses
	mentioned in Indian standards pertaining to structural dynamics.
PGST103.3	The graduates will be able to analyze various type of structure
	subjected to dynamic loading.

### PGST103P Structural Dynamics Lab

On completion of the course, the Students shall be able to:

#### PGST104T Elective-I Advanced Steel Design

со	STATEMENTS
PGST104.1	To Understand the analysis and design of eccentric connections.
PGST104.2	To understand the design of steel chimney.
PGST104.3	To understand the basic concepts and incorporate the same in the analysis and design of some structures such as gantry girders and industrial shed.
PGST104.4	To Understand the basic concepts and to incorporate the same in the analysis and design of special structures such as foot bridges, highway-railway bridges, storage vessels etc.

On completion of the course, the Students shall be able to:

#### Elective –II PGOPEN105T (Open) Global Warming and Climate Change

со	STATEMENTS
PGOPEN 105.1	Understand the current evidence for global warming
PGOPEN 105.2	Explain the factors forcing the climate change through the earth history
PGOPEN 105.3	Understand the physical basis of natural greenhouse effect

#### Second Semester

On completion of the course, the Students shall be able to:

#### PGST201T Finite Element Method

со	STATEMENTS
PGST201.1	Analyze finite element method efficiently in order to solve field problems.
PGST201.2	Identify the most appropriate mathematical model for solution of common Engineering problems.
PGST201.3	Select the suitable finite element and solve the problem having complicated geometry and loadings using the software

On completion of the course, the Students shall be able to:

PGST202T	Theory	of Plates	& Shell
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СО	STATEMENTS
PGST202.1	Apply the theory of plates in engineering designs.
PGST202.2	Describe and Exploit various modelling avenues for structural engineering components and obtain the exact and/or approximate solutions.
PGST202.3	Select an appropriate plate theory for different Engineering applications.
PGST202.4	Formulate differential equations for plate problems
PGST202.5	Understand the general plate bending theories

On completion of the course, the Students shall be able to:

#### PGST203T Foundation Design

СО	STATEMENTS
PGST203.1	The students will be familiar with advanced methods used for concrete
PGST203.2	Identify underlying concepts in modern concrete design methods
PGST203.3	An ability to identify & design various types of foundations according to field conditions
PGST203.4	The graduates will be able to design various types of foundation systems like isolated, combined, pile, etc. as per codal provisions.

On completion of the course, the Students shall be able to:

#### PGST204T Elective-III High Rise Structures

CO	STATEMENTS
PGST204.1	Understand behavior & Failures mode of various type of building in past earthquake.

PGST204.2	Analyze & apply the result in designing mathematical modeling with different structure system
PGST204.3	Apply the knowledge & skill in practical problem .
PGST204.4	Understand the relevant software and use the same in analysis and design of multistory building

#### Foundation Course-I PGFD205T Research Methodology

СО	STATEMENTS
PGST205.1	Students who successfully complete this course would learn the fundamental concepts of Research Methodology, apply the basic aspects of the Research methodology to formulate a research problem and its plan.
PGST204.2	They would also be able to deploy numerical/quantitative techniques for data analysis.
PGST204.3	They would be equipped with good technical writing and presentation skills.

On completion of the course, the Students shall be able to:

#### PGST206P RCC Design Lab

СО	STATEMENTS
PGST206.1	Ability to understand the basic principles involved in analysis and design of multi storied building & reinforced concrete structures.
PGST206.2	The graduates will be able to apply the main design rules and detailing requirements for column and beam according to the codal provision
PGST206.3	Ability to make use design methodologies to analyse reinforced concrete structures.
PGST206.4	Ability to employ the code of practice for design of reinforced concrete structural members.
PGST206.5	Able to design R.C.C column, beam and other structural member.

On completion of the course, the Students shall be able to:

#### PGST207P Steel Design Lab

СО	STATEMENTS
PGST207.1	The graduates will be able to employ step by step process of seismic design of a steel frame building in accordance to IS 800:2007.
PGST207.2	The graduates will be able to understand the concepts of capacity design and failure mode control and their deployment in modern codes of practice.
PGST207.3	The graduates will be able to determine seismic actions on typical steel structures using simplified methods derived from fundamental structural dynamics and earthquake engineering concepts

#### **Third Semester**

On completion of the course, the Students shall be able to:

PGOPEN301T Elective –IV (Open) Disaster Management and Mitigation

СО	STATEMENTS
PGOPEN301.1	Understand the role of government agencies in Disaster management.
PGOPEN301.2	Understand how to react effectively to natural , man- made &
	technological threats.
PGOPEN301.3	Understand the basic types of hazard & their potential.
PGOPEN301.4	Develop a basic understanding of prevention , Mitigation , Response and
	Recovery.

PGFD302T Project Planning & Management		
СО	STATEMENTS	
PGFD302.1	Identify the different stages in a construction project	
PGFD302.2	Carry out Network analysis, Scheduling & contract .	
PGFD302.3	Conduct cost control and project financing.	
PGFD302.4	Specify the responsibilities of different parties in construction safety and project management	
PGFD302.5	Apply project management skills to effectively manage a project or task.	
PGFD302.6	Adopt design tools and software to analyze and verify design assumptions.	

# On completion of the course, the Students shall be able to:

# PGST303P Project Seminar

CO	STATEMENTS
PGST303.1	Improve the technical presentation skills of the students.
PGST303.2	To train the students to do literature review.
PGST303.3	To impart critical thinking abilities

#### **Fourth Semester**

On completion of the course, the Students shall be able to:

### PGST401P Project

CO	STATEMENTS
PGST401.1	Develop managerial skills of the students.
PGST401.2	Develop confidence to take up a project activity independently.
PGST401.3	Develop an understanding of modern construction materials and
	techniques.
PGST401.4	Expose students to take up complex structural design and construction
	challenges.

## ELECTRICAL ENGINEERING

#### **PROGRAM OUTCOMES (PO)**

#### 1. Engineering knowledge:

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

#### 2. Problem analysis:

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

#### 3. Design/development of solutions:

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

#### 4. Conduct investigations of complex problems:

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

#### 5. Modern tool usage:

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

#### 6. The engineer and society:

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

#### 7. Environment and sustainability:

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

#### 8. Ethics:

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

#### 9. Individual and team work:

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

#### 10. Communication:

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

#### 11. Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles

and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

#### 12. Life-long learning:

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

#### **PROGRAM SPECIFIC OUTCOMES (PSO)**

- 1. The graduate will be able to model and design electrical equipment and electrical power system.
- 2. The graduate will be able to identify and rectify the trouble shooting in electrical system.
- 3. The graduate will be able to understand the importance of financial aspects in power system infrastructure development by considering social and environmental needs.
- 4. The graduate will be able to check the performance of electrical equipments.

#### COURSE OUTCOMES (COs)

#### **FIRST SEMESTER**

#### Course Name: BES101T (Applied Mathematics - I) Students shall be able to:

BES101.1T	apply Differential Calculus by using indeterminate forms, Taylor's and Maclaurin's Series.
BES101.2T	apply Partial Differentiation by the use of Euler's theorem, chain rule, Jacobian's and Lagrange's method of multipliers.
BES101.3T	Students shall be able to exhibit the inverse of a Matrix and Rank of a Matrix.
BES101.4T	construct the first order differential equations and can be solved.
BES101.5T	exhibit the Higher order differential equations with constant coefficients and its applications.
BES101.6T	exhibit the Complex numbers by using De Moivre's theorem and can Separate the real and imaginary parts

# Course Name: BES102T (Engineering Physics)

#### Students shall be able to:

BES102.1T	learn the concept of Dual Nature of light and micro-particle with theoretical and experimental support. Also able to analyze the problem related to the topics
BES102.2T	understand Uncertainty Principle as well as application of Schrodinger's equation in one dimensional potential well. Also able to analyze the problem related to the topics
BES102.3T	learn properties of cubic crystal structures and Bragg law for X-ray diffraction. Also able to analyze the problem related to the topics
BES102.4T	understand formation of Bands in solids, properties of semiconductor devices, their testing and utility in small projects.

#### Course Name: BES102 P (Engineering Physics) Students shall be able to:

BES102.1P	learn the band gap of semiconductor material and V-I characteristics of
	diodes and transistor by analysis from graph.
BES102.2P	understand the technique of measurement of refractive index of material
	of prism and wavelength of monochromatic light using Spectrometer.
BES102.3P	learn basic functions of CRO and its use for measurement of fundamental
	Physical quantities i.e. voltages and frequency.
BES102.4P	understand the identification of N-type and P-type specimens and
	calculation of charge carrier density using Hall effect set up.

# Course Name: BES103T (Engineering Chemistry)

#### Students shall be able to:

BES103.1T	Differences between hard & soft water, studies of various softening
	methods & its applications, also able to analyze boiler troubles.
BES103.2T	Electrochemical Fundamentals, corrosion prevention methods &
	environmental induced methods.
BES103.3T	Different types of cements & its manufacturing process. They also
	understand microscopic constituents of cement.
BES103.4T	Applications of SCF, concept of green chemistry & carbon credit.
	Different types, operating principles & mechanisms of batteries & fuel
	cells.

### Course Name: BES103P (Engineering Chemistry)

#### Students shall be able to:

BES103.1P	Analyze the quality of water based on impurities in terms of hardness,
	alkalinity,
	free chlorine etc.
BES103.2P	To determine the metal contents present in ore such as copper, Nickel &
	Iron.
BES103.3P	Analyze Waste water in terms of pH, COD, DO
BES103. 4P	Analyze capacities of resins & heat of neutralization.

# Course Name: BES104T (Basic Electrical Engineering)

#### Students shall be able to:

BES104.1T	Design and verify laws of DC Electric Circuits .
BES104.2T	Understand basic term and analyzed composite Magnetic Circuits.
BES104.3T	Understand basic fundamental of polyphase AC Circuits .
BES104.4T	Understand fundamental of single phase transformer and its testing.

# Course Name: BES104P (Basic Electrical Engineering)

Students shall be able to

BES104.1P	verify laws of DC Electric Circuits .
BES104.2P	Understand and verify B H Curve of Magnetic Circuits.
BES104.3P	Measurement of R,L and C of AC Circuits .
BES104. 4P	Understand fundamental of single phase transformer testing.

Students shall be able to:

BES105.1T	Introduction to various field of Civil Engineering and the role of Engineer
	in Infrastructural Development.
BES105.2T	Introduction to various types of buildings ,its components & various
	building materials used.
BES105.3T	Introduction to surveying & modern survey methods.
BES105.4T	Introduction to water supply & water management.
BES105.5T	Introduction to various modes of transportation & classification of
	highways.
BES105.6T	Introduction to various instruments & tools used in civil engineering & role
	of Engineers in sustainable development.

# Course Name: BES106T (Engineering Graphics – I) Students shall be able to

BES106.1T	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, ty lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engin applications.
BES106.2T	The concept of orthographic projection, co-ordinate plane, first and third method of projection and their conventional representations.
BE106.3T	The concept of projections by projecting image of point placed in all popositions with respect to reference planes, similarly. the projections c placed in first quadrant
BES106.4T	The concept and applications of projection of planes and solids and can a draw
BES106.5T	Conversion of pictorial view into multi view orthographic projection and ca to draw
BES106.6T	The concept of Isometric projection and develop the imagination power to comulti-view orthographic into three dimensional pictorial one view projection.

# Course Name: BES106.1P (Engineering Graphics – I)

# Students shall be able to

BES106.1P	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, types of lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engineering applications.
BES106.2P	The concept of orthographic projection, co-ordinate plane, first and third angle method of projection and their conventional representations.
BES106.3P	The concept of projections by projecting image of point placed in all possible positions with respect to reference planes, similarly. the projections of lines placed in first quadrant
BES106. 4P	The concept and applications of projection of planes and solids and can able to draw
BES106. 5P	Conversion of pictorial view into multi view orthographic projection and can able to draw.
BES106.6P	The concept of Isometric projection and develop the imagination power to convert multi-view orthographic into three dimensional pictorial one view projection.

# Course Name: BES107P (Communication Skill)

The Student shall be able to :

	Correspondence and technical writings.
	gain knowledge of grammar to face competitive examinations to pursue
BES107.2P	master
	degree.
BES107.3P	organize their thoughts in English and hence face job interviews more
	confidently.
BES107. 4P	acquire the skills of comprehension.

# Course Name: BES107P (Computational Skills)

The Student shall be able to :

BES108.1P	Identify and understand the key componants of computer System.
BES108.2P	Understand the basic terminology used in C-langauge and Compile, Debu
	Program.
BES108.3P	Understand and Devolop the program based on Decision control and loop c
	structures.
BES108 4P	Understand and Devolop the C-program based on Array.
BES108.5P	Understand and Devolop the C-program using Function and Pointers.

#### SECOND SEMESTER

#### Course Name: BES201T (Applied Mathematics - II) Students shall be able to :

BES201.1T	solve the Beta and Gamma Functions and Root Mean square Values in
	Integral Calculus.
BES201.2T	trace the curves and can find Areas and Volumes of curves.
BES201.3T	solve Multiple Integrals and apply it to find mass, area and volume
BES201.4T	exhibit Vector Algebra and Vector Differential calculus and also
	Gradient, Divergence and Curl.
BES201.5T	exhibit Vector Integral Calculus by Gauss Divergence Theorem, Stoke's and
	Green's theorem.
BES201.6T	solve fitting of a straight line, parabola, lines of regression in Statistics and
	Langrange's interpolation formula for unequal intervals in Finit
	Differences.

# Course Name: BES202T (Advance Physics)

#### Students shall be able to

BES202.1T	The student shall able to learn the concept of interference of light in thin
	film, Basics of LASER, their types and various engineering applications.
BES202.2T	The student shall able to understand the motion of charged particle in
	Uniform electric and magnetic field and various devices. Also able to
	analyze the problems related to the topic.
BES202.3T	The student shall able to learn the phenomenon of total internal
	reflection, construction of optical fiber and its applications in
	communication and different sensors .Also able to analyze the problems
	related to the topic.
BES202.4T	The student shall able to learn the methods of synthesis of nanomaterials
	and their
	drastic change in properties and their impact on society and environment.

# Course Name: BES202P (Advance Physics)

Students shall be able to

	frequency
	measurement using CRO.
BES202.2P	The student shall understand measurement of conductivity of
	semiconductor material using four-probe setup.
BES202.3P	The student shall able to understand the diffraction pattern shown by He-
	Ne laser
	and measurement of wavelength of laser in simple way.
BES202.4P	The student shall able to understand the interference pattern in Newton's
	ring

# Course Name: BES203T (Material Chemistry)

#### Students shall be able to

BES203.1T	Different properties &, types of fuel, able to analyze the fuel for various
	application, also studies alternative energy sources and their significance.
BES203.2T	Liquid fuel its chemical properties and applications. They also able to
	perform combustion calculations.
BES203.3T	Different types of lubricants, mechanisms, properties and applications.
	They also able to select lubricant for different engineering applications.
BES203.4T	Various types of polymers its property and applications. They also
	understand concept composites and nonmaterial & their engineering
	applications.

#### Course Name: BES203P (Material Chemistry) Students shall be able to

BES203.1P	Analyze the fuel both qualitatively as well as quantitatively in terms of ash, volatile matter, calorific value.
BES203.2P	Determination of physical and chemical properties of lubricant such as viscosity, flash point, acid value etc.
BES203.3P	Know Preparation of biodiesel.
BES203. 4P	Determine saponification of Acetic Acid

# Course Name: BES204T (Engineering Mechanics)

# Students shall be able to

BES204.1T	study plane and space force system
BES204.2T	analyze the plane and space structure considering equilibrium of structure
BES204.3T	study different types of loads and its equilibrium
BES204.4T	study centroid and moment of inertia of plane lamina
BES204.5T	Apply knowledge of kinematic and kinetic analyses and energy and
	momentum methods

# Course Name: BES204P (Engineering Mechanics)

#### Students shall be able to

BES204.1P	Determine the components of a force in rectangular or nonrectangular coordinates and the resultant of a system of forces by graphically.
BES204.2P	Draw complete and correct free-body diagrams and write the appropriate equilibrium equations from the free-body diagram.
BES204.3P	To determine the support reactions on a structure.

# Course Name: BES205T (Advance Electrical Engineering)

## Students shall be able to

BES205.1T	Understand basic term and protection device of Electrical Power System.

BES205.2T	Understand fundamental of DC Machines
BES205.3T	Calculate the domestic electricity charges, illumination and design of wiring system
BES205.4T	Understand fundamental of different type induction motors

# Course Name: BES206P (Engineering Graphics – II) Students shall be able to

BES206.1P	The use Computer Aided Drafting packages, its applicationsand use of
	commands used for drawing.
	Type of section planes, sectional multi view orthographic projection when
BES206.2P	solid in different position is cut by section plane obtain true shape of the
	section and can draw.
BES206.3P	Importance an d application of development of lateral surfaces, method
	of development and development of cut solids, and can draw.
BES206. 4P	How to identify edge obtain by intersection of surfaces, imagination and
	visualization o missing orthographic view and can draw.

# Course Name: BES207P (Work Shop)

# Students shall be able to

BES207.1P	Study of Different Workshop Tools and Equipments : Approach to use different tool and equipments of Fitting, Carpentry, Welding and Blacksmithy to complete the specified job with understanding of practical constraints.
BES207.2P	Teamwork: Work effectively in teams to accomplish the assigned responsibilities in an integral manner.
BES207.3P	Technical Communication: Communicate effectively about laboratory work both orally and in writing journals/technical reports.
BES207.4P	Ethics and safety awareness: Behave with highest ethical standards with concern to global, environmental, economic, social issues, safety requirement with lifelong learning and awareness of contemporary issues.

# Course Name: BES208P (Ethical Science)

#### Student shall able to :

BES208.1P	understand the Culture and Civilization, and acquire the knowledge of right to Information, Public Interest Litigation.
BES208.2P	expand knowledge of industrial Psychology and Sociology (Fatigue, Selection and Training of workers)
BES208.3P	the professional ethics and importance of leadership in Industry.
BES208.4P	acquire the knowledge of Indian Constitution and Federal system and learn fundamental right of different positional.
BES208.5P	understand the concept of Industrial Democracy and work organization.

BEELE301.1	Apply Laplace Transforms to solve ordinary differential equations arising in engineering problems and able to evaluate Inverse Laplace Transforms.
BEELE301.2	Exhibit the fundamental mathematical properties of the Fourier transforms including linearity, shift, and symmetry.
BEELE301.3	Solve isoperimetric problems, Boundary value problems by using Calculus of variations.
BEELE301.4	Solve integral in given region, expansion of function using Taylor's & Laurent's series.
BEELE301.5	Solve certain problems in Calculus of variation by using Partial Differential Equations.
BEELE301.6	Compute Eigen values & vectors & can solve 2 <sup>nd</sup> order differential Equation with Constant coefficients by matrix method.

#### The Students should be able to :

Course Name: BEELE302 T (NCES) Year of Study: 2017-18

The Students should be able to :

BEELE302.1	Learn fundamentals of solar radiation geometry and application of sol
BEELE302.2	Learn the selection of sites for wind farm, different types of wind gene
BEELE302.3	Understand the basic of small hydro, ocean & wave energy.
BEELE302.4	Perform and compare basic environment assessment of renewable en
	system and conventional fossil fuel system.
BEELE302.5	Design hybrid energy system that meet specific energy demand which
	economically feasible and have minimum impact on environment.
BEELE302.6	Utilize local non conventional energy resources to develop the sustain
	energy system.

Course Name: BEELE303 T (EMI) Year of Study: 2017-18

#### The Students should be able to understand:

	Different electrical instrument used for electrical measurement And
DLLL1303.1	Instrumentation.
BEELE303.2	Different Bridges used for measurement of R,L,C.
BEELE303.3	Different types of potentiometers and CT and PT.
BEELE303.4	The basic idea about transducer and Measurement of acceleration, ve
	Measurement of angular velocity, Torque and Power measurement Tc
	meter.
BEELE303.5	The basic idea about Measurement of temperature using thermistor, I
	thermocouple and Two color pyrometers, Optical pyrometer.

Course Name: BEELE303 P (EMI) Year of Study: 2017-18 The Students should be able to :

The Students should	be able to :
BEELE303.1	Understand the performance of temperature controller for an oven
BEELE303.2	Understand the Synchro-transmitter and receiver
BEELE303.3	Understand Time/frequency response of second order system
BEELE303.4	Understand block diagram reduction using MATLAB and obtain transfer
	function, root locus & bode plot
BEELE303.5	Understand Speed Torque and speed voltage characteristic of DC servo
BEELE303.6	Understand AC voltage stabilizer

BEELE303.7	Measure the basic step angle of stepper motor.
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#### Course Name: BEELE304 T (NA) Year of Study: 2017-18

BEELE304.1	Apply node and loop (mesh) analysis.
BEELE304.2	Apply phasor analysis to AC circuits in sinusoidal steady state.
BEELE304.3	Use various network theorems for analysis and design of electric circu
BEELE304.4	Compute initial and final conditions for current and voltage in first and
	order circuits.
BEELE304.5	Determine the response of a circuit excited by a waveform composed
	step and ramp components.
BEELE304.6	Characterize two – port networks by z, y, t and h Parameter

#### The Students should be able to :

Course Name: BEELE304 P (NA) Year of Study: 2017-18

The Students should be able to:

BEELE304.1	Understand mesh & node analysis.
BEELE304.2	Understand network theorems.
BEELE304.3	Understand network parameters.
BEELE304.4	Understand 3 phase circuits.

Course Name: BEELE305 T (EDC) Year of Study: 2017-18

BEELE305.1	Principle and working of basic semiconductor diode and analysis of re-
	regulated circuits.
BEELE305.2	The basics of Bipolar Junction Transistor and their small signal analysis
	different biasing arrangements.
BEELE305.3	Analysis and design of various transistor amplifier circuits and their fre
	responses at low, mid and high frequency and concept of both positive
	negative feedback in electronic circuits.
BEELE305.4	Design and analysis of oscillator circuits generate signals in various fre
	ranges. Also the working principle and operation of FET and MOSFET.
BEELE305.5	Fundamental background in differential amplifier and its different stag
	with its different circuit design.

Course Name: BEELE305 P (EDC) Year of Study: 2017-18

BEELE305.1	Principle and working of basic semiconductor diode and analysis of rec regulated circuits.
BEELE305.2	The basics of Bipolar Junction Transistor and their small signal analysis
	different biasing arrangements.
BEELE305.3	Analysis and design of various transistor amplifier circuits and their fre
	responses at low, mid and high frequency and concept of both positive
	negative feedback in electronic circuits.
BEELE305.4	Design and analysis of oscillator circuits generate signals in various fre
	ranges. Also the working principle and operation of FET and MOSFET.
BEELE305.5	Fundamental background in differential amplifier and its different stag
	with its different circuit design.

The Students should be able to understand:
#### IV SEMESTER Year of Study: 2017-18

#### Course Name: BEELE401 T (EEM) Year of Study: 2017-18

BEELE401.1	Exhibit the Mathematical Modeling by using concept of transfer functi Laplace transforms of step, ramp, parabolic signals & response of first
	system.
BEELE401.2	Find the solution of differential equation with constant coefficients by
	transform.
BEELE401.3	Gain the concept of fuzzy union & intersection and combination of fuz
BEELE401.4	Find approximate solution of algebraic transcendental equation by nu
	methods.
BEELE401.5	Find approximate solution of ordinary differential equation by numeri
	method.
BEELE401.6	Apply basic concepts and method of probability theory also able to lea
	definition of variance and standard deviation of discrete random varia

#### The Students should be able to :

Course Name: BEELE402 T (EMF) Year of Study: 2017-18

#### The Students should be able to

BEELE402.1	Apply the knowledge of vector analysis.
BEELE402.2	Apply various laws in the analysis of electromagnetic systems.
BEELE402.3	Understand the physical basis for the functioning of circuit elements.
BEELE402.4	Apply Electromagnetic boundary conditions.
BEELE402.5	Familiar with the four Maxwell's equations used to study time varying electromagnetic or dynamic fields.
BEELE402.6	Understand the concept of uniform plane-wave propagation and electromagnetic power density flow in lossless medium.

Course Name: BEELE403 T (DLEC) Year of Study: 2017-18

BEELE403.1	Basics of logic families & their classification.
BEELE403.2	Combinational Logic design.
BEELE403.3	Sequential Logic design.
BEELE403.4	Basics of operational amplifiers and their types and different applicati
BEELE403.5	Linear IC"s and multi-vibrators used in digital electronics.

### The Students should be able to understand:

Course Name: BEELE403 P (DLEC) Year of Study: 2017-18

#### The Students should be able to understand:

BEELE403.1	Design various Combinational & Sequential Logic Circuits & various typ
	linear and non linear op-amp Circuits.
BEELE403.2	Have fair inside into the different aspect of the digital components of
	electronic systems & various applications of the op-amp circuits.

Course Name: BEELE404 T (EMC-I) Year of Study: 2017-18

#### The Students should be able to understand:

BEELE404.1 Principle, construction, connections, vector grouping, operation an	d te
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	3-phase transformer.
BEELE404.2	Conversion of 3-phasse supply to 2-phase supply, parallel operation of 3-ph.
	Transformers.
BEELE404.3	Principle, armature and field construction, types, operation characteristics,
	armature reaction, commutation, methods to improve commutation in dc
	generators.
BEELE404.4	Principle, types, voltage build up, performance characteristics, torque
	evaluation in dc motors.
BEELE404.5	Principle, construction, types, torque development, performance
	characteristics, tests to determine performance indices & parameters of
	equivalent circuit of 3-phase and double cage induction motors, methods of
	starting, speed control and braking of induction motors.

Course Name: BEELE404 P (EMC-I) Year of Study: 2017-18

BEELE404.1	Determine efficiency and regulation of transformer using different te
BEELE404.2	study speed control and its different tests of dc motor
BEELE404.3	perform different load test on dc shunt generator
BEELE404.4	control the speed of induction motor and its different test for deterr
	efficiency

Course Name: BEELE405 T (CP) Year of Study: 2017-18

The Students should be able to understand:

BEELE405.1	General information of computers and operating systems Structure of program, Data types, Storage class, variables, expressions and Operato
BEELE405.2	Use of arrays and sorting techniques.
BEELE405.3	Pointers and structures.
BEELE405.4	Basics of strings and arrays.
BEELE405.5	C++ concepts.
BEELE405.6	Matrix operation using programming.
BEELE405.7	Use of graphic tools for presentation.

urse Name: BEELE405 P (CP) Year of Study: 2017-18

• Students should be able to understand:

BEELE405.1	General information of computers and operating systems Structure of ' program, Data types, Storage class, variables, expressions and Operator
BEELE405.2	Use of arrays and sorting techniques.
BEELE405.3	Pointers and structures. C++ concepts.
BEELE405.4	Basics of strings and arrays.
BEELE405.5	C++ concepts. Matrix operation using programming

Course Name: BEELE406 P (ENV) Year of Study: 2017-18

The Students should be able to :

BEELE406.1	Learn the natural sources available.
BEELE406.2	Learn about ecosystem, biodiversity, pollution.
BEELE406.3	Learn the effect on environment on social aspects and human populat

#### V SEMESTER Year of Study: 2017-18

Course Name: BELE501T. (EPS-I) Year of Study: 2017-18

BELE501T.1	Theory and application of main component in power system.
BELE501T.2	Modeling and representation of the system components used in powe
BELE501T.3	Concept of designing transmission line parameters.
BELE501T.4	The basic concept of load flow analysis.
BELE501T.5	Theory and application various insulator used in power system.
BELE501T.6	Basic concept of power system control.

The Students should be able to understand:

Course Name: BELE502T. (UEE) Year of Study: 2017-18

#### The Students should be able to :

BELE502T.1	Maintain electric drives used in an industries.
BELE502T.2	Identify a heating/ welding scheme for a given application.
BELE502T.3	Maintain/ Trouble shoots various lamps and fittings in use.
BELE502T.4	Understand the different schemes of traction schemes and its main
	components.
BELE502T.5	Understand applications for fan, blowers, compressor, pumps and refr
	using electric power.
BELE502T.6	Understand application of electrical supply for different applications.
BELE502T.7	Identify the job/higher education / research opportunities in Electric L
	industry.

Course Name: BELE503T. (EMD) Year of Study: 2017-18

The Students should be able to :

BELE503T.1	Select proper material for design of a machine.
BELE503T.2	Design a overall transformer and estimates its performance character
	per requirement and constraints specified.
BELE503T.3	Select & Design proper cooling system as per the transformer specification
BELE503T.4	Design of induction machine & estimates its performance characterist
BELE503T.5	Design rotor core of Induction motor.
BELE503T.6	Design overall dimensions of synchronous machines.

Course Name: BELE504T. (MI) Year of Study: 2017-18

The Students should	be able to understand:
	-

BELE504T.1	Application of VLSI circuit.
BELE504T.2	Introduction of Intel 8085 architecture.
BELE504T.3	Programming instructions.
BELE504T.4	Different Interrupt in 8085.
BELE504T.5	Methods of data transfer in 8085.
BELE504T.6	Hardware and interface using 8085

Course Name: BELE504P. (MI) Year of Study: 2017-18

The Students should be able to:

BELE504P.1	Understand the architecture of Intel 8085 microprocessor.
BELE504P.2	Apply programming instructions.

BELE504P.3	Familiarize with the assembly level programming.	
BELE504P.4	Understand the architecture and interfacing of 8255 and 8253 to 8085.	

Course Name: BELE505T. (EMC-II) Year of Study: 2017-18

	· · · · · · · · · · · · · · · · · · ·
BELE505T.1	Understand operation and characteristic of synchronous machines.
BELE505T.2	Understand steady state and transient behavior of synchronous mach
BELE505T.3	Understand synchronization and parallel operation of synchronous ge
BELE505T.4	Understand performance of synchronous motor.
BELE505T.5	Understand different type special electric motors.
BELE504T.6	Understand control and applications of ac motor.

Course Name: BELE505P. (EMC-II) Year of Study: 2017-18

#### The Students should be able to:

BELE505P.1	Know the, characteristics and working of various types of Electrical ma
BELE505P.2	Understand construction and working of synchronous & asynchronou
	machines.

Course Name: BELE506P. (ED & S) Year of Study: 2017-18

#### The Students should be able to:

BELE506P.1	Draw, Simulate and Run the various types of Electrical circuits using Po Simulation Software.
BELE506P.2	Understand the components of the electrical power systems.

Course Name: BELE507P. (EEW) Year of Study: 2017-18

The Students should be able to understand:

BELE507P.1	Testing of Various Electrical and Electronics components using multimer CRO.
BELE507P.2	Design, installation and costing of Domestic, Commercial and Industria

#### VI SEMESTER Year of Study: 2017-18

Course Name: BELE601T. (PSP) Year of Study: 2017-18

The Students should be able to:

BELE601T.1	Understand different sources of energy.
BELE601T.2	Work in Power Generation plant.
BELE601T.3	Calculate the tariff for different customers.
BELE601T.4	Work in industry voltage control for AC generator.
BELE601T.5	Understand different cogeneration technologies, captive generation.
BELE601T.6	Understand Energy problems, prospects of changes in energy supply, a
	for sustainable development.

Course Name: BELE601T. (EEIM) Year of Study: 2017-18

The Students should be able to understand:

BELE602T.1	Demand and its analysis.	
BELE602T.2	get the terminology use in the market	

BELE602T.3	the sources of finance	
BELE602T.4	The managing of the things economically.	
BELE602T.5	The need and importance of Human resource Management.	
BELE602T.6	Marketing Management within any sector is very important. So with the help of marketing management they are able to sold out their product and services.	

Course Name: BELE603T. (EDTC) Year of Study: 2017-18

#### The Students should be able to:

BELE603T.1	Solve numerical on starting, speed control and braking.
BELE603T.2	Solve numerical on heating and cooling of motors.
BELE603T.3	Understand Power Semiconductor based drives.
BELE603T.4	work on the drives used in the Industry
BELE603T.5	Work with PLC's in the Industry.
BELE603T.6	Gain an insight in the working of drives used in traction.

Course Name: BELE604T. (PE) Year of Study: 2017-18

#### The Students should be able to:

BELE604T.1	Understand fundamental concepts and techniques used in power elec
BELE604T.2	Analyze various single phase and three phase power converter circuits
BELE604T.3	Identify basic requirements for power electronics based design application
BELE604T.4	Develop skills to build, and troubleshoot power electronics circuits.
BELE604T.5	Use power converters in commercial and industrial applications.

Course Name: BELE604P. (PE) Year of Study: 2017-18

#### The Students should be able to:

BELE604T.1	Understand the characteristics of different power electronics devices s SCR, UJT, IGBT, MOSFET and TRIAC.
BELE604T.2	Understand the working operation of control rectifier, Inverter and co
BELE604T.3	Understand the triggering and commutation technique of SCR.
BELE604T.4	Understand the protection circuits of SCR.

Course Name: BELE605T. (CS-I) Year of Study: 2017-18

#### The Students should be able to:

BELE605T.1	Understand Model the linear systems and study the control system
	components specifications through classical and state variable approa
BELE605T.2	Understand the time response and time response specifications.
BELE605T.3	Analyses root locus method in time domain.
BELE605T.4	Analyze the absolute & relative stability
BELE605T.5	Understand Frequency response tools like bode plot and Nyquist plot.
BELE605T.6	Understand the introductory concepts of state variable approach.

Course Name: BELE605P. (CS-I) Year of Study: 2017-18

The Students should be able:

BELE605P.1	To study the Synchro transmitter & receiver.	
BELE605P.2	To find the voltage error generated for input DC voltage & AC voltage using	
	potentiometer.	
BELE605P.3	To study the time response of second order system.	
BELE605P.4	To study the performance parameter of controller used to control the	
	temperature of oven.	
BELE605P.5	To obtain the speed Vs voltage & speed Vs torque characteristics & Armature	
	current Vs torque characteristics of DC Servomotor.	
BELE605P.6	To study the block diagram reduction using MATLAB & obtain the transfer	
	function.	

Course Name: BELE606T. (FE) Year of Study: 2017-18

#### The Students should be able to :

BELE606T.1	Face competitive examination to pursue master degree.
BELE606T.2	Organize their thoughts in English and hence face job interviews more
	confidently.
BELE606T.3	Produce a set of documents related to technology and writing in the v
	and shall have improved their ability to write clearly and accurately.
BELE606T.4	Acquire the skill of comprehension.
BELE606T.5	Acquire language skills required to write their Reviews, Projects, and F
BELE606T.6	Critically analyze data from research, incorporate it into assigned writ
	clearly, concisely, and logically and attribute the source with proper ci

Course Name: BELE607P. (IVR) Year of Study: 2017-18

The Students should be able to understand:

BELE607P.1	Recognize the process units & identify the input and output for differe
	processes.
BELE607P.2	Experience the importance of working safely.
BELE607P.3	Understand the concept of energy conversion & estimate overall effici
	power plant.

### VII SEMESTER Year of Study: 2017-18

Course Name: BEELE701T (CS-II) Year of Study: 2017-18

	The Compensated Performance Analysis of Lead, Lag and Lag-lead
BEELE701.1	Compensators in time & frequency domain.
	Analyze the practical system for the desired specifications through cla
BEELE701.2	state variable approach.
	Design the optimal control system with and without constraints& Ana

The Students should be able to understand:

	Design the optimal control system with and without constraints& Ana
BEELE701.3	Performance Index. single P.I. Integral Square Error (ISE).
	Analyze non-linear and work with digital system and their further rese
BEELE701.4	
	The concept of singular point & graphical analysis of isoclines and Delt
BEELE701.5	Methods
	Controllability & observability of discrete time systems.
BEELE701.6	

The Students should be able to :

	Understand the basics of power system.	
BEELE702.1		
	Analyze and solve problems on symmetrical & unsymmetrical fault,	
BEELE702.2		
	Analyze and solve problems on stability.	
BEELE702.3		
	Understand economy of operation of power plants	
BEELE702.4		
	Get familiar with types of grounding.	
BEELE702.5		

## Course Name BEELE705T (EID) Year of Study: 2017-18

The Students should be able to :

BEELE705.1	Understand the concept of load forecasting and problems based on analysis, design electrical installation for residential and commercial and their testing.
BEELE705.2	Understand types, construction and selection of PVC/ XLPE cables and conductors, their specification, insulator selection as per IER.
BEELE705.3	Understand construction and working of protective and switching dev calculation of short circuit current.
BEELE705.4	Understand the electric supply to various induction motor starters, devices and capacitor for reactive power compensation, payback peric .
BEELE705.5	Design of 11kV and 33 kV substations with specification, commis transformers along with its accessories, parallel operation of tra varies bus bars, earthing and IE rules.

## Course Name BEELE705P (EID) Year of Study: 2017-18

The Students should be able to understand:

BEELE705.1	Understand design of residential, commercial & factory wiring, calcula
	load and costing.
BEELE705.2	Measure earth resistance using earth tester.
BEELE705.3	Understand operating principal and parts of electrical apparatus.
BEELE705.4	Understand construction and working of MCB, ELCB, MCCB, breaker, f
	substation equipment, Buchholz relay, oil temperature indicator, mag
	level gauge and silica gel.
BEELE705.5	Understand the testing of transformer DOL starter, star delta starter, v
	earth electrodes.

Course Name: BEELE704T (HVE) Year of Study: 2017-18

### The Students should be able to :

BEELE704.1 Get the knowledge about breakdown mechanism in solid, liquid ar	nd g
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	insulation along with related theories.	
BEELE704.2	Get the knowledge about lightning and switching overvoltage phenomenon in	
	power system and their protection.	
BEELE704.3	Understand behavior of travelling waves on transmission lines.	
BEELE704.4	Get the knowledge about different generation techniques of high voltage for	
	testing purpose.	
BEELE704.5	Get the knowledge about different measurement mechanism of high voltage	
	for testing purpose.	
BEELE704.6	Get the knowledge about non-destructive and high voltage testing of electrical	
	equipments.	

Course Name: BEELE704P (HVE) Year of Study: 2017-18

### The Students should be able to :

BEELE704.1	Get the knowledge about breakdown mechanism in solid, liquid and gains and solid and gains along with related theories.
BEELE704.2	Get the knowledge about lightning and switching overvoltage phenor power system and their protection.
BEELE704.3	Understand behavior of travelling waves on transmission lines.
BEELE704.4	Get the knowledge about different generation techniques of high voltatesting purpose.
BEELE704.5	Get the knowledge about different measurement mechanism of high v for testing purpose.
BEELE704.6	Get the knowledge about non-destructive and high voltage testing of equipments.

Course Name: BEELE703T (Elective-I)(FACTS) Year of Study: 2017-18

The	Students	should	be	able	to :	

BEELE703.1	Understand the necessity, problems and constraints related with stabi
	large interconnected systems.
BEELE703.2	Understand the basic knowledge of various types of Power Converter
BEELE703.3	Understand the basic knowledge regarding the working of different sh
	STATCOM) controllers.
BEELE703.4	Understand the basic knowledge regarding the working of different se
	(TCSC, GCSC, SSSC) controllers
BEELE703.5	Understand the basic knowledge of Phase Angle Regulators(PARs) the applications.
BEELE703.6	Understand the basic knowledge regarding the working of series-shun
	series-series ( IPFC ).controllers & special purpose FACTs controllers

Course Name: BEELE706P (PROJECT SEMINAR) Year of Study: 2017-18

The Students should be able to :

BEELE706.1	Prepare & deliver a seminar to improve the confidence level	
BEELE706.2	Come across various researches going in Electrical Engineering.	

BEELE802.1	Understand the knowledge of dynamics and control ar
	drive.
BEELE802.2 Analyze and control dc motor drives by using different power	
	Control the speed of an AC-AC & DC-AC converter fed to induction ma
BEELE802.3	acquires the basic knowledge of energy conservation in domestic load
	induction motor drives.
BEELE802.4	Know the transient operation of synchronous motor and frequency control
	converters fed to the synchronous motor.
BEELE802.5	Carry research on the newer switched reluctance motor and brush
	motors and get basic idea about renewable power drives for energy
	conservation.
BEELE802.6	Understand the traction drives with ac and dc motors.

The Students should be able to:

Course Name: BEELE801T (E-II(PQ)) Year of Study: 2017-18

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BEELE801.1	Basic definations of power quality problems and various techniques or
	grounding.
BEELE801.2	Basics of flickers & transient overvoltages.
BEELE801.3	Various aspects related to occurence of events like sags & interruption
	their mitigation techniques.
BEELE801.4	Basics of Waveform Distortion & Harmonics.
BEELE801.5	Aspects related to power quality monitoring.
BEELE801.6	Aspects related to power quality assessment.

Course Name: BEELE803T (SGP) Year of Study: 2017-18

#### The Students should be able to understand:

BEELE803.1	Theory & application of main components used in power system prote
BEELE803.2	Application of over current relay, directional over current relay and div
	relay scheme for Protection of medium and high voltage transmission
BEELE803.3	Differential protection for the protection of transformer, generator an
BEELE803.4	Design of static relay with application.
BEELE803.5	Theory, construction, and applications of main types of circuit breaker

Course Name: BEELE803P (SGP) Year of Study: 2017-18

BEELE803.1	Observe construction and parts of electromagnetic relay. Determine ti
	by the over current relay to close the contacts.
BEELE803.2	Determine time taken by the earth fault relay to close the contacts
BEELE803.3	Determine operating time of reverse power relay by changing directio
	power flow.
BEELE803.4	Draw time-current characteristic by measuring current and time of di
	over current relay
BEELE803.5	Understand the working of static differential relay by injecting the cur
	test kit.

#### The Students should be able to:

Course Name: BEELE804T (CAPS) Year of Study: 2017-18 The Students should be able to:

The Stadents should		
BEELE804.1	Determine Bus Impedance & Admittance matrix (required for Load flow &	
	Short circuit Studies) by graphically, Inspection & building algorithm.	
BEELE804.2	Incidence and network matrices for three phase element	
BEELE804.3	Calculate Load flow study of a power system by Newton-Raphson & Gauss-	
	Seidal Iterative Method.	
BEELE804.4	Understand Short circuit studies	
BEELE804.5	Understand the Transient stability by using Eulers, Modified Eulers & RK-4 order differential method	

Course Name: BEELE804P(CAPS) Year of Study: 2017-18 The Students should be able to :

BEELE804.1	Understand fundamental of application of electrical .engineering
BEELE804.2	Understand fundamental of application matrix in electrical .engineerir
BEELE804.3	Simulate the different models of electrical engineering
BEELE804.4	Measure the different parameters of electrical circuit
BEELE804.5	Simulate & modeling of different electrical circuit

Course Name: BEELE805P(PROJECT) Year of Study: 2017-18

The Students should be able to :

BEELE805.1	Acquire system integration skills, documentation skills, project man skills, identify problems & solution and also solved real life problem:
BEELE805.2	Develop professionalism.
BEELE805.3	Develop oral as well as written presentation skills.

# ELECTRONICS AND TELECOMMUNICATION ENGINEERING

#### Program Outcome (POs)

At the end of the program the graduates of the E & T department shall be able to

- 1. Apply knowledge of mathematics, science, engineering fundamentals and telecommunication engineering to solve the complex engineering problems.
- 2. Identify, analyze and formulate the complex engineering problems in the field of telecommunication reaching significant conclusions.
- 3. Design and realize a system or process to meet desired needs within realistic constraints.
- 4. Use research based skills including experimental design to provide valid conclusions.
- 5. Solve problems in the field of telecommunication engineering using appropriate modern tools.
- 6. Apply knowledge to societal, health, safety issues and consequent responsibilities.
- 7. Evaluate the impact of technology on society and environmental sustainability.
- 8. Fulfill professional and ethical responsibilities in engineering practices.
- 9. Work as an individual and/or as a member or leader in multidisciplinary fields.
- 10. Communicate effectively on global problems using written, oral and visual means.
- 11. Accord with engineering and management projects relevant to global, economic, environmental and/or social context.
- 12. Engage in life-long learning in the context of technological and social evolution.

#### **Program specific outcomes (PSOs)**

At the end of the program the graduates of the E&T department shall have ability to Student shall have ability to

- Apply basic fundamental knowledge related to electronics circuits, communication systems and signal processing to solve engineering and societal problems.
- 2. Design, verify and validate electronic functional elements for a variety of applications with a focus on problem solving schemes.
- 3. Use engineering and management concepts to analyze specifications and prototype electronic experiments and projects either independently or in teams

#### **COURSE OUTCOMES:**

APPLIED MATHEMATICS – I (BESI- 1)

After the completion of the course: Students shall be able to

Subject code	Statement
BESI- 1T.1	Apply Differential Calculus by using indeterminate forms, Taylor's and
	Maclaurin's Series.
BESI- 1T.2	Apply Partial Differentiation by the use of Euler's theorem, chain rule,
	Jacobian's and Lagrange's method of multipliers.
BESI- 1T.3	Exhibit the inverse of a Matrix and Rank of a Matrix.
BESI- 1T.4	Construct the first order differential equations and can be solved.
BESI- 1T.5	Exhibit the Higher order differential equations with constantcoefficients
	and its applications.
BESI- 1T.6	Exhibit the Complex numbers by using De Moivre's theorem and can
	Separate the realand imaginary parts.

#### **ENGINEERING PHYSICS-PRACTICALS (BESI- 2P)**

At the end of completion of course,

Subject code	Statement
BESI-2P.1	Learn the band gap of semiconductor material and V-I characteristics of
	diodes and transistor by analysis from graph.
BESI-2P.2	To understand the technique of measurement of refractive index of material of prism and wavelength of monochromatic light using
	Spectrometer.
BESI-2P.3	Learn basic functions of CRO and its use for measurement of fundamental Physical quantities i.e. voltages and frequency.
BESI-2P.4	Understand the identification of N-type and P-type specimens and calculation of charge carrier density using Hall effect set up.

## ENGINEERING PHYSICS (BESI- 2T)

At the end of completion of course,

Subject code	Statement
BESI- 2.1	Learn the concept of Dual Nature of light and micro-particle with
	theoretical and experimental support. Also able to analyze the problem
	related to the topics
BESI- 2.2	Understand Uncertainty Principle as well as application of Schrodinger's
	equation in one dimensional potential well .Also able to analyze the
	problem related to the topics
BESI- 2.3	Learn properties of cubic crystal structures and Bragg law for X-ray
	diffraction. Also able to analyze the problem related to the topics
BESI- 2.4	Understand formation of Bands in solids, properties of semiconductor
	devices, their testing and utility in small projects.

## Engineering Chemistry (BESI-3T)

On Completion of this course a successful student will be able to understand

	Differences between hard & soft water, studies of various softening methods
BESI-3.1	& its applications, also able to analyze boiler troubles.
	Electrochemical Fundamentals, corrosion prevention methods &
BESI-3.2	environmental induced methods.
	Different types of cements & its manufacturing process. They also understand
BESI-3.3	microscopic constituents of cement.
	Applications of SCF, concept of green chemistry & carbon credit. Different
BESI-3.4	types, operating principles & mechanisms of batteries & fuel cells.

## **BASIC ELECTRICAL ENGG (BESI-4T)**

After completion of this course successful Student will be able to

	Design and verify laws of DC Electric Circuits.
BESI-4.1	
	Understand basic term and analyzed composite Magnetic Circuits.
BESI-4.2	
	Understand basic fundamental of polyphase AC Circuits.
BESI-4.3	
	Understand fundamental of single phase transformer and its testing.
BESI-4.4	

#### **BASICS OF CIVIL ENGINEERING (BESI-5T)**

Students shall be

BESI-5.1	Able to utilize basic knowledge of different fields of civil engineering.
BESI-5.2	Have basic knowledge of various building components.
	Able to apply the knowledge of mathematics, science and engineering to
BESI-5.3	identify, formulate and solve engineering problems.
BESI-5.4	Able to use basic knowledge of various materials used for construction.
BESI-5.4	Able to understand the basic knowledge of tools & equipment's used in
	fields of civil engineering.

# Engineering Graphics – I (BES1-06T)

The student should able to understand

BES1-6.1	Use of drawing instruments, lettering, sheet lay out, drawing sheet size types of lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engineerin applications
BES1-6.2	The concept of orthographic projection, co-ordinate plane, first and angle method of projection and their conventional representations.
BE1-6.3	The concept of projections by projecting image of point placed possible positions with respect to reference planes, similarly. projections of lines placed in first quadrant
BES1-6.4	The concept and applications of projection of planes and solids and car to draw.
BES1-6.5	Conversion of pictorial view into multi view orthographic projection can able to draw
BES1-6.6	The concept of Isometric projection and develop the imagination powe convert multi-view orthographic into three dimensional pictorial one v projection.

# Engineering Graphics – I (BES106.1P)

The student should able to understand

BES1-6.1P	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, types of lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engineering applications.
BES1-6.2P	The concept of orthographic projection, co-ordinate plane, first and third angle method of projection and their conventional representations.
BES1-6.3P	The concept of projections by projecting image of point placed in all possible positions with respect to reference planes, similarly. the projections of lines placed in first quadrant
BES1-6. 4P	The concept and applications of projection of planes and solids and can able to draw

BES1-6. 5P	Conversion of pictorial view into multi view orthographic projection
	and can able to draw
	The concept of Isometric projection and develop the imagination
BES1-6.6P	power to convert multi-view orthographic into three dimensional
	pictorial one view projection.

# ADVANCED ELECTRICAL ENGG (BESII-7T)

After completion of this course successful Student will be able to

BESII-7.1	Understand basic term and protection device of Electrical Power System.
BESII-7.2	Understand fundamental of DC Machines.
BESII-7.3	Calculate the domestic electricity charges, illumination and design of wiring system.
BESII-7.4	Understand fundamental of different type induction motors

## COMMUNICATIONSKILL(BESI-8)

BESII-8.1P	Students shall acquire language skills required to write their business,
	Job Correspondences and technical writings.
BESII-8.2P	Students shall be able to gain knowledge of grammar to face competitive and entrance examinations to pursue master's degree.
BESII-8.3P	Students shall be able to organize their thoughts in English; and hence,
	face job interviews more confidently.
BESII-8.4P	Students shall be able to acquire the skills of comprehension.

#### FIRST YEAR BE: SEMESTER-II

Applied Math (BESII-1)

BESII-1.1	Solve the Beta and Gamma Functions and Root Mean square Values in Integral Calculus.
BESII-1.2	To trace the curves and can find Areas and Volumes of curves.

BESII-1.3	To solve Multiple Integrals and apply it to find mass, area and volume
BESII-1.4	To exhibit Vector Algebra and Vector Differential calculus and alsoGradient,
	Divergence and Curl.
BESII-1.5	To exhibit Vector Integral Calculus by Gauss Divergence Theorem, Stoke's and
	Green's theorem.
BESII-1.6	Solve fitting of a straight line, parabola, lines of regression in Statistics and
	Langrange's interpolation formula for unequal intervals in Finite Differences.

# Advanced Physics (BESII-2)

At the end of completion of course,

BESII-2.1	learn the concept of interference of light in thin film, Basics of LASER, their types
	and various engineering applications learn the concept of interference of light in
	thin film, Basics of LASER, their types and various engineering applications
BESII-2.2	Understand the motion of charged particle in Uniform electric and magnetic
	field and various devices. Also able to analyze the problem related to the topics
BESII-2.3	learn the phenomenon of total internal reflection, construction of optical fiber
	and its applications in communication and different sensors Also able to analyze
	the problem related to the topics
BESII-2.4	learn the methods of synthesis of nanomaterial and their drastic change in
	properties and their impact on society and environment

# Advanced Physics Practical (BESII-2P)

At the end of completion of course, student shall able to

BESII-2.1	Learn the different Lissajeous Figures and frequency measurement using CRO.
BESII-2.2	Understand measurement of conductivity of semiconductor material using
	four-probe setup.
BESII-2.3	Understand the diffraction pattern shown by He-Ne laser and measurement of
	wavelength of laser in simple way.
BESII-2.4	Understand the interference pattern in Newton's ring apparatus and its use for
	measurement of radius of curvature of plano-convex lens.

### Material Chemistry (BESII-3T)

On completion of this course a successful student will be able to understand

	Different properties &, types of fuel, able to analyze the fuel for various
BESII-3.1	application, also studies alternative energy sources and their significance.
BESII-3.2	Liquid fuel its chemical properties and applications. They also able to perform combustion calculations.

BESII-3.3	Different types of lubricants, mechanisms, properties and applications.
	They also able to select lubricant for different engineering applications.
BESII-3.4	Various types of polymers its property and applications. They also understand concept composites and nonmaterial & their engineering applications.

### **ENGINEERING MECHANICS (BESII-4T)**

Students shall be able to

BESII-4.1	Solve three-dimension force and moment problems.
BESII-4.2	Solve problems dealing with forces in a plane or in space and equivalent
	force systems.
BESII-4.3	Solve beam & truss problems and understand distributed force systems.
BESII-4.4	Determine centroid & moments of Inertia.
BESII-4.5	Apply knowledge of kinematic and kinetic analyses and energy and
	momentum methods

#### ADVANCE ELECTRICAL ENGINEERING (BESII-5T)

After completion of this course successful Student will be able to

de	Statement
SII-5T .1	Understand basic term and protection device of Electrical Power System.
SII-5T .2	Understand fundamental of DC Machines.
SII-5T .3	Calculate the domestic electricity charges, illumination and design of wiring system
SII-5T.4	Understand fundamental of different type induction motors

### **ENGINEERING GRAPHICS – II (BESII-6P)**

The students should able to understand

BESII6P.1	The use Computer Aided Drafting packages, its applicationsand use
	of commands used for drawing.
BESII6P.2	Type of section planes, sectional multi view orthographic projection
	when solid in different position is cut by section plane obtain true
	shape of the section and can draw.
BESII6P.3	Importance and application of development of lateral surfaces,
	method of development and development of cut solids, and can
	draw.
BESII6P. 4	How to identify edge obtain by intersection of surfaces, imagination
	and visualization o missing orthographic view and can draw.

#### **BESI-7 T Communication Skills**

On completion of the course, the Students shall be able to:

СО	STATEMENTS
BESI – 7.1	language skills required to write their business, Job Correspondences and technical writings.
BESI – 7.2	gain knowledge of grammar to face competitive and entrance examinations to pursue master's degree.
BESI – 7.3	Student shall able to organize their thoughts in English and hence face job interviews more confidently.
BESI – 7.4	Student shall able to acquire the skills of comprehension.

# Ethical Science(BESII-8)

Students shall be able to

BESII8.1	Culture and Civilization, and acquire the knowledge of socio-legal
	terms.
BESII8.2	expand knowledge of industrial Psychology and Sociology (Fatigue, Selection and Training of workers)
BESII8.3	Acquire professional ethics and dynamics of leadership in Industry.
BESII8.4	Acquire the knowledge of Indian Constitution.
BESII8.5	Understand the concept of Industrial Democracy and Work Organization.
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### III SEM BE E&T

## **APPLIED MATHEMATICS –III (BEENT301)**

By the end of course, the students shall be able to

CO	Statement
BEENT301.1	Apply Laplace transforms to solve ordinary differential Equations arising
	in engineering problems.
BEENT301.2	Calculate the Fourier sine and cosine transforms.
BEENT301.3	Solve to Isoperimetric problem, Boundary value problem by using
	Calculus of Variations.
BEENT301.4	Solve the integral in given region, expansion of function by using Taylor's
	and Laurent's Series, verify function is analytic or not in given region and
	also able to find Analytic function by using functions of complex
	variable.
BEENT301.5	Solve certain problems in Calculus of Variation by using Partial
	Differential Equation
BEENT301.6	find any power of matrix , inverse of matrix , verify linear dependence
	and independence of vectors & to solve second order linear differential
	equation with constant coefficient by using matrices.

# Electronic Devices and Circuits (BEETE302T)

BEETE302.1	After completion of this subject, the students shall be able to have the basic
	knowledge of various semiconductor devices. And also able to study &
	analyze the rectifier & regulated circuit.
BEETE302.2	After completion of this subject, the students shall be able to understand
	different biasing circuits of BJT.
BEETE302.3	After completion of this subject, the students shall be able to understand the
	small signal model of BJT & negative feedback circuits.
BEETE302.4	After completion of this subject, the students shall be able to understand the
	positive feedback circuits.
BEETE302.5	After completion of this subject, the students shall be able to have a
	fundamental knowledge of power amplifiers.
BEETE302.6	After completion of this subject, the students shall be able to understand
	different biasing circuits of FET & small signal model of FET.

## Electronic Devices & Circuits (BEENT302P)

After the completion of the course: Students shall be able to

BEETE302P.1	After completion of this subject, the students shall be able to understand basic concepts of different semiconductor components.
BEETE302P.2	After completion of this subject, the students shall be able understand the use of semiconductor devices in different electronic circuits.
BEETE302P.3	After completion of this subject, the students shall able to calculate different performance parameters of transistors.
BEETE302P.4	After completion of this subject, the students shall be able able to plot and study the characteristics of semiconductor devices.
BEETE302P.5	After completion of this subject, the students shall be able to understand the effect of feedback in common emitter amplifier.
BEETE302P.6	After completion of this subject, the students shall be able to understand Colpitt's Oscillator & frequency resonance of a two stage RC coupled amplifier.

## Electronic Measurement & Instrumentation (BEETE403T)

BEENT303.1	Explain the basic concepts of electronics measurement & apply the
	statistical analysis for the measurement of error.
BEENT303.2	Understand the construction & working of electromechanical instruments
	& design of instruments as per specifications.
BEENT303.3	Employ various bridges for the measurement of electrical parameters.
BEENT303.4	Understand the basic principle of transducers for the measurement of
	different physical quantities.

BEENT303.5	Understand the working of various types of oscilloscopes & measurement
	of electrical parameters using oscilloscope.
	Know the construction & operation of various signal analyzers &
DEENT 505.0	understand the basic concept of data acquisition system.

### **Electronic Measurement & Instrumentation (BEETE403P)**

After the completion of the course: Students shall be able to

BEETE403P.1	Measure the value of unknown passive components like Resistance,
	Inductance & Capacitance by various methods.
BEETE403P.2	Use various measuring Instruments like Multimeter, CRO, Function
	Generator in effective manner
BEETE403P.3	Measure various physical parameters like Temperature, Displacement &
	Level by using different techniques.
BEETE403P.4	Study different aspects of data acquisition system.

#### **OBJECT ORIENTED PROGRAMMING & DATA STRUCTURE (BEETE304T)**

After the completion of the course: Students shall be able to

BEETE304.1	Able to differentiate between the concepts of structure oriented
	programming and object oriented programming and able to understand
	benefits, applications, data types, class concepts of OOP.
	Able to apply concepts of operator and function overloading and generic
DEETE304.2	programming
	Able to understand and apply various object oriented features like
	inheritance, data abstraction, encapsulation and polymorphism to solve
DEEIE304.3	various computing problems
	Able to implement various kinds of searching and sorting techniques, and
DEE12304.4	able to choose technique for a specific problem.
	Able to understand various data structure such as stacks, queues, and
BEETE304.5	linked list to solve various computing problems
BEETERON 6	Able to understand various Tree representations, Tree implementations
DLLILJU4.0	and traversing of trees.

## **OBJECT ORIENTED PROGRAMMING & DATA STRUCTURE (BEETE304P)**

BEETE304P.1	Able to differentiate between the concepts of structure oriented
	programming and object oriented programming.

BEETE304P.2	Able to understand various tree representations, Tree implementations
	and traversing of trees.
	Able to apply concepts of operator and function overloading and generic
DELTESO41.5	programming.
	Able to implement various kinds of searching and sorting technique, and
DEETESU4P.4	able to choose technique for a specific problem.
	Understand and apply various object oriented features like inheritance to
DEETESU4P.5	solve various computing problems.
BEETE304P.6	Able to understand various data structure such as stack, queue, and link
	list to solve various computing problems.

# NETWORK ANALYSIS AND SYNTHESIS (BEETE305T)

After the completion of the course: Students shall be able to

BEETE305.1	Student shall be able to understand the basic Kirchhoff's laws and source transformation techniques to analyze simple and complex networks.
BEETE305.2	Student shall be able to learn and apply the different network theorems for analysis of simple and complex networks to specific applications.
BEETE305.3	Student shall be able to understand the basic concepts of series and parallel resonance of different elements with frequency for specific applications.
BEETE305.4	Student shall be able to understand the fundamentals of filters, attenuators and transmission lines.
BEETE305.5	Student shall be able to know the standard input signals for network analysis and synthesis by using Laplace transform.
BEETE305.6	Student shall be able to understand the different two port networks and network functions for the analysis of networks to the specific applications.

# Applied Mathematics IV (BEETE401T)

BEETE401.1	Students shall be able to solve algebraic & transcendental equations, linear simultaneous equation & first order differential equations by using different methods.
BEETE401.2	Students shall be able to exhibit the application of Z transforms & its inverse.
BEETE401.3	Students shall be able to solve series solution of differential equation &
	recurrence relation, Rodrigue's formula using Bessel's function & Legendre's
	polynomials.
BEETE401.4	Students shall be able to define & apply the concept of probability, conditional
	probability, random variables, probability distribution, joint & conditional
	distribution.
BEETE401.5	Students shall be able to define & apply the concept of expectation to
	variance, standard deviation, moment generating function, covariance,
	correlation coefficient of random variables.
BEETE401.6	Students shall be able to exhibit the application of Binomial, Poisson, Normal
	distributions & central limit theorem.

## Power Devices & Machines (BEETE402T)

After the completion of the course: Students shall be able to

	After completion of this subject, the students shall be able to
BEETE402.1	Understand the working and nature of characteristics of different
	power components used in Power Devices.
BEETE402.2	After completion of this subject, the students shall be able to calculate
	performance parameters for different devices.
BEETE402.3	After completion of this subject, the students shall be able to perform
	different tests on Transformers and motors for calculating the losses,
	efficiency, regulation etc.
BEETE402.4	After completion of this subject, the students shall be able to
	Understand different speed control methods for motors.

# Power Devices & Machines (BEETE402P)

After the completion of the course: Students shall be able to

BEETE402P.1	After completion of this subject, the students shall be able to Understand the working and nature of characteristics of different power components used in Power Devices.
BEETE402P.2	After completion of this subject, the students shall be able to calculate performance parameters for different devices.
BEETE402P.3	After completion of this subject, the students shall be able to perform different tests on Transformers and motors for calculating the losses, efficiency, regulation etc.
BEETE402P.4	After completion of this subject, the students shall be able to Understand different speed control methods for motors.

## **ELECTROMAGNETIC FIELDS (BEETE403T)**

BEETE403.1	Understand basic concepts of coordinate systems for mathematical analysis
	of Electromagnetic Engineering and basic laws of electrostatics.
BEETE403.2	Understand basic laws of magneto statics.
BEETE403.3	Exhibit relationship between basic electromagnetic fields through Maxwell's
	equations
BEETE403.4	Develop and interpret electromagnetic wave equations in different medium
BEETE403.5	Apply the use of waveguides for transmission of electromagnetic waves at
	higher frequencies and their parametric calculations.

BEETE403.6	Understand the fundamental concept of radiation and elements used for
	radiation along with technologies

### Digital Circuits and Fundamentals of Microprocessor (BEETE404T)

After the completion of the course: Students shall be able to

BEETE404.1	Able to understand the concepts of realization of Boolean functions using
	various logic structures.
BEETE404.2	Able to analyze and design digital combinational circuits like decoders, encoders, multiplexers, and de-multiplexers including arithmetic circuits.
BEETE404.3	Able to analyze and design sequential digital circuits like flip-flops, registers, counters.
BEETE404.4	Able to Apply the knowledge of digital components in sequential circuit design.
BEETE404.5	Knowledge of the nomenclature and technology in the area of memory devices: ROM, RAM, PROM, SRAM, DRAM etc.
BEETE404.6	Able to understand the internal working of a microprocessor structure & to use instruction set in writing assembly-language program.

## Digital Circuits and Fundamentals of Microprocessor (BEETE404P)

After the completion of the course: Students shall be able to

BEETE404P.1	Able to understand the concepts of realization of Boolean functions using
	various logic structures.
BEETE404P.2	Able to analyze and design digital combinational circuits like decoders, encoders, multiplexers, and de-multiplexers including arithmetic circuits.
BEETE404P.3	Able to analyze and design sequential digital circuits like flip-flops, registers, counters.
BEETE404P.4	Able to Apply the knowledge of digital components in sequential circuit design.
BEETE404P.5	Able to understand the internal working of a microprocessor structure & to use instruction set in writing assembly-language program.

# Signal and Systems (BEETE405T)

BEETE405.1	Get the knowledge about basic signal concept, the spectral representation for
	periodic & spectral representation for periodic signals and their properties.
BEETE405.2	Understand the mathematical concepts related to probability theory and
	random process.
BEETE405.3	Have the fundamental understanding of different coding schemes and able to
	apply selective coding scheme for the application needed.
BEETE405.4	Understand the different analog modulation and digital modulation schemes.
BEETE405.5	Understand the match filter detection of binary signal.
BEETE405.6	Understand the basics of information theory and error correcting codes for error free digital communication.

# **Environmental Studies (BEETE406T)**

After the completion of the course: Students shall be able to

BEETE406.1	Spread awareness between people; cultivate them with sufficient knowledge, care, and practical competence to live in an ecologically responsible way.
BEETE406.2	Understand Natural resources and associated problems.
BEETE406.3	Analyze the roles of organisms as part of interconnected food webs , populations , communities and ecosystems.
BEETE406.4	Assess the factors responsible for the loss of biodiversity. Species can be saved from extinction through identification & conservation of biodiversity hotspots using scientific techniques.
BEETE406.5	Analyze the problem of pollution control & use new techniques for reduction of pollution
BEETE406.6	Use scholarly information to solve social, economic and urbanization issues related to sustainability.
BEETE406.7	Analyze & understand Human rights, Value education & Global population

# SOFTWARE WORKSHOP (BEETE407P)

BEETE406P.1	Understand basic commands in MATLAB and Pspice software.
BEETE406P.2	To study and plot different types of signals using graphical techniques in MATLAB.
BEETE406P.3	To solve various problems of signal processing using MATLAB programming.
BEETE406P.4	To analyze given problems mathematically with the help of MATLAB.

BEETE406P.5	To study, design and plot characteristics of various electronic circuits using Pspice software.
BEETE406P.6	To test various electronic circuits using Pspice simulator.

# ANTENNAS AND WAVE PROPAGATION (BEETE501)

After completion of this subject, the students shall be able to

BEETE501.1	understand and Describe transmission line characteristics
BEETE501.2	After completion of this subject, the students shall be able to Analyze wire
	antennas(monopoles, dipoles, and loops) and its Radiation Resistances
BEETE501.3	After completion of this subject, the students shall be able to Analyze and de
	antenna arrays and describe the operation of broadband and traveling wave
BEETE501.4	After completion of this subject, the students shall be able to Analyze and de
	Microstrip antenna
BEETE501.5	After completion of this subject, the students shall be able to describe the op
	aperture and reflector antennas
BEETE501.6	After completion of this subject, the students shall be able to understand diff
	kinds of wave propagation ,antenna parameters(radiation pattern,
	beamwidth, lobes, directivity, gain, impedance, efficiency, polarization) & antenn
	special application

# MICROPROCESSOR AND MICROCONTROLLERS (BEETE502T)

After completion of this subject, the students shall be able to

BEETE502.1	Understand internal organization of 8086/8088 microprocesso microcontrollers.
BEETE502.2	Understand the concept of addressing modes, interrupts and timing Microprocessor and microcontroller.
BEETE502.3	Student shall be able to design the interfacing of 8086 & 8051 with Keybc ADC/DAC, Stepper motor etc and to implement it on hardware.
BEETE502.4	Have knowledge of serial & parallel data communication.
BEETE502.5	Understand the concept of DMA & Pentium.
BEETE502.6	Understand fundamental of Numeric coprocessor & its use in practical appl

# MICROPROCESSOR AND MICROCONTROLLERS (BEETE502P)

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BEETE502.1	At the end of the course, the students shall be acquired knowle
	fundamentals of microprocessor and microcontroller systems.
BEETE502.2	understand assembly language programming skills and to apply it.
BEETE502.3	understand interfacing of different peripherals with microproce microcontroller.

# Analog Circuits & Designs (BEETE503T)

After completion of this subject, the students shall be able to

BEETE503.1	Understand the basic concept of Op-amp & to design Op-amp.
BEETE503.2	Get knowledge of amplifier & their principles.
BEETE503.3	Design linear Op-amp circuits such as voltage follower, summing amplifier, averaging amplifier, instrumentation amplifier circuits for various practical
BEETE503.4	Design non-linear Op-amp such as comparator IC such as LM 339, Schmitt t multivibrator circuits for various practical applications using IC 555.
BEETE503.5	Analyze and design amplifier circuits, oscillators, filter, regulated power sur
BEETE503.6	Demonstrate the gain bandwidth concept and frequency response of basic

# Analog Circuits & Designs (BEETE503P)

After completion of this subject, the students shall be able to

503.1	Apply the knowledge of mathematics to understand Basic characteristic, constructions of Op-Amp
503.2	Analyze and Design linear Op-Amp circuits such as Voltage follower, Summing
	amplifier, scaling and averaging amplifier, Instrumentation amplifier circuits for va
	practical applications
503.3	Explore the mathematical knowledge to the use and design non-linear Op-Amp su
	Comparators, Comparator IC such as LM 339, Schmitt trigger, multivibrator circuit
	various practical applications using IC555.
503.4	Analyze and design regulated power supply using regulated ICs
503.5	Understand, Analyze and design sinusoidal oscillators and function generator
503.6	Able to identify, formulate and design the application based filters and driver circu

#### **Communication Electronics (BEETE504T)**

BEETE504.1	Apply the knowledge of engineering mathematics to understand the basic working principals of building blocks of communication system and analyze the techniques for AM modulation.Solve the problems involving bandwidth calculation, representation & Generation of an AM sine wave
BEETE504.2	Understand, analyze, formulate and Compare different modulation techniques of Generation of FM (Direct & Indirect Method). Also solve communication engineering problems.
BEETE504.3	Explore and apply knowledge of engineering mathematics to understand the analog and digital pulse modulation techniques.
BEETE504.4	Apply concept of noise, properties & its effects in communication system for formulate the Engg. Problem.
BEETE504.5	Understand the concept of demodulation techniques, AM and FM superhetrodyne receiver block diagram. Explore and apply knowledge of engineering mathematics for performance calculation of receiver.
BEETE504.6	Understand the knowledge about fundamentals of Broadband Communication Systems.

# Communication Electronics (BEETE504P)

E504.1	Apply the knowledge of engineering mathematics to understand Amplitude
	Modulation & Demodulation and to find modulation index of an AM modulated w
E504.2	Understand, analyze, formulate and Compare different modulation techniques of
	Generation of FM (Direct & Indirect Method).
E504.3	Explore and apply knowledge of engineering mathematics to understand the analog
	and digital pulse modulation techniques, PCM, DM, PAM, PPM, PWM.
E504.4	Apply concept Analog sampling techniques :Natural Sampling ,Sample and Hold
	sampling
	Flat Top sampling.
E504.5	Understand the concept of demodulation techniques and apply the knowledge of
	engineering mathematics to understand AM and FM superhetrodyne receiver.
E504.6	Understand the knowledge about fundamentals of Broadband Communication
	Systems and multiplexing techniques TDM, FDM.

## Industrial Economics & Entrepreneur Development (BEETE505T)

After completion of this subject, the students shall be able to

BEETE505.1	The Student shall able to learn and understand how to select and develop
	medium Scale business ideas.
BEETE505.2	The Student shall able to select various institutions for financial and work
	particular business idea application.
BEETE505.3	The Student shall able to make and implement project proposals and repo
	for venture capital.
BEETE505.4	The Student shall able to develop management skills to achieve goals.
BEETE505.5	The Student shall exhibit the knowledge to plan and implement projects k
	management techniques
BEETE505.6	The Student shall able to understand social responsibility as a modern ma
	concept.

### **TELECOMMUNICATION SWITCHING SYSTEMS (BEETE601T)**

After completion of this subject, the students shall be able to

BEETE601.1	Understand the working principle of switching systems & identify the new evolution from analogue to digital system.
BEETE601.2	Analyze mathematical modeling of basic telecommunication traffic theory
BEETE601.3	Apply principles of switching networks & design multi stage switching involving time and space switching stages.
BEETE601.4	Analyze network synchronization and network management.
BEETE601.5	Assess the need for voice digitization in data networks & digital networks.
BEETE601.6	Identify the limitations of conventional Mobile Telephone System & unc design concepts for the operation of cellular system using modern tool.

# DIGITAL SIGNAL PROCESSING (BEETE602T)

understand the representation and different operations on discrete
analytically/graphically in time domain and application of it in signal proce
apply z-transform and IZT for various discrete time signals.
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BEETE602.3	understand the Transform domain and its significance and problems related to computational complexity.
BEETE602.4	learn the basic forms of IIR filters and to design and realize filters with desired specifications for specific applications.
BEETE602.5	learn the basic forms of FIR filters and to design with the help of different window techniques with preferred specifications for particular applications.
BEETE602.6	understand the basic concept of multi rate signal processing with its applications and
	apply it to wavelet transform

# DIGITAL SIGNAL PROCESSING (BEETE602P)

After completion of this subject, the students shall be able to

BEETE602.1	analyze and process the signals in the discrete domain.
BEETE602.2	understand Z transforms and discrete time Fourier transforms for the ana
	digital signals and systems
BEETE602.3	design the filters to suit requirements of specific applications.
BEETE602.4	apply the techniques, skills, and modern engineering tools like digital proc
	MATLAB
Construct Construct C	

#### Control System Engineering (BEETE603T)

After completion of this subject, the students shall be able to

BEETE603.1	Modeling of the system
BEETE603.2	Understand the response of different order systems for various inputs.
BEETE603.3	Analyze the stability criteria of control system for determining relative sta
BEETE603.4	Analyze the stability margin in frequency response of linear system.
BEETE603.5	Have the knowledge of different compensation techniques.
BEETE603.6	Apply the state variable approach in design.

### **Digital Communication (BEETE604T)**

BEETE604.1	Apply the knowledge of engineering mathematics to understand the ba
	principals of building blocks of digital communication system and
BEETE604.2	Understand, analyze and formulate the source and waveform coding meth
BEETE604.3	Explore and apply knowledge of mathematics to understand the digital me
	techniques.
BEETE604.4	Apply concepts of Galois field, error control techniques and demonstrate 1
	and decoding techniques to design and formulate the Engg, problem.
BEETE604.5	Understand the concept of channel coding and decoding techniques with
	mathematical analysis.

# **Digital Communication (BEETE604P)**

After completion of this subject, the students shall be able to

At the end of the course, the students will be able to understand error de
correction code
At the end of the course, the students will be able to development of cond
sampling, adaptive delta modulation /De-modulator circuits.
At the end of the course, the students will be able to understand the effec
distortion using EYE-Diagram
At the end of the course, the students will be able to understand Types of
Modulation and basic digital carrier modulation techniques: FSK,QPSK,DPS
At the end of the course, the students will be able to understand Matlab
convolution Encoder and Decoder, FSK and QPSK
At the end of the course, the students will be able to analyze performance
spectrum communication system

### Functional English (BEETE605T)

After completion of this subject, the students shall be able to

BEETE605.1	Student shall have enough knowledge to face competitive examination to
	master degree.
BEETE605.2	Student shall able to organize their thoughts in English and hence face job
	more confidently.
BEETE605.3	Student shall able to produce a set of documents related to technology an
	the workplace and shall have improved their ability to write clearly and ac
BEETE605.4	Student shall able to acquire the skill of comprehension.
BEETE605.5	Student shall also acquire language skills required to write their Reviews, P
	Reports.
BEETE605.6	Student shall understand how to critically analyze data from research, incl
	into assigned writing clearly, concisely, and logically and attribute the sour

### Electronic workshop Practice (BEETE606PT)

BEETE606.1	Use DSO and spectrum analyzer
BEETE606.2	Study and identify different electronic components
BEETE606.3	Test different electronic components
BEETE606.4	Design PCB using PCB design software

## INDUSTRIAL VISIT (BEETE607P)

#### After completion of this subject, the students shall be able to

со	Statement
BEETE607.1	To provide industry exposure to students
BEETE607.2	To understand the industrial requirements
BEETE607.3	To correlate the engineering knowledge with industrial atmosphere
BEETE607.4	To apply ethics while working in industry

#### **BE VII SEM E&T**

### **DSP PROCESSOR AND ARCHITECTURE (BEETE701T)**

Student shall be able to Student shall be able

BEETE701T.1	Understand the fundamentals of fixed and floating point archited various DSP Processors.
BEETE701T.2	Describe detailed architecture, addressing mode and instruc TMS320C5X.
BEETE701T.3	Write and execute different programs of DSP processor.
BEETE701T.4	Describe detailed architecture, addressing mode and instruction TMS320C54X.
BEETE701T.5	Design and implement DSP algorithm using code composer describe the detailed architecture TMS320C6X and Motorola DSF
BEETE701T.6	Design decimation filter and interpolation filter.

# DSP PROCESSOR & ARCHITECTURE (BEETE701P)

At the end of the course, the students shall be

BEETE701P.1	acquire knowledge about various addressing modes and Archite DSP TMS320C54XX and Motorola DSP563XX and are able to prog processor.
BEETE701P.2	able to Analyze and design Interpolation, Decimation filters using software
BEETE701P.3	Acquiring knowledge about Architecture of DSP TMS320C6X proce
BEETE701P.4	to Analyze and design Sine wave, Square wave and triangular was SCILAB
BEETE701P.5	to Analyze and design FIR, IIR filters using MATLAB software

## TELEVISION AND VIDEO ENGINEERING (BEETE702P)

BEETE702P.1	Understand the analysis and synthesis of Television system & TV Signal.
BEETE702P.2	Study different components of block diagram of TV & picture tube
BEETE702P.3	Analyze different sections & blocks in television receiver also to check various
	waveforms
BEETE702P.4	To understand various color TV system with greater emphasis on PAL T.V.
	system.
BEETE702P.5	Able to understand advance technology of TV engineering such as Digital TV,
	HDTV.

After completion of this course Student should be able to

## **TELEVISION AND VIDEO ENGINEERING (BEETE702T)**

After completion of this course students should be able to

BEETE702T.1	Analyze and synthesize colour Television system & Picture.	
BEETE702T.2	Understand & Compare NTSC, PAL & SECAM TV System	
BEETE702T.3	Perceive clear knowledge related to Digital signal transmission, MAC Signal,	
	Image & Video compression	
BEETE702T.4	Understand HDTV Standards, transmission & reception along with 3D TV	
	system	
BEETE702T.5	3EETE702T.5 Analyze IP Audio & Video, IPTV & Different video recorders	
BEETE702T.6	702T.6 Understand different consumer application such as LED, LCD, BLUE Ray Player	

## **OPTICAL COMMUNICATION (BEETE703T)**

After the completion of course, the students shall be able to

3EETE703.1	Gain the fundamental knowledge of the basic elements of optical fiber.
3EETE703.2	Identify and analyze the different kinds of losses, signal distortion in optica wave guides & other signal degradation factors.
3EETE703.3	Classify various optical source materials and analyze the use of it to design 8 implementation of LED structures, LASER diodes & Connectors.
3EETE703.4	Understand the fiber optic receivers such as PIN, APD diodes, receiver operation & performance and application of it in telecommunication.
3EETE703.5	Identify & distinguish the analog and digital links.
3EETE703.6	Identify the operational principal of WDM, SONET, measurement of attenuation dispersion, refractive index profile in optical fibers.

#### Advance Digital system Design(BEETE704P)

The students shall be able to

BEETE 704.1	Model, simulate, and verify the digital model with hardware description language.
BEETE 704.2	Design and prototype with programmable logic devices
BEETE 704.3	Learn the modular design style to create large digital logic circuits.
BEETE 704.4	Create and simulate basic circuit modules (or macros) using VHDL.
BEETE 704.5	Analyze the problem and develop new logic using VHDL

## Advance Digital system Design: BEETE704P

After completion of this subject, the students shall be able to

BEETE 704.1	Model, simulate, and verify the digital model with hardware descri
BEETE 704.2	Design and prototype with programmable logic devices
BEETE 704.3	Learn the modular design style to create large digital logic circuits.
BEETE 704.4	Create and simulate basic circuit modules (or macros) using VHDL.
BEETE 704.5	Analyze the problem and develop new logic using VHDL

#### Advance Digital system Design: BEETE704T

BEETE 704.1	Understand the Device technologies in Digital System Desigi
	Hardware design by discussing the role of digital components in sy
BEETE 704.2	Understand the basic foundation course in VHDL.
BEETE 704.3	Apply knowledge to modeling of system tested with test benches.
BEETE 704.4	Fundamentals of finite state machine.
BEETE 704.5	Understand HDL SYNTHESIS, HDL based digital design, HI architecture and design of combinational and sequential circuit.
BEETE 704.6	Exhibit Fundamentals of PLDs, CPLD, FPGA, modeling of system benches & synthesis also implementation on FPGA/CPLD.

#### Data compression and encryption (BEETE 705T)

Students shall be able to

BEETE 705.1	Understand various coding schemes used for text compression
BEETE 705.2	Implement various audio compression techniques
BEETE 705.3	Understand the basics of video compression technique
BEETE 705.4	Explore their knowledge about encryption in providing authenticat
	digital communication
BEETE 705.5	Understand the concept of various cryptography algorithm
BEETE 706.6	Understand various aspects of system security

BEETE 801.1	Apply the knowledge of mathematics to understand use of different
	microwave tubes as klystrons, magnetrons, TWT, BWO.
BEETE 801.2	Analyze different microwave components with the help of scattering matrix
	and its parameters and also analyze different power distribution Tees.
BEETE 801.3	Explore the mathematical knowledge to the use of active and passive
	microwave devices.
BEETE 801.4	Evaluate the impact of technology in the field of engineering by using
	microwave measurements methods.
BEETE 801.5	Understand the fundamentals of radar systems based on engineering
	mathematical knowledge.
BEETE 801.6	Able to identify, formulate and model problems and find radar engineering
	solution based on a system approach and used in wide spectrum of
	applications.

# Microwave and Radar Engineering: (BEETE801P)

After completion of this subject, the students shall be able to

BEETE 801.1	Describe working of microwave bench and reflex klystron.
BEETE 801.2	Measure power, gain & VSWR of microwave component.
BEETE 801.3	Analyze the S-parameter of microwave component.
BEETE 801.4	Describe the operation of various Radar systems.
BEETE 801.5	Understand and analyze the different parameters of cassegain ant

# COMPUTER COMMUNICATION NETWORK (BEETE 802T)

After completion of this course, E&T graduate shall be able to

BEETE 802.1	Understand the fundamental requirement of theoretical & pract computer network using TCP/IP model.
BEETE 802.2	Apply knowledge to use proper networking hardware dev transmission media, router and switches etc. for communication.
BEETE 802.3	Understand different recent technologies in backbone networks 8 for communication.
BEETE 802.4	Use modern tool & simulation software to simulate the pr algorithms to solve networking problems.
BEETE 802.5	Use various network utilities & configure various networks on diffe
BEETE 802.6	Conceptualize & implement network security & its applicatic projects

#### COMPUTER COMMUNICATION NETWORK (BEETE802P)

ETE802P.1Understand the Basic hardware components & software in compu<br/>networking.ETE802P.2Perform data communication between two pc using RS 232 serial port & RJ<br/>port.ETE802P.3Understand different network configuration commandETE802P.4Understand Network Simulator (NS2).ETE802P.5Create network Topology in NS2.ETE802P.6Create Link State & Distance Vector algorithm in wired mode, UDP & T<br/>Protocols and various protocols in wireless mode using NS2.

After completion of this course, the students shall be able to

#### Wireless Mobile Communication: (BEET803)

BEETE 803.1	Design a model of cellular system communication and analyze their operation and performance.
BEETE 803.2	Quantify the causes and effects of path loss and signal fading on received signal characteristics.
BEETE 803.3	Understand the efficient codes for reliable communication for safety by providing combat for channel in bursty application with proper orientation of signals.
BEETE 803.4	Construct and analyze the GSM system and their hierarchy.
BEETE 803.5	Design & manage the wireless networking, its architecture and upgrade knowledge of various Wireless Access protocols.
BEETE 803.6	Design, Manage & analyze the Wireless LAN technology and upgrade the knowledge of various Wireless Application Protocols.

#### DIP (BEETE804T)

By the end of the course, students shall be able to

EETE804.1	Understand the fundamentals of Digital Image processing
EETE804.2	Understand filtering, transforms & morphology.
EETE804.3	Understand image analysis, coding & compression
EETE804.4	Understand the image enhancement
EETE804.5	Understand the Image restoration & construction
EETE804.6	Understand the image segmentation.

# M. Tech CBCS (VLSI) First Semester

## PGVLS101T – VLSI Subsystem Design – Theory

Graduates shall be able to

СО	Statement
PGVLS101.1	Design different CMOS based circuits.
PGVLS101.2	Analyse the model parameters of CMOS based circuits.
PGVLS101.3	Apply transient optimization techniques.
PGVLS101.4	Apply various clocking strategies

## PGVLS102T – Advanced Digital Signal Processing

Graduates shall be able to

СО	Statement
PGVLS102.1	Represent discrete-time signals analytically and visualize
	them in the time domain.
PGVLS102.2	Meet the requirement of theoretical and practical aspects
	of DSP with regard to sampling and reconstruction.
PGVLS102.3	Design and implement digital filter for various applications.
PGVLS102.4	Estimation of Power Spectrum
PGVLS102.5	Describe the concept of multi rate signal processing and
	how to apply it for the wavelet transform.
PGVLS102.6	Describe the various transforms for analysis of signals and
	systems.

### PGVLS103T – VLSICircuits

Graduates shall be able to

CO	Statement
PGVLS103.1	Describe and formulate the flow of VLSI Design for any application.
PGVLS103.2	Simulate and Analyse the VLSI Circuits.
PGVLS103.3	Understand VLSI design modelling.
PGVLS103.4	Synthesize VLSI system design.

# PGVLS104/3T – Embedded Systems (Elective – I)

Graduates shall be able to

СО	Statement
PGVLS104.1	Program an embedded system using microcontrollers
PGVLS104.2	Program an embedded system using ARM.
PGVLS104.3	Design, implement and test an embedded system.
PGVLS104.4	Apply interfacing techniques based upon the embedded application.

# PGOPENETX025 – Soft Computing Techniques (Elective – II Open)

Graduates shall be able to

СО	Statement
PGOPENETX025.1	Understand the concept fuzzy logic control to real time systems.
PGOPENETX025.1	Provide comprehensive knowledge of fuzzy logic control and adaptive
	Tuzzy logic
PGOPENETX025.1	Understand and design genetic controller.
PGOPENETX025.1	Understand the concept of applications to soft computing.

## M. Tech CBCS (VLSI) Second Semester

# PGVLS201T – AnalogVLSI Design

Graduates shall be able to

СО	Statement
PGVLS201.1	Understand the concepts of analog design.
PGVLS201.2	Design various analog systems including data converters
PGVLS201.3	Understand modelling of CMOS amplifiers and Comparators.
PGVLS201.4	Understand the concept and use of Switched Capacitor Circuits.

#### PGVLS202T – VLSI Testing

Graduates shall be able to

CO	Statement
PGVLS202.1	Do testing of various Memory Modules and Combinational &
	sequential logic Circuits.
PGVLS202.2	Understand various test generation algorithms.
PGVLS202.3	Understand various fault simulation techniques.

# PGVLS203T – Modelling of Digital System and Testing
СО	Statement
PGVLS203.1	Understand the various styles of modelling in Verilog.
PGVLS203.2	Simulate different combinational and sequential circuits.
PGVLS203.3	Understand the basics of FPGA and its applications.
PGVLS203.4	Describe the fundamentals of testing of logic circuits.

# PGVLS204/1T – System on Chip (SoC)Elective-III (Discipline Specific)

Graduates shall be able to

СО	Statement
PGVLS204.1	Understand various hardware and software system design
	approaches.
PGVLS204.2	Understand Concept of chip designing.
PGVLS204.3	Describe various customization techniques for chip designing.

#### PGFD205T – Foundation Course I – Research Methodology

Graduates shall be able to

CO	Statement
PGFD205T.1	Apply knowledge on various kinds of research questions and
	research designs
PGFD205T.2	Formulate research problems (task) and develop a sufficiently
	coherent research design
PGFD205T.3	Assess the appropriateness of different kinds of research
	designs
PGFD205T.4	Apply knowledge on qualitative, quantitative and mixed
	methods of research, as well asrelevant ethical and
	philosophical considerations
PGFD205T.5	Develop independent thinking for critically analysing research
	reports

### M. Tech CBCS (VLSI) Third Semester

# PGOPEN301T – Elective – IV (Open) – Wireless Sensor Network

Graduates shall be able to

СО	Statement
PGOPEN301.1	Appreciate the need for designing energy efficient sensor
	nodes andprotocols for prolonging network lifetime.
PGOPEN301.2	Demonstrate an understanding of the different
	implementationchallenges and the solution approaches.

#### PGFD302T – Foundation II – PROJECT PLANNING, EVALUATION & MANAGEMENT

Graduates shall be able to

CO	Statement
PGFD302.1	Establish measures of success
PGFD302.2	Quantify value commensurate with cost
PGFD302.3	Optimize use of organizational resources
PGFD302.4	Incorporate quality principles and put strategic plans into
	practice
PGFD302.5	Ensure fast time-to-market Project Manager with Reduced
	cost to deliver solutions
PGFD302.7	Lower risk of slipping schedule
PGFD302.8	Repeatable successes on projects with Crisis prevention
PGFD302.9	Structured approach to Project Management with more
	predictable results

#### PGVLS303P – Project Seminar –

Graduates shall be able to

СО	Statement
PGVLS303.1	Identify the contemporary topic pertaining to VLSI Design.
PGVLS303.2	Present the topics with good written and oral
	communication skills.

#### M. Tech CBCS (VLSI) Fourth Semester

#### PGVLS401P – Project

### Course Outcome

In addition to communication, team work and research skills, each student will attain at least the following learning outcomes from this degree course:

- Demonstrate a depth of knowledge of VLSI System Design
- Complete an independent research project, resulting in at least a thesis publication, and research outputs in terms of publications in high impact factor journals, conference proceedings, and patents.
- Demonstrate knowledge of contemporary issues in their chosen field of research.

• Demonstrate an ability to present and defend their research work to a panel of experts.

#### ELECTRONICS ENGINEERING

#### Program Outcomes (PO's):

Graduates shall exhibit following outcomes by the time of graduation from computer engineering program:

- 1. An ability to apply knowledge of mathematical foundations and computer science theory.
- 2. An ability to identify, analyze, formulate, and to solve the complex problems using computer engineering principles.
- 3. An ability to design, develop and evaluate software as well as hardware solutions.
- 4. An ability to conduct experiments with analysis and interpretation of data.
- 5. An ability to use modern software and hardware tools necessary for computer engineering practices.
- 6. An understanding of social and legal issues with responsibility in professional engineering practices.
- 7. An ability to understand the impact of computing and engineering solutions in a global, economic, environmental, and societal context.
- 8. An understanding of professional ethics and responsibilities.
- 9. An ability to work in multidisciplinary teams with cooperation, respect, creativity, and responsibility as a member or leader of a team.
- 10. An ability to communicate effectively with engineering community and society at large.
- 11. An understanding of engineering principles to demonstrate technical skills for project and finance management.
- 12. An ability to recognize the need of lifelong learning and to sustain with rapidly changing technologies.

#### Program Specific Outcome (PSO's):

Graduates of computer engineering shall demonstrate:

PSO1: Problem Solving Skills: an ability to develop computer programs in different areas. PSO2: Use of Modern Tools: an ability to apply standard practices in project development. PSO3: Communication Skills: an ability to demonstrate the oral and written communication skills in their area of expertise.

#### Course Outcomes(CO's):

# **FIRST SEMESTER**

#### Course Name: BES101T (Applied Mathematics - I) Students shall be able to:

BES101.1T	apply Differential Calculus by using indeterminate forms, Taylor's and		
	Maclaurin's Series.		
BES101.2T	apply Partial Differentiation by the use of Euler's theorem, chain rule,		
	Jacobian's and Lagrange's method of multipliers.		
BES101.3T	Students shall be able to exhibit the inverse of a Matrix and Rank of a		
	Matrix.		
BES101.4T	construct the first order differential equations and can be solved.		
BES101.5T	exhibit the Higher order differential equations with constant coefficients		
	and		
	its applications.		
BES101.6T	exhibit the Complex numbers by using De Moivre's theorem and can		
	Separate		
	the real and imaginary parts		

# Course Name: BES102T (Engineering Physics) Students shall be able to:

BES102.1T	learn the concept of Dual Nature of light and micro-particle with theoretical and experimental support. Also able to analyze the problem
	related to the topics
BES102.2T	understand Uncertainty Principle as well as application of Schrodinger's
	equation in one dimensional potential well. Also able to analyze the
	problem related to the topics
BES102.3T	learn properties of cubic crystal structures and Bragg law for X-ray
	diffraction. Also able to analyze the problem related to the topics
BES102.4T	understand formation of Bands in solids, properties of semiconductor
	devices, their testing and utility in small projects.

# Course Name: BES102 P (Engineering Physics)

# Students shall be able to:

BES102.1P	learn the band gap of semiconductor material and V-I characteristics of
	diodes and transistor by analysis from graph.
BES102.2P	understand the technique of measurement of refractive index of material
	of prism and wavelength of monochromatic light using Spectrometer.
BES102.3P	learn basic functions of CRO and its use for measurement of fundamental
	Physical quantities i.e. voltages and frequency.
BES102.4P	understand the identification of N-type and P-type specimens and
	calculation of charge carrier density using Hall effect set up.

#### Course Name: BES103T (Engineering Chemistry) Students shall be able to:

Students shan be usie to:		
BES103.1T	Differences between hard & soft water, studies of various softening	
	methods & its applications, also able to analyze boiler troubles.	
BES103.2T	Electrochemical Fundamentals, corrosion prevention methods &	
	environmental induced methods.	
BES103.3T	Different types of cements & its manufacturing process. They also	
	understand microscopic constituents of cement.	
BES103.4T	Applications of SCF, concept of green chemistry & carbon credit.	
	Different types, operating principles & mechanisms of batteries & fuel	

cells.		

# Course Name: BES103P (Engineering Chemistry) Students shall be able to:

	Analyze the quality of water based on impurities in terms of hardness,
BES103.1P	alkalinity,
	free chlorine etc.
BES103.2P	To determine the metal contents present in ore such as copper, Nickel &
	Iron.
BES103.3P	Analyze Waste water in terms of pH, COD, DO
BES103. 4P	Analyze capacities of resins & heat of neutralization.

# Course Name: BES104T (Basic Electrical Engineering)

Students shall be able to:

BES104.1T	Design and verify laws of DC Electric Circuits .	
BES104.2T	Understand basic term and analyzed composite Magnetic Circuits.	
BES104.3T	Understand basic fundamental of polyphase AC Circuits .	
BES104.4T	Understand fundamental of single phase transformer and its testing.	

# Course Name: BES104P (Basic Electrical Engineering)

Students shall be able to

BES104.1P	verify laws of DC Electric Circuits .
BES104.2P	Understand and verify B H Curve of Magnetic Circuits.
BES104.3P	Measurement of R,L and C of AC Circuits .
BES104. 4P	Understand fundamental of single phase transformer testing.

# Course Name: BES105T (Basic Civil Engineering)

Students shall be able to:

BES105.1T	Introduction to various field of Civil Engineering and the role of Engineer
	in Infrastructural Development.
BES105.2T	Introduction to various types of buildings ,its components & various
	building materials used.
BES105.3T	Introduction to surveying & modern survey methods.
BES105.4T	Introduction to water supply & water management.
BES105.5T	Introduction to various modes of transportation & classification of
	highways.
BES105.6T	Introduction to various instruments & tools used in civil engineering & role
	of Engineers in sustainable development.

# Course Name: BES106T (Engineering Graphics – I)

BES106.1T	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, ty lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engin applications.
BES106.2T	The concept of orthographic projection, co-ordinate plane, first and third method of projection and their conventional representations.
BE106.3T	The concept of projections by projecting image of point placed in all popositions with respect to reference planes, similarly. the projections c placed in first quadrant

BES106.4T	The concept and applications of projection of planes and solids and can able to
	draw
BES106.5T	Conversion of pictorial view into multi view orthographic projection and can able
	to draw
BES106.6T	The concept of Isometric projection and develop the imagination power to convert
	multi-view orthographic into three dimensional pictorial one view projection.

# Course Name: BES106.1P (Engineering Graphics – I)

S	tu	de	nts	shall	be	able	to
-				011011	~ ~		

BES106.1P	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, types of lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engineering applications.
BES106.2P	The concept of orthographic projection, co-ordinate plane, first and third angle method of projection and their conventional representations.
BES106.3P	The concept of projections by projecting image of point placed in all possible positions with respect to reference planes, similarly. the projections of lines placed in first quadrant
BES106. 4P	The concept and applications of projection of planes and solids and can able to draw
BES106. 5P	Conversion of pictorial view into multi view orthographic projection and can able to draw.
BES106.6P	The concept of Isometric projection and develop the imagination power to convert multi-view orthographic into three dimensional pictorial one view projection.

# Course Name: BES107P (Communication Skill)

The Student shall be able to :

BES107.1P	acquire language skills required to write their business, Job Correspondence and technical writings.
BES107.2P	gain knowledge of grammar to face competitive examinations to pursue master degree.
BES107.3P	organize their thoughts in English and hence face job interviews more confidently.
BES107. 4P	acquire the skills of comprehension.

# Course Name: BES107P (Computational Skills)

The Student shall be able to :

BES108.1P	Identify and understand the key componants of computer System.		
BES108.2P	Understand the basic terminology used in C-langauge and Compile, Debu		
	Program.		
BES108.3P	Understand and Devolop the program based on Decision control and loop c		
	structures.		
BES108 4P	Understand and Devolop the C-program based on Array.		
BES108.5P	Understand and Devolop the C-program using Function and Pointers.		

#### SECOND SEMESTER

# Course Name: BES201T (Applied Mathematics - II) Students shall be able to :

BES201.1T	solve the Beta and Gamma Functions and Root Mean square Values in		
	Integral Calculus.		
BES201.2T	trace the curves and can find Areas and Volumes of curves.		
BES201.3T	solve Multiple Integrals and apply it to find mass, area and volume		
DEC201 4T	exhibit Vector Algebra and Vector Differential calculus and also		
BES201.41	Gradient, Divergence and Curl.		
BES201.5T	exhibit Vector Integral Calculus by Gauss Divergence Theorem, Stoke's and		
	Green's theorem.		
	solve fitting of a straight line, parabola, lines of regression in Statistics and		
BES201.6T	Langrange's interpolation formula for unequal intervals in Finit		
	Differences.		

# Course Name: BES202T (Advance Physics)

Students shall be able to

BES202.1T	The student shall able to learn the concept of interference of light in thin film, Basics of LASER, their types and various engineering applications.		
BES202.2T	The student shall able to understand the motion of charged particle in Uniform electric and magnetic field and various devices. Also able to analyze the problems related to the topic.		
BES202.3T	The student shall able to learn the phenomenon of total internal reflection, construction of optical fiber and its applications in communication and different sensors .Also able to analyze the problems related to the topic.		
BES202.4T	The student shall able to learn the methods of synthesis of nanomaterials and their drastic change in properties and their impact on society and environment.		

# Course Name: BES202P (Advance Physics)

# Students shall be able to

	The student shall able to learn the different Lissajeous Figures and			
BES202.1P	frequency			
	measurement using CRO.			
BES202.2P	The student shall understand measurement of conductivity of			
	semiconductor material using four-probe setup.			
BES202.3P	The student shall able to understand the diffraction pattern shown by He-			
	Ne laser			
	and measurement of wavelength of laser in simple way.			
BES202.4P	The student shall able to understand the interference pattern in Newton's			
	ring			

# Course Name: BES203T (Material Chemistry)

BES203.1T	Different properties &, types of fuel, able to analyze the fuel for various
	application, also studies alternative energy sources and their significance.
BES203.2T	Liquid fuel its chemical properties and applications. They also able to
	perform combustion calculations.
BES203.3T	Different types of lubricants, mechanisms, properties and applications.
	They also able to select lubricant for different engineering applications.

	Various types of polymers its property and applications. They also
BES203.4T	understand concept composites and nonmaterial & their engineering
	applications.

# Course Name: BES203P (Material Chemistry)

Students shall be able to	
BES203.1P	Analyze the fuel both qualitatively as well as quantitatively in terms of ash, volatile matter, calorific value.
BES203.2P	Determination of physical and chemical properties of lubricant such as viscosity, flash point, acid value etc.
BES203.3P	Know Preparation of biodiesel.
BES203. 4P	Determine saponification of Acetic Acid

#### Course Name: BES204T (Engineering Mechanics)

#### Students shall be able to

BES204.1T	study plane and space force system
BES204.2T	analyze the plane and space structure considering equilibrium of structure
BES204.3T	study different types of loads and its equilibrium
BES204.4T	study centroid and moment of inertia of plane lamina
BES204.5T	Apply knowledge of kinematic and kinetic analyses and energy and
	momentum methods

# Course Name: BES204P (Engineering Mechanics)

#### Students shall be able to

BES204.1P	Determine the components of a force in rectangular or nonrectangular
	coordinates and the resultant of a system of forces by graphically.
BES204.2P	Draw complete and correct free-body diagrams and write the appropriate
	equilibrium equations from the free-body diagram.
BES204.3P	To determine the support reactions on a structure.

#### Course Name: BES205T (Advance Electrical Engineering) Students shall be able to

BES205.1T	Understand basic term and protection device of Electrical Power System.
BES205.2T	Understand fundamental of DC Machines
BES205.3T	Calculate the domestic electricity charges, illumination and design of wiring system
BES205.4T	Understand fundamental of different type induction motors

#### Course Name: BES206P (Engineering Graphics – II) Students shall be able to

BES206.1P	The use Computer Aided Drafting packages, its applicationsand use of
	commands used for drawing.
BES206.2P	Type of section planes, sectional multi view orthographic projection when
	solid in different position is cut by section plane obtain true shape of the
	section and can draw.
BES206.3P	Importance an d application of development of lateral surfaces, method
	of development and development of cut solids, and can draw.
BES206. 4P	How to identify edge obtain by intersection of surfaces, imagination and
	visualization o missing orthographic view and can draw.

# Course Name: BES207P (Work Shop)

#### Students shall be able to

BES207.1P	Study of Different Workshop Tools and Equipments : Approach to use different tool and equipments of Fitting, Carpentry, Welding and Blacksmithy to complete the specified job with understanding of practical constraints.
BES207.2P	Teamwork: Work effectively in teams to accomplish the assigned responsibilities in an integral manner.
BES207.3P	Technical Communication: Communicate effectively about laboratory work both orally and in writing journals/technical reports.
BES207.4P	Ethics and safety awareness: Behave with highest ethical standards with concern to global, environmental, economic, social issues, safety requirement with lifelong learning and awareness of contemporary issues.

# Course Name: BES208P (Ethical Science)

Student shall able to :

BES208.1P	understand the Culture and Civilization, and acquire the knowledge of right to Information, Public Interest Litigation.
BES208.2P	expand knowledge of industrial Psychology and Sociology (Fatigue, Selection and Training of workers)
BES208.3P	the professional ethics and importance of leadership in Industry.
BES208.4P	acquire the knowledge of Indian Constitution and Federal system and learn fundamental right of different positional.
BES208.5P	understand the concept of Industrial Democracy and work organization.

# **BEENE301T: Applied Mathematics-III**

СО	Statement
BEENE301.1	Apply Laplace transforms to solve ordinary differential Equations arising
	in engineering problems.
BEENE301.2	Calculate the Fourier sine and cosine transforms.
BEENE301.3	Solve to Isoperimetric problem, Boundary value problem by using
	Calculus of Variations.
BEENE301.4	Solve the integral in given region, expansion of function by using Taylor's
	and Laurent's Series, verify function is analytic or not in given region and
	also able to find Analytic function by using functions of complex
	variable.
BEENE301.5	Solve certain problems in Calculus of Variation by using Partial
	Differential Equation
BEENE301.6	find any power of matrix , inverse of matrix , verify linear dependence
	and independence of vectors & to solve second order linear differential
	equation with constant coefficient by using matrices.

#### **BEENE302T: ELECTRONIC DEVICES AND CIRCUITS**

By the end of course, the students shall be able to

СО	Statement
BEENE302.1	Overview of Semiconductor diodes and Rectifiers.
BEENE302.2	Analyze BJT and its biasing techniques.
BEENE302.3	Analyze and design Amplifiers circuits.
BEENE302.4	overview of positive feedback and Oscillators.
BEENE302.5	Effective use of power amplifiers in Commercial use.
BEENE302.6	Overview of JFET and MOSFET circuits which deploy that knowledge in
	project work.

#### **BEENE302P: Electronics Devices and circuits**

By the end of course, the students shall be able to

BEENE302.	
1	Overview of Semiconductor diodes and their characteristics
BEENE302.	
2	Analyze BJT and JFET and its input and output characteristics.
BEENE302.	
3	Analyze the performance of Rectifiers and Emmiter follower
BEENE302.	
4	overview of positive feedback and Oscillators.
BEENE302.	Feddback effect in CE amplifier and Frequency response in RC coupled
5	amplifier
BEENE302.	
6	demonstrate the working of full wave voltege doubler.

## **BEENE303T: Electronics Measurement & Instrumentation**

By the end of course, the students shall be able to

СО	Statement
BEENE303.1	Acquaint the basic principles of measuring instruments and measure the
	resistance by various methods.
BEENE303.2	Identify different electronic instruments for electronic parameter
	measurement
BEENE303.3	Understand the basic concept of AC and DC bridges
BEENE303.4	Measure various physical parameters by using different transducers
	techniques
BEENE303.5	Use the various measuring instruments such as CRO, Function
	generator, Spectrum analyzer in effective manner.
BEENE303.6	Understand different signal processing techniques and data acquisition
	system.

#### **BEENE303P : Electronics Measurement & Instrumentation**

CO	Statement
C303.	
1	Measure the different range of resistance by various methods.
C303.	
2	Measure different electronic parameter using bridge method
C303.	
3	Determine the frequency of unknown signal using Lissagious Pattern Method.

C303.	Find out the value of different physical parameter using various transducing
4	techniques.
C303.	Demonstrate various measuring instruments such as CRO, Function generator,
5	Spectrum analyzer in effective manner.

### BEENE304T : OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURE

By the end of course, the students shall be able to

СО	Statement
BEENE304.1	Introduce and apply the basic concepts of object oriented programming
	such as classes, objects, constructor, destructor.
BEENE304.2	Explain the features of object oriented programming such as
	polymorphism and shall be able to apply them in different languages.
BEENE304.3	Design and implement inheritance and virtual function concepts based
	programs.
BEENE304.4	Explain the basic data structures and algorithms for manipulating them.
BEENE304.5	Implement and Integrate data structures like stack and queue in larger
	programs of C++ language.
BEENE304.6	Code and test well-structured programs of moderate size using the C++
	language.

#### BEENE304P: OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURE

By the end of course, the students shall be able to

CO	Statement
BEENE304.1	Implement the concept of object oriented programming in any
	programming language.
BEENE304.2	Explain the basic data structures and algorithms for manupulating them.
BEENE304.3	Implement data structures and algorithms in c++ language.
BEENE304.4	Integrate the data structures and algorithms in larger programs.
BEENE304.5	Code and test well-structured programs of moderate size using the C++
	language.
BEENE304.6	Apply principles of good program design to the C++ language.

#### BEENE305T: NETWORK ANALYSIS AND SYNTHESIS

By the end of course, the students shall be able to

CO	Statement
BEENE305.1	understand the basic Kirchhoff's laws and source transformation
	techniques to analyze simple and complex networks.
BEENE305.2	learn and apply the different network theorems for analysis of simple
	and complex networks to specific applications.
BEENE305.3	understand the basic concepts of series and parallel resonance of
	different elements with frequency for specific applications.
BEENE305.4	understand the fundamentals of filters, attenuators and transmission
	lines.
BEENE305.5	know the standard input signals for network analysis and synthesis by
	using Laplace transform.
BEENE305.6	understand the different two port networks and network functions for
	the analysis of networks to the specific applications.

#### **BEENE401T : Applied Mathematics –IV**

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СО	Statement
BEENE401.1	Student shall be able to find approximate solution of algebraic and

	transcendental equation by numerical method.
BEENE401.2	Student shall be able to find solution of differential equation with
	constant coefficient by Z-transform.
BEENE401.3	Students shall be able to solve recurrence relation ,Rodrigue's formulae
	,series solution of differential equation.
BEENE401.4	Student shall be able to apply the basic concept and method of
	probability theory.
BEENE401.5	Students shall be able to learn formal definition of the variance and
	standard deviation of discrete random variable .
BEENE401.6	Students shall be able to familiar with the Binomial, Normal and Poisson
	Distributions.

### **BEENE402T : POWER DEVICES AND MACHINES**

By the end of course, the students shall be able to

СО	Statement
BEENE402.1	Understand the basics of different components used in Power
	Electronics.
BEENE402.2	Exhibit fundamentals, working & characteristics of different power
	devices along with their applications in electronics circuits.
BEENE402.3	apply the knowledge of AC-DC converters, & Choppers, inverters which
	are widely used in industries.
BEENE402.4	Understand the different AC, DC machines & their speed control
	methods.
BEENE402.5	Understand the 3-phase transformers
BEENE402.6	Understand the 3-phase Induction motor, Dc motor, Universal motor

#### **BEENE402P : POWER DEVICES AND MACHINES**

By the end of course, the students shall be able to

CO	Statement
BEENE402.1	Understand the working and nature of characteristics of different power
	components used in Power Devices.
BEENE402.2	calculate performance parameters for different devices.
BEENE402.3	perform different tests on Transformers and motors for calculating the
	losses, efficiency, regulation etc.
BEENE402.4	Understand different speed control methods for motors.
BEENE402.5	
BEENE402.6	

# **BEENE403T : ELECTROMAGNETIC FIELDS**

CO	Statement
BEENE403.1	Understand the concept of Electric field & different coordinate system
	for mathematical analysis of Electromagnetic Engineering.
BEENE403.2	Understand the concepts of Magnetic fields required to understand the
	concepts of Electromagnetic Engineering.
BEENE403.3	Understand the Maxwell's equations use in Electromagnetic field.
BEENE403.4	Understand the different theorems and their use in Electromagnetic
	field.
BEENE403.5	Understand the use of waveguides for the transmission of
	electromagnetic waves at higher
BEENE403.6	Understand the basic concepts of Radiation and Elements used for

radiation along with the
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#### BEENE404T: DIGITAL CIRCUITS AND FUNDAMENTAL OF MICROPROCESSOR

By the end of course, the students shall be able to

CO	Statement
BEENE404.1	understand the representations, design methodologies for combinational circuits and able to use the methods of systematic reduction of Boolean algebra expressions including Karnaugh map and design of arithmetic circuits.
BEENE404.2	analyze and design digital combinational circuits like decoders, encoders, multiplexers, and de-multiplexers.
BEENE404.3	understand all types of flip flop and its conversion.
BEENE404.4	analyze sequential logic components such as registers, shift registers and counters.
BEENE404.5	demonstrate understanding of the different families of digital logic circuits and memory devices and their characteristics, Families.
BEENE404.6	know about 8085 microprocessor, addressing modes, instructions sets, assembly language programming.

#### BEENE404P: DIGITAL CIRCUITS AND FUNDAMENTAL OF MICROPROCESSOR

By the end of course, the students shall be able to

СО	Statement
BEENE404.1	Understand the fundamental of basic gates & verify the truth table of
	different Logic Gates
BEENE404.2	verify truth table of Multiplexer and Demultiplexer.
BEENE404.3	verify the truth table of different types of Flip-flops
BEENE404.4	Understand the use of basic gates in combinational circuits.
BEENE404.5	Understand the fundamental of basic gates and their use in sequential
	circuits.
BEENE404.6	execute an ALP with 8085 microprocessor.

#### **BEENE405T : SIGNALS AND SYSTEMS**

By the end of course, the students shall be able to

СО	Statement
BEENE405.1	Analyze the different types of signal and able to compute Fourier series,
	Fourier transform and Inverse Fourier transforms of Signal.
BEENE405.2	Express probability concepts and random processes and able to apply in
	communication system.
BEENE405.3	Differentiate coding schemes and able to apply selective coding scheme
	for the needed application.
BEENE405.4	Design amplitude modulator, frequency modulator.
BEENE405.5	Analyze and design digital communication techniques.
BEENE405.6	Apply theoretical principles of information theory and able to construct
	error correcting codes.

#### **BEENE406T : ENVIRONMENTAL STUDIESs**

CO	Statement
BEENE406.1	Recognize major concepts in environmental sciences and demonstrate
	in-depth understanding of the environment.
BEENE406.2	Develop analytical skills, critical thinking, and demonstrate problem-
	solving skills using scientific techniques.

BEENE406.3	Convey a clear idea of the interdisciplinary nature of environmental
	science.
BEENE406.4	Ability to apply the fundamental knowledge of science and engineering
	to assess environmental, health risk and disaster management.
BEENE406.5	Understand what is life-time learning and how does it contribute to
	advancements of career.
BEENE406.6	Understand what are professional ethics and how do ethics affect the
	outcomes of environmental laws and regulations.

## **BEENE407P : SOFTWARE WORKSHOP**

By the end of course, the students shall be able to

CO	Statement
BEENE407.1	Overview of matlab and pspice software.
BEENE407.2	Programming, Calculus, simple matrix and array manipulations using
	MATLAB
BEENE407.3	To plot signals: discrete and continuous and Function programming
	using MATLAB
BEENE407.4	Design and simulation of Device characteristics
BEENE407.5	To draw, analyze and plot the electronic circuits using pSpice Software.
BEENE407.6	Circuit Simulation & Introduction to PCB designing

## **BEENE501T : Switching Theory & Automata**

By the end of course, the students shall be able to

СО	Statement
BEENE501.1	Demonstrate basic tools for the design of digital circuits and
	fundamental concepts used in the design of digital systems
BEENE501.2	Obtain structural properties by using Functional Decomposition &
	Symmetric functions.
BEENE501.3	Describe designing aspects of logic circuits using threshold elements.
BEENE501.4	Design combinational logic circuits, sequential logic circuits.
BEENE501.5	Understand behavior, capabilities and structure of finite state machines
	and sequential machines.
BEENE501.6	Diagnose faults of switching circuits & methods of improving their
	reliability.

#### **BEENE502T : Microprocessor & Microcontroller**

By the end of course, the students shall be able to

СО	Statement
BEENE502.1	Internal organization of 8086 microprocessor and instruction set.
BEENE502.2	Interfacing of 8086 with peripherals which deploy that knowledge in
	project work.
BEENE502.3	Analyze the concept of Interrupts and serial and parallel data
	communication
BEENE502.4	Concepts of DMA , Pentium and coprocessor
BEENE502.5	Internal organization of 8051 and instruction sets.
BEENE502.6	Interfacing of 8051 with peripherals which deploy that knowledge in
	project work.

#### **BEENE502P : Microprocessor & Microcontroller**

СО	Statement
BEENE502.1	Demonstrate the concept of assembly language structure and

	programming
BEENE502.2	Interfacing of 8086 with peripherals which deploy that knowledge in
	project work.
BEENE502.3	Internal organisation of 8086 and instruction set
BEENE502.4	Simulate the program on different hardware and software models.
BEENE502.5	Internal organization of 8051 and instruction sets.
BEENE502.6	Interfacing of 8051 with peripherals which deploy that knowledge in
	project work.

# BEENE503T : Analog Circuits & Design

By the end of course, the students shall be able to

СО	Statement
BEENE503.1	Apply the knowledge of mathematics to understand Basic characteristic,
	construction, open loop & close loop operations of Op-Amp.
BEENE503.2	Analyze and Design linear Op-Amp circuits such as Voltage follower,
	Summing amplifier, scaling and averaging amplifier, Instrumentation
	amplifier circuits for various practical applications
BEENE503.3	Explore the mathematical knowledge to the use and design non-linear
	Op-Amp such as Comparators, Comparator IC such as LM 339, Schmitt
	trigger, multivibrator circuits for various practical applications using
	IC555.
BEENE503.4	Analyze and design regulated power supply using regulated ICs
BEENE503.5	Understand, Analyze and design sinusoidal oscillators and function
	generator.
BEENE503.6	identify, formulate and design the application based filters and driver
	circuits

# BEENE503P : Analog Circuits & Design

By the end of course, the students shall be able to

CO	Statement
BEENE503.1	Gain a sound understanding of the operation, analysis and design of
	analog electronic circuits and systems.
BEENE503.2	Design linear and nonlinear applications of operational amplifier.
BEENE503.3	Design the oscillators and other complex circuits using op amp ICs.
BEENE503.4	Describe gain-bandwidth concept and frequency response of basic
	amplifiers.
BEENE503.5	Design different systems using opamp and passive devices.
BEENE503.6	Explain working of different analog circuits and apply them to complex
	circuits.

# **BEENE504T : Communication Electronics**

СО	Statement
BEENE504.1	Realize the basic concept of communication and different modulation
	system based on basic parameter.
BEENE504.2	Ellaborate Angle modulation and mathematical Anaylisis
BEENE504.3	Understand the concept of sampling and various pulse modulation
	techniques
BEENE504.4	Study of noise its various sources and terminology to be used in
	practical communication system
BEENE504.5	Understand performance characteristics and special feautres of

	communication receiver
BEENE504.6	Grasp the knowledge of broadband communication links and various
	cabling to be used in communication purposes

#### **BEENE504P : Communication Electronics**

By the end of course, the students shall be able to

СО	Statement
BEENE504.1	Apply the knowledge of engineering mathematics to understand
	Amplitude Modulation & Demodulation and to find modulation index of
	an AM modulated wave.
BEENE504.2	Understand, analyze, formulate and Compare different modulation
	techniques of Generation of FM (Direct & Indirect Method).
BEENE504.3	Explore and apply knowledge of engineering mathematics to understand
	the analog and digital pulse modulation techniques, PCM, DM,
	PAM,PPM,PWM.
BEENE504.4	Apply concept Analog sampling techniques :Natural Sampling ,Sample
	and Hold sampling
	Flat Top sampling.
BEENE504.5	Understand the concept of demodulation techniques and apply the
	knowledge of engineering mathematics to understand AM and FM
	superhetrodyne receiver.
BEENE504.6	Understand the knowledge about fundamentals of Broadband
	Communication Systems and multiplexing techniques TDM, FDM.

#### **BEENE505T : Industrial Economics & Enterpreneurship Development**

By the end of course, the students shall be able to

СО	Statement
BEENE505.1	learn and understand how to select and develop a small or medium
	Scale business ideas.
BEENE505.2	The Student shall able to select various institutions for financial and
	working in a particular business idea application.
BEENE505.3	make and implement project proposals and reports to hunt for venture
	capital.
BEENE505.4	develop management skills to achieve goals.
BEENE505.5	exhibit the knowledge to plan and implement projects by applying
	management techniques
BEENE505.6	understand social responsibility as a modern management concept.

#### **BEENE601T : Microwave Engineering**

By the end of course, the students shall be able to

СО	Statement
BEENE601.1	Understand the working of O-type Microwave Device.
BEENE601.2	Recognize the operation of M-type Microwave Device.
BEENE601.3	Analyze and find various transmission line parameters using smith chart.
BEENE601.4	Understand the concept in analysis of microwave network and Study the
	performance of Microwave Components with scattering matrix.
BEENE601.5	Demonstrate Microwave equipment and make Measurements.
BEENE601.6	Express Microwave Solid State Devices and its application.

#### **BEENE601P : Microwave Engineering**

CO Statement
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BEENE601.1	Describe working of microwave bench.
BEENE601.2	To measure the characteristics of microwave devices.
BEENE601.3	Measure power & VSWR of microwave component.
BEENE601.4	To measure radiation parameters of antenna.
BEENE601.5	Analyze the S-parameter of microwave component.
BEENE601.6	Describe working of microwave bench.

#### **BEENE602T** : Digital Signal processing

By the end of course, the students shall be able to

СО	Statement
BEENE602.1	understand the representation and different operations on discrete time
	signal analytically/graphically in time domain and application of it in
	signal processing.
BEENE602.2	apply z-transform and IZT for various discrete time signals.
BEENE602.3	understand the Transform domain and its significance and problems
	related to computational complexity.
BEENE602.4	learn the basic forms of IIR filters and to design and realize filters with
	desired specifications for specific applications.
BEENE602.5	learn the basic forms of FIR filters and to design with the help of
	different window techniques with preferred specifications for particular
	applications.
BEENE602.6	understand the basic concept of multi rate signal processing with its
	applications and apply it to wavelet transform.

#### **BEENE602P** : Digital Signal processing

By the end of course, the students shall be able to

CO	Statement
BEENE602.1	Analyze and process the signals in the discrete domain.
BEENE602.2	Design the filters to suit requirements of specific applications.
BEENE602.3	Apply the techniques, skills, and modern engineering tools like MATLAB
	and digital processors.
BEENE602.4	Design and implement digital filter for various applications.
BEENE602.5	Design the various transforms for analysis of signals and systems.
BEENE602.6	Represent discrete time signals analytically and visualize them in the
	time domain.

# **BEENE603T : Control System Engg.**

СО	Statement
BEENE603.1	Have knowledge about basic need for various control
	system and analyze the mathematical modelling of the system.
BEENE603.2	Understand the response of different order systems for
	various inputs.
BEENE603.3	Analyze the stability criteria of control system for
	determining relative stability.
BEENE603.4	Analyze the stability margin in frequency response of linear
	system.
BEENE603.5	Have the knowledge of different compensation techniques.
BEENE603.6	Apply the state variable approach in design.

By the end of course, the students shall be able to

СО	Statement
BEENE604.1	Understand the block sets such as source encoder, channel
	encoder etc. of Digital Communication.
BEENE604.2	Know the mathematical analysis involved in digital
	communication.
BEENE604.3	Understand the circuit requirements and parameter values
	for optimum system performance.
BEENE604.4	Demonstrate the concept of coding and decoding
	techniques .
BEENE604.5	Understand reciever techniques for detection of signal in
	AWGN channel.
BEENE604.6	Understand projects in the Digital Communication such as
	Adaptive Channel Coder, Wireless Switching , Convolution encoder, etc.

#### **BEENE605T : Functional English**

By the end of course, the students shall be able to

СО	Statement
BEENE605.1	Student shall have enough knowledge to face competitive examination
	to pursue master degree.
BEENE605.2	Student shall able to organize their thoughts in English and hence face
	job interviews more confidently.
BEENE605.3	Student shall able to produce a set of documents related to technology
	and writing in the workplace and shall have improved their ability to
	write clearly and accurately.
BEENE605.4	Student shall able to acquire the skill of comprehension.
BEENE605.5	Student shall also acquire language skills required to write their
	Reviews, Projects, and Reports.
BEENE605.6	Student shall understand how to critically analyze data from research,
	incorporate it into assigned writing clearly, concisely, and logically and
	attribute the source with proper citation.

#### **BEENE606P : Electronics Workshop Practice**

By the end of course, the students shall be able to

СО	Statement
BEENE606.1	Use DSO and spectrum analyzer
BEENE606.2	Study and identify different electronic components
BEENE606.3	Test different electronic components
BEENE606.4	Design PCB using PCB design software
BEENE606.5	Design and fabricate mini project
BEENE606.6	

#### **BEENE607P** : Industrial Visit

By the end of course, the students shall be able to

СО	Statement
BEENE607.1	provide industry exposure to students
BEENE607.2	understand the industrial requirements
BEENE607.3	correlate the engineering knowledge with industrial atmosphere
BEENE607.4	apply ethics while working in industry

#### **BEENE701T : DSP PROCESSOR & ARCHITECTURE**

CO	Statement
BEENE701.1	Recognize the fundamentals of fixed and floating point architectures of
	various DSPs.
BEENE701.2	Describe the detailed architecture, addressing mode, instruction sets of
	TMS320C5X.
BEENE701.3	To write & execute different program of DSP processor.
BEENE701.4	Describe the detailed architecture, addressing mode, instruction sets of
	TMS320C54X.
BEENE701.5	To design & implement DSP algorithm using code composer studio &
	Describe the detailed architecture TMS320C6X and Motorola DSP563XX.
BEENE701.6	To design decimation filter and interpolation filter.

#### **BEENE701P : DSP PROCESSOR & ARCHITECTURE**

By the end of course, the students shall be able to

СО	Statement
BEENE701.1	Understand the architecture of TMS320C5X and working.
BEENE701.2	Understand the architecture of TMS320C54Xand working.
BEENE701.3	Implement different processing algorithms on DSP processors.
BEENE701.4	Understand the architecture Motorola Processors.
BEENE701.5	Design different types of filters and study their characteristics.
BEENE701.6	Understand the code composer studio and design the different program
	for DSP Processor.

#### **BEENE702T : EMBEDDED SYSTEM**

By the end of course, the students shall be able to

СО	Statement
BEENE702.1	understand basics of general computing system and the embedded
	systems.
BEENE702.2	understand the architecture of the embedded system and Interrupt
	Service Mechanism.
BEENE702.3	understand of the architecture of the ARM processor and its
	programming
BEENE702.4	understand the various protocols like Bluetooth, IEEE 802.11 and IEEE
	802.16, GPRS, MODBUS CAN, I2C and USB
BEENE702.5	summarize the basic properties of a real-time operating system.
BEENE702.6	analyze various examples of embedded systems.

#### **BEENE702P : EMBEDDED SYSTEM**

By the end of course, the students shall be able to

СО	Statement
BEENE702.1	familiar with Flash magic (ARM7) software.
BEENE702.2	familiar with ARM kit.
BEENE702.3	perform mathematical operation like addition, subtraction of 16 bit
	numbers.
BEENE702.4	read values from RTC and display on LCD.
BEENE702.5	know the concept of Real Time Operating System
BEENE702.6	perform experiments on different peripheral devices like LCD, Seven
	segment, GSM, etc.

#### **BEENE703T : OPTICAL COMMUNICATION**

СО	Statement	
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BEENE703.1	Basic elements of optical fiber system.
BEENE703.2	Different type of distortion occur in fiber optics.
BEENE703.3	The various types of optical sources.
BEENE703.4	The various types of optical detectors.
BEENE703.5	Various Analog links and Digital links.
BEENE703.6	Overview of WDM,SONE, measurement of atenuation, dispersion, RI in
	fiber optics.

## **BEENE704T : Advanced Digital System design**

By the end of course, the students shall be able to

СО	Statement
BEENE704.1	Acquire Knowledge About device technology and Development flow
	along with basic concept of VHDL.
BEENE704.2	Develop VHDL code for entities using various modeling styles.
BEENE704.3	Implement subprogram code and to construct test bench in VHDL.
BEENE704.4	Analyze the basic Finite state machine and able to create VHDL code.
BEENE704.5	Ability to synthesize the VDHL Code.
BEENE704.6	Summarize the concept of Programmable Logic Devices (FPGA/CPLD)

# **BEENE704P : Advanced Digital System design**

By the end of course, the students shall be able to

CO	Statement
BEENE704.1	Model, simulate, verify the digital model with hardware description
	language.
BEENE704.2	Design and prototype with programmable logic devices
BEENE704.3	Create and simulate basic circuit modules (or macros) using VHDL
BEENE704.4	Learn the modular design style to create large digital logic circuits.
BEENE704.5	Develop test bench of various modules
BEENE704.6	Develop programs and synthesis same program

#### **BEENE705T : Elective I MOBILE COMMUNICATION**

By the end of course, the students shall be able to

СО	Statement
BEENE705.1	Have an introduction to mobile communication and cellular system.
BEENE705.2	Have an overview of mobile radio environment.
BEENE705.3	Understand modulation techniques for mobile communication.
BEENE705.4	Understand fundamental of Equalization, diversity and channel coding.
BEENE705.5	Understand multiple access techniques.
BEENE705.6	Understand GSM and switching system.

#### **BEENE706P** : Project Seminar

СО	Statement
BEENE706.1	Identify problems from outside world, generate new ideas & find
	solution by designing the prototype model associated with it.
BEENE706.2	Select suitable project making use of engineering & technical knowledge
	gain from previous courses with awareness of technology on society &
	their ethical responsibility.
BEENE706.3	Identify modern engineering tool for implementation of project, form a
	team & distribute work among themselves.
BEENE706.4	Communicate technical & general information by means of oral and

	written presentation skill
BEENE706.5	Design the system & achieve satisfactory results within stipulated time.
BEENE706.6	Acquire problem solving, project management & documentation skill.

#### BEENE801T : MICROELECTROMECHANICAL SYSTEMS & SYSTEMS ON CHIP

By the end of course, the students shall be able to

CO	Statement
BEENE801.1	Understand working principles of currently available microsensors,
	actuators used in Microsystems.
BEENE801.2	Choose a micromachining technique, such as bulk micromachining and
	surface micromachining for a specific MEMS fabrication process
BEENE801.3	Understand the basic concepts of microsensors, actuators and
	transducers.
BEENE801.4	Understand RF MEMS components in communications, space and
	defence applications.
BEENE801.5	Understand overview of micro-system packaging.
BEENE801.6	know about system on chip and Microsystems technology.

#### **BEENE802T : COMPUTER COMMUNICATION NETWORK**

By the end of course, the students shall be able to

СО	Statement
BEENE802.1	Understand the fundamental requirement of theoretical & practical
	aspects of computer network using TCP/IP model.
BEENE802.2	Apply knowledge to use proper networking hardware devices such as
	transmission media, router and switches etc. for communication.
BEENE802.3	Understand different recent technologies in backbone networks & LAN
	network for communication.
BEENE802.4	Use modern tool & simulation software to simulate the protocol & use
	algorithms to solve networking problems.
BEENE802.5	Use various network utilities & configure various networks on different
	platform.
BEENE802.6	Conceptualize & implement network security & its application to
	societal projects

## **BEENE802P : COMPUTER COMMUNICATION NETWORK**

By the end of course, the students shall be able to

СО	Statement
BEENE802.1	understand and select various cables used for networking
BEENE802.2	understand and select various connectors used for networking
BEENE802.3	Establish peer to peer computers as well as Local Area Network
	connectivity
BEENE802.4	Effectively use available networking tools in Computer Communication
	Network
BEENE802.5	Understand different recent technologies in backbone networks & LAN
	network for communication.
BEENE802.6	Design the different network topology by NS2

### BEENE803T : CMOS VLSI DESIGN

СО	Statement
BEENE803.1	Design PMOS and NMOS transistor.
BEENE803.2	Implementation different combinational logic circuits.

BEENE803.3	Design layout for various circuits.	
BEENE803.4	Design CMOS transistor.	
BEENE803.5	Design different systems using opamp and passive devices.	
BEENE803.6	Explain working of different analog circuits and apply them to complex	
	circuits.	

#### **BEENE803P : CMOS VLSI DESIGN**

By the end of course, the students shall be able to

CO	Statement
BEENE803.1	Understand the characteristic of NMOS/PMOS.
BEENE803.2	Design PMOS and NMOS transistor
BEENE803.3	Design of circuits using transmission gate
BEENE803.4	Implementation different combinational logic circuits.
BEENE803.5	Design layout for various circuits
BEENE803.6	Design CMOS transistor

#### **BEENE804T : Elective 2 WIRELESS SENSOR NETWORK**

By the end of course, the students shall be able to

СО	Statement	
BEENE804.1	Understand basic concept of WSN and engineering principle of sensor	
	design.	
BEENE804.2	Understand radio transmission technology issues and computing science	
	approach towards WSN with emphasis on tiny sensor	
BEENE804.3	Understand Routing challenges and strategies to develop its protocols	
	for WSN.	
BEENE804.4	Have an overview of transport control protocol	
BEENE804.5	Have knowledge of Middleware.	
BEENE804.6	Have knowledge of network management for WSN, identifying design	
	issues and its requirement.	

#### **BEENE805T : Elective 3 DATA COMPRESSION & ENCRYPTION**

By the end of course, the students shall be able to

CO	Statement
BEENE805.1	Implement various text compression technique.
BEENE805.2	Implement various audio compression technique.
BEENE805.3	Implement various Image, video compression technique.
BEENE805.4	Gain the knowledge of encryption techniques application to digital
	communication.
BEENE805.5	Provide various authentications using digital communication.
BEENE805.6	Provide knowledge of system security.

# **M.Tech in Electronics Engineering**

#### **COURSE OUTCOMES:**

#### Advanced Digital Signal Processing (PGETX101T)

PGETX101.1	Represent discrete-time signals analytically and
	visualize them in the time domain.
PGETX101.2	Meet the requirement of theoretical and practical

	aspects of DSP with regard to sampling and
	Reconstruction
PGETX101.3	Design and implement digital filter for various
	applications
PGETX101.4	Estimation of Power Spectrum
PGETX101.5	Describe the concept of multi rate signal
	processing and how to apply it for the wavelet
	transform.
PGETX101.6	Describe the various transforms for analysis of
	signals and systems

# High Speed Semiconductor Devices and Circuits (PGETX102T)

By the end of the course the students shall be able to:

PGETX102.1	Identify different MOS devices for the specific application.
PGETX102.2	Fabrication of different MOS devices corresponding to the requirements.
PGETX102.3	Integrate different MOS devices.
PGETX102.4	Understand HBT and HEMT Devices

# Advanced Embedded System Design (PGETX103T)

By the end of the course the students shall be able to:

PGETX103.1	Able to select suitable embedded systems for real world applications
PGETX103.2	Able to design suitable embedded systems for real world applications
PGETX103.3	Able to embed different components as the application
PGETX103.4	Understand Distributed Embedded Architecture

#### Pattern Recognition (PGETX104/1T)

PGETX104.1	Formulate and describe various applications in
	pattern recognition
PGETX104.2	Mathematically derive, construct, and utilize
	Bayesian-based classifiers and non-Bayesian
	classifiers
	both theoretically and practically
PGETX104.3	Identify the strengths and weaknesses of
	different types of classifiers.
PGETX104.4	Validate and assess different clustering
	techniques
PGETX104.4	Understand the possibilities and limitations of
	pattern recognition

#### Analog IC Design (PGETX104/2T)

PGETX104.1	Design different Analog circuits.
PGETX104.2	Analyze the model parameters of integrated
	circuits.
PGETX104.3	Acquire knowledge about MOS Devices and
	Modelling
PGETX104.4	Design CMOS Amplifiers

By the end of the course the students shall be able to:

# Advanced Digital Communication (PGETX104/3T)

By the end of the course the students shall be able to:

PGETX104.1	Describe the Digital Transmission of Signals.
PGETX104.2	Analyze the Digital Transmission of Signals.
PGETX104.3	Describe the effective digital modulation
	techniques as per the applications
PGETX104.4	Model digital communication systems using
	appropriate mathematical techniques

#### Nano Electronics (PGOPEN105T)

By the end of the course the students shall be able to:

PGOPEN105T.1	Analyze modelling and simulation of various
	communication networks
PGOPEN105T.2	Generate test and estimate parameters
PGOPEN105T.3	Apply this knowledge for detection estimation and
PGOPEN105T.4	Apply this knowledge for simulation of various communication network

#### Soft Computing Techniques (PGOPEN105T)

PGOPEN105T.1	Learn about soft computing techniques and their
	applications
PGOPEN105T.2	Analyze various neural network architectures
PGOPEN105T.3	Understand perceptions and counter propagation
	networks.
PGOPEN105T.4	Define the fuzzy systems
PGOPEN105T.5	Analyze the genetic algorithms and their
	applications

#### Advanced Digital Signal Processing (PGETX106P)

PGETX106P.1	Represent discrete-time signals analytically and
	visualize them in the time domain.
PGETX106P.2	Meet the requirement of theoretical and practical
	aspects of DSP with regard to sampling and
	Reconstruction
PGETX106P.3	Design and implement digital filter for various
	applications
PGETX106P.4	Estimation of Power Spectrum
PGETX106P.5	Describe the concept of multi rate signal
	processing and how to apply it for the wavelet
	transform.
PGETX106P.6	Describe the various transforms for analysis of
	signals and systems

By the end of the course the students shall be able to:

#### Advanced Embedded System Design (PGETX107P)

By the end of the course the students shall be able to:

PGETX107P.1	Able to select suitable embedded systems for real world applications
PGETX107P.2	Able to design suitable embedded systems for
	real world applications
PGETX107P.3	Able to embed different components as the application
PGETX107P.4	Understand Distributed Embedded Architecture

#### Digital System Modelling and Simulation (PGETX201T)

By the end of the course the students shall be able to:

PGETX201.1	Design of combinational circuit.
PGETX201.2	Design of sequential circuit.
PGETX201.3	Implementation of digital system.
PGETX201.4	Experimentation on Hardware /Software co-
	design

High Performance Communication Networks (PGETX202T)

PGETX202.1	Understand the principles of wired and wireless networks
PGETX202.2	Understand the requirement of theoretical & practical aspect of computer network.
PGETX202.3	Describe various protocols used in High Performance based network
PGETX202.4	Design MANET based applications

#### Advanced System Design (PGETX203T)

By the end of the course the students shall be able to:

PGETX203.1	Demonstrate system modelling.
PGETX203.2	Simulate different linear systems
PGETX203.3	Simulate different non-linear systems
PGETX203.4	Acquire knowledge of Robotic Systems and
	Automation

Fault Tolerance in Digital Circuits (PGETX204/1T)

By the end of the course the students shall be able to:

PGETX204.1	Demonstrate Logic Level
PGETX204.2	Demonstrate Register Level Modelling
PGETX204.3	Identify efficient fault detection technique.
PGETX204.4	Simulate the faults in an application

Advanced Digital Image Processing (PGETX204/2T)

By the end of the course the students shall be able to:

PGETX204.1	To be able to design and implement image
	enhancement schemes
PGETX204.2	To be able to design and implement compression
	schemes
PGETX204.3	To be able to design and implement restoration
	schemes
PGETX204.4	To be able to design and implement
	segmentation schemes.

Mobile Communication (PGETX204/3T)

By the end of the course the students shall be able to:

PGETX204.1	Understand the Cellular Systems
PGETX204.2	Know the concept of Switching systems
PGETX204.3	Understand the concept of Base station
	subsystems
PGETX204.4	

Advanced Communication Technologies (PGETX204/4T)

PGETX204.1	Compare different modulation techniques of
	Generation of FM
PGETX204.2	Explain the working principles of basic building
	blocks of a digital communication system
PGETX204.3	Describe digital modulation techniques
PGETX204.4	Model digital communication systems using

		appropriate mathematical techniques
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Foundation Course I – Research Methodology (PGFD205T) By the end of the course the students shall be able to:

PGFD205.1	Knowledge on various kinds of research questions
	and research designs
PGFD205.2	Formulate research problems (task) and develop
	a sufficiently coherent research design
PGFD205.3	Assess the appropriateness of different kinds of
	research designs
PGFD205.4	Knowledge on qualitative, quantitative and mixed
	methods of research, as well as relevant ethical
	and philosophical considerations
PGFD205.5	Develop independent thinking for critically
	analyzing research reports

Digital System Modelling and Simulation (PGETX206P)

By the end of the course the students shall be able to:

PGETX206P.1	Design of combinational circuit.
PGETX206P.2	Design of sequential circuit.
PGETX206P.3	Implementation of digital system.
PGETX206P.4	Experimentation on Hardware /Software co-
	design

Advanced System Design (PGETX207P)

By the end of the course the students shall be able to:

PGETX207P.1	Demonstrate system modelling.
PGETX207P.2	Simulate different linear systems
PGETX207P.3	Simulate different non-linear systems
PGETX207P.4	Acquire knowledge of Robotic Systems and
	Automation

Wireless Sensor Network (PGOPEN301T)

PGOPEN301.1	The student would be able to appreciate the need
	for designing energy efficient sensor nodes and
	protocols for prolonging network lifetime.
PGOPEN301.2	The student would be able to demonstrate an
	understanding of the different implementation
	challenges and the solution approaches.
PGOPEN301.3	Some existing applications of wireless sensor
	actuator networks
PGOPEN301.4	Apply these principles in the context of wireless
	sensor networks

PGOPEN301.5	understand what research problems sensor
	networks pose in disciplines such as signal
	processing, wireless communications and even
	control systems

#### Foundation Course II – Project Planning and Management (PGFD302T) By the end of the course the students shall be able to

PGFD302.1	Develop a project proposal
PGFD302.2	Develop a logical framework
PGFD302.3	Develop measureable indicators
PGFD302.4	Have ability to insert Monitoring and Evaluation
	into a project
PGFD302.5	Develop a grant proposal & project budget

#### Project Seminar (PGETX303P)

By the end of the course the students shall be able to

PGETX303P.1	Identify the contemporary topic pertaining to
	Electronics Design.
PGETX303P.2	Present the topics with good written
	communication skills.
PGETX303P.3	Present the topics with good oral communication
	skills.

#### Project (PGETX401P)

By the end of the course the students shall be able to

PGETX401P.1	Demonstrate a depth of knowledge of Electronics System Design
PGETX401P.2	Complete an independent research project, resulting in at least a thesis publication, and research outputs in terms of publications in high impact factor journals, conference proceedings, and patents
PGETX401P.3	Demonstrate knowledge of contemporary issues in their chosen field of research
PGETX401P.4	Demonstrate an ability to present and defend their research work to a panel of experts.

### COMPUTER ENGINEERING

#### Program Outcomes (PO's)

Graduates shall exhibit following outcomes by the time of graduation from computer engineering program:

- 1. An ability to apply knowledge of mathematical foundations and computer science theory.
- 2. An ability to identify, analyze, formulate, and to solve the complex problems using computer engineering principles.

- 3. An ability to design, develop and evaluate software as well as hardware solutions.
- 4. An ability to conduct experiments with analysis and interpretation of data.
- 5. An ability to use modern software and hardware tools necessary for computer engineering practices.
- 6. An understanding of social and legal issues with responsibility in professional engineering practices.
- 7. An ability to understand the impact of computing and engineering solutions in a global, economic, environmental, and societal context.
- 8. An understanding of professional ethics and responsibilities.
- 9. An ability to work in multidisciplinary teams with cooperation, respect, creativity, and responsibility as a member or leader of a team.
- 10. An ability to communicate effectively with engineering community and society at large.
- 11. An understanding of engineering principles to demonstrate technical skills for project and finance management.
- 12. An ability to recognize the need of lifelong learning and to sustain with rapidly changing technologies.

#### Program Specific Outcome (PSO's)

Graduates of computer engineering shall demonstrate:

**PSO1:Problem Solving Skills**: an ability to develop computer programs in different areas. **PSO2:Use of Modern Tools:** an ability to apply standard practices in project development. **PSO3:Communication Skills:** an ability to demonstrate the oral and written communication skills in their area of expertise.

#### FIRST SEMESTER

#### Course Name: BES101T (Applied Mathematics - I) Students shall be able to:

BES101 1T	apply Differential Calculus by using indeterminate forms, Taylor's and
DL3101.11	Maclaurin's Series.
REC101 2T	apply Partial Differentiation by the use of Euler's theorem, chain rule,
DE3101.21	Jacobian's and Lagrange's method of multipliers.
DEC101 2T	Students shall be able to exhibit the inverse of a Matrix and Rank of a
DE2101.31	Matrix.
BES101.4T	construct the first order differential equations and can be solved.
	exhibit the Higher order differential equations with constant coefficients
BES101.5T	and
	its applications.
	exhibit the Complex numbers by using De Moivre's theorem and can
BES101.6T	Separate
	the real and imaginary parts

#### Course Name: BES102T (Engineering Physics) Students shall be able to:

	learn the concept of Dual Nature of light and micro-particle with
BES102.1T	theoretical and experimental support. Also able to analyze the problem
	related to the topics

BES102.2T	understand Uncertainty Principle as well as application of Schrodinger's
	equation in one dimensional potential well. Also able to analyze the
	problem related to the topics
BES102.3T	learn properties of cubic crystal structures and Bragg law for X-ray
	diffraction. Also able to analyze the problem related to the topics
BES102.4T	understand formation of Bands in solids, properties of semiconductor
	devices, their testing and utility in small projects.

# Course Name: BES102 P (Engineering Physics)

#### Students shall be able to:

BES102.1P	learn the band gap of semiconductor material and V-I characteristics of
	diodes and transistor by analysis from graph.
BES102.2P	understand the technique of measurement of refractive index of material
	of prism and wavelength of monochromatic light using Spectrometer.
BES102.3P	learn basic functions of CRO and its use for measurement of fundamental
	Physical quantities i.e. voltages and frequency.
BES102.4P	understand the identification of N-type and P-type specimens and
	calculation of charge carrier density using Hall effect set up.

#### Course Name: BES103T (Engineering Chemistry) Students shall be able to:

BES103.1T	Differences between hard & soft water, studies of various softening methods & its applications, also able to analyze boiler troubles.
BES103.2T	Electrochemical Fundamentals, corrosion prevention methods & environmental induced methods.
BES103.3T	Different types of cements & its manufacturing process. They also understand microscopic constituents of cement.
BES103.4T	Applications of SCF, concept of green chemistry & carbon credit. Different types, operating principles & mechanisms of batteries & fuel cells.

# Course Name: BES103P (Engineering Chemistry)

	Students shall be able to:	
		Analyze the quality of water based on impurities in terms of hardness
BES103.1P	alkalinity,	
	free chlorine etc.	
BES103.2P	PES102 20	To determine the metal contents present in ore such as copper, Nickel &
	Iron.	
	BES103.3P	Analyze Waste water in terms of pH, COD, DO
	BES103. 4P	Analyze capacities of resins & heat of neutralization.

# Course Name: BES104T (Basic Electrical Engineering)

#### Students shall be able to:

BES104.1T	Design and verify laws of DC Electric Circuits .
BES104.2T	Understand basic term and analyzed composite Magnetic Circuits.
BES104.3T	Understand basic fundamental of polyphase AC Circuits .
BES104.4T	Understand fundamental of single phase transformer and its testing.

#### Course Name: BES104P (Basic Electrical Engineering) Students shall be able to

BES104.1P	verify laws of DC Electric Circuits .
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BES104.2P	Understand and verify B H Curve of Magnetic Circuits.
BES104.3P	Measurement of R,L and C of AC Circuits .
BES104. 4P	Understand fundamental of single phase transformer testing.

# Course Name: BES105T (Basic Civil Engineering)

#### Students shall be able to:

BES105 1T	Introduction to various field of Civil Engineering and the role of Engineer
DL3103.11	in Infrastructural Development.
	Introduction to various types of buildings ,its components & various
DE3103.21	building materials used.
BES105.3T	Introduction to surveying & modern survey methods.
BES105.4T	Introduction to water supply & water management.
DECIOE ET	Introduction to various modes of transportation & classification of
DE2102.21	highways.
	Introduction to various instruments & tools used in civil engineering & role
DE2102.01	of Engineers in sustainable development.

#### Course Name: BES106T (Engineering Graphics – I) Students shall be able to

BES106.1T	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, ty lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engin applications.
BES106.2T	The concept of orthographic projection, co-ordinate plane, first and third method of projection and their conventional representations.
BE106.3T	The concept of projections by projecting image of point placed in all popositions with respect to reference planes, similarly. the projections c placed in first quadrant
BES106.4T	The concept and applications of projection of planes and solids and can a draw
BES106.5T	Conversion of pictorial view into multi view orthographic projection and ca to draw
BES106.6T	The concept of Isometric projection and develop the imagination power to comulti-view orthographic into three dimensional pictorial one view projection

# Course Name: BES106.1P (Engineering Graphics – I)

BES106.1P	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, types of lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engineering applications
BES106.2P	The concept of orthographic projection, co-ordinate plane, first and third angle method of projection and their conventional representations.
BES106.3P	The concept of projections by projecting image of point placed in all possible positions with respect to reference planes, similarly. the projections of lines placed in first quadrant
BES106. 4P	The concept and applications of projection of planes and solids and can able to draw
BES106. 5P	Conversion of pictorial view into multi view orthographic projection and can able to draw
BES106.6P	The concept of Isometric projection and develop the imagination power to

convert multi-view orthographic into three dimensional pictorial one view
projection.

# Course Name: BES107P (Communication Skill)

The Student Shan be able to .	The	Student	shall	be	able	to	:
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BES107.1P	acquire language skills required to write their business, Job
	Correspondence and technical writings.
	gain knowledge of grammar to face competitive examinations to pursue
BES107.2P	master
	degree.
PES107 20	organize their thoughts in English and hence face job interviews more
DE3107.3P	confidently.
BES107. 4P	acquire the skills of comprehension.

# Course Name: BES107P (Computational Skills)

The Student shall be able to :

BES108.1P	Identify and understand the key componants of computer System.
PES109 2D	Understand the basic terminology used in C-langauge and Compile, Debu
DE3108.2P	Program.
BES108.3P	Understand and Devolop the program based on Decision control and loop c
	structures.
BES108 4P	Understand and Devolop the C-program based on Array.
BES108.5P	Understand and Devolop the C-program using Function and Pointers.

## SECOND SEMESTER

#### Course Name: BES201T (Applied Mathematics - II) Students shall be able to :

BES201.1T	solve the Beta and Gamma Functions and Root Mean square Values in
	Integral Calculus.
BES201.2T	trace the curves and can find Areas and Volumes of curves.
BES201.3T	solve Multiple Integrals and apply it to find mass, area and volume
DEC201 AT	exhibit Vector Algebra and Vector Differential calculus and also
BE5201.41	Gradient, Divergence and Curl.
BES201.5T	exhibit Vector Integral Calculus by Gauss Divergence Theorem, Stoke's and
	Green's theorem.
BES201.6T	solve fitting of a straight line, parabola, lines of regression in Statistics and
	Langrange's interpolation formula for unequal intervals in Finit
	Differences.

# Course Name: BES202T (Advance Physics)

BES202.1T	The student shall able to learn the concept of interference of light in thin film, Basics of LASER, their types and various engineering applications.
BES202.2T	The student shall able to understand the motion of charged particle in Uniform electric and magnetic field and various devices. Also able to

	analyze the problems related to the topic.
BES202.3T	The student shall able to learn the phenomenon of total internal reflection, construction of optical fiber and its applications in communication and different sensors .Also able to analyze the problems related to the topic.
BES202.4T	The student shall able to learn the methods of synthesis of nanomaterials and their drastic change in properties and their impact on society and environment.

# Course Name: BES202P (Advance Physics)

# Students shall be able to

	The student shall able to learn the different Lissajeous Figures and
BES202.1P	frequency
	measurement using CRO.
BE6202 2D	The student shall understand measurement of conductivity of
DESZUZ.ZP	semiconductor material using four-probe setup.
	The student shall able to understand the diffraction pattern shown by He-
BES202.3P	Ne laser
	and measurement of wavelength of laser in simple way.
BES202.4P	The student shall able to understand the interference pattern in Newton's
	ring

# Course Name: BES203T (Material Chemistry)

# Students shall be able to

BES203.1T	Different properties &, types of fuel, able to analyze the fuel for various
	application, also studies alternative energy sources and their significance.
BES203.2T	Liquid fuel its chemical properties and applications. They also able to
	perform combustion calculations.
BES203.3T	Different types of lubricants, mechanisms, properties and applications.
	They also able to select lubricant for different engineering applications.
	Various types of polymers its property and applications. They also
BES203.4T	understand concept composites and nonmaterial & their engineering
	applications.

# Course Name: BES203P (Material Chemistry)

#### Students shall be able to

BES203.1P	Analyze the fuel both qualitatively as well as quantitatively in terms of ash volatile matter calorific value
BES203.2P	Determination of physical and chemical properties of lubricant such as viscosity, flash point, acid value etc.
BES203.3P	Know Preparation of biodiesel.
BES203. 4P	Determine saponification of Acetic Acid

# Course Name: BES204T (Engineering Mechanics)

BES204.1T	study plane and space force system
BES204.2T	analyze the plane and space structure considering equilibrium of structure
BES204.3T	study different types of loads and its equilibrium
BES204.4T	study centroid and moment of inertia of plane lamina
BES204.5T	Apply knowledge of kinematic and kinetic analyses and energy and
	momentum methods

# Course Name: BES204P (Engineering Mechanics)

#### Students shall be able to

BE6204 1D	Determine the components of a force in rectangular or nonrectangular
BE3204.1P	coordinates and the resultant of a system of forces by graphically.
BES204.2P	Draw complete and correct free-body diagrams and write the appropriate
	equilibrium equations from the free-body diagram.
BES204.3P	To determine the support reactions on a structure.

# Course Name: BES205T (Advance Electrical Engineering)

#### Students shall be able to

BES205.1T	Understand basic term and protection device of Electrical Power System.
BES205.2T	Understand fundamental of DC Machines
BES205.3T	Calculate the domestic electricity charges, illumination and design of wiring system
BES205.4T	Understand fundamental of different type induction motors

# Course Name: BES206P (Engineering Graphics – II)

Students shall be able to	
BES206.1P	The use Computer Aided Drafting packages, its applicationsand use of
	commands used for drawing.
BES206.2P	Type of section planes, sectional multi view orthographic projection when
	solid in different position is cut by section plane obtain true shape of the
	section and can draw.
BES206.3P	Importance an d application of development of lateral surfaces, method
	of development and development of cut solids, and can draw.
BES206. 4P	How to identify edge obtain by intersection of surfaces, imagination and
	visualization o missing orthographic view and can draw.

# Course Name: BES207P (Work Shop)

#### Students shall be able to Study of Different Workshop Tools and Equipments : Approach to use different tool and equipments of Fitting, Carpentry, BES207.1P Welding and Blacksmithy to complete the specified job with understanding of practical constraints. Teamwork: Work effectively in teams to accomplish the assigned BES207.2P responsibilities in an integral manner. Technical Communication: Communicate effectively about laboratory BES207.3P work both orally and in writing journals/technical reports. Ethics and safety awareness: Behave with highest ethical standards with concern to global, environmental, economic, social issues, safety BES207.4P requirement with lifelong learning and awareness of contemporary issues.

# Course Name: BES208P (Ethical Science)

Student shall able to :

BES208.1P	understand the Culture and Civilization, and acquire the knowledge of right to Information, Public Interest Litigation.
BES208.2P	expand knowledge of industrial Psychology and Sociology (Fatigue,

	Selection and
	Training of workers)
BES208.3P	the professional ethics and importance of leadership in Industry.
BES208.4P	acquire the knowledge of Indian Constitution and Federal system and learn fundamental right of different positional.
BES208.5P	understand the concept of Industrial Democracy and work organization.

#### 1] APPLIED MATHEMATICS-III: BECME301T

Upon successful completion of the course the student will be able to

BECME301.1	Apply Laplace transforms to solve ordinary differential equations arising in engineering problems and able to evaluate inverse Laplacetransforms
	of functions.
BECME301.2	Calculate the Fourier sine and cosine transforms.
BECME301.3	Compute Z- transform and inverse Z- transforms.
BECME301.4	Compute Eigen values and vectors and can solve 2 <sup>nd</sup> order Linear Differential Equation with Constant Coefficients by Matrix method
BECME301.5	Apply the basic concepts and methods of probability theory
BECME301.6	Learn formal definition of the variance and standard deviation of discrete random variable.

# 2] DIGITAL ELECTRONICS: BECME302T

Upon successful completion of the courses the student will be able

BECME302.1	Demonstrate knowledge of binary number theory, Boolean algebra and
	binary codes.
BECME302.2	Analyze and design combinational systems using standard gates and
	minimization methods (such as Karnaugh maps).
BECME302.3	Analyze and design combinational systems composed of standard
	combinational modules, such as multiplexers and
	decoders.
BECME302.4	Demonstrate knowledge of simple synchronous sequential systems and
	design flip-flops and latches.
BECME302.5	Analyze and design sequential systems composed of standard sequential
	modules, such as counters and registers
BECME302.6	Analyze and design basic arithmetic circuits such as adder, sub tractor,
	BCD adder, arithmetic and logic unit.

#### 3] CONCEPTS IN COMPUTER ENGINEERING: BECME303T

Upon successful completion of the courses the student will be able

BECME303.1	Demonstrate a basic understanding of computer hardware and
	memory.
BECME303.2	Demonstrate generations of computer and processor.
BECME303.3	Apply logical skills to programming in a variety of languages.
BECME303.4	Demonstrate a basic understanding of computer software.
BECME303.5	Demonstrate a basic understanding of operating systems & open
	source technology.
BECME303.6	Demonstrate a basic understanding of multimedia systems.

#### 4] PROGRAMMING METHODOLOGY AND DATA STRUCTURES: BECME304T

Upon successful completion of the course the student will be able to

BECME304.1	Understand fundamental of C language, design the flowchart and develo
BECME304.2	Design C programs using pointer, structure and string operations.
BECME304.3	Analyze and experiment various searching and sorting techniques.
BECME304.4	Evaluate expressions and experiment stack and queue operations.
BECME304.5	Analyze and design Linked List.
BECME304.6	Analyze and design trees and graphs with different techniques.

#### 5] INTRODUCTION TO COMPUTER NETWORK: BECME305

Upon successful completion of the course the student will be able to

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BECME305.1	Have a good understanding of the data communicating as well as OSI reference model and TCP IP reference model with fundamental concepts of computer network
BECME305.2	Have a good knowledge of physical layer objectives and digital
	transmission.
BECME305.3	Specify and analyze the problems in existing protocols and then move
	to formulate new advance protocols for networking as well as
	understanding the different IEEE standards.
BECME305.4	Have working knowledge of the datagram network, protocols and
	algorithms.
BECME305.5	Understand the socket programming and different shaping policies.
BECME305.6	Have knowledge of the use of cryptography, network security,
	domain name system, authentication services and browser
	architecture

#### 6] ENVIRONMENTAL ENGINEERING (BECME306T)

Upon successful completion of the course the student will be able to

BECME306.1	Understand the current environmental challenges.
BECME306.2	Understand the relationship between scientific approaches and
	environmental issues.
BECME306.3	Learn their roles as citizens regarding the environment.
BECME306.4	Learn the ways to avoid pollution.
BECME306.5	Aware others about urban sprawl.
BECME306.6	Learn how to do water west management.

#### 7] COMPUTER LAB 1: BECME307P

Upon successful completion of the course the student will be able to

BECME307.1	Understand basics of Computer system.
BECME307.2	Create web pages using different text formatting tags.
BECME307.3	Create different lists in web page.
BECME307.4	Create tables with its different properties.
BECME307.5	Hyperlink number of web pages.
BECME307.6	Create different types of forms.
BECME307.7	Design different types of frame layouts.
BECME307.8	Design a web page with different styles.
BECME307.9	Write simple java script.
BECME307.10	Exhibit skills to create dynamic websites.

#### 1] DISCRETE MATHEMATICS AND GRAPH THEORY: BECME401T

Upon successful completion of the course the student will be able toBECME401.1Gain the experience in various techniques of Mathematical
BECME401.2	Specify basic mathematical concepts like sets, Relations and Functions
BECME401.3	Exhibit the elementary formal logic.
BECME401.4	Solve and model the problems by using graphs and trees
BECM401.5	Formulate and interpret the statements presented in
BECM401.6	Familiar to recurrence relations and combinatorial analysis.

### 2] FILE STRUCTURE AND DATA PROCESSING: BECME402T

Upon successful completion of the course the student will be able to

BECME402.1	Demonstrate the knowledge and ability to explain the importance of file structure in the Data storage and manipulation
BECME402.2	Understand about various kind of secondary storage devices are used to store data.
BECME402.3	Understand how the file structure approach differs from the data base approach.
BECME402.4	Demonstrate knowledge of the low level aspects of file manipulation.
BECME402.5	Demonstrate the knowledge and ability to explain the importance of data compression.
BECME402.6	Understand some of the high level file structure tool and recognize the
	difference between various indexing techniques.
BECME402.7	Analyze and design some of the learned techniques and concepts using
	C++ for solving various file management problems.

## 3] MICROPROCESSOR : BECME403T

Upon successful completion of the course the student will be able to

BECME403.1	Understand the architecture of 8086 microprocessor.
BECME403.2	Understand the integer instructions and computations.
BECME403.3	Understand the logical instructions and their use.
BECME403.4	Understand the stack related instructions and their use.
BECME403.5	Understand the 8255 PPI architecture and I/O instructions.
BECME403.6	Understand the 8259 PIC architecture and interrupt structure.

### 4] NUMERICAL COMPUTATION TECHNIQUES: BECME404T

Upon successful completion of the course the student will be able to

BECME404.1	Compute numerical approximations to the roots of polynomial and transcendental equations.
BECME404.2	Solve numerical solution to a system of linear equations by Gaussian Elimination, Gauss-Seidel, Gauss-Jordan Methods etc.
BECME404.3	Apply several methods of numerical integration and numerical differentiation.
BECME404.4	Compute measures of central tendency like mean, median, mode etc.
BECME404.5	Solve dispersion moments about the mean.
BECME404.6	Compute various types of probability distributions.
BECME404.7	Calculate coefficient of correlation and regression lines.
BECME404.8	Test the hypothesis using suitable statistical test

### 5] OBJECT ORIENTED METHODOLOGY: BECME405T

1	
BECME405.1	Understand the object- oriented software development process,
	object-oriented methodologies and work flow.
BECME405.2	Learn fundamental principles of OO programming and modeling
	techniques.

BECME405.3	Understand Master key principles in OO analysis, design, and
	development with example.
BECME405.4	Understand management of data stores and designing algorithms.
BECME405.5	Familiar with the application of the Unified Modeling Language
	towards analysis and design.
BECME405.6	Understand how to apply Object Oriented Analysis Processes for
	projects.

### 6] COMPUTER LAB-II:BECME406P

Upon successful completion of the course the student will be able to

BECME406.1	Demonstrate the knowledge and ability to explain the importance of COBOL language as well as storage media and COBOL coding sheets.
BECME406.2	Demonstrate the use of various editing characters and menu driven program for arithmetic operations.
BECME406.3	Demonstrate STRING and UNSTRING verb.
BECME406.4	Demonstrate knowledge of the creation of COBOL table.
BECME406.5	Create different sequential files and display all the records.
BECME406.6	Perform various operations on records in a file.
BECME406.7	Have knowledge of merging and sorting of a files and generation of
	reports.

### 1] THEORY OF COMPUTATION: BECME501T

Upon successful completion of the course the student will be able to

-	
BECME501.1	Understand basics of formal languages, deterministic and
	nondeterministic finite automata.
BECME	Differentiate regular sets, regular expressions, regular grammars and
501.2	their inter-conversion.
BECME	Understand context-free languages, grammars and normal forms,
501.3	Pushdown Automata.
BECME	Understand basic properties of Turing machines, computing with Turing
501.4	machines and linear bounded automata.
BECME	Understand the concepts of tractability and decidability, the concepts of
501.5	NP-completeness and NP-hard problems.
BECME	Understand basics of Recursive functions.
501.6	

### 2] COMPUTER ARCHITECURE AND ORGNIZATION: BECME502T

Upon successful completion of the course the student will be able to

BECME502.1	Learn Foundations of computer architecture and organization.
BECME502.2	Understand Organization of control unit, arithmetical and logical unit,
	memory unit and I/O unit.
BECME502.3	Understand internal organizations of computers, CPU, memory unit,
	Input/output and the relations between its main components.
BECME502.4	Determine the applicability of single-cycle (MIPS), multi-cycle (MIPS),
	parallel, pipelined, superscalar, and RISC/CISC architectures
BECME502.5	Learn I/O organization and mechanism of peripheral devices.
BECME502.6	Develop ability to analyze cost performance and design trade-offs in
	designing and constructing a computer processor including memory

### 3] INDUSTRIAL ECONOMICS & ENTREPRENEUR DEVELOPMENT: BECME503T

BECME603.1	Learn and understand how to select and develop a small or medium Scale business ideas.
BECME603.2	Select various institutions for financial and working in a particular business idea application.
BECME 603.3	Make and implement project proposals and reports to hunt for venture capital.
BECME603.4	Develop management skills to achieve goals.
BECME603.5	Exhibit the knowledge to plan and implement projects by applying management techniques
BECME603.6	Understand social responsibility as a modern management concept.

## 4] COMPUTER GRAPHICS: BECME504T

Upon successful completion of the course the student will be able to

BECME504.1	Understand basic concept of computer graphics, Generation of line, circle
	and ellipse algorithms.
BECME504.2	Learn polygon filling algorithms.
BECME504.3	Exhibit Segment tables, Windowing and clipping line algorithm.
BECME504.4	Learn the concept of projections 3D and 2D transformation.
BECME504.5	Understand the Hidden surfaces line removal algorithm, Methods of
	interpolation and surface rendering methods.
BECME504.6	Learn the concept of Color Models and design of Animation.

### 5] TCP/IP: BECME503T

Upon successful completion of the courses the student will be able to

BECME503.1	Understand the architecture and underlying technology of wired and wireless LANs
BECME503.2	Demonstrate the ability to perform both classfull and classless Subnetting techniques for IPV4 network.
BECME503.3	Demonstrate the ability to decode Ethernet frames, IP Packets and TCP or UDP segments, ARP using software protocol tracer.
BECME503.4	Understand Internet Control Message Protocols and Routing protocols.
BECME503.5	Understand Mobile IP, Multicasting and Multicast routing protocols.
BECME503.6	Implement client and server programs in JAVA using the following classes: Sockets, Server Socket

### 6] COMPUTER LAB -III BECME506P

Upon successful completion of the course the student will be able to

•	
BECME506.1	Sort the numbers through command line argument and multiplication of
	matrices using interactive input.
BECME506.2	Implement stack related operations and knowledge of the array.
BECME506.3	Have knowledge of abstract class and interface with different methods.
BECME506.4	Demonstrate the knowledge of the package and exception handling.
BECME506.5	Have knowledge of the string with different methods.
BECME506.6	Perform the applet program and client server application.

### 1] SYSTEM SOFTWARE: BECME601T

Upon successful completion of the courses the student will be able to

BECME601.1	Understand fundamentals of system software and its programming.
BECME601.2.	Solve problems in assembly language and machine language
	programming.
BECME601.3.	Learn different types of assembler, loader and macro processor related
	concepts and programming.
BECME601.4.	Learn basics of Compiler and its various phases.
BECME601.5.	Understand different types of Device Driver and its applications.
BECME601.6.	Understand about the advancements in system software by case study of
	Intel@64 and IA-32 Processors.

### 2] DESIGN AND ANALYSIS OF ALGORITHMS: BECME602T

Upon successful completion of the course the student will be able to

BECME602.1	Understand basic concept of algorithm and analyze the performance of
	algorithm, order notation and how to design efficient algorithms.
BECME602.2	Learn the time complexity, space complexity of an algorithm, also
	understand the asymptotic notation for analyzing the algorithms.
BECME602.3	Understand various algorithms for sorting (e.g., insertion, merge, quick-
	sort, and heap sort), data structures (trees and arrays), and selection
	(e.g., min, max) and how to use them.
BECME602.4	Exhibit the different computational models divide-and-conquer, greedy
	algorithms, and various complexity measures (e.g., running time, disk
	space) to analyze the complexity of different algorithms.
BECME602.5	Know various advanced design and analysis techniques such as dynamic
	programming
BECME602.6	Learn the concept of searching (e.g., linear and binary search),
	backtracking, Queen problem, graph coloring, Hamiltonian and how they
	can be manage or avoided and implement them.

## 3] DATABASE MANAGEMENT SYSTEM: BECME603T

Upon successful completion of the course the student will be able to

BECME603.1	Learn and understand fundamentals of database management system
	and introduction of relational algebra.
BECME603.2	Query development knowledge using SQL and PL/SQL.
BECME603.3	Modeling and normalization of databases.
BECME603.4	Learn query processing and optimization techniques.
BECME603.5	Knowledge of transaction and concurrency control.
BECME603.6	Learn fundamentals of distributed databases.

## 4] SOFTWARE ENGINEERING & PROJECT MANAGEMENT: BECME604T

spon successful completion of the course the student will be usic to		
BECME604.1	Understand common lifecycle processes including Waterfall (linear),	
	incremental approaches (such as Unified process), and agile approaches.	
BECME604.2	Design a solution to a given problem using one or more design patterns	
	and implement the design in a programming language.	
BECME604.3	Apply software testing and quality assurance techniques At the module	
	level, and understand these techniques at the system and organization	
	level.	
BECME604.4	Prepare technical documentations and make presentations on various	
	aspects of a software development project, including the technical	
	aspects (architecture, design, quality assurance) as well as the managerial	
	aspects (planning, scheduling, and delivery).	

BECME604.5	Explain fundamental elements of Software Project Management.
BECME604.6	Apply knowledge of computing, mathematics, science, and engineering
	appropriate to the discipline, particularly in the modeling and design of
	software systems and in the analysis of tradeoffs inherent in design
	decisions

### 5] FUNCTIONAL ENGLISH BECME605T

Upon successful completion of the course the student will be able to

BECME605.1	Have enough knowledge to face competitive examination to pursue
	master degree.
BECME605.2	Organize their thoughts in English and hence face job interviews more
	confidently.
BECME605.3	Produce a set of documents related to technology and writing in the
	workplace and shall have improved their ability to write clearly and
	accurately.
BECME605.4	Acquire language skills required to write their Reviews, Projects, and
	Reports.
BECME605.5	Acquire the skill of comprehension.
BECME605.6	Understand how to critically analyze data from research, incorporate it
	into assigned writing clearly, concisely, and logically and attribute the
	source with proper citation.

### 6] MINI PROJECT & INDUSTRIAL VISIT: BEIT606P

Upon successful completion of the course the student will be able to

BECME606P .1	Understand programming concepts and learn about and go through the software development cycle with emphasis on different processes -
	requirements, design, and implementation phases.
BECME606P .2	Demonstrate independent learning.
BECME606P .3	Demonstrate the ability to locate and use technical information from multiple sources.
BECME606P.4	Demonstrate an understanding of professional ethics.
BECME606P .5	Demonstrate the ability to communicate effectively in speech and writing.
BECME606P .6	learn to work as a team and to focus on getting a working project done on time with each

### 1] ADVANCED MICROPROCESSORS & MICROCONTROLLERS: BECME702T

Upon successful completion of the course the student will be able to

BECME702.1	Have knowledge of the historical evolution of 16 bit as well as 32 bit microprocessor and microcontroller.
BECME702.2	Understand the paging, protection, segmentation mechanism with pipelining concepts.
BECME702.3	Understand the Pentium superscalar features and architecture with functional pin diagram.
BECME702.4	Have basic knowledge of the Pentium programming, programmers model as well as different instruction set related to Pentium processor.
BECME702.5	Have a good knowledge of the 8 bit 8051 microcontroller with their timers, programming, interrupts and various applications.
BECME702.6	Understand 16 bit 8096 microcontroller with their features and various applications.

#### 2] INFORMATION ASSURANCE AND NETWORK SECURITY: BECME703T

Upon successful completion of the course the student will be able to

BECME703.1	Understand functioning of security services in computing
	environments& fundamentals of network attacks.
BECME703.2	Analyze and understand the Advance Cryptographic Techniques and
	Hash functions.
BECME703.3	Experiment various key management and network security protocols.
BECME703.4	Learn the security issues in Internet and able to understand design of
	sample security protocols.
BECME703.5	Gain the knowledge of security issues associated with electronic
	payment
BECME703.6	Acquire knowledge about the cyber security laws and ethical hacking

## 3] DATA WAREHOUSING & MINING: BECME704T (III) ELECTIVE -I

Upon successful completion of the course the student will be able to

BECME704T	Understand basic principles, concepts and applications of Data
(iii).1	Warehousing and Data Mining.
BECME704T	Design a data warehouse or data mart to present information needed
(iii).2	by management in a form that is usable for management client.
BECME704T	Exhibit the online analytical processing knowledge.
(iii).3	
BECME704T	Use different OLAP models.
(iii).4	
BECME704T	Understand need of multidimensional analysis and various data
(iii).5	warehousing schemas.
BECME704T	Exhibit good knowledge of the fundamental concepts that provide the
(iii).6	foundation of data mining.
BECME704T	Extract knowledge using data mining techniques .
(iii).7	
BECME704T	Perform clustering and classification.
(iii).8	
BECME704T	Adapt new data mining tools.
(iii).9	

## 4] SOFT COMPUTING : BECME704T (I) ELECTIVE -I

Upon successful completion of the course the student will be able to

BECME704(i).1	Learn fundamentals of artificial neural network.
BECME704(i).2	Learn error back propagation and related learning rules.
BECME704(i).3	Understand crisp set theory and fuzzy set theory.
BECME704(i).4	Learn rule based fuzzy systems.
BECME704(i).5	Understand fundamentals of genetic algorithm.

### 5] WEB TECHNOLOGIES: BECME705T(II) ELECTIVE-II

Upon successful completion of the course the student will be able to

BECME705.1	Write html, XHTML and CSS codes.
BECME705.2	Do the client side programming using javascript.
BECME705.3	Understand life cycle of applet, servlet, jsp and basicprograms of JSP.
BECME705.4	Write Internal, External DTD in XML.
BECME705.5	Understand Different internet protocols and web service feeds.
BECME705.6	Understand Different internet protocols and web service feeds.
	Finally they can create dynamic websites.

### 6] SEMINAR ON PROJECT : BECME706P

Upon successful completion of the course the student will be able to

BECME706P.1	Demonstrate and deal with latest technology.
BECME706P.2	Improve stage daring, oral and written communication skills.
BECME706P.3	Deal with social and legal issues.
BECME706P.4	Improve academics and to retain in associated field.
BECME706P.5	Work in group for smooth conduction of assigned task.
BECME706P.6	Do literature survey, to write papers and to face the quries in
	recognized topics.

## 1] UNIX & Shell Programming: BECME801T

Upon successful completion of the course the student will be able to

BECME801.1	Understand VI editor of unix operating System
BECME801.2	Learn unix structure, commands and utilities.
BECME801.3	Master the basics of linux administration.
BECME801.4	Manage unix base networks, write complex shell scripts, carry casual unix
	system management such as storage backups, use unix as a programming
	platform.
BECME801.5	Learn the use of unix system as programmers & developers.
BECME801.6	Understand & work effectively in linux/unix environment.

### 2] DISTRIBUTED SYSTEMS AND GRID COMPUTING : BECME802T

Upon successful completion of the course the student will be able to

BECME802.1	Understand fundamentals of distributed systems and associated issues.
BECME802.2	Exhibit the importance of clock synchronization and development of
	related algorithms
BECME802.3	Understand the case study of distributed architecture of CORBA.
BECME802.4	Understand fundamentals of grid computing and architectural models.
BECME802.5	Explore Message Passing Techniques and its implementations
BECME802.6	Understand fundamentals of cloud computing and cloud computing
	services.

#### 3] BIO-INFORMATICS & CYBER SECURITY:BECME803T (III) ELECTIVE --III

Upon successful completion of the course the student will be able to

BECME803.1	Understand the basic of bio-informatics.
BECME803.2	Understand the biological information resources.
BECME803.3	Understand the data mining and pattern matching techniques based on
	sequencing alignment and data analysis.
BECME803.4	Used different bioinformatics algorithms and its tools.
BECME803.5	Understand the pre-requisites in information and security in which
BECME803.6	Understand the information and network security.

### 4] SOFTWARE TESTING & QUALITY ASSURANCE: BECME803T (II) ELECTIVE -III

BECME803T (ii).1	Understand basic testing concepts and objectives of testing.
BECME803T (ii).2	Learn the unit testing technique and tools for unit testing
BECME803T(ii).3	Exhibit the input test generation knowledge for testing techniques.
BECME803T (ii).4	Use the data flow testing and system integration testing to learn
	interfaces and various integration techniques.
BECME803T(ii).5	Exhibit the knowledge of system test categories and test case design.

BECME803T (ii).6 Learn acceptance testing.

### 5] MULTIMEDIA SYSTEM: BECME804T (III) ELECTIVE –IV

Upon successful completion of the course the student will be able to

BECME804 (iii).1	Understand Multimedia Systems Architecture and Evolving
	Technologies in Multimedia.
BECME804 (iii).2	Know about different Editing Tools for Multimedia Elements.
BECME804 (iii).3	Work with different editing tools for sound, text, video and images
BECME804 (iii).4	Understand compression techniques
BECME804 (iii).5	Know different extension for Multimedia Elements.
BECME804 (iii).6	Understand Designing and Producing of Multimedia contents

### 6] PROJECT (BECME805)

BECME805.1	Solve problem and demonstrate the result of the project.
BECME805.2	Develop novel algorithm to solve the problem.
BECME805.3	Use modern technology that solves the problem of social needs.
BECME805.4	Analyze the problem by comparing with existing system.
BECME805.5	Write conference paper.
BECME805.6	Demonstrate presentation, communication, team work skill.

## Course Outcomes (COs) OF M.Tech Computer Science and Engineering

### 1] HIGH PERFORMANCE COMPUTER ARCHITECTURE (THEORY)( PGCSE101T)

Upon successful completion of the course the student will be able to

PGCSE101.1	Learn concepts of different computer models and Principles of scalable
	performance
PGCSE101.2	Understand basic concepts of Pipelining.
PGCSE101.3	Exhibit basic concepts and challenges of instruction level parallelism
PGCSE101.4	Learn Basic concept of hierarchical memory organization.
PGCSE101.5	Learn Parallel and Scalable Architecture of Multiprocessors and
	Multicomputer as well as Chache.

### 2] ADVANCES IN OPERATING SYSTEM DESIGN (THEORY) (PGCSE102T)

Upon successful completion of the courses the student will be able to:-

PGCSE102.1	Architecture and different Algorithms of Distributed Operating system.
PGCSE102.2	Concepts of Distributed File system, Shared Memory and Scheduling.
PGCSE102.3	Basics of Failure Recovery and Fault Tolerance in Distributed system.
PGCSE102.4	Fundamentals of Multiprocessor system and Real Time Operating system.

### 3] DATA SCIENCE (THEORY)( PGCSE103T)

Upon successful completion of the courses the student will be able to

1 0051105.1	onderstand busie concept of data science.
PGCSE103.2	Learn different type of statistical inference, supervised and unsupervised
	learning.
PGCSE103.3	Understand basic concept of Big data analytics.
PGCSE103.4	Learn different feature generation and feature selection algorithms.
PGCSE103.5	Understand basic concepts related to graph analytics.

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### <u>4] AI AND EXPERT SYSTEM DESIGN–ELECTIVE-I (DISCIPLINE SPECIFIC) (THEORY)(</u> PGCSE104/2T)

Upon successful completion of the courses the student will be able to

PGCSE104.1	Understand Overview of artificial Intelligence and different state space
	representatoion.
PGCSE104.2	Solve problems using different laws in propositional logic, also can
	transform certain formulas to different form of logic.
PGCSE104.3	Understand characteristics and architecture of an expert system.
PGCSE104.4	Learn architecture of rule based expert System also form judgments and
	take decision from Uncertain, incomplete and contradictory information
PGCSE104.5	Understand basic neural network concepts, supervised and unsupervised
	learning

### 5] ADVANCE DATA MINING AND BIG DATA ANALYTICS –ELECTIVE-II(OPEN) (T)( PGCSE105/1T)

PGCSE105.1	Understand basic principles, concepts and applications of Data Warehousin
	Mining.
PGCSE105.2	Design a data warehouse or data mart to present information needed by man
	a form that is usable for management client.
PGCSE105.3	Exhibit the online analytical processing knowledge.

PGCSE105.4	Use different OLAP models.
PGCSE105.5	Understand need of multidimensional analysis and various data warehousing schemas.

### <u>6] HIGH PERFORMANCE COMPUTER ARCHITECTURE- LABORATORY - I (PRACTICAL)(</u> PGCSE106P)

Upon successful completion of the courses the student will be able to

PGCSE106.1	Demonstrate Instruction Level Parallelism.
PGCSE106.2	Demonstrate Pipeling.
PGCSE106.3	Perform practical on message passing interface
PGCSE106.4	Study distributed memory environment

### 7] ADVANCES IN OPERATING SYSTEM DESIGN - LABORATORY - II (PRACTICAL) (PGCSE107P)

Upon successful completion of the courses the student will be able to

PGCSE102.1	Study client server based program using RPC and RMI
PGCSE102.2	Simulate the functioning of Lamports logical clock using C or Java
	Programming.
PGCSE102.3	Simulate distributed mutual exclusion using C or Java Programming
PGCSE102.4	Implement CORBA mechanism
PGCSE102.4	Study Cloud computing

### M. Tech (Second Sem) :-

### 1] ADVANCES IN ALGORITHM (THEORY) (PGCSE201T)

#### Upon successful completion of the courses the student will be able to

PGCSE201.1	Understand basic concept of algorithm and analyze the performance of
	algorithm, order notation and how to design efficient algorithms.
PGCSE201.2	Exhibit different computational models divide-and-conquer, greedy
	algorithms, and various complexity measures to analyze the complexity of
	different algorithms.
PGCSE201.3	Learn concepts of flow and matching and can also solve problems on
	weighted graphs
PGCSE201.4	Learn different pattern matching algorithms and concept of cryptography
PGCSE201.5	Understand different algorithms like randomization, approximation and
	linear programming.

#### 2] ADVANCES COMPUTER NETWORK AND SECURITY (THEORY) (PGCSE202T)

Upon successful completion of the courses the student will be able:-

PGCSE202.1	Concept of TCP/IP architecture and type of addressing.
PGCSE202.2	Different networking protocol and its functions.
PGCSE202.3	Concepts of Mobile networking and its various supporting protocol
PGCSE202.4	Different Network Security techniques and protocols
PGCSE202.5	Concepts related to Hash & MAC.

### 3] ADVANCE DIGITAL IMAGE PROCESSING (THEORY) (PGCSE203T)

PGCSE203.1	Analyze general terminology of digital image processing.
PGCSE203.2	Examine various types of images, intensity transformations, spatial filtering and Develop Fourier transform for image processing in frequency domain.
PGCSE203.3	Understand the concept of colour image processing and wavelet transform application.

PGCSE203.4	Understand morphological operations and its application in region filling
	and boundary extraction.
PGCSE203.5	Understand the concept of feature detection (edge or boundary) and
	image segmentation.

## <u>4] ADVANCE MULTIMEDIA SYSTEM ELECTIVE-III (Discipline Specific) (Theory)</u> (PGCSE204/1T)

Upon successful completion of the course the student will be able

PGCSE204.1	Learn basic concepts of multimedia system design.
PGCSE204.2	Understand different file format and data standards.
PGCSE204.3	Learn concept of different telecommunication considerations used for multimedia.
PGCSE204.4	Learn concepts user interface and integrated document management.
PGCSE204.5	Understand how to use different distributed multimedia system.

## 5] RESEARCH METHODOLOGY FOUNDATION COURSE - I (THEORY) (PGFD205T)

Upon successful completion of the course the student will be able to

PGFD205.5	Develop independent thinking for critically analyzing research report.
	relevant ethical and philosophical considerations.
PGFD205.4	Get Knowledge on qualitative, quantitative and mixed methods of research
PGFD205.3	Assess the appropriateness of different kinds of research designs.
PGFD205.2	Formulate research problems (task) and develop a sufficiently coherent resea
PGFD205.1	Get Knowledge on various kinds of research questions and research designs.

### 6] ADVANCES IN ALGORITHM - LABORATORY -III(PRACTICAL) (PGCSE206P)

Upon successful completion of the course the student will be able to		
PGCSE206.1	Analyze time complexity of quick sort	
PGCSE206.2	Analyze time complexity of merge sort	
PGCSE206.3	Implement a program on LCS problem.	
PGCSE206.4	Implement knapsack problem	
PGCSE206.5	Implement activity selection problem	
PGCSE206.6	Implement a program on Depth First Search problem.	
PGCSE206.7	Implement a program on Breadth First Search problem.	

### 7] ADVANCE DIGITAL IMAGE PROCESSING - LABORATORY -IV (PRACTICAL) (PGCSE207P)

Upon successful completion of the course the student will be able

PGCSE207.1	Demonstrate use of various edge detection algorithms in image
	segmentation and extraction of ROI.
PGCSE207.2	Demonstrate use of morphological operations and image transforms in
	image segmentation.
PGCSE207.3	Analyze and apply data compression, coding techniques for efficient image
	processing.
PGCSE207.4	Demonstrate object recognition and classification for motion estimation.

### 1] ELECTIVE - IV SECURITY ANALYSIS OF SOFTWARE(OPEN) (THEORY) (PGOPEN301/1T)

PGOPEN301.1	Learn basic concepts of computer security form different type of threats and attacks.
PGOPEN301.2	Understand how to create different access control matrix and lists.
PGOPEN301.3	Learn different security policies and models.

PGOPEN301.4 Study different administrative policies and their goals.

## 2] PROJECT PLANNING AND MANAGEMENT - FOUNDATION COURSE - II (THEORY) (PGFD302T)

Upon successful completion of the course the student will be able to

PGFD302.1	Gain a systematic and comprehensive understanding of key concepts and
	skills essential to project management in international affairs.
PGFD302.2	Select and Identify project.
PGFD302.3	Understand how to plan the project.
PGFD302.4	Learn project quality management and value engineering.
PGFD302.5	Learn concept related to project execution and planning

### 3] PROJECT SEMINAR (PGCSE303P)

Upon successful completion of the course the student shall able to

PGCSE303.1	Demonstrate and deal with latest technology.
PGCSE303.2	Improve stage daring, oral and written communication skills.
PGCSE303.3	Deal with social and legal issues.
PGCSE303.4	Improve academics and to retain in associated field.
PGCSE303.5	Work in group for smooth conduction of assigned task.

### 1] PROJECT(PGCSE401P)

Upon successful completion of the course the student shall able to

PGCSE401.1	Solve problem and demonstrate the result of the project.
PGCSE401.2	Develop novel algorithm to solve the problem.
PGCSE401.3	Use modern technology that solves the problem of social needs.
PGCSE401.4	Analyze the problem by comparing with existing system.
PGCSE401.5	Demonstrate presentation, communication, team work skill.

### INFORMATION TECHNOLOGY ENGINEERING

#### Program Outcomes (PO's)

Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, and information technology, engineering fundamentals to the solution of complex engineering problems.
- Problem analysis: Identify, formulate, and analyze engineering problems reaching substantiated conclusions using appropriate techniques and tools of information Technology
- 3. Design/development of solutions : Design and develop processes, software

solutions for complex engineering problems that meet the specified needs with appropriate problem solving approach.

- 4. Conduct investigations of complex problems: Use research-based knowledge and research methods, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage: Select and use the appropriate Modern IT tools & Languages like Advanced Java, Scripting Languages, MATLAB, Java kit, NS-2, Weka, UNITY etc. for prediction and modeling the complex engineering activities.
- The engineer and society: Understand societal, enviornmental, legal, safety, cultural professional and ethical issues and the consequent responsibilities of IT profession.
- 7. Environment and sustainability: Develop sustainable IT solutions considering the societal and environmental contexts.
- 8. Ethics: Exhibit technical skills with professional ethics & responsibilities.
- Individual and teamwork: Work effectively as an individual, and as a member or leader in Technical activities or extra-curricular events in multidisciplinary environment.
- Communication: Communicate effectively the complex engineering problems / solutions / technical & research work/ projects / ideas in Seminar, symposium, conferences & Journals also design documentation and write effective reports.
- 11. Project management and finance: Understand the engineering and management principles to manage multidisciplinary projects with financial acumen.
- 12. Life-long learning: Engage in independent and lifelong learning to adapt the rapid technological changes in information technology and allied.

Program Specific Outcome (PSO's) Graduates of Information Technology shall demonstrate:

PSO1: Professional Skills: The ability to understand, analyze and develop computer programs/software application in the areas related to algorithms, system software, mobicomputing, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2: Problem-Solving Skills: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3: Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur.

### FIRST SEMESTER

### Course Name: BES101T (Applied Mathematics - I) Students shall be able to:

BES101.1T	apply Differential Calculus by using indeterminate forms, Taylor's and Maclaurin's Series.
BES101.2T	apply Partial Differentiation by the use of Euler's theorem, chain rule, Jacobian's and Lagrange's method of multipliers.
BES101.3T	Students shall be able to exhibit the inverse of a Matrix and Rank of a Matrix.
BES101.4T	construct the first order differential equations and can be solved.
BES101.5T	exhibit the Higher order differential equations with constant coefficients
	and
	its applications.
BES101.6T	exhibit the Complex numbers by using De Moivre's theorem and can
	Separate
	the real and imaginary parts

## Course Name: BES102T (Engineering Physics)

Students shall be able to:	
BES102.1T	learn the concept of Dual Nature of light and micro-particle with theoretical and experimental support. Also able to analyze the problem related to the topics
BES102.2T	understand Uncertainty Principle as well as application of Schrodinger's equation in one dimensional potential well. Also able to analyze the problem related to the topics
BES102.3T	learn properties of cubic crystal structures and Bragg law for X-ray diffraction. Also able to analyze the problem related to the topics
BES102.4T	understand formation of Bands in solids, properties of semiconductor devices, their testing and utility in small projects.

## Course Name: BES102 P (Engineering Physics)

### Students shall be able to:

BES102.1P	learn the band gap of semiconductor material and V-I characteristics of
	diodes and transistor by analysis from graph.
BES102.2P	understand the technique of measurement of refractive index of material
	of prism and wavelength of monochromatic light using Spectrometer.
BES102.3P	learn basic functions of CRO and its use for measurement of fundamental
	Physical quantities i.e. voltages and frequency.
BES102.4P	understand the identification of N-type and P-type specimens and
	calculation of charge carrier density using Hall effect set up.

Course Name: BES103T (Engineering Chemistry) Students shall be able to:

BES103.1T	Differences between hard & soft water, studies of various softening
	methods & its applications, also able to analyze boiler troubles.
BES103.2T	Electrochemical Fundamentals, corrosion prevention methods &
	environmental induced methods.
BES103.3T	Different types of cements & its manufacturing process. They also
	understand microscopic constituents of cement.
BES103.4T	Applications of SCF, concept of green chemistry & carbon credit.
	Different types, operating principles & mechanisms of batteries & fuel
	cells.

### Course Name: BES103P (Engineering Chemistry) Students shall be able to:

	Analyze the quality of water based on impurities in terms of hardness,
BES103.1P	alkalinity,
	free chlorine etc.
BES103.2P	To determine the metal contents present in ore such as copper, Nickel &
	Iron.
BES103.3P	Analyze Waste water in terms of pH, COD, DO
BES103. 4P	Analyze capacities of resins & heat of neutralization.

# Course Name: BES104T (Basic Electrical Engineering)

### Students shall be able to:

BES104.1T	Design and verify laws of DC Electric Circuits .
BES104.2T	Understand basic term and analyzed composite Magnetic Circuits.
BES104.3T	Understand basic fundamental of polyphase AC Circuits .
BES104.4T	Understand fundamental of single phase transformer and its testing.

## Course Name: BES104P (Basic Electrical Engineering)

### Students shall be able to

BES104.1P	verify laws of DC Electric Circuits .
BES104.2P	Understand and verify B H Curve of Magnetic Circuits.
BES104.3P	Measurement of R,L and C of AC Circuits .
BES104. 4P	Understand fundamental of single phase transformer testing.

## Course Name: BES105T (Basic Civil Engineering)

## Students shall be able to:

BES105 1T	Introduction to various field of Civil Engineering and the role of Engineer			
BE3105.11	in Infrastructural Development.			
BES105.2T	Introduction to various types of buildings ,its components & various			
	building materials used.			
BES105.3T	Introduction to surveying & modern survey methods.			
BES105.4T	Introduction to water supply & water management.			
BES105.5T	Introduction to various modes of transportation & classification of			
	highways.			
BES105.6T	Introduction to various instruments & tools used in civil engineering & role			
	of Engineers in sustainable development.			

#### Course Name: BES106T (Engineering Graphics – I) Students shall be able to

Students shall be able to			
BES106.1T	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, ty		

	lines, dimensioning methods.
	Use of scale and scale factor. How to draw the curves used engineering
	applications.
BES106.2T	The concept of orthographic projection, co-ordinate plane, first and third angle
	method of projection and their conventional representations.
	The concept of projections by projecting image of point placed in all possible
BE106.3T	positions with respect to reference planes, similarly. the projections of.lines
	placed in first quadrant
BES106.4T	The concept and applications of projection of planes and solids and can able to
	draw
BES106.5T	Conversion of pictorial view into multi view orthographic projection and can able
	to draw
<b>DEGLOC C</b>	The concept of Isometric projection and develop the imagination power to convert
BE2100.01	multi-view orthographic into three dimensional pictorial one view projection.

## Course Name: BES106.1P (Engineering Graphics – I)

## Students shall be able to

BES106.1P	Use of drawing instruments, lettering, sheet lay out, drawing sheet sizes, types of lines, dimensioning methods. Use of scale and scale factor. How to draw the curves used engineering applications.			
BES106.2P	The concept of orthographic projection, co-ordinate plane, first and third angle method of projection and their conventional representations.			
BES106.3P	The concept of projections by projecting image of point placed in all possible positions with respect to reference planes, similarly. the projections of lines placed in first quadrant			
BES106. 4P	The concept and applications of projection of planes and solids and can able to draw			
BES106. 5P	Conversion of pictorial view into multi view orthographic projection and can able to draw.			
BES106.6P	The concept of Isometric projection and develop the imagination power to convert multi-view orthographic into three dimensional pictorial one view projection.			

## Course Name: BES107P (Communication Skill)

## The Student shall be able to :

BES107.1P	acquire language skills required to write their business, Job
	Correspondence and technical writings.
	gain knowledge of grammar to face competitive examinations to pursue
BES107.2P	master
	degree.
BES107.3P	organize their thoughts in English and hence face job interviews more
	confidently.
BES107. 4P	acquire the skills of comprehension.

## Course Name: BES107P (Computational Skills)

## The Student shall be able to :

BES108.1P	Identify and understand the key componants of computer System.
BES108.2P	Understand the basic terminology used in C-langauge and Compile, Debu
	Program.
BES108.3P	Understand and Devolop the program based on Decision control and loop c
	structures.

### SECOND SEMESTER

Course Name: BES201T (Applied Mathematics - II) Students shall be able to :

BES201.1T	solve the Beta and Gamma Functions and Root Mean square Values in				
	Integral Calculus.				
BES201.2T	trace the curves and can find Areas and Volumes of curves.				
BES201.3T	solve Multiple Integrals and apply it to find mass, area and volume				
BES201.4T	exhibit Vector Algebra and Vector Differential calculus and also				
	Gradient, Divergence and Curl.				
BES201.5T	exhibit Vector Integral Calculus by Gauss Divergence Theorem, Stoke's and				
	Green's theorem.				
	solve fitting of a straight line, parabola, lines of regression in Statistics and				
BES201.6T	Langrange's interpolation formula for unequal intervals in Finit				
	Differences.				

## Course Name: BES202T (Advance Physics)

## Students shall be able to

BES202.1T	The student shall able to learn the concept of interference of light in thin		
	film, Basics of LASER, their types and various engineering applications.		
BES202.2T	The student shall able to understand the motion of charged particle in		
	Uniform electric and magnetic field and various devices. Also able to		
	analyze the problems related to the topic.		
	The student shall able to learn the phenomenon of total internal		
	reflection, construction of optical fiber and its applications in		
BE3202.31	communication and different sensors .Also able to analyze the problems		
	related to the topic.		
BES202.4T	The student shall able to learn the methods of synthesis of nanomaterials		
	and their		
	drastic change in properties and their impact on society and environment.		

## Course Name: BES202P (Advance Physics)

### Students shall be able to

	The student shall able to learn the different Lissajeous Figures and
BES202.1P	frequency
	measurement using CRO.
BES202.2P	The student shall understand measurement of conductivity of
	semiconductor material using four-probe setup.
	The student shall able to understand the diffraction pattern shown by He-
BES202.3P	Ne laser
	and measurement of wavelength of laser in simple way.
BES202.4P	The student shall able to understand the interference pattern in Newton's
	ring

### Course Name: BES203T (Material Chemistry) Students shall be able to

BES202 1T	Different properties &, types of fuel, able to analyze the fuel for various
DL3203.11	application, also studies alternative energy sources and their significance.
BES203.2T	Liquid fuel its chemical properties and applications. They also able to
	perform combustion calculations.
BES203.3T	Different types of lubricants, mechanisms, properties and applications.
	They also able to select lubricant for different engineering applications.
BES203.4T	Various types of polymers its property and applications. They also
	understand concept composites and nonmaterial & their engineering
	applications.

## Course Name: BES203P (Material Chemistry)

Students shall	be able to
BES203.1P	Analyze the fuel both qualitatively as well as quantitatively in terms of
	ash, volatile matter, calorific value.
BES203.2P	Determination of physical and chemical properties of lubricant such as
	viscosity, flash point, acid value etc.
BES203.3P	Know Preparation of biodiesel.
BES203. 4P	Determine saponification of Acetic Acid

### Course Name: BES204T (Engineering Mechanics)

Students	shall	he	able to	<b>`</b>
Judents	Shan	ne	able u	,

BES204.1T	study plane and space force system
BES204.2T	analyze the plane and space structure considering equilibrium of structure
BES204.3T	study different types of loads and its equilibrium
BES204.4T	study centroid and moment of inertia of plane lamina
BES204.5T	Apply knowledge of kinematic and kinetic analyses and energy and
	momentum methods

### Course Name: BES204P (Engineering Mechanics)

#### Students shall be able to

BES204.1P	Determine the components of a force in rectangular or nonrectangular
	coordinates and the resultant of a system of forces by graphically.
BES204.2P	Draw complete and correct free-body diagrams and write the appropriate
	equilibrium equations from the free-body diagram.
BES204.3P	To determine the support reactions on a structure.

## Course Name: BES205T (Advance Electrical Engineering)

### Students shall be able to

BES205.1T	Understand basic term and protection device of Electrical Power System.
BES205.2T	Understand fundamental of DC Machines
BES205.3T	Calculate the domestic electricity charges, illumination and design of wiring system
BES205.4T	Understand fundamental of different type induction motors

### Course Name: BES206P (Engineering Graphics – II) Students shall be able to

PES206 1D	The use Computer Aided Drafting packages, its applicationsand use of
DE3200.1P	commands used for drawing.

BES206.2P	Type of section planes, sectional multi view orthographic projection when
	solid in different position is cut by section plane obtain true shape of the
	section and can draw.
BES206.3P	Importance an d application of development of lateral surfaces, method
	of development and development of cut solids, and can draw.
BES206. 4P	How to identify edge obtain by intersection of surfaces, imagination and
	visualization o missing orthographic view and can draw.

## Course Name: BES207P (Work Shop) Students shall be able to

BES207.1P	Study of Different Workshop Tools and Equipments : Approach to use different tool and equipments of Fitting, Carpentry, Welding and Blacksmithy to complete the specified job with
	understanding of practical constraints.
BES207.2P	Teamwork: Work effectively in teams to accomplish the assigned responsibilities in an integral manner.
BES207.3P	Technical Communication: Communicate effectively about laboratory work both orally and in writing journals/technical reports.
BES207.4P	Ethics and safety awareness: Behave with highest ethical standards with concern to global, environmental, economic, social issues, safety requirement with lifelong learning and awareness of contemporary issues.

## Course Name: BES208P (Ethical Science)

Student shall able to :

BES208.1P	understand the Culture and Civilization, and acquire the knowledge of right to Information. Public Interest Litigation.
	, 6
	expand knowledge of industrial Psychology and Sociology (Fatigue,
BES208.2P	Selection and
	Training of workers)
BES208.3P	the professional ethics and importance of leadership in Industry.
BES208.4P	acquire the knowledge of Indian Constitution and Federal system and learn fundamental right of different positional
BES208.5P	understand the concept of Industrial Democracy and work organization.

## BEIT301T: Applied Mathematics-III

BEIT301T.1	Apply Laplace transforms to solve ordinary differential equations arising in engineering problems and able to evaluate inverse Laplace transforms of functions.
BEIT301T.2	Calculate the Fourier sine and cosine transforms.
BEIT301T.3	Compute Z- transform and inverse Z- transforms.
BEIT301T.4	Compute Eigen values and vectors and can solve 2 <sup>nd</sup> order Linear

	Differential Equation with Constant Coefficients by Matrix method.
BEIT301T.5	Apply the basic concepts and methods of probability theory
BEIT301T.6	Learn formal definition of the variance and standard deviation of discrete
	random variable.

BEIT302T : Programming Logic and Design using 'C'

Upon successful completion of the courses the student will be able

BEIT302T.1	Design and code well-structured C-programs, flowcharts.
BEIT302T.2	Analyze the problem and implement the solution on the basis of decision
	control structures and loop control structures.
BEIT302T.3	Write program using Function, 1-D, 2-D Array, apply Searching and sorting
	technique
BEIT302T.4	Understand the concept of structure, design the structure.
BEIT302T.5	Perform operations on Strings and File and use different graphics
	functions.
BEIT302T.6	Understand the concept of graphic, analyse the problem and apply
	graphics functions.

## BEIT303T : Ethics in Information Technology

Upon successful completion of the courses the student will be able

BEIT303T.1	Make reflective moral choices about the uses of computers, based on explicit ethical theories and models critically and reflectively argue about morally ambiguous issues in computing Recognize and act upon legal issues and constraints in computing and identify ethical issues related to Information technology.
BEIT303T.2	Understand critically assess legal dimensions of actions involving the use of computers and moral dimensions of actions involving the use of computers and its internet crime.
BEIT303T.3	Understand critically assess the impact of computer-related legislation and rules on systems, organizations, individuals, communities and societies.
BEIT303T.4	Understand and implement intellectual property, trade secrets, laws related to intellectual properly. Importance of software quality & process.
BEIT303T.5	Understand ethics in organization. & how to handle issue in organization by using ethical ways.
BEIT303T.6	Understand standard of leaving. Uses of electronic health care & impact of information technology on quality of life.

BEIT304T: Digital Electronics and Fundamentals of Microprocessor

BEIT304T.1	Demonstrate knowledge of binary number theory, Boolean algebra and
	binary codes, logic gates and their truth tables.
BEIT304T.2	Analyze and design combinational systems using standard gates and
	minimization methods (such as Karnaugh maps).

BEIT304T.3	Analyze and design combinational systems composed of standard combinational modules, such as multiplexers and decoders.
BEIT304T.4	Analyze and design flip-flops and convert one type f/f to another and sequential systems composed of standard sequential modules, such as counters and registers.
BEIT304T.5	Identify the basic elements and functions of microprocessors 8085 and operation of microprocessors 8085.
BEIT304T.6	Analyze instruction sets of 8085. Apply the programming techniques in designing simple assembly language programs for solving simple problems by using instruction sets of microprocessor.

BEIT304P : Digital Electronics and Fundamentals of Microprocessor

Upon successful completion of the courses the student will be able

BEIT304P.1	Understand and verify digital ICs and its use.
BEIT304P.2	Analyze, design and debug combinational and sequential circuits.
BEIT304P.3	Design and develop basic memory elements by using flip flops.
BEIT304P.4	Analyze, design and debug 8085 assembly language programs
BEIT304P.5	Document lab work in the form of lab report.

### BEIT305T : Data Communication

Upon successful completion of the courses the student will be able

BEIT305T.1	Understand the importance of data communications and the Internet in supporting business communications and daily activities.
BEIT305T.2	Understand the working of data communication in OSI reference model and TCP/IP model.
BEIT305T.3	Analyze data rate, performance, throughput & noise rate of data communication model and design of different modulators to converts data in analog to digital form and vice-versa.
BEIT305T.4	Design of waveforms to represent digital data in analog form & vice-versa. Understand different protocols in networking.
BEIT305T.5	Understand types of transmission media and connectors.
BEIT305T.6	Understand types of networks and networking devices.

## BEIT306T: Environmental Engineering

BEIT306T.1	Understand the scope, importance of environment in society, social engineering.
BEIT306T.2	Understand the relationship between scientific approaches and environmental issues and use or resources' for sustainable life style.
BEIT306T.3	Understand all types of eco system, problems and conservations.

BEIT306T.4	Understanding India value of biodiversity, and threats social ethical, moral and aesthetic and optional value of biodiversity.
BEIT306T.5	Understanding causes effects and control of pollution, solid, rain-water&, waste water management and disaster management and prevention.
BEIT306T.6	Understand the process of unsustainable to sustainable development, envoinmental ethical issues and possible solutions, rights of animal, wild life protection, environmental impact assessment.

### BEIT307P: Computer Lab 1

Upon successful completion of the courses the student will be able

BEIT307P.1	Understand and design the architecture of computer.
BEIT307P.2	Understand and execute the DOS commands.
BEIT307P.3	Understand and use different tools for windows.
BEIT307P.4	Understand the use of network accessories.
BEIT307P.5	Understand and execute booting process of operating system.

### BEIT401T : Discrete Mathematics and Graph Theory

Upon successful completion of the courses the student will be able

BEIT401T.1	Gain the experience in various techniques of Mathematical Induction.
BEIT401T.2	Specify basic mathematical concepts like sets, Relations and Functions
BEIT401T.3	Exhibit the elementary formal logic.
BEIT401T.4	Solve and model the problems by using graphs and trees.
BEIT401T.5	Formulate and interpret the statements presented in Boolean logic.
BEIT401T.6	Familiar to recurrence relations and combinatorial analysis.

## BEIT402T: Algorithms and Data Structures

BEIT402T.1	Understand the concept of data, data structure, algorithm and complexity of algorithm.
BEIT402T.2	Implement the stack and queue, evaluate the expression.
BEIT402T.3	Understand the concept of dynamic storage and able to implement the linked list.
BEIT402T.4	Understand the concept of non-linear data structure using tree.

BEIT402T.5	Understand concept of graph and be able to solve the problem of traversing the graphs and finding the shortest path.
BEIT402T.6	Understand the different searching and sorting technique and able to apply the searching and sorting technique on given problem.

## BEIT403T: Theory of Computation

Upon successful completion of the courses the student will be able

BEIT403T.1	Understand fundamentals of core concepts in automata theory and formal languages & Finite automata.
BEIT403T.2	Understand regular sets, regular expression, regular grammar, & convert into finite automata & vice-versa.
BEIT403T.3	Prove whether language is regular or not and Context free or not.
BEIT403T.4	Design & construct pushdown automata, Turing machines and grammars.
BEIT403T.5	Acquire a fundamental understanding of core concepts relating to the theory of computation and computational models including decidability and undesirability.
BEIT403T.6	Identify formal language classes and proves properties of language.

## BEIT404T : Computer Architecture and Organization

## Upon successful completion of the courses the student will be able

BEIT404T.1	Understand the Basic Structure of Computers Functional Units and Machine Instructions.
BEIT404T.2	Understand the different instruction types, develop and execute the assembly language programs.
BEIT404T.3	Understand the micro control system and Microprogramming, Macro Processor.
BEIT404T.4	Understand and design processing component e.g. adders, multiplier
BEIT404T.5	Understand and design memory system.
BEIT404T.6	Understand Computer Peripherals and Families of microprocessors Chips.

## BEIT405T : Object Oriented Methodology

BEIT405T.1	Understand the basic concept of Object Oriented Methodology and design
	object model of real word system.
BEIT405T.2	Apply dynamic modeling concepts on real word problem and design
	dynamic model and functional model of system.
BEIT405T.3	Analyze problem statement using various phases of object modeling and
	dynamic modeling.

BEIT405T.4	Implement system using subsystems and allocating tasks to subsystems.
BEIT405T.5	Design algorithms and associations for object design.
BEIT405T.6	Implement the concept of object orientation in programming language.

## BEIT405P : Object Oriented Methodology

Upon successful completion of the courses the student will be able

BEIT405P.1	Understand concepts of object orientation and analyze real world
	problems.
BEIT405P.2	Design and develop c++ program using object oriented concepts to solve
	complex real world problems
BEIT405P.3	Test extensibility and reusability of programs.
BEIT405P.4	Debug c++ programs
BEIT405P.5	Document lab work in the form of lab report.

## BEIT501T: System Programming

Upon successful completion of the courses the student will be able

BEIT501T.1	Understand the basics of system programs like editors, compiler,
	assembler, linker, loader, interpreter and debugger.
BEIT501T.2	Understand the basic foundation of assemblers and implement symbol,
	literal, base, pseudo-op, machine-op table.
BEIT501T.3	Understand various concepts of assemblers and implement macro
	processor object code.
BEIT501T.4	Develop and implement program from an object module created by
	assembler and compiler.
BEIT501T.5	Understand the design of Linker, Loader, and compiler and object file
	format.
BEIT501T.6	Understand the design issues of the device driver.

## BEIT502T: Design and Analysis of Algorithms

BEIT502T.1	Analyze complexity of algorithms using methods of recurrence relations and apply mathematical preliminaries to analyze and design stages of different types of algorithms
BEIT502T.2	Evaluate sorting network using comparison & biotonic sorter and choose data structures the best one for different types of problems and

	understand amortized analysis.
BEIT502T.3	Design and Evaluate techniques for developing efficient computer
	algorithms for sorting, job sequencing and minimum spanning tree.
BEIT502T.4	Evaluate Traveling salesman problem, matrix multiplication with minimal
	multiplication, OBST and shortest path using Bellman-Ford Algorithm,
	Floyd-Warshall Algorithm
BEIT502T.5	Investigate 4-Queen's problem, 8-Queen's problem, graph coloring,
	Hamiltonian cycles and understand Approximation algorithm.
BEIT502T.6	Apply algorithm design techniques to solve certain NP- hard and NP-
	complete problems.

## BEIT503T: Software Engineering

Upon successful completion of the courses the student will be able

BEIT503T.1	Understand formal methods, software quality measurement and analysis,
	requirements gathering, software system design.
BEIT503T.2	Understand and implement the process to be followed in the software
	development life cycle.
BEIT503T.3	Investigate, formulate and develop practical solutions to the Business
	Process Engineering, Product Engineering, System Modeling, and
	Requirements Engineering.
BEIT503T.4	Design and use appropriate technique of Engineering Concepts, Model,
	Pattern Based Software Design, Architectural Design, Mapping data flow
	into software architecture.
BEIT503T.5	Understand and validate testing process of software development.
BEIT503T.6	Understand and Identify Risk Management, RMMM Quality Management, ,
	Change Management, Reengineering and implement the solutions in
	software development process.

## BEIT503P: Software Engineering

BEIT503P.1	Understand an effective software engineering process, based on knowledge of widely used development lifecycle models.
BEIT503P.2	Indentify group working skills including general organization, planning and time management and inter-group negotiation. Capture, document and analyze requirements.
BEIT503P.3	Implement requirements specification into an implementable design, following a structured and organized process.
BEIT503P.4	Understand effective use of UML, along with design strategies such as defining a software architecture, separation of concerns and design patterns.
BEIT503P.5	Formulate a testing strategy for a software system, employing techniques such as unit testing, test driven development and functional testing.
BEIT503P.6	Evaluate the quality of the requirements, analysis and design work done during the module.

Upon successful completion of the courses the student will be able

BEIT504T.1	Understand basic concept of computer graphics, Generation of line, circle and ellipse algorithms and develop program functions to implement line, circle algorithms.
BEIT504T.2	Understand and develop algorithms for polygon filling, 2D transformation.
BEIT504T.3	Exhibit Segment tables, Windowing and clipping algorithm.
BEIT504T.4	Create computer models of 3D objects using mathematical knowledge and skills and demonstrate geometrical transformations, hidden surfaces removal algorithm.
BEIT504T.4	Understand the Curves and surfaces methods of interpolation and surface rendering methods.
BEIT504T.5	Understand concept of Color Models and design of Animation.

## BEIT505T: Java Programming

Upon successful completion of the courses the student will be able

BEIT505T.1	Understand fundamentals of programming such as variables, conditionals, and iterative execution, methods, etc.
BEIT505T.2	Understand fundamentals of object oriented programming in java including defining classes, invoking methods, using class libraries, etc.
BEIT505T.3	Be aware of the important topics and principles of software development.
BEIT505T.4	Have the ability to write computer programs to solve specified problems.
BEIT505T.5	Use the java SDK environment to create, debug and run simple java programs.
BEIT505T.6	Understand fundamentals of programming such as variables, conditionals, and iterative execution, methods, etc.

### BEIT505P: Java Programming

Upon successful completion of the courses the student will be able

BEIT505P.1	Understand and familiar with the features of the Java language;
BEIT505P.2	Analyze specified problem, Design & write a Java program
BEIT505P.3	Understand, evaluate, debug and test Java programs;
BEIT505P.4	Understand and use Java libraries;
BEIT505P.5	Documentation and reuse library code.

BEIT506T : Industrial Economics and Entrepreneurship Development

BEIT506T.1	Understand analytical skills to solve industrial economics problem
BEIT506T.2	Identify the basic determinants of market structure and analyses the key
	issues in business integration.
BEIT506T.3	Understand the role of central bank as well as commercial banks in
	industrial growth also implement the concept of capital formation in
	business environment.
BEIT506T.4	Acquire a fundamental understanding of entrepreneurship development
	and project formulation by using various techniques.
BEIT506T.5	Identify and solve the need of Finance and working capital in industry.
BEIT506T.6	Understand the concept of Sickness in small scale industry, and identify
	Government Policy and incentives for Small Scale industry.

## BEIT601T: Computer Networks

Upon successful completion of the courses the student will be able

BEIT601T.1	Understand basic computer network technology & evaluation the performance of network and design the network of IEEE802.11.
BEIT601T.2	Understand design issues of data link layer and protocols and evaluate errors in data communication.
BEIT601T.3	Evaluate addresses of networking devices and design network layer protocols.
BEIT601T.4	Design of different transport & application layer protocols.
BEIT601T.5	Understand working & design of BOOTP, DHCP, DNS, FTP and TFTP.
BEIT601T.6	Understand Mobile IP, phases of mobile IP and protocols of Internet security.

## BEIT602T: Operating Systems

BEIT602T.1	Understand fundamentals of Operating system
BEIT602T.2	Understand the structure and organization of the file system.
BEIT602T.3	Analyze the concepts of process management, process synchronization and scheduling and solves problems related to it.
BEIT602T.4	Analyze different approaches to memory management and solves problems related to it.
BEIT602T.5	Analyze the concepts of process management, process synchronization and scheduling and solves problems related to it.
BEIT602T.6	Learn different approaches of handling the deadlock and formulate solutions to avoid deadlock.

Upon successful completion of the courses the student will be able

BEIT603T.1	Understand fundamentals of database management system & introduction of Formal relational query language.
BEIT603T.2	Understand different file organization, indexing, Hashing & construct B+ tree.
BEIT603T.3	Construct ER diagram for any system & understand concept of functional dependency
BEIT603T.4	Develop an ability to remove data redundancy by translating created relational model into normalized form.
BEIT603T.5	Understand query processing and optimization techniques.
BEIT603T.6	Understand the concept of transaction & Concurrency Control.

## BEIT604T: Internet Programming

Upon successful completion of the courses the student will be able

BEIT604T.1	Understand history of the internet and related internet concepts that are vital in understanding web development. Also demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.
BEIT604T.2	Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
BEIT604T.3	Create a multi-file project using XML, DTD, CSS, and XSL, file types and develop well-formed and valid XML documents for publishing on the Web.
BEIT604T.4	Understand & exhibit a server-side scripting language, sessions, security, and considerations related to implementing efficient and maintainable server-side applications. Also develop the ability to securely incorporate databases into real-world web applications.
BEIT604T.5	Design and implement server side programs using Servlets and JSP
BEIT604T.6	Understand context regarding the history of Android and its creation, as well as teach you how to build actual Android software, with the aim of getting devs to the point where they can think in terms of Android programming

## BEIT604P: Internet Programming

BEIT604P.1	Demonstrate the important HTML tags for designing static pages.
BEIT604P.2	Design of all type of Cascading Style sheet.
BEIT604P.3	Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
BEIT604P.4	Create a multi-file project using XML, CSS file types and develop well-formed and valid XML documents for publishing on the Web.
BEIT604P.5	Exhibit a server-side scripting language, sessions, security, and considerations related to implementing efficient and maintainable server-side applications.

BEIT604P.6	Understand context regarding the history of Android and its creation, as
	well as teach you how to build actual Android software, with the aim of
	getting devs to the point where they can think in terms of Android
	programming

## BEIT605T: Functional English

Upon successful completion of the courses the student will be able

BEIT605T.1	Have enough knowledge to face competitive examination to pursue master degree.
BEIT605T.2	Organize their thoughts in English and hence face job interviews more confidently.
BEIT605T.3	Produce a set of documents related to technology and writing in the workplace and shall have improved their ability to write clearly and accurately.
BEIT605T.4	Acquire the skill of comprehension.
BEIT605T.5	Acquire language skills required to write their Reviews, Projects, and Reports.
BEIT605T.6	Understand how to critically analyze data from research, incorporate it into assigned writing clearly, concisely, and logically and attribute the source with proper citation.

## BEIT606P: Mini project and Industrial Visit

Upon successful completion of the courses the student will be able

BEIT606P.1	Acquire practical knowledge within the chosen area of technology for project development.
BEIT606P.2	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach.
BEIT606P.3	Contribute as an individual or in a team in development of technical projects.
BEIT606P.4	Develop effective communication skills for presentation of project related activities.
BEIT606P.5	Write a technical report with research writing tools summarizing state-of- the-art on an identified topic.
BEIT606P.6	Explore the knowledge to publish research paper, presentation in reputed national and international journals / conferences.

## BEIT701T: Data Warehousing and Mining

BEIT701T.1	Understand	basic	principles,	concepts	and	applications	of	Data
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	Warehousing.
BEIT701T.2	Understand need of preprocessing & preprocess the data for mining
	applications
BEIT701T.3	Use different OLAP models & understand need of multidimensional
	analysis and various data warehousing schemas.
BEIT701T.4	Exhibit good knowledge of the fundamental concepts that provide the
	foundation of data mining and to adapt new data mining tool.
BEIT701T.5	Mine frequent patterns & generate association rules using Apriori
	algorithm
BEIT701T.6	Understand Business Intelligence, Big Data & Hadoop Technology.

## BEIT702T: Computer System Security

Upon successful completion of the courses the student will be able

BEIT702T.1	Understand mathematical foundation of cryptography and apply encryption and decryption algorithms according to the required security level
BEIT702T.2	Analyze and formulate existing authentication protocols for two party communications
BEIT702T.3	Design and develop secure authentication systems by use of message authentication techniques.
BEIT702T.4	Apply the crypto systems so far learned to building of information and network security mechanisms.
BEIT702T.5	Identify and formulate security requirements of different application of application layer.
BEIT702T.6	Understand ethical issues related to the misuse of computer security and use the SSL or firewall based solution against security threats.

### BEIT703T: Artificial Intelligence

Upon successful completion of the courses the student will be able

BEIT703T.1	Understand the current useful real-world applications of AI and apply					
	knowledge representation, reasoning techniques to real-world problems.					
BEIT703T.2	Implement state-space search algorithms for a variety of problems.					
BEIT703T.3	Analyze new information from provided knowledge and design simple					
	knowledge-based systems.					
BEIT703T.4	Exhibite working knowledge of reasoning in the presence of incomplete					
	and/or Uncertain information					
BEIT703T.5	Design the expert system and apply AI techniques to the problem of					
	acquisition and representation of expert knowledge for problem solving in					
	the expert's domain.					
BEIT703T.6	Solve problems with uncertainty using probabilistic techniques and					
	statistical reasoning:					

## BEIT704T2: Multimedia Systems

BEIT704T2.1 Un	derstand architecture and evolving technologies in multimedia systems.
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BEIT704T2.2	Understand basic techniques and software tools for making multimedia.
BEIT704T2.3	Design and develop Text, Audio, Image, sound and Video to store digitally in a computer system.
BEIT704T2.4	Understand the technique of lossy and lossless data compression using different compression standards.
BEIT704T2.5	Understand different file formats and work effectively as an individual and as a team member to design multimedia application.
BEIT704T2.6	Design and develop multimedia for web making it ready for delivery.

## BEIT705T3: Digital Signal Processing

Upon successful completion of the courses the student will be able

BEIT705T3.1	Understand discrete-time signals, analyze and process the signal to meet the requirement of theoretical and practical aspect of DSP with regards to sampling and reconstruction.
BEIT705T3.2	Understand Z-transform for the analysis of the digital signals and systems.
BEIT705T3.3	Understand and analyze the digital signals using Discrete Fouries transform(DFT)
BEIT705T3.4	Design and implement IIR filter for analysis of frequency response.
BEIT705T3.5	Design and implement FIR filter for analysis of frequency response.
BEIT705T3.6	Understand, analyze and design the digital signals using Fast Fouries transform(FFT)

## BEIT706P : Seminar on Project

Upon successful completion of the courses the student will be able

BEIT706P.1	Demonstrate and deal with latest technology.
BEIT706P.2	Improve stage daring, oral and written communication skills.
BEIT706P.3	Deal with social and legal issues.
BEIT706P.4	Improve academics and to retain in associated field
BEIT706P.5	Work in group for smooth conduction of assigned task.
BEIT706P.6	literature survey ,write and present technical papers in symposium / Conferences.

## BEIT801T : Distributed Systems

BEIT801T.1	Understand the concepts that underlie distributed computing systems
	along with design and implementation issues.
BEIT801T.2	Evaluate the scheduling requirements of different types of processes and

	find their solutions.
BEIT801T.3	Analyze synchronization problems in uni-processor and multiprocessor systems.
BEIT801T.4	Understand system architecture and operating design parameters that significantly impact algorithm performance.
BEIT801T.5	Analyze design issues & design a distributed shared memory system.
BEIT801T.6	Implement various file handling methods.

## BEIT802T : Gaming Architecture and Programming

Upon successful completion of the courses the student will be able

BEIT802T.1	Understand knowledge about Game design, Process, Specification,
	importance of architectural design, the rules for designing architecture,
	partitioning of problems, creation of interfaces, development and delivery
	approaches.
BEIT802T.2	Design and implement the acquire knowledge for game industry, using
	state-of-art technologies and research to have an expert understanding of
	the game vision, also about reusability of software and patterns such as
	middleware, which provides support in game content construction, also
	architectural styles and tier system allowing incremental development.
BEIT802T.3	Use appropriate innovative teaching methodology for importance of
	coding standard and conventions to ensure quality, the seven important
	principle and five important aspects in game development which help
	render the game world to display technologies and platform available.
BEIT802T.4	Understand various design practices used is game development and learn
	game building process in detail and design first game project.
BEIT802T.5	Analyze programming using Microsoft's DirectX technology and design first
	pong game also learns 3D project, 3D graphics and game engines.
BEIT802T.6	Exhibit knowledge how game resources are cached and loaded into
	memory, so as to give player a more seamless, non-stuttering experience

## BEIT802P : Gaming Architecture and Programming

BEIT802P.1	Understand UNITY environment and its fundamentals.
BEIT802P.2	Understand and execute UNITY function and Commands.
BEIT802P.3	Understand the virtual reality concept and structure development of UNITY tool.
BEIT802P.4	Understand, analyze, and develop the different games in 2D and 3D mode.

Upon successful completion of the courses the student will be able

BEIT803T4.1	Understand the useful real-world applications of machine learning.
BEIT803T4.2	Identify the challenges and formulate strength and limitations of available techniques in machine learning.
BEIT803T4.3	Investigate and Implement appropriate machine learning algorithms for a variety of problems.
BEIT803T4.4	Understand and implement learning algorithms for supervised, unsupervised and semi- supervised tasks.
BEIT803T4.5	Exhibit the support vector machine in mathematical detail.

## BEIT804T3 : E-Commerce and Enterprise Resource Planning

Upon successful completion of the courses the student will be able

BEIT804T3.1	Understand and analyze the principles of E-commerce and basics of World Wide Web.
BEIT804T3.2	Design and develop the concept of electronic data interchange and its legal, social and technical aspects.
BEIT804T3.3	Understand concept of E-banking, safety electronic payment system.
BEIT804T3.4	Acquire the fundamental knowledge of ERP package and used appropriate supporting techniques.
BEIT804T3.5	Understand and implement ERP Life-cycle, Methodology, Project Management and Monitoring.

### BEIT805P: Project

BEIT805P.1	Gather, organize, summarize and interpret technical literature with the
	purpose of formulating a project proposal.
BEIT805P.2	Design and construct a hardware and software system, component, or
	process to meet desired needs.
BEIT805P.3	Define intended future work based on the technical review to work on
	multidisciplinary Problems.
BEIT805P.4	Work as professionals, with portfolio ranging from data management,
	network configuration, designing hardware, database and software design
	systems.
BEIT805P.5	Write a technical report with research writing tools summarizing state-of-
	the-art on an identified topic.

#### **Program Outcome For MBA**

**Management Skills:** An ability to apply Conceptual knowledge of varied areas of management which includes marketing, finance, Human resource & production in organisation

**Identification of problems in organization:** An ability to identify problems, loopholes or lacunae prevailing in the organization due to distinguish factors.

**Solving Complex problems:** An ability to design solutions for broadly- defined managerial practices to meet specified needs with appropriate consideration for public institutional and safety, cultural, societal, and environmental considerations.

**Investigation:** An ability to conduct investigations of broadly-defined managerial practices; to provide valid conclusions.

**Use of Technology to solve complexities:** An ability to select and apply appropriate techniques, resources, and modern managerial practices to understand the limitations.

**Social Awareness:** An ability to demonstrate understanding of the societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to management practices.

**Corporate Social Responsibility:** An ability to understand the impact of business management solutions in societal and environmental context, and demonstrate knowledge of, and need for sustainable development.

**Values:** An ability to understand and commit to professional ethics, responsibilities and norms of business management practices and code of conduct.

**Working as a team:** An ability to function effectively as an individual, and as a member or leader in diverse management teams.

- . **Communication skills:** An ability to communicate effectively on broadly-defined management practices with the management community and with society at large, by being able to comprehend and write effective managerial reports, make effective presentations, and give and receive clear instructions.
- . **Project Management and Finance:** An ability to demonstrate knowledge and understanding of management principles and apply the same to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments
- . Life-long learning: An ability to recognize the need for, and to engage in life-long learning in management and allied domain with rapidly changing technology.

#### **Program Specific Outcome**

- 1. Graduating students shall have an ability to perform as management professionals, as they are equipped with skills and competences necessary to manage people, enterprises & business.
- 2. Graduates shall possess lifelong learning skills needed for data management, business analysis & diagnostic problem-solving and demonstrate ability to manage change in national and international business environment.
- 3. Able to perform critical functions of business viz. Marketing, Finance, Human Resources and Systems needed for successful career in Industry, Research, Entrepreneurship and Consulting.
- 4. Students were equipped with innovative ideas to solve the complex problems faced by society by building new processes or through establishing enterprises.

Course Outcome

Semester - I

MBCI1: Principles of Management

Graduates shall be able to

CO	Statement
MBCI1.1	Understand the development of Management Thought, its history, and
	Functions of Management.
MBCI1.2	Have Exposure to the practice of management in areas of planning &
	Decision Making
MBCI1.3	Understand staffing process and role of authority and responsibility
MBCI1.4	Understand global perspective of management

MBCI-2 : Managerial Economics

### Graduates shall be able to

СО	Statement
MBCI-2.1	Understanding of the basic theoretical framework of microeconomics like demand analysis, demand forecasting and supply analysis.

MBCI-2.2	Getting acquainted with production function and cost concept.
MBCI-2.3	Understanding of various market structure and pricing policies.
MBCI-2.4	Understanding the national income concept, knowledge of the business cycle concept, knowledge of monetary and fiscal policy, understanding the types, couses, effects and remedial measures of inflation and deflation.

# MBCI-3 : Accounting for managers

## Graduates shall be able to

СО	Statement
MBCI-3.1	Understanding of the Basic Concepts of Accounting, getting acquainted with recording of transaction in the books of account and understanding of Cash Book and Importance of Bank Reconciliation Statement.
MBCI-3.2	Getting acquainted with the Schedule III format of Final Account and preparation of Final Accounts.
MBCI-3.3	Getting acquainted with Cash Flow Statement as per Accounting Standard 3 and Understanding the implications of various profitability, liquidity and activity ratios.
MBCI-3.4	Understanding the concept of budgetary control, its application in business and preparation of various types of budgets.

## MBCI4: Business Legislations

## Graduates shall be able to

CO	Statement
MBCI4.1	Understand the essentials of valid contract and agreements.
MBCI4.2	Understand company act
MBCI4.3	Understand consumer protection act ,1986
MBCI4.4	To learn objects and code of IT act

## MBCI5: Business Communication & Information System

## Graduates shall be able to
CO	Statement
MBCI5.1	Understand the basics of Business Communication, channel of Communication.
MBCI5.2	Have Knowledge about the various types of business letter
MBCI5.3	Understand concept about data & information system and various management support system.
MBCI5.4	To learn emerging technologies & trends

## MBCI6: Research Methodology & Quantitative Techniques

## Graduates shall be able to

СО	Statement
MBCI6.1	Recognize the theory of statistical significance and types of errors.
MBCI6.2	Aware about Measures of dispersion, Business Forecasting its types and
	techniques.
MBCI6.3	Think basic of research and understanding its designing process.
MBCI6.4	Understand to choose sample size and its technique.

#### Semester - II

MBCII1: Human Resource Management & Organizational Behavior

Graduates shall be able to

CO	Statement
MBCII1.1	Understand importance of human resource and its management.
MBCII1.2	Analyse importance of recruitment and selection process of employees.
MBCII1.3	Understand Organization behaviour with foundation of Individual and
	Group Behaviour.
MBCII1.4	Study different types of motivational Theories and its impact on
	organization growth

#### MBCII2: Financial Management

СО	Statement
MBCII2.1	Understand business finance and sources of financing.
MBCII2.2	Understand capital structure and cost of capital.
MBCII2.3	Understand concept of capital budgeting i.e. time value of money,
	compounding & Discounting.
MBCII2.4	Study working capital management & estimate working capital
	requirement.

## MBCII3: Marketing Management

#### Graduates shall be able to

CO	Statement
MBCII3.1	Understand basic concept of marketing and knowledge about buying behavior.
MBCII3.2	Understand knowledge about product management, packaging and pricing decision
MBCII3.3	Understand the process of physical distribution channel and understanding promotion decision.
MBCII3.4	To learn marketing research and understanding various types of marketing.

#### MBCII4: Operation Management

#### Graduates shall be able to

CO	Statement
MBCII4.1	Understand Scope & Functions of operations Management.
MBCII4.2	Analyze plant location & Different types of production process.
MBCII4.3	Understand of role of material management & Inventory management.
MBCII4.4	Understand Quality Concepts & Quality system

## MBCII-5: Cost Accounting Graduates shall be able to

СО	Statement
MBCIL-5 1	Awareness about basic concepts of cost accounting, methods, techniques
IVIDCII-3.1	of costing and ability to prepare cost sheet and tender.
MBCII-5.2	Understanding the application of managerial costing and break even in
	various business problems.
MBCII-5.3	Understanding standard costing and variance analysis.
MBCII-5.4	Understanding contract costing and operating costing.

#### MBCII6: Economic Environment of Business

CO	Statement
MBCII6.1	Understand factors affecting internal & External Environment
MBCII6.2	Understand concept of GDP & overview of union budget.
MBCII6.3	Understand factors affecting international business.
MBCII6.4	Analyze role of technological innovation on environment

Semester – III

#### MBCIII1: Strategic Management

#### Graduates shall be able to

CO	Statement
MBCIII1.1	Understand strategic management process and vision, mission & goal and gain knowledge about various models for internal analysis.
MBCIII1.2	Gain knowledge of various modal for external analysis and various matrix portfolio analyses.
MBCIII1.3	Understand about strategic formulation and corporate level strategy.
MBCIII1.4	Understand business level strategy & functional level strategy also understanding global strategy.

#### Semester - IV

## MBCIV1: Business Ethics & Corporate Governance

#### Graduates shall be able to

CO	Statement
MBCIV1.1	Understand various theories related to business ethics
MBCIV1.2	Understand code of ethics & role of corporate social responsibility
MBCIV1.3	Gain knowledge about globalization & business ethics
MBCIV1.4	Understand ethics in various functional areas of management

## MBCIV2: Entrepreneurship Development

#### Graduates shall be able to

СО	Statement
MBCIV2.1	Study Concept of successful entrepreneurs, and various Barriers to entrepreneurship.
MBCIV2.2	Understand steps in setting up a small business enterprise.
MBCIV2.3	study different Entrepreneurial Support system, government and non- government
MBCIV2.4	Understand project appraisal process

#### Foundation Courses

## MBFIII1: Environment Management

CO	Statement
MBFIII1.1	Have Knowledge about Environment and its importance, Need for public awareness, benefits of natural resources – Renewable and non renewable.
MBFIII1.2	Be Aware about Concept of an Ecosystem, Structure & its functions,

	ecosystem degradation and its effect on environment.
MBFIII1.3	Be Conscious about pollution, its effects and preventative measure.
MBFIII1.4	Understand Human Population issues and possible solutions.

#### MBFIII1: Project Management

Graduates shall be able to

СО	Statement
MBFIII1.1	Understand concept of project management and project life cycle
MBFIII1.2	Be Aware about raw material procurement and risk mangement .
MBFIII1.3	Understand various network techniques.
MBFIII1.4	Understand how to manage and work in teams

#### MBFIV2: International Business Management

Graduates shall be able to

CO	Statement
MBFIV2.1	Understand International trade and trading blocks.
MBFIV2.2	Understand FDI & EXIM policy.
MBFIV2.3	Understand exchange rate management and role of RBI in it.
MBFIV2.4	recognize factors affecting Environment

#### MBFIV2: Agri Business Management

Graduates shall be able to

CO	Statement
MBFIV2.1	Understand concept of agricultural input.
MBFIV2.2	Understand livestock management.
MBFIV2.3	Understand concept of floriculture, biotech & Food management.
MBFIV2.4	Gain knowledge of role of rural marketing in agriculture

#### Marketing Mangement

#### MBEIII11: Sales & Distribution Management

Graduates shall be able to

СО	Statement
MBEIII11.1	Understand sales management, sales forecasting and sales planning and
	control.
MBEIII11.2	Understand sales organization, recruitment, selection, training and
	design sales territory and sales quota.
MBEIII11.3	Understand physical distribution channel and functional of distribution
	channel
MBEIII11.4	Understand Supply chain management and logistics

#### MBEIII12: Integrated Marketing Communication & Brand Management Graduates shall be able to

СО	Statement
MBEIII12.1	Understand Functional Areas of marketing communication & Consumer
	response .

MBEIII12.2	Understand Media planning And media classification.
MBEIII12.3	Describe and identify all the components of "Brand equity" and
	understand strategic brand management process.
MBEIII12.4	Design branding strategy & to choose brand elements.

#### Human Resource Management

MBEIII11: Training & Development Practices

Graduates shall be able to

СО	Statement
MBEIII11.1	Understand training need analysis.
MBEIII11.2	Understand on the job & off the job training.
MBEIII11.3	Understand different modules of Evaluating training program.
MBEIII11.4	Understand types of management development training .

## MBEIII12: Performance & Compensation Management

Graduates shall be able to

СО	Statement
MBEIII12.1	evaluate performance of employees with the help of appraisal.
MBEIII12.2	Identify different methods for performance appraisal of employees.
MBEIII12.3	Study legal procedure for compensation of employees.
MBEIII12.4	Understand employees and their career mapping

#### MBEIV13: Industrial Relation and Labour Laws

Graduates shall be able to

СО	Statement
MBEIV13.1	understand concept of Industrial Relations & Labour Laws.
MBEIV13.2	understand Industrial Conflicts/ Disputes its Causes & Impact and legal
	Perspective for it.
MBEIV13.3	Analyse right of employees for payment and wages.
MBEIV13.4	understand social security of employees by providing them
	compensation, Provident Fund, Gratuity, Maternity benefit etc.

#### Financial Management

# MBEIII-12: SECURITIES, PROTFOLIO AND RISK MANAGEMENT Graduates shall be able to

СО	Statement
MBCI-12.1	Understand the various alternatives available for investment, learn to measure and find out the relationship between risk and return and value the equities and bonds.
MBCI-12.2	Understanding the tools and techniques of fundamental and technical analysis.
MBCI-12.3	Understanding the concept of portfolio management, risk and return involved and understanding the construction and composition of a stock index.

	Knowledge about the mechanism of the futures and options market, the
MBCI-12.4	various types of futures and options, strategies and purpose of these
	contracts.

## MBEIII-11 : CORPORATE FINANCIAL MANAGEMENT

Graduates shall be able to

СО	Statement
MBCI-11.1	Understand the concept of capital budgeting.
MBCI-11.2	Understanding about the concept of leasing, various types and
	mechanism of leasing.
MBCI-11.3	Knowledge about the various methods of valuation of business and to
	understand the concept of dividend policies and valuation models.
MBCI-11.4	Understanding the basic concepts of mergers and acquisitions, reasons of
	M & A and its failure.

## MBEIV13: Investment Environment & Wealth Management

со	Statement
MBEIV13.1	Understand role of various organization (SEBI,RBI,IRDA,& PFRDA,CCIL,NSDL,CSDL)
MBEIV13.2	Understand concept & principles of insurance, traditional plans ,unit linked plans & tax treatment
MBEIV13.3	Understand various terminologies relate to mutual fund
MBEIV13.4	Understand investment life cycle, investment options & aspects of Wealth management