B. TECH – CIVILENGINEERING

Department Vision

To Lead Academics and Research in Civil Engineering Globally.

Department Mission

- To provide high quality education and make the students as ethical, world class professionals.

- To improve the skills of both staff and students with opportunities to innovate and explore knowledge through research projects and consultancy.

- To inculcate the feeling of present needs in students and evoke in them a responsibility to serve the society better.

Program Educational Objectives (PEOs):

PEO1	Graduate will be able to succeed in diversified fields of industry/higher studies by acquiring technical knowledge and contribute to the sustainable development of infrastructure.
PEO2	Graduate will be able to exhibit professionalism and ethics and show ability to accept modern trends by engaging in lifelong learning.
PEO3	Graduate will be able to apply innovative ideas and succeed as a researcher/entrepreneur to serve societal needs.

Program Specific Outcomes (PSO's):

PSO1:	Develop critical aptitude skills and become professional to address any problem of the society.
PSO2:	Acquire practical knowledge by field visits and function effectively with the training of software by means of curriculum.
PSO3:	Effectively communicate with the stakeholders and execute engineering projects with high proficiency.

Program Outcomes(POs):

Engineering Graduates will be able to:

1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problemanalysis:**Identify,formulate,reviewresearchliterature,andanalyzecomplex engineering problems reaching substantiated conclusions using first principlesofmathematics,naturalsciences,andengineeringsciences.
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 knowledgeandresearchmethodsincludingdesignofexperiments,analysisand 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 sustain able 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 understandingoftheengineeringandmanagementprinciplesandapplythese to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary 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.

Course outcomes (Cos) of all courses of all programs offered by the institution

Course Outcomes for First Year First Semester Course

Course Code: B17 BS 1101	
Course Title: ENGLISH – I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.
Course Code: B17 BS 1102	
Course Title: MATHEMATICS – I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also, will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also, will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
CO-3	Determine Laplace transform and inverse Laplace transform of various functions.
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jacobian and maxima/minima of functions of two variables.
CO-6	Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non-homogeneous PDEs.
Course Code:B17 BS 1105	
Course Title:ENGINEERING CHEMISTRY	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly, students understand liquid crystals and semiconductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.
Course Code:B17 ME 1101	
Course Title:ENGINEERING MECHANICS	
CO-1	Determine the resultant of the given force systems.
CO-2	Analyze force systems using equations of equilibrium.
CO-3	Determine centroid, centre of gravity and moment of inertia of areas and bodies.
CO-4	Analyze trusses and simple beams.
CO-5	Distinguish between kinematics and kinetics.
CO-6	Apply the work energy and impulse momentum methods of various engineering problems.
Course Code:B17 ME 1102	
Course Title:ENGINEERING DRAWING	
CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

Course Code:B17 CE 1101	
Course Title:ENVIRONMENTAL STUDIES	
CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc toinculcate the students about environmental awareness and safe transfer of our mother earth andits natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents
CO-5	Constitutional provisions for the protection of natural resources
Course Code: B17 BS 1107	
Course Title:ENGINEERING CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipment's.
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.
Course Code: B17 BS 1108	
Course Title:ENGLISH COMMUNICATION SKILS LAB- I	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts.
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.
Course Code: B17 BS 1109	
Course Title:ENGINEERING WORKSHOP & IT WORKSHOP	
	PART-A (ENGINEERING WORKSHOP)
CO-1	Use various tools to prepare basic carpentry and fitting joints.
CO-2	Prepare jobs of various shapes using black smithy.
CO-3	Make basic house wire connections.
CO-4	Fabricate simple components using tin smithy.
	PART-B (IT WORKSHOP)
CO-1	Understand the basic components and peripherals of a computer.
CO-2	To become familiar in configuring a system.
CO-3	Learn the usage of productivity tools.
CO-4	Acquire knowledge about the netiquette and cyber hygiene.
CO-5	Get hands on experience in trouble shooting a system
Course Code: B17 BS 1111	
Course Title: INNER ENGINEERING	
CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities

CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

Course Outcomes for First Year Second Semester Course

Course Code: B17 BS 1201

Course Title: ENGLISH – II

CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
CO-3	To express fluently and accurately in social discourse.
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.

Course Code: B17 BS 1202

Course Title: MATHEMATICS – II

CO-1	Find a real root of algebraic and transcendental equations using different methods
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpson's rules.
CO-4	Solve a first order ordinary differential equation by Euler and RK methods.
CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

Course Code: B17 BS 1203

Course Title:MATHEMATICS – III

CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix Reduce a Quadratic form to its canonical form and classify.
CO-3	Evaluate double integrals over a region and triple integral over a volume.
CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green's, Stokes' and Gauss divergence theorems.

Course Code: B17 BS 1204

Course Title:ENGINEERING PHYSICS

CO-1	Learn the basic concepts of interference and diffraction of light and its applications.
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications.
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultrasonics as a tool for technological applications.
CO-4	Learn the behavior of particles at the very microscopic level by using wave nature of particles and understand the behavior of materials and be able to classify them using the band theory of solids.
CO-5	Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

Course Code:B17 CS 1201

Course Title:COMPUTER PROGRAMMING USING C

CO-1	Understand the basic terminology used in computer programming.
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program.
CO-4	Design programs involving decision structures, loops and functions.
CO-5	Explain the difference between call by value and call by reference.
CO-6	Understand the dynamics of memory by the use of pointers.
CO-7	Use different data structures and create/update basic data files.

Course Code:B17 CE 1201

Course Title:BUILDING MATERIALS AND CONSTRUCTION

CO-1	Define and classify various stones, clay products used in construction sector.
CO-2	Find various types of wood their conversion and relevant BIS testing procedures to be carried out to ascertain the quality of building materials.
CO-3	Identify the major ingredients of construction materials like lime, cement, aggregate and their use in the construction industry.
CO-4	Select different materials for finishing's and various constructions pertaining to masonry works and foundations.
CO-5	Develop the conceptual knowledge of various supports in building construction.

Course Code: B17 EE 1201

Course Title:CIRCUIT THEORY

CO-1	Various electrical networks in presence of active and passive elements.
CO-2	Electrical networks with network topology concepts.
CO-3	Magnetic circuit with various dot conventions.
CO-4	R, L, C network with sinusoidal excitation.
CO-5	Three phase AC circuits.

Course Code: B17 EE 1202

Course Title:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

CO-1	Able to analyze the various Electrical networks and understand the basics of Magnetic Circuits.
CO-2	Able to understand the operation of DC generators,3-Point starter and conduct the Swinburne's test.
CO-3	Able to analyze the Performance of Transformers.
CO-4	Able to explain the operation of three phase induction motors and alternator.
CO-5	Able to analyze the operation of Half-wave and Full-wave rectifiers and single stage CE amplifier.

Course Code: B17 BS 1206

Course Title:ENGINEERING PHYSICS LAB

CO-1	Students get hands on experience in setting up experiments and using theInstruments/equipment individually.
CO-2	Get introduced to using new/ advanced technologies and understand their significance.

Course Code: B17 BS 1208

Course Title:ENGLISH COMMUNICATION SKILS LAB- II

CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

Course Code: B17 CS 1204

Course Title:C PROGRAMMING LAB

CO-1	Apply and practice logical ability to solve the problems.

CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment**.**
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs**.**
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals**.**
CO-7	Identification of various computer components, Installation of software
Course Code: B17 BS 1210	
Course Title:ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS	
CO	**Course Outcome:** Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper**.**

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2101	
Course Title:MATHEMATICS – IV	
CO-1	Using the concept of Analytic function in applications including Electrostatics and Fluid dynamics.
CO-2	Finding theoretical solution of certain Elliptic, Parabolic and Hyperbolic partial differential equations.
CO-3	Using Z-transforms to solve linear difference equations with constant coefficients.
CO-4	Fitting of probability frequency distribution to a given data.
CO-5	Using the concepts of sampling theory to analyze data related to some large and small samples.
Course Code: B17 CE 2101	
Course Title:MECHANICS OF SOLIDS	
CO-1	Summarize the behavior of basic materials under the influence of different external loading conditions and support conditions. (K2)
CO-2	Determine shear Force and Bending moments in statically determinate Beams and draw the Diagrams. (K5)
CO-3	Examine the different methods to find slope and deflection of beams subjected to loads(K4)
CO-4	Estimate the principal stresses & strains and torsional stresses in structural members(K3)
CO-5	Evaluate the crippling load for columns with different end conditions. (K5)
Course Code: B17 CE2102	
Course Title:ENVIRONMENTAL ENGINEERING	
CO-1	Explain the quality of water.[K2]
CO-2	Analyze the water quality parameters and compare with the permissible limits. [K4]
CO-3	Summarize the working principles of conventional unit operations of a water treatment plant. [K2]
CO-4	Determine the sizes of different unit operations in a water treatment plant. [K5]
CO-5	Assess the suitability of conventional methods and latest membrane processes for different water bodies.[K5]
CO-6	Design a conventional water treatment plant with given specifications for given capacity. [K6]
Course Code: B17 CE 2103	
Course Title:BUILDING PLANNING & DESIGN	
CO-1	Understand various types of buildings and housing concept.

CO-2	Apply the concepts of climatology and orientation of both residential and commercial buildings.
CO-3	Apply the principles of planning and byelaws used for building planning.
CO-4	Recommend appropriate planning for 2 Bed room and 3 Bed room houses.
CO-5	Draw plan, elevation and section for various structures.
CO-6	Design individual rooms with attention to functional and furniture requirements.

Course Code:B17 CE 2104

Course Title:SURVEYING-I

CO-1	Appreciate the importance of preparation of Map and Plan for required site with suitable scale.
CO-2	Prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.
CO-3	Judge on which type of instrument to be used for carrying out survey for a specific work
CO-4	Describe different modern instruments used in surveying.

Course Code:B17 CE 2105

Course Title:ENGINEERING GEOLOGY

CO-1	The course will provide the students with basic knowledge and understanding in the most central part of engineering geology, rock and soil.
CO-2	Students should develop an appreciation of geologic processes and their influence civil engineering works.
CO-3	The course will give students an overview and an understanding of the engineering properties of rock and soil materials.
CO-4	Based on lectures and exercises, students will gain basic understanding of the importance of engineering geology related to technical issues during construction.
CO-5	Students will develop the ability to perform basic engineering geological assessments and analysis, and to understand the relevance of engineering geology in complex projects in and on solid rock.

Course Code: B17 CE2106

Course Title:ENGINEEIRNG GEOLOGY LAB

CO-1	Elucidate the mega-scopic identification of minerals.
CO-2	Categorize the rocks according to mega-scopic description
CO-3	Interpret geological maps
CO-4	Estimate the types of subsurface formation by using geophysical methods

Course Code: B17 CE2107

Course Title:STRENGTH OF MATERIALS LABORATORY

CO-1	The student clearly understands the concepts of deciding the shape or type of specimen for assessing the respective strengths against various straining actions.
CO-2	The student can design the specimens for assessing a particular property of the material with the available machines.
CO-3	The student can design the experiments making use of various techniques of load measuring or deformation measuring instruments.
CO-4	The student will be confident to decide the range of the machine and set the machine accordingly by suitable modifications, for results with a finer degree of accuracy.

Course Code: B17 CE2108

Course Title:AUTOCAD FOR CIVIL ENGINEERING

CO-1	Student's ability to perform basic sketching techniques will improve.
CO-2	Student's ability to use architectural and engineering scales will increase.

CO-3	Student's ability to produce engineered drawings will improve.
CO-4	Student's ability to convert sketches to engineered drawings will increase.
CO-5	Student's will become familiar with office practice and standards.
CO-6	Student's will become familiar with AutoCAD two dimensional drawings.
CO-7	Student's will develop good communication skills and teamwork.

Course Code: B17 BS 2107

Course Title:ENGLISH PROFICIENCY-I

CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts.
CO-5	Improve their inter-personal communication skills.
CO-6	Be confident in presentation skills.

Course Code: B17 BS 2108

Course Title:PROFESSIONAL ETHICS & HUMAN VALUES

CO	By the end of the course student should be able to understand the importance of ethics and values in life and society.

Course Outcomes for Second Year SecondSemester Course

Course Code: B17 CE2201

Course Title:STRUCTURAL ANALYSIS – I

CO-1	Determine deflections in determinate beams by different methods.
CO-2	Evaluate the strain energy for structural members subjected to different loads.
CO-3	Analyze different indeterminate beams for BM and SF by different methods of analysis.
CO-4	Determine reactions, BM & SF in beams subjected to moving loads.
CO-5	Distinguish between thin and thick cylinders and understand different failure theories.

Course Code: B17 CE2202

Course Title:FLUID MECHANICS- I

CO-1	Determine the physical properties of fluids and different types of forces acting on a fluid element extended to forces on various gates.
CO-2	Determine the forces that are acting on immersed bodies in static fluids through application of buoyancy and floatation.
CO-3	Determine different types of fluid flows to find out the local and convective accelerations in 1D, 2D flows fields and derive the Laplace equation.
CO-4	Apply conservation principles of mass momentum and energy on fluids through system and control volume approaches.
CO-5	Calculate the force exerted by the fluid on bends, nozzles, plates and vanes by impulse momentum principle.
CO-6	Analyze the steady laminar and turbulent flows through pipes and solve pipe networks for series and parallel pipes to solve two reservoir and three reservoir problems.

Course Code: B17 CE 2203

Course Title:ENVIRONEMNTAL ENGINEERING – II

CO-1	Compare water and waste water.
CO-2	Explain principles of conventional treatment process and miscellaneous treatment techniques.
CO-3	Examine the operational differences of each unit process.
CO-4	Interpret the feasible technique required for particular waste water.

CO-5	Determine the size of unit operations using working principles of each.

Course Code: B17 CE 2204	
Course Title:CONCRETE TECHNOLOGY	
CO-1	Understand the basic concepts of concrete.
CO-2	Realize the importance of quality of concrete.
CO-3	Familiarize the basic ingredients of concrete and their role in the production of concrete and its behavior in the field.
CO-4	Test the fresh concrete properties and the hardened concrete properties.
CO-5	Evaluate the ingredients of concrete through lab test results.
CO-6	Design the concrete mix by BIS method.
CO-7	Familiarize the basic concepts of special concrete and their production and applications.
CO-8	Understand the behavior of concrete in various environments.

Course Code:B17 CE 2205	
Course Title:SURVEYING – II	
CO-1	Appreciate the importance of Theodolite in Surveying
CO-2	Apply Concepts of Tachometry in Surveying.
CO-3	Construct the Curves in Highways, road construction and canal works.
CO-4	Use the RS and GIS in designing
CO-5	Use the Total Station in Surveying.

Course Code:B17 CE 2206	
Course Title:REMOTE SENSING & GIS	
CO-1	Be familiar with ground, air and satellite-based sensor platforms.
CO-2	Interpret the aerial photographs and satellite imageries
CO-3	Create and input spatial data for GIS application
CO-4	Apply RS and GIS concepts in water resources engineering.

Course Code: B17 CE2207	
Course Title:SURVEYING FIELD WORK	
CO-1	Apply the linear measurement in simple Boundary Surveys.
CO-2	Identify direction of any line using compass survey.
CO-3	Relate the importance of Theodolite in Surveying
CO-4	Apply Concepts of Tachometry in Surveying.
CO-5	Use the Total Station in Surveying.

Course Code: B17 CE2208	
Course Title:FLUID MECHANICS LAB – I	
CO-1	Define and Measure Fluid Properties.
CO-2	Illustrate Flow Measuring Devices used in pipes, channels and Tanks.
CO-3	Analyze characteristics of broad crested weir.
CO-4	Illustrate the characteristics of surface profiles in free and forced vibrations.
CO-5	Compare sharp crested full width and contracted weirs.

Course Code: B17 CE2209	
Course Title:ENGINEERING WORKSHOP & IT WORKSHOP	
CO-1	Fully equipped with various surveying concepts and methods using advanced ground survey equipment's.
CO-2	Carry out profiling and grid levelling, for generation of profiles, contour maps, and earth works

	computations.
CO-3	Handle the Satellite images and interpret the satellite data.
CO-4	The interpret data can be used to prepare plan for urban development/town planning.
CO-5	Prepare the candidates with National Global employability.

Course Code: B17 BS 2206	
Course Title:ENGLISH PROFICIENCY-II	
CO-1	Develop the skills of taking and making notes.
CO-2	Interpret the pictures appropriately and effectively.
CO-3	Read, comprehend and infer a given piece of writing effectively.
CO-4	Learn and practice the skills of Research writing.
CO-5	Communicate well through various forms of writing.
CO-6	Be confident in giving presentations and dealing with people.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE3101	
Course Title:STRUCTURAL ANALYSIS – II	
CO-1	Student should be able to understand andanalyse the statically indeterminate trusses by using method of consistent deformation and Castigliano's theorem– II
CO-2	Analyse the statically indeterminate rigid frame by Slope Deflection Method, Moment Distribution Method, Kani's Methods and Column Analogy Method.
CO-3	Analyze three hinged, two hinged arches and cables and suspension bridge with Two hinged and Three hinged Stiffening Girder.
CO-4	Analyse suspension cables support are at the same level and different levels.
CO-5	To develop stiffness matrix and flexibility matrix for two span continuous beams by direct method.
Course Code: B17 CE 3102	
Course Title: REINFORCED CONCRETE STRUCTURES-I	
CO-1	Analyze and design the flexural members.
CO-2	Design the reinforced concrete beams subjected to shear only and also combined action of shear and torsion.
CO-3	Distinguish between the behavior of one way and two-way actions in slab and familiarize to design of two way slabs whose corners restrained and not restrained from lifting up.
CO-4	Design the compression members.
CO-5	Design the footing and staircase.
Course Code: B17 CE 3103	
Course Title:STEEL STRUCTURES-I	
CO-1	Design of simple connections with bolted connections.
CO-2	Design of simple connections with welded connection.
CO-3	Design of tension members subjected to axial force
CO-4	Design of compression axially loaded members as built-up columns
CO-5	Design the laterally supported and unsupported beams as per I.S code.
Course Code: B17 CE 3104	
Course Title:GEOTECHNICALENGINEERING-I	
CO-1	Know the fundamental relationships between different parameters of soil mass and classify different types of soils along with identifying their properties(K3).
CO-2	Estimate Effective stresses and permeability of soils(K3).
CO-3	Estimate stress distribution in soil for different Load conditions(K3).

CO-4	Appreciate the processes of compaction and consolidation and apply them to field problems(K3)
CO-5	Identify shear strength parameters for different conditions(K3).

Course Code:B17 CE 3105

Course Title:FLUID MECHANICS- II

CO-1	Apply the principles of modelling pumps, turbines, propellers using various dimensionless numbers.
CO-2	Determine discharge and design most economical channel section for uniform flow in open channels.
CO-3	Use momentum and energy principles for design of turbines and pumps.
CO-4	Recommend suitable type of turbines and pumps for the given project.

Course Code:B17 CE 3106

Course Title:ESTIMATION & QUANTITY SURVEYING

CO-1	List out various components, estimations and units of measurement for different works
CO-2	Apply the method of building estimate to find out the quantities of various items of work
CO-3	Determine the rate per unit of various items of work and their specifications
CO-4	Explain the estimation of various roads and related items
CO-5	Select various methods to find out the valuation of a property

Course Code: B17 CE3107

Course Title:ENVIRONMENTAL ENGINEERING LAB

CO-1	Determine physical properties of water
CO-2	Determine the turbidity and hardness of water
CO-3	Determine COD and BOD of water
CO-4	Estimate concentration of acidity and alkalinity
CO-5	Estimate chloride content of water

Course Code: B17 CE3108

Course Title:FLUID MECHANICS LAB– II

CO-1	Determine the coefficient of impact on a flat plate and curved vane by comparing the theoretical and actual forces by impact.
CO-2	Analyze the working of the centrifugal pump and develop the characteristics of power input, head and efficiency under various discharges and plot the characteristic curves.
CO-3	Analyze the working of the reciprocating pump and develop the characteristics of power input and discharge and efficiency under various heads and plot the characteristic curves.
CO-4	Determine the performance characteristics of pelton wheel turbine and develop the characteristic curves of unit discharge, unit power and unit head under varying unit speed.
CO-5	Determine the performance characteristics of Francis turbine and develop the characteristic curves of unit discharge, unit power and unit head under varying unit speed.

Course Code: B17 CE3109

Course Title:GEOGRAPHIC INFORMATION SYSTEMS LABORATORY

CO-1	Assign appropriate datum and projection systems for the given data
CO-2	Pre-process the raw data to make it suitable for overlaying with various themes
CO-3	Create thematic layers by using digitization techniques and attaching attribute data
CO-4	Visualize and interpret digital elevation model

Course Code: B17 BS 3101

Course Title:PROBLEM SOLVING & LINGUISTIC COMPETENCE

	PART-A (Verbal and Soft Skills-I)
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.

CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.
	Part-B (Quantitative Aptitude –I)
CO-1	The students will be able to perform well in calculating on number problems and various units of ratio concepts.
CO-2	Accurate solving problems on time and distance and units related solutions.
CO-3	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability.
CO-4	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any person to be placed in the industry.
CO-5	The students will learn to apply Logical thinking to the problems of syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, GATE for further studies.

Course Code: B17 BS 3105

Course Title:IPR& PATENTS

CO-1	Identify various types of intangible property that an engineering professional could generate in the course of his career.
CO-2	Distinguish between various types of protection granted to Intellectual Property such as Patents, Copy Rights, Trademarks etc.,
CO-3	List the steps involved in getting protection over various types of intellectual property and maintaining them.
CO-4	Take precautions in writing scientific and technical reports without plagiarism.
CO-5	Help micro, small and medium entrepreneurs in protecting their IP and respecting others IP as part of their business processes.

Course Outcomes for Third Year First Semester Course

Course Code: B17 CE 3201

Course Title:REINFORCED CONCRETE STRUCTURES – II

CO-1	Distinguish between the behaviors of cantilever and counter fort retaining walls and design the cantilever and counter fort retaining walls.
CO-2	Design the reinforced concrete circular and rectangular water tanks.
CO-3	Design the reinforced concrete T-beam bridge.
CO-4	Design the piles and pile cap.
CO-5	Design the flats labs

Course Code: B17 CE3202

Course Title:STEEL STRUCTURES-II

CO-1	Design of columns bases.
CO-2	Design components of a plate girder with and without stiffeners by using IS: 800-2007 code
CO-3	Design of circular water tank in working stress method.
CO-4	Design of beam-column connections subjected to eccentric shear connections.
CO-5	Design of end bearings.

Course Code: B17 CE3203

Course Title:GEOTECHNICAL ENGINEERING-II

CO-1	Plan a detailed soil exploration programme. (K2)
CO-2	Apply various methods for estimating bearing capacity of different types of foundations. (K3)
CO-3	Estimate load capacity of single piles and groups of piles and know the theory

	aspects of well foundations (K3)
CO-4	Determine the stability of finite and infinite slopes. (K3)
CO-5	Calculate earth pressures on retaining walls using Rankine's and Coulomb's theories (K3)

Course Code: B17 CE 3204

Course Title:TRANSPORTATION ENGINEERING – I

CO-1	Plan highway network for a given area.
CO-2	Determine Highway alignment and design highway geometrics
CO-3	Design Intersections and prepare traffic management plans
CO-4	Judge suitability of pavement materials and design flexible and rigid pavements
CO-5	Construct and maintain highways

Course Code:B17 CE 3205

Course Title:AIR POLLUTION AND CONTROL

CO-1	Explain the classification, sources and effects of air pollution [K2]
CO-2	Explain the different meteorological conditions that influence the dispersion of the pollutants [K2]
CO-3	Illustrate the plume behaviour for different atmospheric stability conditions [K2]
CO-4	Adapt various pollution control equipment's or methods to control the discharge of pollutants [K3]
CO-5	Measure the pollution levels by sampling and analysis [K5].

Course Code:B17 CS3213

Course Title:DATABASE MANAGEMENT SYSTEMS

CO-1	Demonstrate the basic elements of a relational database management system.
CO-2	Ability to identify the data models for relevant problems.
CO-3	Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
CO-4	Apply normalization for the development of application software

Course Code: B17 CE3206

Course Title:ALTERNATIVE ENERGY SOURCES

CO-1	Summarize the need of renewable sources in Global scenario. [K2]
CO-2	Explain the solar thermal conversion processes. [K2]
CO-3	Explain the wind energy conversion techniques. [K2]
CO-4	Explain the biomass energy conversion methodologies. [K5]
CO-5	Analyze the principle of ocean thermal energy conversion system. [K4]

Course Code: B17 CE 3207

Course Title:WASTEWATER MANAGEMENT

CO-1	Define the quality of industrial wastes. [K1]
CO-2	Explain various industrial waste treatment processes. [K2]
CO-3	Outline the advanced treatment techniques available for industrial wastes. [K2]
CO-4	Explain the sludge reduction and disposal methodologies. [K2]
CO-5	Analyse the waste effluent treatment from different case studies. [K4].

Course Code: B17 CE3208

Course Title:GREEN FUEL TECHNOLOGIES

CO-1	Classify various types of green fuels. [K2]
CO-2	Examine the production of bio ethanol using fermentation process.[K3]

CO-3	Explain the generation of bio diesel using algae species. [K2]
CO-4	Interpret the production of bio diesel from plant seeds. [K2]
CO-5	Explain the production of biogas from biogas plant. [K2]

Course Code: B17 CE3209

Course Title:GEOTECHNICAL ENGINEERING LAB

CO-1	Identify the physical properties of soil and classify various types of soil.(K2)
CO-2	Determine the permeability of soil.(K3)
CO-3	Determine compaction characteristics of soils and estimate in-situ density of soil.(K3)
CO-4	Determine the shear strength parameters of soils by various methods.(K3)
CO-5	Estimate the California Bearing Ratio (CBR) of a soil.(K3)
CO-6	Determine the relative density of a coarse-grained soil.(K3)

Course Code: B17 CE3210

Course Title:CONCRETE TECHNOLOGY LAB

CO-1	Conduct test and find consistency and fineness of cement.
CO-2	Examine the specific gravity of cement.
CO-3	Conduct test and determine the setting times of cement.
CO-4	Determine the compressive strength of cement.
CO-5	Determine the specific gravity of coarse aggregate and fine ggregate.
CO-6	Determine the fineness modulus of coarse aggregate and fine aggregate.
CO-7	Determine the bulking of sand.
CO-8	Understand and determine workability of concrete by slump, compaction factor, flow table and Vee – Bee tests.
CO-9	Evaluate hardened properties of concrete like compressive strength, split tensile strength and flexural strength.

Course Code: B17 BS3201

Course Title:EMPLOYABILITY SKILLS

	Part-A (Verbal Aptitude and Soft Skills-II)
CO-1	Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	Analyse the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign Universities), letters of recommendation (for professional and educational purposes).
CO-4	Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during The course of their recruitment process.
	Part-B (Quantitative Aptitude-II)
CO-1	The students will be able to perform well in calculating different types of data interpretation problems.
CO-2	The students will perform efficaciously on analytical and logical problems using various methods.
CO-3	Students will find the angle measurements of clock problems with the knowledge of calendars and clock.
CO-4	The students will skilfully solve the puzzle problems like arrangement of different positions.
CO-5	The students will become good at solving the problems of lines, triangular, volume of cone, cylinder and so on.

Course Code: B17 BS 3202	
Course Title:BASIC CODING	
CO-1	Know about Control Structures, Loop Structures and branching in programming.
CO-2	Know about various searching and sorting methods.
CO-3	Know about Functions, Recursions and Storage Classes.
CO-4	Know about Structures and Unions.
CO-5	Know different Operating System concepts.
CO-6	Differentiate OSI Model Vs. TCP/IP suite.

Course Outcomes for Fourth Year First Semester Course	
Course Code: B17 CE4101	
Course Title:TRANSPORTATION ENGINEERING – II	
CO-1	Illustrate the different types of Components of Railway Engineering
CO-2	Plan the Geometric Design for a Railway Track
CO-3	Characterize the concepts of railway Interlocking and signalling systems
CO-4	Identify the technical issues related to planning and design of airports
CO-5	Distinguish the technical components of harbours
Course Code: B17 CE4102	
Course Title:WATER RESOURCES ENGINEERING-I	
CO-1	Choose major hydrologic components & apply key concepts to several practical areas of engineering hydrology & related design aspects
CO-2	Determine aquifer parameters & yield of wells.
CO-3	Carry out surface & subsurface investigation to locate ground water
CO-4	Determine storage capacity & life of reservoirs
CO-5	Assess the irrigation needs of crops
Course Code: B17 CE4103	
Course Title:PROJECT PLANNING AND MANAGEMENT	
CO-1	Apply the concepts of planning, scheduling and controlling to determine time estimates of the project
CO-2	Estimate the optimum cost –time relationship for the given project network
CO-3	Explain updating and resources allocation methods
CO-4	Make use of contracts and tender bidding procedures required for construction industry
CO-5	Apply the significance of project management for developing managerial skills
Course Code: B17 CE 4104	
Course Title:FINITE ELEMENTS METHODS OF ANALYSIS (Elective-I)	
CO-1	Understand the concepts behind variational methods and weighted residual methods in FEM.
CO-2	Identify the application and characteristics of FEA elements such as bars, beams, 2-D element and axisymmetric element.
CO-3	Develop element characteristic equation procedure and generation of global stiffness equation will be applied.
CO-4	Able to apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form.
Course Code:B17 CE 4105	
Course Title:SOLID WASTE MANAGEMENT (Elective-I)	
CO-1	Explain the quality of solid wastes.

CO-2	Explain various functional elements of solid waste management.
CO-3	Explain transport and segregation of wastes.
CO-4	Explain the processing, composting and incineration methods of solid wastes.
CO-5	Explain disposal methods of solid wastes.

Course Code:B17 CE 4106

Course Title:EXPANSIVE SOILS (Elective-I)

CO-1	Understand the occurrence and effect of expansive soils
CO-2	Understand the clay mineralogy of soil
CO-3	Apply the knowledge of soil mechanics for predicting the heave of the soil
CO-4	Design the foundation of structures for various field conditions

Course Code: B17 CE4107

Course Title:TRAFFIC ENGINEERING (Elective-I)

CO-1	Demonstrate the Traffic Characteristics.
CO-2	Identify Highway Capacity and Level of Service
CO-3	Distinguish Parking Studies and Traffic Accident Studies
CO-4	Develop Intersection Design.
CO-5	Classify Traffic Regulations and Signals.

Course Code: B17 CE 4108

Course Title:PRESTRESSED CONCRETE STRUCTURES (Elective-II)

CO-1	Calculate the prestressing losses as per IS code provisions
CO-2	Analysis of prestress members and stress in tendons as per IS:1343
CO-3	Designing the Prestressed members for flexural and shear, as per IS code provisions.
CO-4	Analysis of transfer of prestress (pretensioned members) as per code provisions.

Course Code: B17 CE4109

Course Title:GROUND IMPROVEMENT TECHNIQUES (Elective-II)

CO-1	Apply in-situ densification methods for improving cohesive and cohesion less soil deposits
CO-2	Apply grouting technique for improving soils
CO-3	Understand the purpose of geotextile and geogrid
CO-4	Apply the concepts of reinforced soil to various structures
CO-5	Understand various soil stabilization techniques

Course Code: B17 CE4110

Course Title:TRANSPORTATION PLANNING(Elective-II)

CO-1	Explain about Urban Structure and Transport Systems.
CO-2	Apply Comprehensive Transport Planning Study.
CO-3	Analyze Economic Evaluation of Transport Projects.
CO-4	Apply Transport and Environmental standards.
CO-5	Apply Transport Policy and Management.

Course Code: B17 CE4111

Course Title:URBAN HYDROLOGY (Elective-II)

CO-1	Develop intensity duration frequency curves for urban drainage systems
CO-2	Develop design storms to size the various components of drainage systems
CO-3	Apply best management practices to manage urban flooding
CO-4	Prepare master drainage plan for an urbanized area

Course Code: B17 CE4112	
Course Title:HIGHWAY MATERIALS TESTING LAB	
CO-1	Evaluate the quality of Road Aggregates
CO-2	Evaluate the quality of Bitumen
Course Code: B17 CE4113	
Course Title:COMPUTER APPLICATIONS IN CIVIL ENGINEERING LAB	
CO-1	Develop a program which are necessary to classify and evaluate the values
CO-2	Develop an excel sheet for the design of structural elements
CO-3	Model and analyze the beams and plane frames using STAAD

Course Outcomes for FourthYear Second Semester Course	
Course Code: B17 CE4201	
Course Title:WATER RESOURCE ENGINEERING-II	
CO-1	Analyze gravity and earth dams
CO-2	Design of Irrigation canals
CO-3	Design Spillways and energy dissipation works
CO-4	Design diversion head works
CO-5	Classify river training works
CO-6	Use the principal components of hydroelectric scheme
Course Code: B17 CE4202	
Course Title:ADVANCED STRUCTURAL ANALYSIS(Elective-III)	
CO-1	Determine the fixed end moments of fixed beams with different moment of inertia and member end moments of symmetrical and un symmetrical portal frame by column-analogy method.
CO-2	Determine the member end moments of single bay single storey portal frames by flexibility and stiffness matrix methods
CO-3	Determine the moments of multi-storey frames subjected to vertical loads by substitute frame method and multi-storey frames subjected to lateral loads by portal, cantilever and girder factor method.
Course Code: B17 CE4203	
Course Title:ENVIRONMENTAL IMPACT ASSESSMENT (Elective-III)	
CO-1	Explain the elements of EIA and EIS
CO-2	Explain the environmental attributes to be considered for the EIA study
CO-3	Explain the methodologies for EIA and review the relief and rehabilitation works
CO-4	Explain the prediction and assessment of impacts
CO-5	Explain the case studies of EIA
Course Code: B17 CE 4204	
Course Title:EARTH RETAINING STRUCTURES (Elective–III)	
CO-1	Apply the knowledge of lateral earth pressure theories for retaining structures
CO-2	Design the different types of Retaining walls and sheet piles using earth pressure theories.
CO-3	Design the Reinforced soil retaining walls, Braced cuts and cofferdams.
Course Code:B17 CE 4205	
Course Title:PAVEMENT ANALYSIS AND DESIGN (Elective–III)	
CO-1	Classify the factors affecting Pavement Design.
CO-2	Analyze stresses and strains in a flexible pavements.
CO-3	Analyze stresses and strains in Rigid Pavements.

CO-4	Design a Flexible pavement using IRC and AASHTO.
CO-5	Design a Rigid Pavement using IRC and AASHTO.
Course Code:B17 CE 4206	
Course Title:IRRIGATION STRUCTURES DESIGN & DRAWING	
CO-1	Understand the paper - space environment thoroughly
CO-2	Develop the components using 2D & 3D wire frame models through various editing commands
CO-3	Explain assemble of various components of compound solids
CO-4	Design irrigation canal structures
Course Code: B17 CE4208	
Course Title:PROJECT WORK	
CO-1	Identify a current problem through literature/field/case studies Identify the background objectives and methodology for solving the same.
CO-2	Design a technology/ process for solving the problem.
CO-3	Develop a technology/ process for solving the problem.
CO-4	Evaluate that technology/ process at the laboratory level.

B. TECH - COMPUTER SCIENCE AND ENGINEERING

Department Vision

To envision a diverse, stimulating, continually improving academic and research environment to fulfill the needs of the society and to mould students as socially responsible and competent professionals in the field of computer science and engineering.

Department Mission

- To provide a strong theoretical and practical background across thecomputer science and engineering discipline with an emphasis on softwaredevelopment.

- To impart modern technologies with industrial, academic and researchcollaboration.

- To inculcate professional behavior, strong ethical values, leadership abilitiesand impart the skills necessary to continue education for professional growth.

Program Educational Objectives (PEOs):

PEO1	Graduates of the program will become significant component of computer industry with basic and specialized knowledge in computer science and engineering blended with knowledge in mathematics and modern technologies.
PEO2	Graduates will have adequate knowledge and technical skills for continuous education and research.
PEO3	Graduates are prepared to be socially responsible computing

	professionals/entrepreneurs by creating necessary environment that fosters the graduate's communication, presentation, teamwork, leadership skills, and professional ethics.

Program Specific Outcomes (PSO's):

PSO1:	Ability to apply in depth problem solving and programming skills.
PSO2:	Ability to do collaborative development of software solutions fortrans-disciplinary engineering problems.
PSO3:	Ability to design and integrate hardware and software components forthe advancement of technology.

Program Outcomes (POs):

Engineering Graduates will be able to:

1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problemanalysis:**Identify,formulate,reviewresearchliterature,andanalyzecomplex engineering problems reaching substantiated conclusions using first principlesofmathematics,naturalsciences,andengineeringsciences.
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 knowledgeandresearchmethodsincludingdesignofexperiments,analysisand 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 sustain able 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 understandingoftheengineeringandmanagementprinciplesandapplythese to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary 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.

Course outcomes (Cos) of all courses of all programs offered by the institution

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1101	
Course Title: ENGLISH – I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.
Course Code: B17 BS 1102	
Course Title: MATHEMATICS – I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also, will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also, will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
CO-3	Determine Laplace transform and inverse Laplace transform of various functions.
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jacobian and maxima/minima of functions of two variables.
CO-6	Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non-homogeneous PDEs.
Course Code: B17 BS 1103	
Course Title:MATHEMATICS –II	
CO-1	Find a real root of algebraic and transcendental equations using different methods.
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpson's rules
CO-4	Solve a first order ordinary differential equation by Euler and RK methods

CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms, Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

Course Code: B17 BS 1104

Course Title:ENGINEERING PHYSICS

CO-1	Learn the basic concepts of interference and diffraction of light and its applications.
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultrasonics as a tool for technological applications
CO-4	Learn the behavior of particles at the very microscopic level by using wave nature of particles and understand the behavior of materials and be able to classify them using the band theory of solids.
CO-5	Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

Course Code:B17 CS 1101

Course Title:COMPUTER PROGRAMMINGUSING C

CO-1	Understand the basic terminology used in computer programming
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program. Design programs involving decision structures, loops and functions.
CO-4	Explain the difference between call by value and call by reference
CO-5	Understand the dynamics of memory by the use of pointers
CO-6	Use different data structures and create/update basic data files.

Course Code:B17 CE 1101

Course Title:ENVIRONMENTAL STUDIES

CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc toinculcate the students about environmental awareness and safe transfer of our mother earth andits natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents
CO-5	Constitutional provisions for the protection of natural resources

Course Code: B17 BS 1106

Course Title:ENGINEERING PHYSICS LAB

CO-1	Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurementsindividually.
CO-2	Students get hands on experience in setting up experiments and using the instruments/equipment
CO-3	Get introduced to using new/ advanced technologies and understand their significance.

Course Code: B17 BS 1108

Course Title:ENGLISH COMMUNICATION SKILS LAB- I

CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts.
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.

Course Code: B17 CS 1102

Course Title: C PROGRAMMING LAB& HARDWARE FUNDAMENTALS (Common to CSE & IT)

CO-1	Apply and practice logical ability to solve the problems.

CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals.
CO-7	Identification of various computer components, Installation of software
Course Code: B17 BS 1110	
Course Title: ENGINEERING PHYSICS VIRTUAL LABS–ASSIGNMENTS (Common to CSE, ECE & IT)	
CO-1	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1201	
Course Title: ENGLISH – II	
CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
CO-3	To express fluently and accurately in social discourse
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.
Course Code: B17 BS 1203	
Course Title: MATHEMATICS – III	
CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix, Reduce a Quadratic form to its canonical form and classify
CO-3	Evaluate double integrals over a region and triple integral over a volume.
CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green's, Stokes and Gauss divergence theorems.
Course Code: B17 BS 1205	
Course Title:ENGINEERING CHEMISTRYCommon to CSE, ECE & IT)	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly, students understand liquid crystals and semiconductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.
Course Code: B17 ME 1201	
Course Title:ENGINEERING DRAWING(Common to CSE, ECE & IT)	
CO-1	Apply principles of drawing to represent dimensions of an object.

CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

Course Code:B17 CS 1202

Course Title:OBJECT-ORIENTEDPROGRAMMINGTHROUGH C++ (Common to CSE & IT)

CO-1	Write, compile and debug programs in C++ language. Use different data types in a computer program.
CO-2	Design programs involving decision structures, loops and functions.
CO-3	Explain classes and abstract classes and objects, abstraction and encapsulation, inheritance, polymorphism, constructors, access control and overloading.
CO-4	Solve a given application problem by going through the basic steps of program specifications, analysis, design, implementation and testing within the context of the object-oriented paradigm.

Course Code:B17 EC 1201

Course Title:ELEMENTS OFELECTRONICS ENGINEERING (Common to CSE & IT)

CO-1	Understand the basic concepts of transport of charge carriers in semiconductors, drift and diffusion currents, physical structure, operation, V-I characteristics of semiconductor diode. .
CO-2	Understand the basic concepts ofspecial types of diodes like Zener Diode, LED, Photo Diode and tunnel diode, rectifier circuits with and without filters.
CO-3	Understand the physical structure, operation, input and output characteristics of BJT in CE,CB,CC circuit configurations.
CO-4	Understand the basic concepts oftransistor biasing and thermal stabilization.
CO-5	Understand the physical structure, operation, characteristics and circuit models of JFET"s and MOSFET"s.

Course Code: B17 BS 1207

Course Title:ENGINEERING CHEMISTRY LAB

CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipment's
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.

Course Code: B17 BS 1208

Course Title:ENGLISH COMMUNICATION SKILS LAB- II

CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

Course Code: B17 CS 1205

Course Title:ENGINEERING WORKSHOP & IT WORKSHOP

CO-1	Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.
CO-2	Apply an object-oriented approach to developing applications of varying complexities.

Course Code: B17 BS 1212

Course Title: INNER ENGINEERING

CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).

CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities.
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

Course Outcomes for Second Year First Semester Course

Course Code: B17 CS 2101

Course Title:DATA STRUCTURES

CO-1	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.
CO-2	Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs. Demonstrate different methods for traversing trees [ABET (a)].
CO-3	Compare alternative implementations of data structures with respect to performance [ABET (a, b, c)].
CO-4	Compare and contrast the benefits of dynamic and static data structures implementations [ABET (a, b, c)].
CO-5	Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack [ABET (a, c)].
CO-6	Discuss the computational efficiency of the principal algorithms for sorting, searching.

Course Code: B17 BS2102

Course Title:PROBABILITY, STATISITICS& QUEUING THEORY

CO-1	Identify the random variable as discrete/continuous and analyse it.
CO-2	Predict the distribution suitable for the given data from its moments.
CO-3	Measure the intensity of association between the variables.
CO-4	Fit a best suitable Curve for the given data.
CO-5	Decide the test applicable for giving inference about Population Parameter based on Sample statistic.
CO-6	Make business decisions about the resources needed to provide a service in day-to-day life applications including telecommunication, traffic engineering, computing and the design of factories, shops, offices and hospitals.

Course Code: B17 BS 2103

Course Title:DISCRETE MATHEMATICAL STRUCTURES

CO-1	Rewrite the mathematical arguments using logical connectives and quantifiers and verify the validity of the arguments using propositional and predicate logic.
CO-2	Identify and give examples of various types of relations and describe various properties of relations.
CO-3	Solve different counting problems.
CO-4	Solve the recurrence relations which occur in many fields.
CO-5	Utilize the concepts in graphs and Number theory in their fields.

Course Code: B17 CS2102

Course Title:COMPUTER GRAPHICS

CO-1	Summarize the application areas of computer graphics.
CO-2	Implement algorithms for scan converting graphic primitives in a graphic package.
CO-3	Apply direct and indirect methods for two-dimensional transformations using matrices.
CO-4	Construct three-dimensional geometric transformations using matrices.
CO-5	Visualize two-dimensional viewing transformations.

CO-6	Produce views of three-dimensional scenes.
CO-7	Visualize the working of I/O devices.

Course Code:B17 CS2103

Course Title:DIGITAL LOGIC DESIGN

CO-1	An Ability to define different number systems, binary addition and subtraction, 2`s complement representation and operations with his representation.
CO-2	An Ability to understand different Boolean Algebra theorems and apply them for logic functions.
CO-3	An Ability to design the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
CO-4	An Ability to define the following combinational circuits: multiplexer, de-multiplexers, encoders/decoders, comparators, arithmetic-logic units and to be able to build simple circuits.
CO-5	An ability to understand asynchronous and synchronous sequential circuits like counters and registers.
CO-6	An ability to understand memories like RAM and ROM, Programmable Logic Devices

Course Code:B17 CS 2104

Course Title:DATA ANALYSISANDVISUALIZATION USINGPYTHON

CO-1	Acquire knowledge on Basics of Python.
CO-2	Acquire knowledge on OOP of Python.
CO-3	Acquire knowledge on NumPy and Basics of Statistics.
CO-4	Use library such as Pandas.
CO-5	Acquire knowledge on Graph Visualizations in Python.
CO-6	Acquire knowledge on Data analysis.

Course Code: B17 CS 2105

Course Title:DATASTRUCTURESLAB

CO-1	Student will be able to write programs to implement stacks and queues.
CO-2	Abilityto implement various searching and sorting techniques.
CO-3	Ability to implement programs using trees and graphs.

Course Code: B17 CS 2106

Course Title:DATA ANALYSIS ANDVISUALIZATION USINGR AND PYTHON LAB

CO-1	Acquire Programming knowledge on Basics of Python.
CO-2	Acquire Programming knowledge on Searching and sorting using Python.
CO-3	Acquire Programming knowledge on Text and File Handling.
CO-4	Develop Python Programs to Mean, Median, Mode, Correlation, Regression and Probability distributions.
CO-5	Acquire Programming knowledge on NumsPy, Pandas Library.
CO-6	Acquire Programming knowledge on Graph Visualizations in Python and Data for Analysis.

Course Code: B17 CS 2107

Course Title:INDUSTRY ORIENTED TRAINING(R Programming Lab)

CO-1	Install and find documentation for R functions and libraries. Search for and find domain [1] specific R packages.
CO-2	Use and understand the R data types (vectors, matrices, data frames, strings)
CO-3	Reshape data and use visual exploratory graphics. Practice good data management.
CO-4	Write their own functions in R and break a problem into a set of functions.
CO-5	Be fluent in programming concepts such aqs functional programming, code reuse, object [1] oriented programming, recursion, regular expressions, and split-transform-recombine data manipulation.
CO-6	Engage in good code and data organization practices and use a consistent programming style

Course Code: B17 BS 2107	
Course Title:ENGLISH PROFICIENCY-I	
CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts.
CO-5	Improve their inter-personal communication skills.
CO-6	Be confident in presentation skills.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS 2201	
Course Title:COMPUTER ORGANIZATION	
CO-1	Knowledge about major components of a computer such as processor, memory and I/O modules along with their interconnections internally with outside world.
CO-2	Detailed idea about architecture of central processing unit, functions of control unit, memory, I/O devices and their issues.
CO-3	Simple and multiple processor organization and their issues.
Course Code: B17 CS 2202	
Course Title:OPERATINGSYSTEMS	
CO-1	The student understands OS evolution, its structure and services provided by it.
CO-2	Learn process life cycle, process scheduling objectives, policies and mechanisms, process synchronization; inter process communication, deadlocks and other process subsystem related concepts.
CO-3	Learn memory hierarchy, allocation, de-allocation policies and mechanism for main and auxiliary memory; file system design and implementation issues.
CO-4	Investigate UNIX/ LINUX and Windows OS platforms w.r.t similarities and differences in design paradigms.
Course Code: B17 CS 2203	
Course Title:MICROPROCESSORS	
CO-1	Students can able to understand The 8085A μP. Architecture [K1]
CO-2	Students can learn about 8085 Instruction Set [K2]
CO-3	The Student Develops The Skill Of Writing 8085 Microprocessor Programming [K3]
CO-4	Ability to design semiconductor memories [K2]
CO-5	Students can learn Parallel I/O Interface - 8255 [K2]
CO-6	Students can learn Keyboard/Display Interface - 8279 [K2]
CO-7	Students can able to understand The 8086 μP. Architecture [K1]
CO-8	Students can learn about 8086 Instruction Set [K1]
CO-9	The Student Develops The Skill Of Writing 80865 Microprocessor Programming [K3]
Course Code: B17 CS 2204	
Course Title:DATA COMMUNICATIONS	
CO-1	Students will have the ability to use Data Communications and Networking Protocols and protocol architectures
CO-2	Students will have the ability to develop communication models for providing data transmission facility
CO-3	Students will have the ability to outline Data Communication terminology
CO-4	Students will have the ability to classify various transmission media
CO-5	Students will have the ability to discriminate various types of signals for data transmission and

	ability to describe data encoding techniques
CO-6	Students will have the ability to describe data communications interface
CO-7	Students will have the ability to apply various flow control , error control techniques of data link control protocols
CO-8	Students will have the ability to use various data communication terminals and processing hardware
CO-9	Students will have the ability to demonstrate multiplexing techniques

Course Code:B17 CS2205

Course Title:ADVANCED DATA STRUCTURES

CO-1	Ability to understand various hashing techniques.
CO-2	Ability to write programs to implement sorting techniques
CO-3	Ability to understand concepts related to graph theory.

Course Code:B17 ME 2207

Course Title:OPERATIONSRESEARCH

CO-1	Ability to solve LPP problems using various methods.
CO-2	Ability to solve transportation and assignment problems using several methods.
CO-3	Analyze the PERT and CPM charts.
CO-4	Ability to solve replacement problems and game theory problems.

Course Code: B17 CS 2206

Course Title:OPERATING SYSTEMSANDUNIX PROGRAMMING LAB

CO-1	The student practices UNIX commands, Vi editor, shell commands.
CO-2	The student develops skill in writing C programs using system calls for process management; inter process communication and memory management aspects.
CO-3	The student learns shell programming and develops skill for writing scripts for batch level tasks.

Course Code: B17 CS 2207

Course Title:DIGITAL ELECTRONICS & MICROPROCESSOR LAB

CO-1	The student understands the logic gates, half adders, full adders and flip-flops to design a circuit.
CO-2	The student develops the skill of writing microprocessor programming.
CO-3	The student understands the interfacing of microprocessor with stepper motor, R-2R ladder.

Course Code: B17 CS 2208

Course Title:COMPETETIVE PROGRAMMING LAB

CO-1	Write programs using python programming.
CO-2	Write algorithms.
CO-3	Implement various data Structures.
CO-4	To apply object oriented mechanisms.
CO-5	To Implement various Advance data Structures like AVL trees, B-Trees, Splay trees etc.

Course Code: B17 BS 2204

Course Title:PROFESSIONAL ETHICS&HUMAN VALUES

CO-1	By the end of the course student should be able to understand the importance of ethics and values in life and society.

Course Code: B17 BS 2206

Course Title:ENGLISH PROFICIENCY-II

CO-1	Develop the skills of taking and making notes
CO-2	Interpret the pictures appropriately and effectively.
CO-3	Read, comprehend and infer a given piece of writing effectively.
CO-4	Learn and practice the skills of Research writing.

CO-5	Communicate well through various forms of writing.
CO-6	Be confident in giving presentations and dealing with people.

Course Outcomes for Third Year First Semester Course

Course Code: B17 CS 3101	
Course Title:COMPUTER NETWORKS	
CO-1	Distinguish between Circuit Switching and Packet Switching approaches.
CO-2	Apply various concepts of ATM networks.
CO-3	Distinguish between various types of Networks.
CO-4	Apply various Congestion Control Techniques.
CO-5	Know Internetwork Operation.
CO-6	Know various Connection Oriented Transport Control Mechanisms.
Course Code: B17 CS 3102	
Course Title:WEB TECHNOLOGIES	
CO-1	Students will be able to construct web based applications and Identify where data structures are appearing in them.
CO-2	Students will be able to connect java programs to different databases.
CO-3	Students will be able to develop EJB programs.
Course Code: B17 CS 3103	
Course Title:FORMAL LANGUAGES AND AUTOMATA THEORY	
CO-1	Ability to classify machines by their power to recognize languages,
CO-2	Ability to explain finite state machines to solve problems in computing,
CO-3	Ability to explain deterministic and non-deterministic machines,
CO-4	Ability to explain the concepts of Turing Machines, Undesirability, church thesis.
Course Code: B17 CS3104	
Course Title:DATABASE MANAGEMENT SYSTEMS	
CO-1	Generalize the basic concepts of DBMS and RDBMS.
CO-2	Prepare SQL commands for defining, constructing and manipulating databases.
CO-3	Apply conceptual and logical database design using data models.
CO-4	Apply normalization to tables.
CO-5	Manage concurrent transactions.
CO-6	Apply databases Recovery Techniques.
Course Code:B17 CS3105	
Course Title:APPLICATIONDEVELOPMENTUSING JAVA	
CO-1	Able to do projects for web based and internet applications.
CO-2	Understand multitasking and multiprogramming development
CO-3	Able to do network programming.
CO-4	Able to Construct Web application using Java Server Pages
Course Code:B17 CS 3106	
Course Title:EMBEDDED SYSTEMS	
CO-1	To describe the differences between general computing system and Embedded System.

CO-2	To recognize the classification of Embedded System. .
CO-3	To understand various architectures of Embedded System.
CO-4	To design Real Time Embedded System using the concepts of RTOS.
CO-5	To load embedded software on Host machine.
CO-6	To test Host machine

Course Code: B17 CS 3107

Course Title:CYBER SECURITY

CO-1	Cyber Security architecture principles
CO-2	Identifying System and application security threats and vulnerabilities.
CO-3	Identifying different classes of attacks
CO-4	Cyber Security incidents to apply appropriate response
CO-5	Describing risk management processes and practices
CO-6	Evaluation of decision making outcomes of Cyber Security scenarios

Course Code: B17 EC3109

Course Title:DIGITAL SIGNAL PROCESSING

CO-1	Describe the DSP fundamental theory and components, Develop an understanding of DSP advantages, limitations and fundamental tradeoffs. Carry-out LTI system analysis using convolution & Z-transform
CO-2	Carryout data analysis &spectrum analysis using FFT
CO-3	Design of IIR digital filters to meet specifications
CO-4	Design of FIR digital filters to meet specifications
CO-5	Knows multi-rate signal processing aspects & DSP applications

Course Code: B17 ME3110

Course Title:INDUSTRIAL ROBOTICS

CO-1	Distinguish between fixed automation and programmable automation.
CO-2	Identify various components of robot.
CO-3	Select appropriate type of actuator for a joint.
CO-4	Illustrate robot applications in manufacturing.
CO-5	Analyze kinematics of a robot.

Course Code: B17 CS 3108

Course Title:DATABASE MANAGEMENT SYSTEMS LAB

CO-1	The student is exposed to a commercial RDBMS environment such as ORACLE.
CO-2	The student will learn SQL commands for data definition and manipulation.
CO-3	The student applies conceptual design.
CO-4	The student applies Logical data base design.
CO-5	The student takes up a case study and applies the design steps.

Course Code: B17 CS 3109

Course Title:APPLIATION DEVELOPMENT LAB

CO-1	Compare and Contrast HTML, DHTML, CSS, JavaScript and other Web technologies.
CO-2	Implement JavaScript Language to perform functionalities at client side validations.
CO-3	Assess and evaluate the role of "WEBSERVERS" for the management and delivery of electronic information.
CO-4	Develop Web based applications by PHP to have an interactive application such as Client Server Architecture.

Course Code: B17 BS 3101

Course Title:PROBLEM SOLVING & LINGUISTIC COMPETENCE

	Part-A: Verbal and Soft Skills-I
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.
	Part-B: Quantitative Aptitude -I
CO-6	The students will be able to perform well in calculating on number problems and various units of ratio concepts.
CO-7	Accurate solving problems on time and distance and units related solutions.
CO-8	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability.
CO-9	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any person to be placed in the industry.
CO-10	The students will learn to apply Logical thinking to the problems of syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, GATE for further studies.
Course Code: B17BS3103	
Course Title:ADVANCED CODING	
CO-1	Acquire coding knowledge on essential of modular programming
CO-2	Acquire Programming knowledge on linked lists
CO-3	Acquire coding knowledge on ADT
CO-4	Acquire knowledge on time complexities of different methods
CO-5	Acquire Programming skill on Java libraries and Collections

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS 3201	
Course Title:DATA WAREHOUSING & DATA MINING	
CO-1	The student understands the differences between OLTP and OLAP.
CO-2	The student learns how data cube technology supports structuring and querying high dimensional data.
CO-3	The student is introduced to similarity, distance, information gain and other performance and error metrics used for data mining.
CO-4	The student is introduced to association rule mining, supervised and unsupervised learning and the corresponding classification and clustering approaches involving decision trees, Bayesian approaches, model based and agglomerative approaches.
Course Code: B17 CS 3202	
Course Title:OBJECT ORIENTED SOFTWARE NGINEERING	
CO-1	Ability to define a problem and perform Requirements Engineering.
CO-2	Ability to draw UML diagrams for the requirements gathered.
CO-3	Ability to design various aspects of the system
CO-4	Ability to implement the designed problem in Object Oriented Programming Language and test whether all the requirements specified have been achieved or not.
CO-5	Able to apply various testing approaches to test the system
CO-6	Able to use various Process management activities
Course Code: B17 CS 3203	

	Course Title: DESIGN AND ANALYSIS OF ALGORITHMS
CO-1	Students will be able to Argue the correctness of algorithms using inductive proofs and invariants and Analyze worst-case running times of algorithms using asymptotic analysis.
CO-2	Describe the various paradigms of design when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm and synthesize them
CO-3	Students will be able to Compare between different data structures. Pick an appropriate data structure for a design situation

Course Code: B17 CS 3204

Course Title:ARTIFICIAL INTELLIGENCE

CO-1	The Student understands AI problem characteristics, state space approach for solving AI problem, Production System framework.
CO-2	The student learns several optimal search strategies and the use of heuristics.
CO-3	The student learns relational, inferential, inheritable and procedural knowledge and the corresponding knowledge representation approaches.
CO-4	The student is introduced to applying AI problem solving approaches to natural language processing, planning and expert systems

Course Code:B17 CS 3205

Course Title:COMPILER DESIGN

CO-1	Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to understand the Compiler tools like LEX, YACC, etc.
CO-2	Ability to describe the different types of parsers. i.e. Top-down, Bottom-up parsers, Construction of SLR, CLR and LALR parse table.
CO-3	Ability to explain Syntax directed translation, synthesized and inherited attributes.
CO-4	Ability to explain code optimization techniques and code generation techniques to improve the performance of a program in terms of speed & space

Course Code:B17 CS 3206

Course Title:CLOUD COMPUTING

CO-1	Define basic networking concepts for distributed and cloud computing. (K1).
CO-2	Understand the importance of Virtualization concept in cloud computing.(K2)
CO-3	Explain the architecture of Cloud platform. (K2)
CO-4	Make use of some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other cloud software environments. (K3)
CO-5	Utilize infrastructure, storage and tools to access the cloud to develop cloud application .(K3)

Course Code: B17 CS 3207

Course Title:MOBILE COMPUTING (Elective-I)

CO-1	A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities.
CO-2	The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.
CO-3	A comprehension and appreciation of the design and development of context-aware solutions for mobile devices.
CO-4	A student will be able to understand various protocols for mobile computing.
CO-5	A student will be able to understand various platforms for mobile computing.
CO-6	A student will be able to understand various routing algorithm.

Course Code: B17 CS3208

Course Title:DISTRIBUTED SYSTEMS (Elective-I)

CO-1	Scale as the number of entities in the system increase
CO-2	Can sustain failures and recover from them
CO-3	Work with distributed, fault tolerant file systems
CO-4	Can handle and process large data volumes

CO-5	Are secure and handle certain classes of distributed denial of service attacks
CO-6	Are Loosely coupled, transactional and eventually stable

Course Code: B17 CS3209

Course Title:INFORMATION RETRIEVAL SYSTEMS (Elective-I)

CO-1	Identify basic theories in information retrieval systems.
CO-2	Identify the analysis tools as they apply to information retrieval systems.
CO-3	Understands the problems solved in current IR systems.
CO-4	Describes the advantages of current IR systems.
CO-5	Understand the difficulty of representing and retrieving documents.
CO-6	Understand the latest technologies for linking, describing and searching the web.

Course Code: B17 CS 3211

Course Title:NETWORK PROGRAMMING LAB

CO-1	Students will be able to write Socket based Network application programs
CO-2	Students will be able to design and develop Client Server applications using Java.
CO-3	Students will be able to write network applications like One-One chat, Broad casting and Multicasting.
CO-4	Students will be able to understand e-mail programming (SMTP, POP).

Course Code: B17BS3201

Course Title:EMPLOYABILITY SKILLS

CO-1	1. Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	2. Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	3. Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign universities), letters of recommendation(for professional and educational purposes).
CO-4	4. Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	5. Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process.
	Part-B: Quantitative Aptitude-II
CO-6	1. The students will be able to perform well in calculating different types of data interpretation problems.
CO-7	2. The students will perform efficaciously on analytical and logical problems using various methods.
CO-8	3. Students will find the angle measurements of clock problems with the knowledge of calendars and clock.
CO-9	4. The students will skillfully solve the puzzle problems like arrangement of different positions.
CO-10	5. The students will become good at solving the problems of lines, triangular, volume of cone, cylinder and so on

Course Code: B17BS3204

Course Title:COMPETITIVE CODING

CO-1	Acquire coding knowledge on essential of competitive coding
CO-2	Acquire Programming knowledge on time & space complexities
CO-3	Acquire coding knowledge on dynamic Arrays, Set & Map structures and sorting
CO-4	Acquire knowledge on time complexities of different methods

CO-5	Acquire Programming skill on String, Tree, Graph Theory algorithms
Course Code:B17BS3206	
Course Title:IPR& PATENTS	
CO-1	Identify various types of intangible property that an engineering professional could generate in the course of his career.
CO-2	Distinguish between various types of protection granted to Intellectual Property such as Patents, Copy Rights, Trademarks etc.,
CO-3	List the steps involved in getting protection over various types of intellectual property and maintaining them.
CO-4	Take precautions in writing scientific and technical reports without plagiarism.
CO-5	Help micro, small and medium entrepreneurs in protecting their IP and respecting others IP as part of their business processes.

Course Outcomes for Final Year First Semester Course	
Course Code: B17 CS 4101	
Course Title: Big Data Analytics	
CO-1	Identify characteristics of big data and its application areas.
CO-2	Build HDFS and Map Reduce to store and process the big data..
CO-3	Apply advanced map reduce applications on big data.
CO-4	Identify the need-based tools, viz., Pig and Hive to handle
Course Code: B17 CS 4102	
Course Title: Internet of Things	
CO-1	Distinguish between various IoT architectures
CO-2	Apply various communication protocols in IoT
CO-3	Use various sensors and Actuators in IoT applications
CO-4	Implement IoT applications using Arduino and Raspberry pi.
CO-5	Analyse data in IoT applications using cloud services
CO-6	Know various security issues in IoT
Course Code: B17 CS 4103	
Course Title: Machine Learning	
CO-1	Formulate the concepts of ingredients and preliminaries of machine learning
CO-2	Apply tree models, linear models and distance based models
CO-3	Demonstrate the concepts of dimensionality reduction techniques, model evaluation and selection techniques
CO-4	Identify and construct features and ensemble models
CO-5	Formulate the concepts of artificial neural networks, reinforcement learning
Course Code: B17BS 4101	
Course Title: Managerial Economics And Financial Accountancy	
CO-1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
CO-2	The knowledge of understanding Cost and its types and ability to calculate BEP
CO-3	The pupil is also ready to understand the nature of different markets
CO-4	The Learner is able to understand Pricing Practices prevailing in today's business world
CO-5	The Learner is able to prepare Financial Statements and know how to calculate Profit & Loss for a firm
CO-6	The Learner can able to know Types of capital and their sources and know how to calculate

	Depreciation
Course Code: B17 CS 4105	
Course Title: SOFTWARE PROJECT MANAGEMENT (ELLECTIVE-II)	
CO-1	To match organizational needs to the most effective software development model
CO-2	To understand the basic concepts and issues of software project management
CO-3	To effectively Planning the software projects
CO-4	To implement the project plans through managing people, communications and change
CO-5	To select and employ mechanisms for tracking the software projects
CO-6	To conduct activities necessary to successfully complete and close the Software projects
CO-7	To develop the skills for tracking and controlling software deliverables
CO-8	To create project plans that address real-world management challenges
Course Code: B17CS 4106	
Course Title: SCRIPTING LANGUAGES (ELLECTIVE-II)	
CO-1	To master the theory behind scripting and its relationship to classic programming.
CO-2	To survey many of the modern and way cool language features that show up frequently in scripting languages.
CO-3	To gain some fluency programming in Ruby, JavaScript, Perl, Python, and related languages.
CO-4	To design and implement one's own scripting language.
Course Code: B17 CS 4107	
Course Title: BIG DATA ANALYTICS LAB	
CO-1	Build Hadoop environment.
CO-2	Develop a solution for a given problem using map reduce
Course Code: B17 CS 4108	
Course Title: INTERNET OF THINGS LAB	
CO-1	Use sensors, actuators, Arduino and Raspberry pi in IoT applications
CO-2	Design and Develop various IoT applications..

Course Outcomes for Final Year Second Semester Course	
Course Code: B17 BS 4201	
Course Title: MANAGEMENT AND ORGANISATIONAL BEHAVIOUR	
CO-1	Explain management functions and principles
CO-2	Will be able to describe the concepts of functional management that is HRM and Marketing functions
CO-3	Will be able to get discuss about vision, mission, goal, objective and a strategy based on which the corporate planning depends
CO-4	The learner is able to recognise strategically contemporary management practices and describe corporate planning process
CO-5	The learner can discuss about individual behaviour and motivational theories
CO-6	The student can explain about ways in managing conflicts and stress
Course Code: B17 CS 4201	
Course Title: DEEP LEARNING (Elective-III)	
CO-1	The students able to outline the basic concept of Machine learning
CO-2	The students able to express the concepts of deep feed forward networks.
CO-3	The students able to explain the CNN model
CO-4	The students able to explain and apply optimization techniques and auto encoders.

CO-5	The students able to learn about different DNN models and apply that knowledge to different applications
Course Code: B17 CS 4202	
Course Title: CONCURRENT AND PARALLEL PROGRAMMING (Elective-III)	
CO-1	1 Understanding improvement of CPP concepts presented
CO-2	2 The number of reinforcement–exercises assigned
CO-3	3 The time required for the resolution of exercises
CO-4	4 Compliance level with the new model of theoretical teaching
Course Code: B17CS 4203	
Course Title: ARTIFICIAL NEURAL NETWORKS (Elective-III)	
CO-1	This course has been designed to offer as a graduate-level/ final year undergraduate level elective subject to the students of any branch of engineering/ science, having basic foundations of matrix algebra, calculus and preferably (not essential) with a basic knowledge of optimization.
CO-2	Students and researchers desirous of working on pattern recognition and classification, regression and interpolation from sparse observations; control and optimization are expected to find this course useful. The course covers theories and usage of artificial neural networks (ANN) for problems pertaining to classification (supervised/ unsupervised) and regression.
CO-3	The course starts with some mathematical foundations and the structures of artificial neurons, which mimics biological neurons in a grossly scaled down version. It offers mathematical basis of learning mechanisms through ANN. The course introduces perceptrons, discusses its capabilities and limitations as a pattern classifier and later develops concepts of multilayer perceptrons with back propagation learning
Course Code: B17 CS 4204	
Course Title: MACHINE LEARNING LAB	
CO-1	Design Preprocessing model for their own data sets
CO-2	Apply dimensional reduction techniques for their own datasets
CO-3	Develop different clustering & classification techniques
CO-4	Design simple FNN
CO-5	Design CNN, RNN and LSTM networks for image classification and sentiment analysis
Course Code: B17CE4206	
Course Title: PROJECT WORK	
CO-1	Identify a current problem through literature/field/case studies
CO-2	Identify the background objectives and methodology for solving the same.
CO-3	Design a technology/ process for solving the problem.
CO-4	Develop a technology/ process for solving the problem.
CO-5	Evaluate that technology/ process at the laboratory level.

Electronics and Communication Engineering

Department Vision

Envision a diverse, Stimulating and consistent academic research ambience for the student community and shape them into competent professionals in the field of Electronics and Communication Engineering and cater to the needs of society with a keen sense of environmental consciousness.

Mission:

- Educating the students with the state of the art technologies in Electronics and Communication Engineering to meet the ever growing challenges of the industry.
- Nurturing the spirit of innovation and creativity in the faculty and students in order for them to carry out research in collaboration with research organizations and industry.
- Providing ethical and value based education that promotes activities pertaining to societal needs.

Program Educational Objectives (PEOs):

PEO1	Preparing our graduates for successful careers in design, installation, operation and maintenance of electronic systems and processes.
PEO2	Preparing our graduates to have the ability for lifelong learning by pursuing higher education, research and professional development
PEO3	Preparing our graduates to attain leadership roles in industry, academia and research organizations and innovate continuously.
PEO4	Preparing our graduates to develop management skills and become entrepreneurs.
PEO5	Preparing our graduates as ethical, responsible and value based professionals who work continuously for the benefit of the society.

Program Specific Outcomes (PSO's):

PSO1	Should be able to clearly understand the concepts and applications in the field of Electronics, Electromagnetics and Antennas, Communications, Signal Processing, Networking, Embedded Systems and Semiconductor technology
PSO2	Should be able to associate the learning from courses related to Microelectronics, Signal Processing, Microcomputers, Electromagnetics and Antennas, Embedded and Communication Systems to arrive at solutions to real world problems
PSO3	Should have the capability to comprehend the technological advancements in the usage of modern design tools to analyze and design subsystems and processes for a variety of applications.
PSO4	Should possess the skills to communicate in both oral and written forms, the work already done and the future plans with necessary road maps demonstrating the practices of professional ethics and the concerns for societal and environmental wellbeing.

Program Outcomes (POs):

Engineering Graduates will be able to:

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, review 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 sustain able 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 multi-disciplinary 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.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1101	
Course Title:ENGLISH – I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.
Course Code: B17 BS 1102	
Course Title: MATHEMATICS – I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
CO-3	Determine Laplace transform and inverse Laplace transform of various functions.
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jocobian and maxima/minima of functions of two variables.
CO-6	Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non homogeneous PDEs.
Course Code:B17 BS 1103	
Course Title:MATHEMATICS – II	
CO-1	Find a real root of algebraic and transcendental equations using different methods.
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpson's rules.
CO-4	Solve a first order ordinary differential equation by Euler and RK methods.
CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms, Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.
Course Code:B17 BS 1104	
Course Title:ENGINEERING PHYSICS	
CO-1	Learn the basic concepts of interference and diffraction of light and its applications.
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications.
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultrasonic as a tool for technological applications.
CO-4	Learn the behaviour of particles at the very microscopic level by using wave nature of particles and understand the behaviour of materials and be able to classify them using the band theory of solids.
CO-5	Learn the basics of structures of solid materials and nano material preparation techniques/methods.
Course Code:B17 CS 1101	
Course Title:COMPUTER PROGRAMMING USING C	
CO-1	Understand the basic terminology used in computer programming.
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program.
CO-4	Design programs involving decision structures, loops and functions.

CO-5	Explain the difference between call by value and call by reference.
CO-6	Understand the dynamics of memory by the use of pointers
CO-7	Use different data structures and create/update basic data files.

Course Code:B17 CE 1101	
Course Title:ENVIRONMENTAL STUDIES	
CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents
CO-5	Constitutional provisions for the protection of natural resources

Course Code:B17 BS 1106	
Course Title:ENGINEERING PHYSICS LAB	
CO-1	Students get hands on experience in setting up experiments and using the instruments/equipment individually.
CO-2	Get introduced to using new/ advanced technologies and understand their significance.

Course Code: B17 BS 1108	
Course Title: ENGLISH COMMUNICATION SKILS LAB- I	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts.
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.

Course Code: B17 CS 1103	
Course Title: C PROGRAMMING LAB	
CO-1	Apply and practice logical ability to solve the problems.
CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals.
CO-7	Identification of various computer components, Installation of software

Course Code: B17 BS 1110	
Course Title: ENGINEERING PHYSICS - VIRTUAL LABS-ASSIGNMENTS	
CO-1	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1201	
Course Title: ENGLISH – II	
CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.

CO-3	To express fluently and accurately in social discourse.
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.

Course Code: B17 BS 1203

Course Title: MATHEMATICS – III

CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix Reduce a Quadratic form to its canonical form and classify.
CO-3	Evaluate double integrals over a region and triple integral over a volume.
CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green"s, Stokes" and Gauss divergence theorems.

Course Code: B17 BS 1205

Course Title:ENGINEERING CHEMISTRY

CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly students understand liquid crystals and semiconductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.

Course Code:B17 ME 1201

Course Title:ENGINEERING DRAWING

CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

Course Code:B17 CS 1203

Course Title:DATA STRUCTURES

CO-1	Apply advanced data structure strategies for exploring complex data structures.
CO-2	Compare and contrast various data structures and design techniques in the area of Performance.
CO-3	Implement all data structures like stacks, queues, trees, lists and graphs and compare their performance and tradeoffs.
CO-4	Implement different operations on trees.
CO-5	Apply graphs to real time applications.
CO-6	Perform sorting using different algorithms.

Course Code:B17 EE 1203

Course Title:ELEMENTS OF ELECTRICAL ENGINEERING

CO-1	Able to understand the basics of Magnetic Circuits and Kirchhoff's laws.
CO-2	Able to understand the operation of DC Machines and to conduct different Tests
CO-3	Able to analyze the Performance of Transformers.
CO-4	Able to explain the operation of three phase induction motor.

CO-5	Able to explain the operation of three phase induction motor.

Course Code:B17 EE 1207

Course Title:ENGINEERING CHEMISTRY LAB

CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipment.
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.

Course Code:B17 BS 1208

Course Title:ENGLISH COMMUNICATION SKILS LAB- II

CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

Course Code:B17 BS 1209

Course Title:ENGINEERING WORKSHOP & IT WORKSHOP

CO-1	Use various tools to prepare basic carpentry and fitting joints.
CO-2	Prepare jobs of various shapes using black smithy.
CO-3	Make basic house wire connections.
CO-4	Fabricate simple components using tin smithy.

Course Code:B17 BS 1212

Course Title:INNER ENGINEERING

CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities.
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

Course Outcomes for Second Year First Semester Course

Course Code:B17BS2101

Course Title:MATHEMATICS IV

CO-1	Using the concept of Analytic function in applications including Electrostatics and Fluid dynamics.
CO-2	Finding theoretical solution of certain Elliptic, Parabolic and Hyperbolic partial differential equations.
CO-3	Using Z-transforms to solve linear difference equations with constant coefficients.
CO-4	Fitting of probability frequency distribution to a given data.
CO-5	Using the concepts of sampling theory to analyze data related to some large and small samples.

Course Code:B17BS2101

Course Title:ELECTRONIC DEVICES AND CIRCUITS

CO-1	Understand the physical structure, principles of operation, electrical characteristics and circuit models of diodes, BJ's and FE's.
CO-2	Use the concepts of semiconductor physics and electronic devices to design and fabricate simple electronic circuits.

CO-3	Use this knowledge to analyze and design amplifier circuits and oscillator circuits to be used in various applications.
CO-4	Extend the understanding of how electronic circuits and their functions fit into larger electronic systems.

Course Code:B17 EC 2102

Course Title:SWITCHING THEORY AND LOGIC DESIGN

CO-1	Understand various basic number systems, codes and basic logic gates.
CO-2	Learn various types of Boolean expressions and theorems and simplifications using K-map and Tabulation methods.
CO-3	Design and analyze combinational circuits using logic gates.
CO-4	Understand basics of Flip-flops, design and analyze sequential circuits using those Flip-flops and gates.
CO-5	Design of all types of counters and understand basics of Synchronous and Asynchronous sequential circuits, and analyze them.

Course Code:B17 EC 2103

Course Title:SIGNALS AND SYSTEMS

CO-1	Understand the basic concepts of signals and systems.
CO-2	Analyze the spectral characteristics of Continuous Time and Discrete Time periodic and aperiodic signals using Fourier analysis.
CO-3	Analyze system properties based on impulse response and Fourier analysis.
CO-4	Apply Laplace- transforms for analyzing Continuous -time signals and systems.
CO-5	Apply Z- transforms for analyzing discrete-time signals and systems.
CO-6	Understand the process of sampling and the effects of under sampling.

Course Code:B17 EE 2104

Course Title:NETWORK ANALYSIS

CO-1	Gain the knowledge on basic network elements and learn various circuits analyzing techniques
CO-2	Will learn the behavior of energy storing elements (Inductance & Capacitance) in circuits and analyses transient and steady state responses.
CO-3	Will analyze the RLC circuit behavior in detailed.
CO-4	Analyze the performance of periodic waveforms.
CO-5	Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h & g).

Course Code:B17 EC 2104

Course Title:PROBABILITY THEORY & RANDOM PROCESSES

CO-1	Understand the axiomatic formulation of modern probability theory.
CO-2	Characterize Probability Models and functions of Random variables based on single and multiple random variables.
CO-3	Evaluate and apply moments and characteristic functions and understand the concept of Inequalities and probabilistic limits.
CO-4	Understand the concept of Random process and determine covariance and spectral density of stationary random processes.
CO-5	Demonstrate the specific applications to Poisson and Gaussian process and representation of low pass and band pass noise models, Analyze the response of random inputs to linear time invariant systems.

Course Code:B17 CE 2107

Course Title:ELECTRONICS DEVICES AND CIRCUITS LAB

CO-1	Design and fabricate simple circuits like diode rectifiers with filters for providing dc voltages in electronic circuits.
CO-2	Design and fabricate amplifiers with required gain for use in various communication applications.
CO-3	Design and fabricate simple electronic circuits for everyday applications like traffic control lights using relays, automatic counters using LDRs and Burglar alarms.
CO-4	Design and fabricate simple circuits like diode rectifiers with filters for providing dc voltages in electronic circuits.

Course Code:B17 EE 2106	
Course Title:NETWORKS AND ELECTRICAL TECHNOLOGY LAB	
CO-1	Students will gain the skill to make and experiment with practical electric circuits.
CO-2	Students will be able to measure voltage, current, power in practical electric circuits.
CO-3	Students will know the significance of various theorems and their applications.
CO-4	Students will be able to model devices for circuit analysis.
CO-5	Students will be able to assess the behaviour of different electrical machines.
CO-6	Students will be able to predetermine the efficiency and regulation of different machines.
Course Code:B17 BS 2106	
Course Title:PROGRAMMING SKILLS-I(PYTHON)	
CO-1	Ability to apply object oriented concepts in programming.
CO-2	Ability to define, understand and differentiate different types of data types and apply them.
CO-3	Ability to recognize various concepts of python and develops the programs using them and also develop web based application.
Course Code:B17 BS 2107	
Course Title:ENGLISH PROFICIENCY-I	
CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts.
CO-5	Improve their inter-personal communication skills.
CO-6	Be confident in presentation skills.
Course Outcomes for Second Year Second Semester Course	
Course Code:B17EC2201	
Course Title:ELECTRONIC CIRCUIT ANALYSIS	
CO-1	Know the equivalent circuit of multistage amplifier and its analysis.
CO-2	Identify the different feedback topologies and analyze them.
CO-3	Explain the principle of oscillator and design different types of sinusoidal oscillators.
CO-4	Define the difference between voltage and power amplifiers and design different classes and know that Tuned amplifiers amplify a narrow band of frequencies and will also be able to analyze them.
CO-5	Identify that Op-amp not only amplifies but also performs different operations and analyze some of its applications.
Course Code:B17 EE 2203	
Course Title:CONTROL SYSTEMS	
CO-1	Students will be able to model electrical and mechanical physical systems by applying laws of physics.
CO-2	Students will be able to represent mathematical models of systems using block diagrams & Signal Flow Graphs and derive their transfer functions.
CO-3	Students will be able to analyze systems in time domain for transient and steady-state behaviour.
CO-4	Students will learn the concept of stability and use RH criterion and Root locus methods for stability analysis.
CO-5	Students will learn to obtain frequency response plots of systems and use them for system analysis and stability assessment.
Course Code:B17 EC 2202	
Course Title:ELECTRO MAGNETIC FIELD THEORY & TRANSMISSION LINES	
CO-1	Ability to apply the knowledge of mathematics, Science and engineering to the Analysis and design of systems involving electric and magnetic fields as well as

	Electromagnetic Waves.
CO-2	Ability to identify, formulate and solve engineering problems in the area of electric and Magnetic fields and waves.
CO-3	Ability to use Maxwell's equations to solve electromagnetic field problems.
CO-4	Ability to apply the knowledge of electromagnetic fields in practical transmission lines and waveguides.

Course Code:B17 EC 2203

Course Title:ANALOG COMMUNICATIONS

CO-1	Understand the need for modulation and the concepts of Amplitude Modulation and Demodulation techniques and evaluate various parameters in time and frequency Domain.
CO-2	Understand the concepts of Angle Modulation and Demodulation techniques and Evaluate various parameters of Angle modulated waveform in Time and Frequency Domain
CO-3	Analyze and compare the performance of various analog modulation techniques in the presence of noise.
CO-4	Analyze different characteristics of transmitters.
CO-5	Analyze different characteristics of receivers.

Course Code:B17 EC 2204

Course Title:COMPUTER ARCHITECTUE AND ORGANIZATION

CO-1	Understand how computers represent and manipulates data.
CO-2	Develop the general architecture design of a digital computer.
CO-3	Learn the art of Microprogramming.
CO-4	Develop independent learning skills to interface main memory & I/O.

Course Code:B17 BS 2201

Course Title:MANAGEMENT SCIENCE

CO-1	Create awareness about the concepts like Evolution of Management thought, functions & principles of management.
CO-2	Provide all round information to the students about matters related to concepts & functions related to Marketing.
CO-3	Acquire in-depth knowledge about the concepts and functions of HRM.
CO-4	Understand about aspects of Production Management and Financial Management
	Gain knowledge about Strategy formulation & implementation, SWOT analysis in order to compete with the competition & to gain competency advantage.

Course Code:B17 EC 2207

Course Title:ANALOG ELECTRONIC CIRCUITS LAB WITH SIMULATION

CO-1	Acquire a basic knowledge on simple applications of operational amplifier.
CO-2	Observe the amplitude and frequency responses of negative feedback amplifier and two stages RC coupled amplifier.
CO-3	Design and test sinusoidal oscillators.
CO-4	Design and test a power amplifier.
CO-5	Design, construct and take measurement of the analog electronic circuits to compare experimental results in the laboratory with theoretical analysis.
CO-6	Use Multisim to test their electronic design.

Course Code:B17 EC 2208

Course Title:ANALOG COMMUNICATION LAB

CO-1	Design and implement modulation and demodulation circuits for amplitude modulation technique.
CO-2	Design and implement modulation and demodulation circuits for frequency modulation technique.
CO-3	Design second order passive and active filters for various frequency bands.
CO-4	Construct the circuit and study the characteristics of different transmitter and receiver circuits such as Harmonic generator, RF Amplifier, IF Amplifier, pre-emphasis and de-emphasis.

Course Code:B17 BS 2205	
Course Title:PROGRAMMING SKILLS-II(JAVA)	
CO-1	Ability to define different procedural and object oriented concepts and will be able to differentiate between them.
CO-2	Ability to define, understand and differentiate different types of arrays and apply them.
CO-3	Ability to recognize various concepts of java and develops the programs using them.
CO-4	Ability to identify and differentiate the various features of AWT components to construct container based programs
Course Code:B17 BS 2204	
Course Title:PROFESSIONAL ETHICS & HUMAN VALUES	
CO-1	By the end of the course student should be able to understand the importance of ethics and values in life and society.
Course Outcomes for Third Year First Semester Course	
Course Code:B17 EC 3101	
Course Title:PULSE AND DIGITAL CIRCUITS	
CO-1	Understand the applications of Integrator, differentiator circuits.
CO-2	Design of different clipping circuits and understand the applications clamper circuits.
CO-3	Analyze different Bi-stable, Monostable, AstableMultivibrators and Schmitt trigger for various applications.
CO-4	Understand Different Time Base Generators.
CO-5	Analyze synchronization techniques for sweep circuits and to understand different logic families; realize logic gates using diodes and transistors.
Course Code:B17 EC 3102	
Course Title:LINEAR ICS AND APPLICATIONS	
CO-1	Understand the external behaviour and characteristics of operational amplifier.
CO-2	Design and analyze linear and non-linear circuits using operational amplifier.
CO-3	Design and analyze oscillators and active filters using operational amplifier.
CO-4	Design and analyze various applications using IC 565 and IC 555.
CO-5	Understand the operation of Analog to Digital and Digital to Analog Converters.
Course Code:B17 EC 3103	
Course Title:ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	
CO-1	Evaluate basics of measurement systems, principle of basic meter
CO-2	Evaluate how a signal can be generated using different types of meters.
CO-3	Investigate a signal / waveform with different oscillators.
CO-4	Use bridges of many types and measure appropriate parameters
CO-5	Design different transducers for measurement of different parameters.
Course Code:B17 EC 3104	
Course Title:DIGITAL COMMUNICATION	
CO-1	Understand the basic concepts of sampling and digital communication systems.
CO-2	Understand the concept of binary and M-ary modulation techniques.
CO-3	Understand the problems of noise and can design any digital communication system for the real time environment.
CO-4	Designing of optimal receiver and understanding the concept of probability of error.
CO-5	Analyze the error performance of two digital modulation techniques and understand the concept of spread spectrum communication system
Course Code:B17 EC 3105	
Course Title:ANTENNAS & PROPAGATION	

CO-1	Understand Radiation mechanism and functions of antennas, identify antenna parameters derive expressions for antenna parameters .
CO-2	Analyze and design wire and aperture antennas for different applications.
CO-3	Analyze and design Antenna arrays.
CO-4	Capable of performing various antenna measurements and come up with conclusions about antenna parameters and performance
CO-5	Identify characteristics of radio wave propagation and be able to design different types of communication links for different frequency bands

Course Code:B17 EC 3106

Course Title:COMPUTER NETWORK ENGINEERING

CO-1	Explain basic computer network principles and layers of the OSI model and TCP/IP.
CO-2	Explain the concepts of transmission media, switching and multiplexing techniques.
CO-3	Explain and analyze the error control and flow control methods.
CO-4	Explain different multiple access control protocols and IEEE standards for LANs and MANs
CO-5	Identify the different types of connecting devices and explain the basic concepts of congestion control algorithms and internetworking.
CO-6	Explain TCP and UDP header formats

Course Code:B17 EC 3107

Course Title:LINEAR INTEGRATED CIRCUITS & PULSE CIRCUTS LAB WITH SIMULATION

CO-1	Design and conduct experiments on RC low pass and high pass circuits.
CO-2	Observe operation of UJT Sweep Generator.
CO-3	Design and test different types of Multi vibrators
CO-4	Acquire a basic knowledge on simple applications of operational amplifier.
CO-5	Design, construct Schmitt trigger using operational amplifier.
CO-6	Use Multisim to test their electronic designs.

Course Code:B17 EC 3108

Course Title:DIGITAL IC'S LABORATORY WITH SIMULATION

CO-1	Synthesize, simulate and implement a digital design in a configurable digital circuit with computer supported aid tools and digital trainer kit.
CO-2	Acquire Knowledge of analysis and synthesis of combinational and sequential circuits with simulators and digital trainer kits.
CO-3	Build high level programming (HDL programming) skills for digital circuits.
CO-4	Adapt digital circuits to electronics and telecommunication field.

Course Code:B17BS310

Course Title:PROBLEM SOLVING & LINGUISTIC COMPETENCE

PART-A (Verbal and Soft Skills-I)

CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.

Part-B (Quantitative Aptitude –I)

CO-1	The students will be able to perform well in calculating on number problems and various units of ratio concepts.
CO-2	Accurate solving problems on time and distance and units related solutions.

CO-3	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability.
CO-4	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any Person to be placed in the industry.
CO-5	The students will learn to apply Logical thinking to the problems of syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, and GATE for further studies.

Course Code:B17 BS 3102

Course Title:BASIC CODING

CO-1	Know about Control Structures, Loop Structures and branching in programming.
CO-2	Know about various searching and sorting methods.
CO-3	Know about Functions, Recursions and Storage Classes.
CO-4	Know about Structures and Unions.
CO-5	Know different Operating System concepts.
CO-6	Differentiate OSI Model Vs. TCP/IP suite.

Course Outcomes for Third Year Second Semester Course

Course Code:B17EC3201

Course Title:MICROPROCESSORS AND ITS APPLICATIONS

CO-1	Understand and analyze architecture of the 8085 microprocessor
CO-2	Be familiar with the 8085 Assembly Language Programming
CO-3	Be familiar with Hardware and software requirements in interfacing and designing 8085 microprocessor based products for practical applications
CO-4	Understand and analyze architecture of the 8086 microprocessor
CO-5	Be familiar with the 8086 Assembly Language Programming

Course Code:B17EC3202

Course Title:MICROWAVE ENGINEERING

CO-1	Explain the working principle of different passive waveguide components used at microwave frequencies.
CO-2	Apply the properties of scattering matrix for solving the scattering matrix of different passive microwave components for both ideal and practical considerations and analyze their operation.
CO-3	Understand the conceptual and operational characteristics of different microwave Tube circuits
CO-4	Explain the operational characteristics of different microwave solid state devices.
CO-5	Understand and implement different experimental procedures involving measurement of microwave parameters

Course Code:B17EC3203

Course Title:VLSI DESIGN

CO-1	Apply the Concept of design rules during the layout of a circuit.
CO-2	Model and simulate digital VLSI systems using hardware design language.
CO-3	Synthesize digital VLSI systems from register-transfer or higher level descriptions
CO-4	Understand current trends in semiconductor technology, and how it impacts scaling and performance.
CO-5	Understand the basic concepts of FPGA and low power VLSI design

Course Code:B17 EC 3204

Course Title:DIGITAL SIGNAL PROCESSING

CO-1	Describe the DSP fundamental theory and components, Develop an understanding of DSP advantages, limitations and fundamental tradeoffs. Carry-out LTI system analysis using convolution & Z-transform
CO-2	Carryout data analysis &spectrum analysis using FFT

CO-3	Design of IIR digital filters to meet specifications
CO-4	Design of FIR digital filters to meet specifications
CO-5	Knows multi-rate signal processing aspects & DSP applications

Course Code:B17EC3205

Course Title:RADAR ENGINEERING

CO-1	Able to understand the basic working principles of various Radars.
CO-2	Apply various mathematical equations to measure the Range and angle information of the targets from the radar.
CO-3	Analyze and design of radar signals, MTI, Pulse Doppler radar and various tracking Radars
CO-4	Analyze various Radar systems, advantages, limitations and their applications.
CO-5	Analyze various Navigational Aids like LORAN, DECCA and VOR.

Course Code:B17EC3206

Course Title:MICROCONTROLLERS

CO-1	Understand instruction execution sequence with clock.
CO-2	Gain comprehensive knowledge about architecture and addressing modes of 8051
CO-3	Learn the art of programming in assembly language for various embedded system applications.
CO-4	Develop independent learning skills to interface memory and PPI with 8051
CO-5	Create the IO interfacing techniques with 8051

Course Code:B17CS3214

Course Title:OOPS THROUGH JAVA

CO-1	Understand Java programming concepts and utilize Java Graphical User Interface in Program writing.
CO-2	Write, compile, execute and troubleshoot Java programming for networking concepts.
CO-3	Build Java Application for distributed environment.
CO-4	Design and Develop multi-tier applications.
CO-5	Identify and Analyze Enterprise applications

Course Code:B17CS3215

Course Title:DATA MINING

CO-1	Understand stages in building a Data Warehouse
CO-2	Understand the need and importance of pre processing techniques
CO-3	Understand the need and importance of Similarity and dissimilarity techniques
CO-4	Analyze and evaluate performance of algorithms for Association Rules.
CO-5	Analyze Classification and Clustering algorithms

Course Code:B17ME3210

Course Title:INDUSTRIAL ROBOTICS

CO-1	Identify various robot configuration and components,
CO-2	Select appropriate actuators and sensors for a robot based on specific application
CO-3	Carry out kinematic and dynamic analysis for simple serial kinematic chains.
CO-4	Perform trajectory planning for a manipulator by avoiding obstacles

Course Code:B17EE3209

Course Title:POWER ELECTRONICS

CO-1	Explain the principle of operation of thyristor, modern power semiconductor devices and necessity of series and parallel connection of thyristors.
CO-2	Explain the operation of Firing and Commutation techniques.

CO-3	Evaluate the phase controlled rectifiers with different loads.
CO-4	Analyse different Choppers, Cyclo-converter and AC voltage Controller configurations.
CO-5	Investigate harmonic reduction techniques for inverters based on PWM techniques

Course Code:B17EC3207

Course Title:BIO MEDICAL ENGINEERING

CO-1	Possess the basic mathematical skills necessary to analyze ECG and EEG signals.
CO-2	Possess the basic scientific skills necessary to analyze ECG and EEG signals
CO-3	Possess the basic computational skills necessary to analyze ECG and EEG signals.
CO-4	Apply classical and modern filtering and compression techniques for ECG and EEG Signals
CO-5	Develop a thorough understanding on basics of ECG and EEG feature extraction.

Course Code:B17CS3216

Course Title:ARTIFICIAL NEURAL NETWORKS

CO-1	This Course introduces Artificial Neural Networks and Learning Rules and Learning method.
CO-2	Feed forward and Feedback Neural Networks are introduced
CO-3	Applications of Neural Networks in different areas are introduced.

Course Code:B17 EC 3208

Course Title:MICROPROCESSORS AND MICROCONTROLLERS LAB

CO-1	To become familiar with the instruction set of Intel microprocessors and microcontroller.
CO-2	To familiarize with Assembly language programming.
CO-3	The accompanying lab is designed to provide practical hands-on experience with microprocessor software applications and interfacing techniques.

Course Code:B17EC3209

Course Title:VLSI LAB

CO-1	Learn the work flow of mentor graphic tools/Cadence tools for logic gates, Combinational and Sequential circuits.
CO-2	Simulate combinational and sequential circuits with EDA tools
CO-3	Acquire Knowledge of analysis of combinational and sequential circuits using CMOS 130nm Technology
CO-4	Acquire practical experience in drawing layouts using Cadence/Mentor Graphics CAD tools.

Course Code:B17BS3201

Course Title:EMPLOYABILITY SKILLS

Part-A (Verbal Aptitude and Soft Skills-II)

CO-1	Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign Universities), letters of recommendation(for professional and educational purposes).
CO-4	Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, and respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process.

Part-B (Quantitative Aptitude-II)

CO-1	The students will be able to perform well in calculating different types of data interpretation problems.
CO-2	The students will perform efficaciously on analytical and logical problems using various methods.
CO-3	Students will find the angle measurements of clock problems with the knowledge of calendars and clock.
CO-4	The students will skillfully solve the puzzle problems like arrangement of different positions.
CO-5	The students will become good at solving the problems of lines, triangular, volume of cone, cylinder and so on.

Course Code:B17BS3203

Course Title:ADVANCED CODING

CO-1	Acquire coding knowledge on essential of modular programming
CO-2	Acquire Programming knowledge on linked lists
CO-3	Acquire coding knowledge on ADT
CO-4	Acquire knowledge on time complexities of different methods
CO-5	Acquire Programming skill on Java libraries and Collections

Course Code:B17BS3206

Course Title:IPR & PATENTS

CO-1	Identify various types of intangible property that an engineering professional could generate in the course of his career.
CO-2	Distinguish between various types of protection granted to Intellectual Property such as Patents, Copy Rights, Trademarks etc.,
CO-3	List the steps involved in getting protection over various types of intellectual property and maintaining them.
CO-4	Take precautions in writing scientific and technical reports without plagiarism.
CO-5	Help micro, small and medium entrepreneurs in protecting their IP and respecting others IP as part of their business processes.

Course Outcomes for Final Year First Semester Course

Course Code:B17EC4101

Course Title:WIRELESS COMMUNICATIONS & NETWORKS

CO-1	Demonstrate the understanding on the functioning of wireless communication systems and evolution of different wireless communication standards.
CO-2	Explain the functioning, protocols, capabilities and application of various wireless communication systems.
CO-3	Ability to apprehend various propagation mechanisms and challenges in Wireless Communication.
CO-4	Demonstrate an ability to evaluate design challenges, constraints in wireless networks.

Course Code:B17EC4102

Course Title:DIGITAL IMAGE PROCESSING

CO-1	Explain digital image fundamentals and basic image processing techniques.
CO-2	Evaluate the techniques for image enhancement and restoration.
CO-3	Define the need for image compression and to analyse various image compression methods.
CO-4	Experiment the Partition of a digital image into multiple objects using various techniques.
CO-5	Illustrate the use of different color models to represent an image.

Course Code:B16EC4103

Course Title:FIBER OPTIC COMMUNICATIONS

CO-1	Summarize the basic concepts of optical communication and demonstrate its components.
CO-2	Apply basic concepts of optical communication components and systems.
CO-3	Gain the knowledge of different sources of light as well as detectors and their comparative study.
CO-4	Analyze concepts of optical communication systems for the basic design of optical communication

	links
Course Code:B17 EC 4104	
Course Title:EMBEDDED SYSTEMS & INTERNET OF THINGS	
CO-1	Get familiarity with architecture and communication protocols of embedded systems and IoT.
CO-2	Apply the knowledge of embedded systems in understanding the concepts of IoT.
CO-3	Apply the knowledge of different protocols of IoT.
CO-4	Analyze data from physical devices through the cloud using data analytics.
Course Code:B17 EC4105	
Course Title:INFORMATION THEOTRY AND CODING (Elective – I)	
CO-1	Appreciate the mathematical concept of information (uncertainty) via probability, compute the entropy of a source &Understandthe need of source coding & variable length codes.
CO-2	Device source codes using Shannon-Fano& Huffman algorithms, calculate the efficiency of a code.
CO-3	Compute mutual entropy of a channel, understand the concept of channel capacity, State Shannon's noisy channel coding theorem which creates the field of channel coding, compute channel capacity of BSC & AWGN channels, definecharacteristics of an ideal communication system.
CO-4	Realize the need & benefits of channel coding, Understand Linear block codes structure, theory &use syndrome technique for decoding for linear block codes, Study cyclic codes (BCH, RS and CRC) structure, theory, implementation & decoding of cyclic codes, differentiate source coding and channel coding &learn applications of coding.
CO-5	Study Convolutional codes representation, generation & decoding of convolutional codes using Viterbi algorithm, get acquainted with concatenated codes to increase coding gain & Trellis Coded Modulation (TCM), Know modern codes & pursue modern wireless communications & information security courses.
Course Code:B17 EC 4106	
Course Title:SATELLITE COMMUNICATIONS & GPS(Elective – I)	
CO-1	Apply fundamentals of Kepler's planetary motion in satellite communication and GPS.
CO-2	Analyze and build the space segment, depending upon the requirement
CO-3	Design link margin for various applications.
CO-4	Choose the correct multiple access technique for better communication.
Course Code:B17 EC 4107	
Course Title:ANALOG IC DESIGN (Elective – I)	
CO-1	Outline the concepts of MOS Devices ,MOS device characteristics, MOS device modeling, CMOS amplifiers, Open-Loop Comparators and different types of oscillators
CO-2	Analyze Analog CMOS Sub circuits and Complex Analog Circuits
CO-3	Design Analog CMOS Sub circuits, CMOS amplifiers, CMOS op-amps and Complex Analog Circuits
CO-4	Extend the analog circuit design to different applications.
Course Code:B17 EC 4108	
Course Title:DIGITAL SIGNAL PROCESSING LAB	
CO-1	Make use of MATLAB simulation tool for performing various operations on discrete signals.
CO-2	Make use of MATLAB simulation tool to verify different DSP algorithms.
CO-3	Make use of MATLAB simulation tool to perform various operations on an Image
Course Code:B17 EC 4109	
Course Title:INTERNET OF THINGS LAB	
CO-1	Able to acquire knowledge on interfacing different sensors and communication modules with the System on Chip Modules.
CO-2	Able to connect SOC devices with the cloud for accessing and analyzing the data.
Course Outcomes for Final Year Second Semester Course	

Course Code:B17 EC 4201	
Course Title:CELLULAR & MOBILE COMMUNICATIONS	
CO-1	Applying the fundamentals of mobile communication systems, cellular concepts and Handoff calculate the amount of interference, frequency reuse distance and capacity of a cellular system.
CO-2	Demonstrate an ability to explain multiple access techniques for Wireless Communication
CO-3	Able to understand the basics of GSM mobile communication standard, its architecture.
CO-4	Apply knowledge of reflection, diffraction and scattering to calculate link budget using path loss models

Course Code:B17 EC 4202	
Course Title:AI & MACHINE LEARNING (Elective – II)	
CO-1	Summarize the basic concepts of artificial intelligence and its applications.
CO-2	Classify the regression and classification techniques
CO-3	Characterize machine learning algorithms as supervised and unsupervised
CO-4	Understand and apply classification and clustering techniques.
CO-5	Interpret concepts of neural networks and their architectures.

Course Code:B17 EC 4203	
Course Title:NETWORK SECURITY & CRYPTOGRAPHY (Elective – II)	
CO-1	Analyze the algorithms on security problems.
CO-2	Understand and apply symmetric and asymmetric approaches.
CO-3	Understand and apply symmetric and asymmetric approaches.
CO-4	Understand, apply and analyze various malicious Software's.
CO-5	Be familiar with some internet security protocols and standards.

Course Code:B17 EC 4204	
Course Title:DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES (Elective - II)	
CO-1	Implement the DFT and FFT on signals and different types of computations of DSP with basic mathematics.
CO-2	Able to deal with the basic architecture and different design issues in DSP processors.
CO-3	Able to perform the operations with different families of commercially available DSP processors.
CO-4	Connect the DSP processors to different interfacing devices.

Course Code:B17 EC 4205	
Course Title:ADVANCED COMMUNICATIONS LABORATORY	
CO-1	Comprehend the microwave signal measurement using VSWR and frequency meter.
CO-2	Comprehend the design, application and practical implementation of various Digital Modulation techniques.
CO-3	Identify the challenges in practical implementation of Microwave Communication systems.
CO-4	Apply the knowledge of antennae to plot the characteristics of various antennae and its coverage area.
CO-5	Comprehend the characteristics and various losses associated with OFC channels.

Course Code:B17 EC 4207	
Course Title:PROJECT WORK	
CO-1	Identify a current problem through literature/field/case studies
CO-2	Identify the background objectives and methodology for solving the same
CO-3	Design a technology/ process for solving the problem.
CO-4	Develop a technology/ process for solving the problem.
CO-5	Evaluate that technology/ process at the laboratory level.

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