



Dr. LANKAPALLI BULLAYYA COLLEGE OF ENGINEERING

The Society For Collegiate Education

Affiliated to Andhra University, Approved by AICTE

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2.6.1 Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website

The major components of Outcome Based Education (OBE) are Course Outcome (CO) and Program Outcome (PO). Course outcomes are the statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by the course instructor, as per the syllabus of the course. The number of Course outcomes for a theory course varies from four to six. The number of Course outcomes for a laboratory course varies from three to six. The keywords used to define COs are based on Bloom's Taxonomy.

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviours that students acquire as they progress through the program.

- 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 sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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

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

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

Programme Outcomes and Course Outcomes of all Programmes offered by the institution are displayed on website of the institution.



Dr. Lankapalli Bullayya College of Engineering

New Resapuvani Palem, Visakhapatnam

Sponsored by Society of Collegiate Education

Approved by AICTE, Affiliated to Andhra University

Regulation : 2019-2020

Name of the Program: BTech Civil Engineering

2.6.1 Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website .

S.No	Course Name	Course Outcome Number	Course Outcome Description
1	Mathematics – I	CE1101.1	Find the partial derivatives of functions of two or more variables
		CE1101.2	Evaluate maxima and minima errors and approximations
		CE1101.3	Solve the ordinary differential equations of first order and first degree.
		CE1101.4	Solve Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay
		CE1101.5	Evaluate the Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.
2	Mathematics – II	CE1102.1	Find rank, Eigen values and Eigen vectors of a matrix and understand the importance of Cayley-Hamilton theorem.
		CE1102.2	Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.
		CE1102.3	Understand Laplace transforms and its properties
		CE1102.4	Apply Laplace Transforms to ordinary differential equations.
		CE1102.5	Expand a perfect periodical function as Fourier Series and half range Fourier series.
3	Chemistry	CE1103.1	Identify the importance of water treatment parameters and its applications.
		CE1103.2	Understand the concepts of environmental influence on corrosion, its mechanism with metals and controlling methods.
		CE1103.3	Educate Preparation methods of polymers and plastics.
		CE1103.4	Analyse and design fuel technology lubrication mechanism.
		CE1103.5	Identify the characteristics and applications of Nano- materials.
4	Computer Programming With C And Numerical Methods	CE1104.1	Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and apply them in problem solving.
		CE1104.2	Apply various operations on derived data types like arrays and strings in problem solving.
		CE1104.3	Design and implement of modular Programming and memory management using Functions, pointers.
		CE1104.4	Apply Structure, Unions and File handling techniques to Design and Solve different engineering programs with minimal complexity.
		CE1104.5	Apply Numerical methods to Solve the complex Engineering problems.

5	Essence Of Indian Traditional Knowledge	CE1105.1	· By the end of this course the students should be able to understand the contribution of Scientific and Technological developments for the benefit of society at large.
		CE1105.2	· Students should be able to understand and appreciate the latest Technological developments and their impact on quality of human life.
		CE1105.3	Students should be able to effectively apply the contributions made by the Technological advancements to the overall growth of nation's economy
		CE1105.4	· Students should be able to identify the gaps and problems in the process of Technological transfer and find ways to avoid or bridge the gaps.
6	English	CE1106.1	· Students will be able to analyse a given text and discover the various aspects related to language and literature;
		CE1106.2	· Learn the various language structures, parts of speech and figures of speech;
		CE1106.3	· Develop one's reading and writing abilities for enhanced communication; and
		CE1106.4	· Learn to apply the topics in real-life situations for creative and critical use.
7	Chemistry Lab	CE1107.1	To understanding the estimation of quantitative amount present in given sample
		CE1107.2	To utilise the fundamental laboratory techniques
		CE1107.3	Student acquaint the skills in organic synthesis of polymers and drugs
8	Computer Programming With Numerical Methods Lab	CE1108.1	Understand various computer components, Installation of software. C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
		CE1108.2	Analysing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
		CE1108.3	Construct programs that demonstrate effective use of C features including arrays, strings, structures, pointers and files.
		CE1108.4	Apply and practice logical ability to solve the real-world problems.
		CE1108.5	Apply Numerical methods to Solve the complex Engineering problems.
9	Mathematics – III	CE1201.1	Evaluate double integration in cartesian and polar coordintes.
		CE1201.2	Apply the Beta, Gamma functions in evaluation of integration.
		CE1201.3	Find the area of curved surfaces and volume of solids
		CE1201.4	Find the Limit and continuity of $f(z)$ - Derivative of $f(z)$. Verify Analytic Functions by using Cauchy- Reimann Equations, Orthogonal systems, Applications to flow problems, Geometrical representation of $f(z)$.Integration of complex functions, Cauchy's theorem, Cauchy's integral formula and their applications
		CE1201.5	Obtain Conformal transformation, Bilinear transformation , Series of complex terms -Taylor's and Laurent's series (without proofs), Zero's and Singularities of analytic functions. Residues and Calculations of residues, Cauchy's Residue Theorem, Evaluation of real definite integrals: Integration around unit circle, semi circle

10	Physics	CE1202.1	Understand the concepts of mechanics, Understand physical characteristics of SHM and obtaining solution of the oscillator using differential equations.
		CE1202.2	Gain Knowledge on the basic concepts of electric and magnetic fields. Understand the concept of the nature of magnetic materials. Gain knowledge on electromagnetic induction and its applications .
		CE1202.3	Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit.
		CE1202.4	Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fiber. Realize their role in optical fiber communication.
		CE1202.5	Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles
11	Engineering Graphics	CE1203.1	Understand the basics of Engineering Graphics and BIS conventions.
		CE1203.2	Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings
		CE1203.3	Demonstrate and practice the various profiles/curves used in engineering practice through standard procedures.
		CE1203.4	Demonstrate and practice the orthographic projections of points, lines, planes, solids and section of solids
		CE1203.5	Demonstrate and practice the development of surfaces of simple solids and Familiarize the basic concept of isometric views clearly.
12	Introduction To Civil Engineering	CE1204.1	Able to describe the principles and classification of surveying and asses the area of irregular boundaries.
		CE1204.2	Able to calculate angular measurements using compass
		CE1204.3	Able to understand the working principles of plane table surveying instruments.
		CE1204.4	Can able to estimate the levels and apply curvature and refraction effect.
		CE1204.5	Will able to identify and draw the contours
13	Professional Ethics And Moral Values	CE1205.1	Understand the meaning of the concept- laws related to Engineers and have a better critical capacity.
		CE1205.2	Self- explore by using different methods to live in harmony at different levels.
		CE1205.3	Evaluate themselves and understand their position in relation to morality and ethics successfully.
		CE1205.4	Awareness about themselves and their surroundings and becoming more responsible in life and in solving sustainable problems.
		CE1205.5	Give solutions with a focus on human relationships and human nature.
14	Physics Lab	CE1206.1	Ability to design and conduct experiments as well as to analyze and interpret
		CE1206.2	Ability to apply experimental skills to determine the physical quantities related to Heat, Electromagnetism and Optics
		CE1206.3	The student will learn to draw the relevance between theoretical knowledge and the means to imply
		CE1206.4	it in a practical manner by performing various relative experiments.

15	Work Shop	CE1207.1	Can be able to work with Wood Materials in real time applications.
		CE1207.2	Can be able to build various parts with Sheet Metal in day-to-day life
		CE1207.3	Can be able to apply Metal Fitting skills in various applications.
		CE1207.4	Can be able to apply this knowledge to basic house electrical wiring and repairs.
16	Mathematics-iv	CE2101.1	Apply the differential operator 'del' to the scalar and vector point functions, Calculate the Gradient, Divergence and Curl, Vector normal to a surface, evaluate the physical concepts like workdone, force and circulator using these operators.
		CE2101.2	Understand the vector differentiation and integration to the engineering problems and Green's theorem in the plane, Stoke's theorem, Gauss Divergence theorem
		CE2101.3	Formulate Partial differential equations and evaluate the linear and nonlinear, Homogeneous and Non-homogeneous partial differential equations.
		CE2101.4	Apply and find the solutions of one-dimensional wave (string equation), one -and two-dimensional Heat flow equations, Laplace's equation in Cartesian and polar coordinates
		CE2101.5	Find the Fourier transforms, Fourier Sine, Cosine and related inverse transforms of different functions and their applications in solving several Physical and Engineering problems
17	Engineering Geology	CE2102.1	· Students can identify different types of rocks and their mineral composition.
		CE2102.2	· Students will study the physical properties of minerals by conducting laboratory tests.
		CE2102.3	· Students can study the models of folds, faults, joints and tunnels.
		CE2102.4	Students can study the satellite data and evaluate the terrain through integrated approach
18	Mechanics Of Materials	CE2103.1	The student can understand the concepts of stress and strain by analysis of solids.
		CE2103.2	The student can understand the engineering properties of materials, force-deformation, and stress-strain relationships.
		CE2103.3	The student can understand the determinate and indeterminate members, and beams, torque, shear forces, and bending moments.
		CE2103.4	The student can understand the design the thick and thin cylinder.
		CE2103.5	The student can understand the combined bending and direct stresses on column and strut members, axial load on open and closed coiled helical spring subjected to axial load.
19	Surveying-I	CE2104.1	· Able to describe the principles and classification of surveying and asses the area of irregular boundaries.
		CE2104.2	· Able to calculate angular measurements using compass
		CE2104.3	· Able to understand the working principles of plane table surveying instruments.
		CE2104.4	· Can able to estimate the levels and apply curvature and refraction effect.
		CE2104.5	Will able to identify and draw the contours

20	Engineering Mechanics	CE2105.1	Apply the principles of free body diagrams & equilibrium conditions in industries while designing any component
		CE2105.2	Solve the static equilibrium of rigid bodies
		CE2105.3	Estimate the trajectory and range of missiles in defense
		CE2105.4	Estimate the displacement, velocity and accelerations of moving bodies
		CE2105.5	Analyze the work energy method and apply these methods to practical problems
21	Building Materials And Building Construction	CE2106.1	Student will have the capability of testing of building construction materials using cement, bricks, aggregate, etc.... to find various properties of them.
		CE2106.2	Student will have the capability of preservation of building construction materials like cement, bricks, aggregate, etc.... from the external agencies. weather, etc
		CE2106.3	Student will understand different type of masonry and types of foundations
		CE2106.4	Students will learn wall surface finishes and concrete grades & mix designs upto M 20 as per IS code
		CE2106.5	Students will understand the design concepts of different types of windows, Doors and stair cases etc
22	Materials, Testing And Evaluation Lab	CE2107.1	the student will be able to Understand strength and quality of materials through laboratory tests
		CE2107.2	the student will be able to Understand about properties of elastic materials
		CE2107.3	the student will be able to Find deformation of materials after the respective experiment
		CE2107.4	the student will be able to Apply the knowledge of mathematics to find the properties of materials
23	Surveying Field Work	CE2108.1	After successful completion of the course,the students will able to undertake survey using level theodolite.
		CE2108.2	The students will able to undertake survey using total station.
		CE2108.3	Fully equipped with various surveying concepts and methods using advanced ground survey equipments.
24	Surveying - II	CE2201.1	Will able to set out curves, buildings, culverts and tunnels.
		CE2201.2	Will able to carry out a geodetic survey, taking accurate measurements using instruments and adjusting the traverse .
		CE2201.3	Will able to apply mathematical adjustment of accidental errors involved in surveying measurements .
		CE2201.4	Will able to plan a survey for applications such as road alignment and height of the building .
		CE2201.5	Will able to invoke advanced surveying techniques over conventional methods in the field of civil engineering .
25	Fluid Mechanics - I	CE2202.1	Understand the significant properties of fluids and pressure measurement, and analyze hydrostatic forces on plane and curved surfaces
		CE2202.2	Comprehend kinematics of fluid flow and further derive and apply continuity, problems such as seepage analysis.
		CE2202.3	Understand the theory of flow measuring devices in pipes and open channel flows, using Bernoulli's equation.
		CE2202.4	Compute forces on pipe bends using linear impulse momentum application
		CE2202.5	Perform analysis of pipes and hydraulic design of pipe networks.

26	Structural Analysis - I	CE2203.1	the student will be able to calculate the deflection of beams using Double integration and Macaulays method
		CE2203.2	the student will be able to calculate the deflection of beams using moment area method, conjugate beam, unit load method and castiglianos theorem
		CE2203.3	the student will be able to calculate the strain energy due to axial loading ,BM, shear stress and torque
		CE2203.4	the student will be able to construct a SFD and BMD for fixed beams and continuous beams using compatibility methods.
		CE2203.5	the student will be able to Compute the different loads for trusses and influence lines
27	Environmental Engineering - I	CE2204.1	Select a source based on quality and quantity
		CE2204.2	Estimate design population and water demand
		CE2204.3	Design a water treatment plant for a village/city
		CE2204.4	Design a sewer by estimating DWF and Storm water flow and plumbing system for buildings
		CE2204.5	Design a Sewage Treatment Plant for a town/city.
28	Geotechnical Engineering - I	CE2205.1	Students will be able to Carry out soil classification
		CE2205.2	Students will be able to solve three phase system problems
		CE2205.3	Students will be able to solve any practical problems related to soil stresses estimation, permeability and seepage including flow net diagram
		CE2205.4	Students will be able to estimate the stresses under any system of foundation loads
		CE2205.5	Students will be able to solve practical problems related to consolidation settlement and time rate of settlement. Students
29	Managerial Economics	CE2206.1	The student will be able to understand the concept of cost, nature of production and a relationship to business operation
		CE2206.2	The student will be able to apply marginal analysis to the firm under different market conditions
		CE2206.3	The student will be able to use the tools of marginal analysis to explain the optimal allocation of resources within the firm
		CE2206.4	The student will be able to analyze the causes and consequences of different market conditions.
		CE2206.5	The student will be able to integrate the concepts of price and output decisions of firms under the various market structure
30	Building Planning And Design	CE2207.1	Analyse the various types of residential buildings.
		CE2207.2	Assess different climatic elements to decide the orientation of the building for ventilation.
		CE2207.3	Draw the complete drawing of plan of a residential building
		CE2207.4	Draw the plan, elevation, and sectional view of the building with functional requirements.
		CE2207.5	Draw the plan using computer Drafting tool.
31	Total Station And Geomatics Lab	CE2208.1	1. After successful completion of the course, the students will be able to undertake survey using level theodolite.
		CE2208.2	2. The students will be able to undertake survey using total station.
		CE2208.3	3. Fully equipped with various surveying concepts and methods using advanced ground survey equipments.

32	Fluid Mechanics Laboratory - I	CE2209.1	Conduct experiments (in teams) in pipe flows and open-channel flows and interpreting data from model studies to prototype cases
		CE2209.2	Analyze a variety of practical fluid-flow devices and utilize principles in design
		CE2209.3	To provide exposure to modern computational techniques
33	Structural Analysis - II	CE3101.1	able to Enable the forces in the members of a truss by using unit load method and Castiglianos theorem-II
		CE3101.2	able to Construct a B.M.D by using compatibility methods like kanis method,slope deflection method and moment distribution method
		CE3101.3	to Calculate the radial shear,normal thrust and bending moment structures for two and three hinged arches
		CE3101.4	able to Compute the sresses in loaded cables in two and three hinged stiffening girder with temperature effect
		CE3101.5	able to adequate knowledge about the forces and displacements in matrix approach using flexibility and stiffness matrix
34	Environmental Engineering-II	CE3102.1	Skill to plan and decide on the sewage management in the urban or rural settings.
		CE3102.2	Ability to design the house plumbing systems through the application of the knowledge acquired.
		CE3102.3	Capability to estimate the characteristics of the sewage and use these in sewage management.
		CE3102.4	Capacity to select and design treatment units both unit operations and processes and disposal system of sludge.
		CE3102.5	Aptitude to recommend and design the septic tanks and Imhoff tanks for usage at the residential dwellings.
35	Reinforced Concrete Structures - I	CE3103.1	Students have explored the concept of Limit state design as per IS 456.
		CE3103.2	Students are competent to Limit state Analysis and Design of Structure collapse and Flexure.
		CE3103.3	Students can Analyse and design the structure in compression.
		CE3103.4	Students can design the structure for limit state of serviceability for Deflection and Cracking.
		CE3103.5	Students can analyse and design foundations and staircases.
36	Steel Structures - I	CE3104.1	Understand concepts of Limit State Design philosophy of steel structures through the use of the Indian Standard IS 800 -2007.
		CE3104.2	Select appropriate structural steel section and design appropriate connection details using bolts or welds
		CE3104.3	Analyse and design of structural steel components for tension and compression.
		CE3104.4	Analyse and design of structural steel components for flexure members.
		CE3104.5	Analyse and design of column bases and foundation systems
37	Remote Sensing And GIS Applications	CE3105B.1	Understand main concepts that define GeographicInformation Systems.
		CE3105B.2	Describe the geographicspace with concepts and terms commonly used to build operating models in GIS.
		CE3105B.3	Use diverse techniques and instruments adequately to measure, locate and find bearingsona map andin a fiel
		CE3105B.4	Know and use GIS and its geo-processes and functio
		CE3105B.5	Know and apply some basic techniques to thematic mapping design


38	Building Services And Maintenance	CE3106.1	Understanding the importance of ventilation and Air conditioning.
		CE3106.2	Understanding the concept of Thermal insulation.
		CE3106.3	Importance of fire safety and equipment required.
		CE3106.4	Understanding plumbing and Electrical services in a building .
		CE3106.5	Importance of machineries in buildings.
39	Geotechnical Engineering Lab - I	CE3107.1	Perform suitable tests for assesing grain size distribution andclassify the soil accordingly.
		CE3107.2	Select appropriate method for determining field density of soil for agiven soil
		CE3107.3	Determine the specific gravity of coarse and fine grained soils
40	Environmental Engineering Lab	CE3108.1	Students will be able to Perform common environmental experiments relating to water and wastewater to assess the quality
		CE3108.2	Students will be able to Statistically analyse and interpret laboratory results.
		CE3108.3	Students will be able to apply the laboratory results to identify the problem and give real-time technical solutions.
		CE3108.4	Students will be able to understand the procedures for water and wastewater sampling and sample preservations.
		CE3108.5	Students will be able to understand the effect of water and wastewater treatment on people and the environment.
41	Estimation, Specifications And Contracts	CE3201.1	Able to acquire basics on fundamentals of quantity surveying
		CE3201.2	Able to analyze rates in civil engineering works
		CE3201.3	Able to estimate and prepare bill of quantities.
		CE3201.4	Able to value a property, price escalation recommendations and rent fixation of a building.
42	Fluid Mechanics -II	CE3202.1	· To classify the types of flows in open channel and also design most economical open channel sections and learns about critical flows.
		CE3202.2	· To study about non-uniform flows in open channels and also to learn about the characteristics of hydraulic jump in rectangular channels.
		CE3202.3	· To impart knowledge on impact of jets, working principle, selection and designing of impulse and reaction turbines.
		CE3202.4	· To explain governing of turbines and performance characteristics of pumps and turbines working under different conditions.
		CE3202.5	· To explain various components and working principles of centrifugal pump and reciprocating pumps. Also, to teach the criteria of selection of the pumps.
43	Reinforced Concrete Structures - II	CE3203.1	the student will be able to Enable the moments and area of steel in cantilever and counterfort retaining wall
		CE3203.2	the student will be able to compute the stresses in water tanks resing on ground,elevated and underground water tanks
		CE3203.3	the student will be able to Enable the design of solid slab and T-beam bridge Deck slab
		CE3203.4	the student will be able to Adequate Knowledge of pile and pile cap design
		CE3203.5	the student will be able to Adequate knowledge about prestessing systems and losses due to psc

44	Transportation Engineering	CE3204.1	Student will be able to Plan highway network for a given area. Judge suitability of pavement materials and design flexible and rigid pavements
		CE3204.2	Student will be able to Determine Highway alignment and design highway geometrics
		CE3204.3	Student will be able to control the traffic moving on the highways effectively by facilitating the traffic control devices
		CE3204.4	Student will be able to Design airfield pavements
45	Water Resources Engineering-I	CE3205.1	· To build knowledge in hydrology and hydraulics and understanding of water resources systems.
		CE3205.2	· To develop skills in the groundwater flow, type of aquifer, and yield from the well.
		CE3205.3	· To provide the knowledge of the design of reservoir operation, sedimentation, and flood routing techniques
		CE3205.4	· To develop skills in modeling flood flows and flood routing.
		CE3205.5	To study the effect, causes, and remedial measures of waterlogging and canal systems.
46	Steel Structures- II	CE3206A.1	Proportionate section of plate girder and design of bolted and welded plate girders as per IS 800-2007 and understand curtailment of flange plates and, connection of flange angles to web and flange angles to flange plates.
		CE3206A.2	Compute design loads on the bridges and design deck type or through type girder bridges and bearings.
		CE3206A.3	Analyse and design steel elevated circular, rectangular and pressed steel water tanks.
		CE3206A.4	Understand concept of plastic analysis application to beams and frames to evaluate the collapse load.
47	Highway Material Lab	CE3207.1	Understanding to Test aggregates and judge the suitability of materials for the road construction
		CE3207.2	Understanding to Test the given bitumen samples and judge their suitability for the road construction
		CE3207.3	Finding to Obtain the optimum bitumen content for Bituminous Concret
		CE3207.4	Determine the traffic volume, speed and parking characteristics
48	Concrete Lab	CE3208.1	the student will be able to Understand the concepts of physical properties of tiles, different bricks, and paver blocks.
		CE3208.2	the student will be able to Conduct various tests on cement, fine aggregate, and coarse aggregate
		CE3208.3	the student will be able to Analyse the properties of fresh and hardened concrete.
		CE3208.4	the student will be able to Design mix proportions of concrete.
49	Computer Applications In Civil Engineering Lab	CE3209.1	Evaluate SF, BM and deflection of various beams using C Programs.
		CE3209.2	Analyse and design singly reinforced, Doubly reinforced beams, columns, footings using C language.
		CE3209.3	Determine runoff of a catchment, Friction factor and minor losses in pipe using C language.
		CE3209.4	Compile C programmes for conversion of WCB to RB and classification of soils.
		CE3209.5	Evaluate bearing capacity of the soils and physical characteristics of water using C programs.

50	Geotechnical Engineering - II	CE4101.1	Students will be able to understand methods of explorations for assessing subsoil characteristics
		CE4101.2	Students will be able to study different methods used for determination of shear strength characteristics of soil.
		CE4101.3	Students will be able to know the impart knowledge of design of shallow and deep foundation system and their suitability depending on type of soil and loading condition.
		CE4101.4	Students will be able to learn various earth pressure theories used for design of earth retaining structures.
		CE4101.5	Students will be able to analyse and evaluate stability of slopes.
51	Fluid Mechanics - III	CE4102.1	To calculate discharge carrying capacity of open channel sections and design of most economical channel sections.
		CE4102.2	To calculate water surface profiles in open channels, hydraulic jump analysis.
		CE4102.3	Select appropriate hydraulic turbines for given conditions and study their performance characteristics.
		CE4102.4	Understand the operation of pumps and study their characteristics.
52	Water Resources Engineering-I	CE4103.1	Analyze the stability analysis and design of gravity dam and an earth dam.
		CE4103.2	Suggest a suitable spillway at a dam site and understand the criteria for design of stilling basin for energy dissipation under spillway.
		CE4103.3	Understand the functions and suitable locations of canal outlets, canal falls, canal regulators and cross drainage works and design of weirs.
		CE4103.4	Understand the functions of component parts of a hydroelectric power scheme.
53	Construction Management	CE4104.1	the student will be able to Ability to appreciate the importance of construction planning
		CE4104.2	the student will be able to Ability to understand the functioning of various earths moving equipment
		CE4104.3	the student will be able to Ability to know the methods of production of aggregate products
		CE4104.4	the student will be able to Ability to apply the gained knowledge to project management and construction techniques
		CE4104.5	the student will be able to Ability to concreting and usage of machinery required for the works.
54	Prestressed Concrete Structures	CE4105A.1	Enable to know the difference between pcc and rcc, methods of psc
		CE4105A.2	the student will be able to Ability to apply the fundamental knowledge to the solution of practical problem
		CE4105A.3	the student will be able to Assess the combined stresses induced by prestress and applied loads using basic concepts of analysis, equivalent load method and load balancing approach.
		CE4105A.4	the student will be able to Analyse structural elements for shear, torsion
		CE4105A.5	the student will be able to Analyse uncracked and cracked prestressed concrete sections.

55	Environmental Impact Assessment	CE4106A.1	Understand the concept and methodologies of EIA
		CE4106A.2	Understand the procedure for environmental clearance
		CE4106A.3	Discuss the basic information on environmental attributes like air, water and noise
		CE4106A.4	Discuss the standards, impact assessment and mitigation
		CE4106A.5	Discuss the socio economic attribute, resettlement and rehabilitation issues
56	Geotechnical Engineering Lab - li	CE4107.1	Understanding to Test aggregates and judge the suitability of materials for the road construction
		CE4107.2	Understanding to Test the given bitumen samples and judge their suitability for the road construction
		CE4107.3	Finding to Obtain the optimum bitumen content for Bituminous Concret
		CE4107.4	Determine the traffic volume, speed and parking characteristics
57	Fluid Mechanics Lab-li	CE4108.1	Demonstrate practical understanding in formation of hydraulic jump and measurement of Rugosity coefficients.
		CE4108.2	Demonstrate practical understanding of friction losses in pipe flows
		CE4108.3	Demonstrate practical understanding of boundary layer, separation and drag
		CE4108.4	Provide the student knowledge in calculating performance analysis in turbine and pumps.
		CE4108.5	Demonstrate the ability to write clear lab records.
58	Project	CE4201.1	Identify thrust area in civil engineering and finalize problem statement.
		CE4201.2	Review the literature to search for technical information from various resources on selected problem
		CE4201.3	Take up any challenging practical problems and find solution by formulating proper methodology.
		CE4201.4	Apply the principles, tools and techniques to solve the problem.
		CE4201.5	Work in a team and effectively communicate with team members Prepare a report and presentation of project.




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Dr. Lankapalli Bullayya College of Engineering (for Women)

(Sponsored by The Society for Collegiate Education, Visakhapatnam, A.P.)
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Regulation : 2019-2020

Name of the Program: B.Tech Computer Science Engineering

2.6.1 Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website.

S No	Course Name	Course Outcome Number	Course Outcome Description
1	Mathematics-I	ENG1101.1	Find the partial derivatives of functions of two or more variables.
		ENG1101.2	Evaluate maxima and minima errors and approximations.
		ENG1101.3	Evaluate double and triple integrals, volumes of solids and area of curved surfaces.
		ENG1101.4	Expand a perfect periodical function as Fourier Series and half range Fourier series.
		ENG1101.5	Have a fundamental understanding of Fourier series and be to give Fourier expansion of given function.
2	Mathematics-II	ENG1102.1	Find rank, Eigen values and Eigen vectors of a matrix and understand the importance of Cayley-Hamilton theorem.
		ENG1102.2	Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.
		ENG1102.3	Understand Laplace transforms and its properties.
		ENG1102.4	Apply Laplace Transforms to ordinary differential equations.
		ENG1102.5	Calculate Bessel's equations, Legendre's equations, and their generating functions.
3	Chemistry	ENG1103.1	Water chemistry -understanding Characterization and treatment
		ENG1103.2	Polymers and plastics-identifying structural properties and engineering applications
		ENG1103.3	Corrosion -understanding the fundamental concepts of corrosion and controlling methods
		ENG1103.4	Fuels and lubricants-Acquire basic knowledge on analyses of coal and refining of petroleum
		ENG1103.5	Nano materials-Apply knowledge on synthesis & apps

4	Computer Programming with C and Numerical Methods	ENG1105.1	Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and apply them in problem solving.
		ENG1105.2	Apply various operations on derived data types like arrays and strings in problem solving.
		ENG1105.3	Design and implement of modular Programming and memory management using Functions, pointers.
		ENG1105.4	Apply Structure, Unions and File handling techniques to Design and Solve different engineering programs with minimal complexity.
		ENG1105.5	Apply Numerical methods to Solve the complex Engineering problems.
5	English	ENG1109.1	Students will be able to analyze a given text and discover the various aspects related to language and literature.
		ENG1109.2	Learn the various language structures, parts of speech and figures of speech.
		ENG1109.3	Develop one's reading and writing abilities for enhanced communication.
		ENG1109.4	Learn to apply the topics in real-life situations for creative and critical use.
6	Chemistry Lab	ENG1110.1	To understanding the estimation of quantitative amount present in given sample.
		ENG1110.2	To utilize the fundamental laboratory techniques.
		ENG1110.3	Student acquaints the skills in organic synthesis of polymers and drugs.
7	Computer Programming with C and Numerical Methods Lab	ENG1112.1	Understand various computer components, Installation of software. C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
		ENG1112.2	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
		ENG1112.3	Construct programs that demonstrate effective use of C features including arrays, strings, structures, pointers and files.
		ENG1112.4	Apply and practice logical ability to solve the real-world problems. Apply Numerical methods to Solve the complex Engineering problems.

8	Mathematics-III	ENG1201.1	Find the partial derivatives of functions of two or more variables.
		ENG1201.2	Evaluate maxima and minima errors and approximations.
		ENG1201.3	Evaluate double and triple integrals, volumes of solids and area of curved surfaces.
		ENG1201.4	To Expand a perfect periodical function as Fourier Series and half range Fourier series.
		ENG1201.5	Have a fundamental understanding of Fourier series and be to give Fourier expansion of given function.
9	Physics	ENG1203.1	Understand the fundamentals of Thermodynamics and Laws of thermodynamics. Understand the working of Carnot cycle and concept of entropy.
		ENG1203.2	Gain Knowledge on the basic concepts of electric and magnetic fields. Understand the concept of the nature of magnetic materials. Gain knowledge on electromagnetic induction and its applications.
		ENG1203.3	Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit.
		ENG1203.4	Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fiber. Realize their role in optical fiber communication.
		ENG1203.5	Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent one Dimensional Schrodinger's wave equation. Understand the fundamentals and synthesis processes of Nanophase materials.
10	Engineering Graphics	ENG1205.1	Understand the basics of Engineering Graphics and BIS conventions.
		ENG1205.2	Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings.
		ENG1205.3	Demonstrate and practice the various profiles/curves used in engineering practice through standard procedures.
		ENG1205.4	Demonstrate and practice the orthographic projections of points, lines, planes, solids and section of solids.
		ENG1205.5	Demonstrate and practice the development of surfaces of simple solids and Familiarize the basic concept of isometric views clearly.
11	Probability Statistics And Queuing Theory	ENG1206.1	Define and explain basic concepts in probability theory and how to translate real-world problems into probability models.
		ENG1206.2	Solve standard problems that include random variables, discrete and continuous probability distributions.
		ENG1206.3	Perform Test of Hypothesis and construct a confidence interval to estimate population parameters.
		ENG1206.4	Compute and interpret the results of Correlation Analysis, Multivariate Regression, Chi-Square test for Independence and Goodness of Fit.
		ENG1206.5	Explain basic concepts in Markov processes, M/M/1 and M/M/C queuing systems.

12	Professional Ethics and Moral Values	ENG1208.1	Grasp the meaning of the concept – Law and also Get an overview of the laws relating to Engineers and also Apprehend the importance of being a law abiding person and They would have better critical ability.
		ENG1208.2	Self-explore by using different techniques to live in harmony at various levels.
		ENG1208.3	Analyze themselves and understand their position with respect to the moral and ethical character needed for a successful and satisfactory work life.
		ENG1208.4	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
		ENG1208.5	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
13	Physics Lab	ENG1211.1	Ability to design and conduct experiments as well as to analyze and interpret.
		ENG1211.2	Ability to apply experimental skills to determine the physical quantities related to Heat, Electromagnetism and Optics.
		ENG1211.3	The student will learn to draw the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments.
14	Workshop	ENG1213.1	Can be able to work with Wood Materials in real time applications.
		ENG1213.2	Can be able to build various parts with Sheet Metal in day-to-day life.
		ENG1213.3	Can be able to apply Metal Fitting skills in various applications.
		ENG1213.4	Can be able to apply this knowledge to basic house electrical wiring and repairs.
15	Elements of Electronics Engineering	CSE211.1	Explain the basics of semiconductors and their classification.
		CSE211.2	Demonstrate the characteristics of PN junction diode and Zener diode.
		CSE211.3	Illustrate the functional behavior of rectifiers and filters.
		CSE211.4	Explain the V-I Characteristics of transistors and the concepts of transistor biasing.
		CSE211.5	Explain transistor amplifiers and field effect transistors.
16	Data Structures and Algorithms	CSE212.1	Describe how arrays, records, linked structures, stacks, and queues are represented in memory and implement the algorithms.
		CSE212.2	Compute efficiency analysis and simulation of Recursion.
		CSE212.3	Demonstrate different methods for traversing trees and implement tree applications.
		CSE212.4	Demonstrate different methods for traversing graphs and implement Graph Operations and applications.
		CSE212.5	Discuss the computational efficiency of the principal algorithms and design, implement and debug programs for sorting, searching techniques and Dictionary.

17	Digital Logic design	CSE213.1	Analyse the operational behavior of various digital logic units such as multiplexers, decoders, flip-flops, counters, shift registers, binary adders and subtractors and ALU.
		CSE213.2	Write assembly language code using various trainers.
		CSE213.3	Understand Pentium class PC architecture.
		CSE213.4	Recognition of hardware & software parts.
18	Object Oriented Programming	CSE214.1	Show competence in the use of the c++ programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard.
		CSE214.2	Apply the basic principles of the object-oriented programming in developing solutions to the problems.
		CSE214.3	Develop reusable generic programs using the concepts of inheritance, polymorphism, interfaces and packages.
		CSE214.4	Design and develop efficient and error free programs using the concepts of Multithreading and Exception handling.
19	Elements of Electrical Engineering	CSE215.1	Describe the basic concepts of electromagnetism, types of induced emf, self and mutual inductances.
		CSE215.2	Describe the principle of operation, types and construction of DC machines and analyse the performance.
		CSE215.3	Understand, Analyze and apply the phasor algebra approach in R, L, C series and parallel AC circuits and study about the three phase circuits.
		CSE215.4	Describe the principle of operation of Transformers, Three phase Induction motors, three phase Synchronous Machine.
20	Managerial Economics	CSE216.1	Understand the links between production costs and the economic models of supply.
		CSE216.2	Represent supply, in graphical form, including the upward slope of the supply curve and what shifts the supply curve.
		CSE216.3	Understand the efficiency and equity implications of market interference, including government policy.
		CSE216.4	Understand how different degrees of competition in a market affect pricing and output.
		CSE216.5	Apply economic reasoning to individual and firm behavior.
21	Data Structures Lab	CSE217.1	Implement stacks queues graphs and trees using arrays and linked lists.
		CSE217.2	Develop programs for searching and sorting algorithms.
		CSE217.3	Apply suitable data structures for a problem and write performance analysis for a given algorithm.
		CSE217.4	Demonstrate improved communication and collaborative skills in attaining solution for a problem.

22	Object Oriented Programming Lab	CSE218.1	Develop programs using basic OOPS concepts such as classes and objects.
		CSE218.2	Implement programs using Inheritance and polymorphism concepts.
		CSE218.3	Develop programs using Exception Handling concepts.
		CSE218.4	Develop applications with graphical user interfaces and event driven programming.
23	Discrete Mathematics	CSE221.1	Rewrite mathematical arguments using logical connectives and quantifiers and verify the validity of logical flow of arguments using propositional, predicate logic.
		CSE221.2	Identify and give examples of various types of relations and describe various properties of the relations.
		CSE221.3	Ability to solve problems using permutations and combinations.
		CSE221.4	Determine isomorphism of graphs and spanning tree of a given graph using BFS/DFS algorithms. Also determine minimal spanning tree of a given graph.
24	Computer Organization & Architecture	CSE222.1	Acquaintance of major components of a computer such as processor, memory and I/O modules along with their interconnections internally with outside world.
		CSE222.2	Detailed awareness about architecture of central processing unit, functions of control unit, memory, I/O devices and their issues.
		CSE222.3	Learn Simple and multiple processor organization and their issues.
		CSE222.4	Compare and contrast memory mapping and IO mapping techniques. Describe and Differentiate different modes of data transfer.
		CSE222.5	Gain knowledge of hierarchical memory organization. Able to construct larger memories. Analyze and suggest efficient cache mapping technique and replacement algorithms for given design requirements.
25	Database Management Systems	CSE223.1	Acquire knowledge on ER-modeling for conceptual database design and relational model.
		CSE223.2	Gains knowledge on formal and commercial query languages: Relational Algebra, calculus and SQL.
		CSE223.3	Apply schema refinement and normalization for a given problem.
		CSE223.4	Understands locking protocols concurrency control, and crash recovery methods.
26	Design and Analysis of Algorithms	CSE224.1	Analyze running times of algorithms using asymptotic analysis.
		CSE224.2	Describe various paradigms of design to use them appropriately when an algorithmic design situation calls for it.
		CSE224.3	Ability to choose appropriate algorithm design techniques for solving problems and analyze the performance of algorithms.
		CSE224.4	Employ various paradigms to model engineering problems, when appropriate and analyze them. Identify the limitations of algorithms and classify the problems into P and NP hard.

27	Organizational Behaviour	CSE225.1	To understand environment of organisation and individual/Group behavioural requirements of employees
		CSE225.2	To enable understanding on various motivation factors needed for any organisation
		CSE225.3	To make student understand importance of leadership qualities in any organisational setup
		CSE225.4	To train student business communication, reasons of conflicts.
28	Environmental Studies	CSE227.1	Knowledge on the fundamental aspects of environment and the environmental management.
		CSE227.2	The knowledge on the salient features of the important international conventions and Familiarity on the new generation waste like e-waste and plastic waste.
		CSE227.3	Understanding of the importance of natural resources management for the sustenance of the life and various forms of pollution and its impact on the environment
29	Database Management Systems Lab	CSE227.1	Explore a commercial RDBMS environment such as ORACLE.
		CSE227.2	Learn and practice SQL commands for data definition and manipulation.
		CSE227.3	Understands conceptual through physical data base design.
		CSE227.4	Design and implement a case study.
30	Digital Electronics & Microprocessors Lab	CSE228.1	The student understands the logic gates, half adders, full adders and flip-flops to design a circuit.
		CSE228.2	The student develops the skill of writing microprocessor programming.
		CSE228.3	The student understands the interfacing of microprocessor with stepper motor, R-2R ladder.
31	Computer Networks	CSE311.1	Learn different aspects of networks, protocols and network design models which instills teamwork in the student to design and estimate the requirements for practical setup of a given network scenario and size.
		CSE311.2	Analyze and compare different LAN protocols and select appropriate routing algorithms for a network.
		CSE311.3	Examine the important aspects and functions of different networking devices, network layer, transport layer and application layer in internetworking.
		CSE311.4	Demonstrate the applications of wireless Networks and over view of advanced networking concepts.

32	Operating Systems	CSE312.1	The student understands OS evolution, its structure and services provided by it.
		CSE312.2	Learn process life cycle, process scheduling objectives, policies and mechanisms, process synchronization, inter process communication, deadlocks and other process subsystem related concepts.
		CSE312.3	Imbibe the approaches necessary for exploring the memory hierarchy, allocation and deallocation policies and mechanism for main and auxiliary memory, file system design and implementation issues.
		CSE312.4	Investigate UNIX/ LINUX and Windows OS platforms w.r.t similarities and differences in design philosophies.
33	Formal Languages & Automata Theory	CSE313.1	Acquire fundamental core concepts in automata theory and formal languages to analyze various computational models.
		CSE313.2	Imbibe the approaches necessary for exploring the language accepted by an automata or generated by a regular expression or a context-free grammar.
		CSE313.3	Apply rigorously formal mathematical methods to prove properties of languages, grammars and automata.
		CSE313.4	Develop a computational model using Turing machine for the given problem.(cs)
34	Object Oriented Software Engineering	CSE314.1	Able to define software engineering process and practices, and demonstrate various process models.
		CSE314.2	Able to identify different types of risks in software development.
		CSE314.3	Able to distinguish different testing strategies and it's working.
		CSE314.4	Able to Estimate the quality of software process & develop the SRS document for project
35	Operations Research	CSE315.1	Solve LPP problems using various methods.
		CSE315.2	Solve transportation assignment problems and Sequencing problem using several methods.
		CSE315.3	Analyze the PERT and CPM charts.
		CSE315.4	Solve replacement problems, Reliability and game theory problems.
36	ELECTIVE-I Data Communications	CSE316.1	Gain Knowledge on the components, tools and techniques of communication systems in layered protocol models.
		CSE316.2	Identification of different types of Network devices along with their operational principles.
		CSE316.3	Determine the various Modulation, Error detection and correction techniques and their application in communication systems.
		CSE316.4	Classification of Routing algorithms and inculcating the networking skills of Routing, Subnetting and Flow Control.


37	Data Communications and Computer Networks Lab	CSE317.1	Understand and Contrast the concept of Signals, OSI & TCP/IP reference models and discuss the functionalities of each layer in these models.
		CSE317.2	Discuss and Analyse flow control and error control mechanisms and apply them using standard data link layer protocols.
		CSE317.3	Design subnets and calculate the IP addresses to fulfil network requirements of an organization. Analyze and apply various routing algorithms to find shortest paths for packet delivery.
		CSE317.4	Explain the details of Transport Layer Protocols (UDP, TCP) and suggest appropriate protocol in reliable/unreliable communication.
38	Operating Systems Lab	CSE318.1	The student practices UNIX commands, Vi editor, shell commands. The student develops skill in writing C programs using system calls for process management, inter process communication and other aspects.
		CSE318.2	The student learns shell programming and develops skill for writing scripts for batch level tasks.
		CSE318.3	The student learns to simulate OS resource management aspects like process scheduling , page replacement and others to evaluate performance.
		CSE318.4	Demonstrate improved communication and collaborative skills in attaining solution for a problem.
39	Compiler Design	CSE321.1	Learn fundamentals of compiler and identify the relationships among different phases of the compiler.
		CSE321.2	Represent language tokens using regular expressions, Context Free Grammar and Finite Automata and design Lexical Analyzer for a language.
		CSE321.3	Compare Top Down with Bottom Up Parsers, and develop appropriate Parser to produce parse tree representation of the input.Design Syntax Directed Translation schemes for a given Context Free Grammar.
		CSE321.4	Apply optimization techniques to Intermediate Code and generate machine code for high level language program.
40	Web Technologies	CSE322.1	Construct web based applications and Identify where data structures are appearing in them.
		CSE322.2	Connect java programs to different databases.
		CSE322.3	Develop EJB programs.
		CSE322.4	Demonstrate improved communication and collaborative skills in attaining solution for a problem.

41	ELECTIVE – II Computer Graphics	CSE323.1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
		CSE323.2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
		CSE323.3	Extract scene with different clipping methods and its transformation to graphics display device.
		CSE323.4	Explore projections and visible surface detection and apply geometric transformations on graphics objects. View and use of illumination models and Techniques for display of 3D scene on 2D screen.
42	ELECTIVE -III Artificial Intelligence	CSE324.1	Gains knowledge on AI problem characteristics, state space approach for solving AI problem, Production System framework.
		CSE324.2	The student analyzes the performance of several heuristic algorithms for optimal search.
		CSE324.3	The student learns relational, inferential, inheritable and procedural knowledge and the corresponding knowledge representation approaches with Logic Programming case studies.
		CSE324.4	Ethically work in teams to apply AI problem solving approaches, natural language processing, planning and expert systems to provide sustainable solutions to human community.
43	Data Warehousing and Data Mining	CSE325.1	Gains knowledge on OLTP, OLAP and data Warehousing concepts.
		CSE325.2	Learns how data cube technology supports summarization and querying high dimensional data.
		CSE325.3	Acquires knowledge on descriptive mining techniques, similarity, distance, information gain and other performance and error metrics used for evaluation of mining results.
		CSE325.4	Imbibes various approaches to supervised and unsupervised learning and the corresponding classification and clustering approaches involving decision trees, Bayesian approaches, model based and agglomerative approaches.
44	MINI PROJECT	CSE326.1	Understand programming language concepts, object-oriented concepts and research activities.
		CSE326.2	Plan, analyze, design and implement a software project or gather knowledge over the field of research and design or plan about the proposed work.
		CSE326.3	Demonstrate the ability to locate and use technical information from multiple sources.
		CSE326.4	Demonstrate the ability to communicate effectively in speech and writing.

45	ELECTIVE - II Lab(Computer Graphics Lab)	CSE327.1	Understand the basic concepts of computer graphics.
		CSE327.2	Design scan conversion problems using C
		CSE327.3	Understand the concepts of different type of geometric transformation of objects in 2D and 3D.
		CSE327.4	Practical implementation of modeling, rendering, viewing of objects in 2D.
46	Web Technologies Lab	CSE328.1	Analyze a web page and identify its elements and attributes.
		CSE328.2	Create XML documents and Schemas.
		CSE328.3	Create web pages using XHTML and Cascading Style Sheets.
		CSE328.4	Build dynamic web pages using JavaScript (Client side programming).
47	ELECTIVE - IV Machine Learning	CSE411.1	Explore and formulate problems in Machine Learning Algorithms
		CSE411.2	Demonstrate the basics of Bayes theorem
		CSE411.3	Apply key concepts of Expectation Maximization in Bayesian approaches
		CSE411.4	Knowledge on concept learning, version spaces and related concepts of bias-free learning
		CSE411.5	Understand parametric Learning models
		CSE411.6	Understand non-parametric Learning models
48	ELECTIVE - V IOT	CSE412.1	Represent IoT Architecture and compare different IoT protocols
		CSE412.2	Interpret the design principles that govern connected devices
		CSE412.3	Develop IoT application using different open source prototyping platforms and hardware platforms
		CSE412.4	Utilize the Internet communication protocols for IoT applications
49	GPS Applications	CSE413.1	Gain knowledge on the history, evolution for societal needs and differentiate characteristics of different GPS satellites
		CSE413.2	Apply basic engineering and mathematical knowledge to understand the geo coordinates and use complex mathematical solution to derive equations to convert between Cartesian and geodetic coordinate systems
		CSE413.3	Know the integral components of GPS constellation and their application with human values
		CSE413.4	Demonstrate the GPS concepts for ethical usage in society.
50	Computational Biology	CSE414.1	have a basic understanding of molecular biology;
		CSE414.2	gain familiarity with computational methods for biological sequence and structure analysis;
		CSE414.3	formulate (and propose algorithmic solutions for) the problem of predicting structure (output) from biological sequence (input) and the inverse problem of finding sequences that fold into a given structure;
		CSE414.4	gain a basic understanding of the regulation of the genetic information and knowledge about associated computational problems;become familiar with some computational methods (prediction algorithms) that facilitate genome editing applications.

51	Entrepreneurship	CSE415.1	Ability to engage in critical thinking by analyzing situations
		CSE415.2	2. Constructing viable solutions for problems that are coming across in any business situations
		CSE415.3	3. Demonstrate the ability to work with others effectively
		CSE415.4	4. Students advance their skills in customer development, customer validation, competitive analysis,
		CSE415.5	5. Utilizing design thinking and process tools to evaluate real-world problems and projects
52	Cryptography and Network Security	CSE416.1	Realize the need and importance of network and data security in the Internet and in the distributed environments.
		CSE416.2	Identify the different types of network security issues and their remedies.
		CSE416.3	Application of various cryptographic tools and techniques in different contexts and as per need of security levels.
		CSE416.4	Implement Internet security protocols and standards.
53	ELECTIVE - IV Lab(Machine Learning Lab)	CSE417.1	Understand the implementation procedures for the machine learning algorithms.
		CSE417.2	Design Java/Python programs for various Learning algorithms.
		CSE417.3	Apply appropriate data sets to the Machine Learning algorithms.
		CSE417.4	Identify and apply Machine Learning algorithms to solve real world problems. Demonstrate improved communication and collaborative skills in attaining solution for a problem
54	ELECTIVE - V Lab (IOT Lab)	CSE418.1	Exercise microprocessor based embedded platforms in IoT
		CSE418.2	Make use of Cloud platform to upload and analyse any sensor data
		CSE418.3	Utilization of Devices, Gateways and Data Management in IoT.
		CSE418.4	Build and test a complete, working IoT system involving prototyping, programming and data analysis.
55	PROJECT-II	CSE421.1	Competence in applying the software engineering principles in planning, and computing the requirements appropriate to solve the problem
		CSE421.2	Formulate an innovative design/ approach to meet the requirements of the client
		CSE421.3	Capability to develop/implement the design with appropriate techniques, resources and contemporary tools exhibiting integrity and ethical behavior in engineering practice.
		CSE421.4	Ability to test and defend performance of the implemented project and understand the Implication of the solution.
		CSE421.5	Perform professionally as a team member, use formal and informal Communication with team members and guide, make presentation and prepare technical document necessary to ensure Project success.




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Regulation : 2019-2020

Department: Electronics and Communication Engineering

2.6.1 Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website

S.NO	Course Name	Course Outcome Number	Course Outcome Description
1	Mathematics -1	ENG 1101.1	Find the partial derivatives of functions of two or more variables
		ENG 1101.2	Evaluate maxima and minima errors and approximations
		ENG 1101.3	Solve the ordinary differential equations of first order and first degree.
		ENG 1101.4	Solve Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay
		ENG 1101.5	Evaluate the Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.
2	Mathematics -2	ENG 1102.1	Find rank, Eigen values and Eigen vectors of a matrix and understand the importance of Cayley-Hamilton theorem.
		ENG 1102.2	Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.
		ENG 1102.3	Understand Laplace transforms and its properties.
		ENG 1102.4	Apply Laplace Transforms to ordinary differential equations.
		ENG 1102.5	Expand a perfect periodical function as Fourier Series and half range Fourier series.
3	Physics	ENG1104.1	Understand the concepts of mechanics, Understand physical characteristics of SHM and obtaining solution of the oscillator using differential equations.
		ENG1104.2	Gain Knowledge on the basic concepts of electric and magnetic fields. Understand the concept of the nature of magnetic materials. Gain knowledge on electromagnetic induction and its applications .
		ENG1104.3	Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit.
		ENG1104.4	Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fiber. Realize their role in optical fiber communication.
		ENG1104.5	Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent one Dimensional Schrodinger's wave equation. Understand the basic of Intrinsic and Extrinsic Semiconductors.
4	Engineering Graphics	ENG1106.1	Understand the basics of Engineering Graphics and BIS conventions.
		ENG1106.2	Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings

		ENG1106.3	Demonstrate and practice the various profiles/curves used in engineering practice through standard procedures.
		ENG1106.4	Demonstrate and practice the orthographic projections of points, lines, planes, solids and section of solids
		ENG1106.5	Demonstrate and practice the development of surfaces of simple solids and Familiarize the basic concept of isometric views clearly.
5	Professional Ethics & Moral Values	ENG1108.1	Grasp the meaning of the concept – Law and also Get an overview of the laws relating to Engineers and also Apprehend the importance of being a law abiding person and They would have better critical ability
		ENG1108.2	Self-explore by using different techniques to live in harmony at various levels
		ENG1108.3	Analyze themselves and understand their position with respect to the moral and ethical character needed for a successful and satisfactory work life
		ENG1108.4	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
6	Physics Lab	ENG1111.1	Ability to design and conduct experiments as well as to analyze and interpret .
		ENG1111.2	Ability to apply experimental skills to determine the physical quantities related to Electromagnetism and Optics.
		ENG1111.3	The student will learn to draw the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments.
7	Workshop	ENG1113.1	Can be able to work with Wood Materials in real time applications.
		ENG1113.2	Can be able to build various parts with Sheet Metal in day-to-day life
		ENG1113.3	Can be able to apply Metal Fitting skills in various applications.
		ENG1113.4	Can be able to apply this knowledge to basic house electrical wiring and repairs.
8	Mathematics-3	ENG1201.1	Evaluate double integration in cartesian and polar coordinates.
		ENG1201.2	Apply the Beta, Gamma functions in evaluation of integration.
		ENG1201.3	Find the area of curved surfaces and volume of solids
		ENG1201.4	Find the Limit and continuity of $f(z)$ - Derivative of $f(z)$. Verify Analytic Functions by using Cauchy- Reimann Equations, Orthogonal systems, Applications to flow problems, Geometrical representation of $f(z)$.Integration of complex functions, Cauchy's theorem, Cauchy's integral formula and their applications
		ENG1201.5	Obtain Conformal transformation, Bilinear transformation , Series of complex terms -Taylor's and Laurent's series (without proofs), Zero's and Singularities of analytic functions. Residues and Calculations of residues, Cauchy's Residue Theorem, Evaluation of real definite integrals: Integration around unit circle, semi circle
9	Chemistry	ENG1202.1	Identify the importance of water treatment parameters and its applications.
		ENG1202.2	Understand the concepts of environmental influence on corrosion,its mechanism with metals and controlling methods.
		ENG1202.3	Educate Preparation methods of polymers and plastics.
		ENG1202.4	Analyse and design fuel technology lubrication mechanism.
		ENG1202.5	Identify the characteristics and applications of Nano- materials.
10	Computer Programming using C &	ENG1204.1	Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and apply them in problem solving.

	Numerical Methods	ENG1204.2	Apply various operations on derived data types like arrays and strings in problem solving.
		ENG1204.3	Design and implement of modular Programming and memory management using Functions, pointers.
		ENG1204.4	Apply Structure, Unions and File handling techniques to Design and Solve different engineering programs with minimal complexity, Numerical methods to Solve the complex Engineering problems.
11	Basic electronics engineering	ENG1206.1	Have a basic knowledge of Electronic materials and their properties.
		ENG1206.2	Identify different resistors and purpose of CRO.
		ENG1206.3	Know the characteristics of special diodes
		ENG1206.4	Know the characteristics, types applications and configurations of Transistors, Know the power devices, concept of Op-Amp's and different IC's.
12	Essence of Indian Traditional Knowledge	ENG1207.1	By the end of this course the students should be able to understand the contribution of Scientific and Technological developments for the benefit of society at large.
		ENG1207.2	Students should be able to understand and appreciate the latest Technological developments and their impact on quality of human life.
		ENG1207.3	Students should be able to effectively apply the contributions made by the Technological advancements to the overall growth of nation's economy.
		ENG1207.4	Students should be able to identify the gaps and problems in the process of Technological transfer and find ways to avoid or bridge the gaps.
13	English	ENG1209.1	Students will be able to analyse a given text and discover the various aspects related to language and literature;
		ENG1209.2	Learn the various language structures, parts of speech and figures of speech;
		ENG1209.3	Develop one's reading and writing abilities for enhanced communication; and
		ENG1209.4	Learn to apply the topics in real-life situations for creative and critical use.
14	Chemistry Lab	ENG1210.1	The course provides the quantitative determination of the amount of various species in solutions.
		ENG1210.2	The Student understand the titration and conduct the quantitative determination with accuracy
		ENG1210.3	The course provides to develop novel materials to be used in titrations, synthesis of polymer or a drug.
15	Computer Programming using C & Numerical Methods Lab	ENG1212.1	Understand various computer components, Installation of software. C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
		ENG1212.2	Analysing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
		ENG1212.3	Construct programs that demonstrate effective use of C features including arrays, strings, structures, pointers and files.
		ENG1212.4	Apply and practice logical ability to solve the real-world problems, Numerical methods to Solve the complex Engineering problems.
16	MATHEMATICS-IV	ECE 2101.1	Apply the differential operator 'del' to the scalar and vector point functions, Calculate the Gradient, Divergence and Curl, Vector normal to a surface, evaluate the physical concepts like workdone, force and circulation using these operators.
		ECE 2101.2	Understand the vector differentiation and integration to the engineering problems and Green's theorem in the plane, Stoke's theorem, Gauss Divergence theorem

		ECE 2101.3	Formulate Partial differential equations and evaluate the linear and nonlinear, Homogeneous and Non-homogeneous partial differential equations.
		ECE 2101.4	Apply and find the solutions of one-dimensional wave (string equation), one -and two-dimensional Heat flow equations, Laplace's equation in Cartesian and polar coordinates
		ECE 2101.5	Find the Fourier transforms, Fourier Sine, Cosine and related inverse transforms of different functions and their applications in solving several Physical and Engineering problems
17	Network Theory Analysis	ECE 2102.1	To Understand the behavior of different circuits and their response using various circuit analysis tools and theorems
		ECE 2102.2	To evaluate two-port network parameters , design attenuators and equalizers
		ECE 2102.3	To Understand the analysis in time domain and frequency domain.
		ECE 2102.4	To Understand basic concepts regarding the system definition mathematically and associated network function.
		ECE 2102.5	To Understand the concept of Network synthesis
18	Electrical Machines	ECE 2103.1	To understand the construction and principle of operation of DC Machines and analyze the performance of the DC machines under load and unloaded conditions
		ECE 2103.2	To understand the construction and principle of operation of transformers and analyze the performance of the transformers under load and unloaded conditions.
		ECE 2103.3	To understand the construction and principle of operation of 3 ϕ Induction Machine and analyze the performance of the 3 ϕ Induction Machine under load and unloaded conditions.
		ECE 2103.4	To understand the construction and principle of operation of 3 ϕ Synchronous Machine and analyze the performance of the 3 ϕ Synchronous Machine under load and unloaded conditions, operation of 1 ϕ Machines.
19	Electronic Devices and Circuits	ECE 2104.1	Remember the basic properties of semiconductor materials and their charge distributions.
		ECE 2104.2	Understand working principles of various Semiconductor Diodes.
		ECE 2104.3	Construct various Rectifier Circuits with different filters using PN Junction Diodes.
		ECE 2104.4	Develop the working principle of BJT in different configurations along with different biasing methods.
		ECE 2104.5	Identify the various stability parameters of a field effect transistor.
		ECE 2104.6	Analyze the small signal low frequency amplifier circuits using BJTs
20	Switching Theory and Logic Design	ECE 2105.1	Distinguish the analog and digital systems, apply positional notations, number systems, computer codes in digital systems.
		ECE 2105.2	Describe the Boolean Algebra theorems, simplify and design logic circuits.
		ECE 2105.3	Implement combinational logic circuit design and modular combinational circuits using encoders, decoders, multiplexers and demultiplexers.
		ECE 2105.4	Illustrate the basic elements of sequential logic circuits.
		ECE 2105.5	Design and analyse sequential circuits.
21	Data Structures	ECE 2106.1	Analyze algorithms and aalgorithm correctness.
		ECE 2106.2	Summarize searching and sorting techniques
		ECE 2106.3	Describe stack,queue and linked list operations
		ECE 2106.4	Knowledge of tree and graphs concepts.
		ECE 2106.5	Apply stack,queue and linked list operations to solve real world problems
22		ECE 2107.1	Solve the Network problems using Network Theorems.

	Network and Machines Lab	ECE 2107.2	Verify the ohm's law and Kirchoff's law
		ECE 2107.3	Evaluate the performance of DC Machines
		ECE 2107.4	Determine the efficiency and Regulation of Transformer by various tests, No-load/magnetization characteristics of DC and AC motors.
23	Electronic Devices & Circuits Lab	ECE 2108.1	Identify and utilize various electronic components and devices with their specifications to Implement and verify the outputs of hardware circuits.
		ECE 2108.2	Construct and Analyze the characteristics of PN junction diode , Zener diode and LED
		ECE 2108.3	Implement the rectifier circuits with and without filter and voltage regulator.
		ECE 2108.4	Analyze the characteristics and calculate the parameters of transistors like BJT, FET, Design the Amplifiers like Common Emitter .
24	Mathematics V	ECE 2201.1	Form the difference equations - Linear difference equations – Rules for finding complementary function - Rules for finding particular integral
		ECE 2201.2	simultaneous difference equations with constant coefficients - Applications to deflection of a loaded string.
		ECE 2201.3	Find the Z-Transforms to different functions.
		ECE 2201.4	Find correlation - coefficient of correlation -Lines of regression, and the properties of Discrete and Continuous Random Variables, Distributions
		ECE 2201.5	Testing of hypothesis - Level of significance - Chisquare test - Goodness of fit - F-distribution.
25	Electromagnetic Field Theory & Transmission Lines	ECE 2202.1	Apply the laws of electrostatics for different types of charge distributions
		ECE 2202.2	Apply the laws of magneto-statics for different types of current distributions
		ECE 2202.3	Analyze boundary conditions using Maxwell's equations at different media interfaces
		ECE 2202.4	Examine the propagation of EM waves in different media
		ECE 2202.5	Understand the concept of transmission lines, waveguides & their applications
26	Analog Electronics Circuits	ECE 2203.1	Design and analysis of CE, CB, CC amplifiers using small signal h-model and pi- model and derivation of voltage gain, current gain, input impedance and output impedance
		ECE 2203.2	compare the design aspects to perform the analysis of multistage amplifiers, basic high frequency transistor amplifier models
		ECE 2203.3	Summarize the design aspects of various feedback amplifiers circuits.
		ECE 2203.4	Design of different types of oscillators based on the condition for oscillations.
		ECE 2203.5	Analyze different types of power amplifiers based on their efficiency considerations.
		ECE 2203.6	Classify the tuned amplifiers and perform their parameters like quality factor and band width.
27	Probability Theory & Random Process	ECE 2204.1	Apply the concepts of probability theory to solve probabilistic problems.
		ECE 2204.2	Analyze various distribution and density functions of a random variable.
		ECE 2204.3	Estimate various parameters of random variables and multiple random variables
		ECE 2204.4	Understand the concept of random processes and determine covariance and spectral density of stationary random processes.
		ECE 2204.5	Understand linear systems with random inputs.
28	Signals & Systems	ECE 2205.1	Able to characterize and analyze the properties of CT and DT signals and systems.
		ECE 2205.2	Able to represent CT and DT systems in the Frequency domain using Fourier analysis tools like CTFS, CTFT, DTFS and DTFT.
		ECE 2205.3	Able to analyze CT and DT systems in Time domain using convolution.
		ECE 2205.4	Able to analyze CT systems using Laplace transforms.

		ECE 2205.5	Able to analyze DT systems using Z Transforms.
29	Environmental Studies	ECE 2206.1	Student will be able to gain Knowledge on the fundamental aspects of environment and the environmental management
		ECE 2206.2	Student will be able to gain knowledge on the salient features of the important international conventions
		ECE 2206.3	Student will be able to understand the importance of natural resources management for the sustenance of the life and the society, various forms of pollution, e-waste and plastic waste.
30	Digital ICs and HDL Lab	ECE 2207.1	Implement logic gates and their realization using ICs and Simulate through VHDL programming.
		ECE 2207.2	Implement and analyze combinational and sequential circuits using ICs and Simulate through VHDL programming
		ECE 2207.3	Implement the logic gates, full Adder, Decoder, Encoder, MUX and DeMUX and Simulate through VHDL programming
		ECE 2207.4	Implement and Analyze Flip-Flops, Shift Register and Counters and Simulate through VHDL programming
31	Analog Electronics & Circuits Lab with Simulation	ECE 2208.1	Design, simulate and verify basic amplifier circuits.
		ECE 2208.2	Design, simulate and verify feedback amplifiers.
		ECE 2208.3	Design, simulate and verify power amplifier circuits
		ECE 2208.4	Design, simulate and verify oscillators, operational amplifiers
32	Linear ICs & Applications	ECE 3101.1	Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.
		ECE 3101.2	Design different RC differentiator and integrator circuits.
		ECE 3101.3	Elucidate and design linear and non-linear applications using op-amps.
		ECE 3101.4	Analyze the various multi-vibrator circuits
		ECE 3101.5	Describe the concepts of filters, Timers and VCO, A/D and D/A convertors
33	Analog Communications	ECE 3102.1	Understand and apply the need for modulation and Amplitude modulation techniques in a communication system.
		ECE 3102.2	Summarize the concepts of angle modulation system
		ECE 3102.3	Analyze the impact of noise in various analog communication systems.
		ECE 3102.4	Attain the knowledge about AM, FM Transmitters and Receivers.
		ECE 3102.5	Apply the principles of sampling in deriving different pulse modulation approaches.
34	OOPS	ECE 3103.1	Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
		ECE 3103.2	Demonstrate the use of various OOPs concepts with the help of programs."
		ECE 3103.3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
		ECE 3103.4	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
		ECE 3103.5	Apply the OOP principles in solving real world problems
35	Antenna & Wave Propagation	ECE 3104.1	Understand the radiation mechanism of an antenna.
		ECE 3104.2	Identify basic antenna parameters.
		ECE 3104.3	Design and Analyze various types of antenna Arrays.
		ECE 3104.4	Construct and Analyze HF, VHF and UHF Antennas.
		ECE 3104.5	Analyze Microwave antennas and summarize the antenna measurement techniques.
		ECE 3104.6	Outline the characteristics of radio wave propagation.


36	Pulse and Digital Circuits	ECE 3105.1	Student will be having strong knowledge in the concept of linear wave shaping of sinusoidal and non-sinusoidal signals.
		ECE 3105.2	Student will be able to design the circuit of clipping and clamping circuits.
		ECE 3105.3	Student will able to derive and design different multivibrators.
		ECE 3105.4	With the basic understanding of the concept of synchronization, the student will be able to design time-based generators and sweep circuits.
		ECE 3105.5	Understand and analyze the different logic families like DTL, RTL, TTL,
37	Digital Signal Processing	ECE 3106.1	Represent signals mathematically in continuous and discrete-time, and in the frequency domain.
		ECE 3106.2	Analyze discrete-time systems using z-transform.
		ECE 3106.3	Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms.
		ECE 3106.4	Design IIR and FIR filters.
		ECE 3106.5	Apply digital signal processing for the analysis of real-life signals.
38	Soft Skills	ECE 3107.1	Make use of techniques for self-awareness and self-development.
		ECE 3107.2	Apply the conceptual understanding of communication into everyday practice.
		ECE 3107.3	Understand the importance of teamwork and group discussions skills.
		ECE 3107.4	Develop time management and stress management skills.
39	Linear ICs and Pulse Circuits Lab	ECE 3108.1	Design various linear & non-linear wave shaping circuits.
		ECE 3108.2	Basic characteristics of op-amp parameters and its measurements, design compensating circuits.
		ECE 3108.3	Develop applications using linear and nonlinear characterization of OPAMP.
		ECE 3108.4	Understand the functionality of IC723 and determine the load and line regulations, Multivibrator circuits using IC555.
40	Analog Communications Lab	ECE 3109.1	Generate, detect and analyze different amplitude modulation & demodulation techniques.
		ECE 3109.2	Analyze and design various analog filters using passive components.
		ECE 3109.3	Detect and Analyze frequency modulation & demodulation techniques.
		ECE 3109.4	Construct pre-emphasis and de-emphasis at the transmitter and receiver respectively.
		ECE 3109.5	Able to Analyze T – Type attenuator and Mixer characteristics.
41	Computer Network Engineering	ECE 3201.1	Learn different aspects of networks, protocols and network design models which instills teamwork in the student to design and estimate the requirements for practical setup of a given network scenario and size
		ECE 3201.2	Analyze and compare different LAN protocols and select appropriate routing algorithms for a network.
		ECE 3201.3	Examine the important aspects and functions of different networking devices, network layer, transport layer and application layer in internetworking.
		ECE 3201.4	Demonstrate the applications of wireless Networks and over view of advanced networking concepts.
		ECE 3201.5	Understanding of wireless networks application
42	Microprocessors & Microcontrollers	ECE 3202.1	Understand the programming using hardware and software
		ECE 3202.2	Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor
		ECE 3202.3	Analyze the data transfer information through serial & parallel ports.
		ECE 3202.4	Distinguish and analyze the properties of Microprocessors & Microcontrollers, also software & hardware structure.

43	Digital Communications	ECE 3203.1	Understand various Pulse Modulation Techniques and understand the concepts of digital modulation techniques and base band transmission.
		ECE 3203.2	To identify signal flow and error performance of digital modulation techniques and calculation.
		ECE 3203.3	Analyze the mathematical performance of noise in communication system.
		ECE 3203.4	Evaluate the concept of Spread Spectrum Modulation techniques.
44	Wireless Sensor Networks	ECE 3204.1	Understand the fundamental Concepts, applications and architectures of wireless sensor networks
		ECE 3204.2	Categorize the various network topologies.
		ECE 3204.3	Realize the MAC Protocols for Wireless Sensor Networks.
		ECE 3204.4	Describe routing protocols for ad hoc wireless networks with respect to TCP design issues.
		ECE 3204.5	Outline the transport layer and security protocols for WSN.
		ECE 3204.6	Differentiate various sensor network platforms and tools.
45	Digital Image Processing	ECE 3205.1	Recall the digital image fundamentals and explain image transformers.
		ECE 3205.2	Implement basic image processing algorithms and techniques (spatial domain and frequency domain)
		ECE 3205.3	Summarize image restoration using degradation model, algebraic approach, inverse filtering, least mean square filters and constrained least square filters, wavelets multi-resolution processing and digital image compression techniques.
		ECE 3205.4	Compare three (RGB, CMY, HIS) color models, pseudo color image processing and full color image processing, image segmentation and morphological image processing.
46	Control Systems	ECE 3206.1	Understand the modeling of linear-time-invariant systems using transfer function and statespace representations.
		ECE 3206.2	Develop mathematical models for physical systems. Employ the time domain analysis to quantify the performance of linear control systems and specify suitable controllers
		ECE 3206.3	Understand the concept of stability and its assessment for linear-time invariant systems.
		ECE 3206.4	Quantify time and frequency domain specifications to determine stability margins.
		ECE 3206.5	Apply state variable theory to determine the dynamic behavior of linear control systems.
47	Cellular Mobile Communication	ECE 3207.1	1.Explain the fundamentals of cellular radio system design and its basic elements.
		ECE 3207.2	2.Analyze the concepts of different co-channel, non-co- channel interference and cellular coverage on signal and traffic of a designed system.
		ECE 3207.3	3.Identify the various types of multiplexing and modulation techniques suitable for mobile communications.
		ECE 3207.4	4.Distinguish the number of radio channels, channel assignment and frequency management used in mobile communications and analyze the different hand off and cell splitting techniques and dropped call rate at cell site area.
		ECE 3207.5	5.Analyze various methodologies to improve the cellular capacity
48	DSP Lab	ECE 3208.1	Generation and Implementation of discrete time signals and systems using MATLAB
		ECE 3208.2	Analyze the Frequency analysis of discrete signals and systems using MATLAB.
		ECE 3208.3	Design and simulate FIR and IIR filters with different techniques using MATLAB

		ECE 3208.4	Verification of Linear and Circular Convolution using DSP Processor.
		ECE 3208.5	Implementation of FIR and IIR filters with different techniques using DSP Processor
49	Microprocessors & Microcontrollers Lab	ECE 3209.1	Understand the programming using hardware and software
		ECE 3209.2	Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor
		ECE 3209.3	Analyze the data transfer information through serial & parallel ports.
		ECE 3209.4	Distinguish and analyze the properties of Microprocessors & Microcontrollers.
		ECE 3209.5	Identify a detailed software & hardware structure of the Microcontroller
50	Principles of Economics & Management	ECE 4101.1	Understand the links between production costs and the economic models of supply.
		ECE 4101.2	Represent supply, in graphical form, including the upward slope of the supply curve and what shifts the supply curve.
		ECE 4101.3	Understand the efficiency and equity implications of market interference, including government policy.
		ECE 4101.4	Understand how different degrees of competition in a market affect pricing and output, economic reasoning to individual and firm behavior.
51	Information Theory & Coding	ECE 4102.1	To Understand the concept of Information Coding Techniques.
		ECE 4102.2	Analyze the discrete channels and system comparisons.
		ECE 4102.3	To Analyze the different types of coding and Rationale for coding.
		ECE 4102.4	Evaluate the Decoding Techniques and Error correcting codes.
52	VLSI Design	ECE 4103.1	Identify a detailed steps of fabrication process of different types of chips.
		ECE 4103.2	Illustrate the design process Of different Combinational and sequential logic circuits and their layouts can be designed
		ECE 4103.3	Analyze the speed enhancement concepts of chip and distinguish the effect of scaling on device parameters
		ECE 4103.4	Designing the circuits at its subsystem level description and generating test vectors for analyzing test procedures for chips
		ECE 4103.5	Understand Basic architectures of Data path subsystems, Application Specific Integrated Circuits, of CPLDs and FPGAs.
53	Microwave Engineering	ECE 4104.1	Understand the concept of Microwave frequencies and waveguides that are used in communication
		ECE 4104.2	Understand the operation and working of the various tubes for the Tx of Microwave frequencies
		ECE 4104.3	Analyze the difference between the conventional tubes and the microwave tubes for the Tx of EM waves
		ECE 4104.4	Acquire knowledge about the measurements to be done at microwaves.
		ECE 4104.5	Design and simulate waveguide components for various applications
54	Radar Engineering	ECE 4105.1	Illustrate radar fundamentals and analysis of the radar signals.
		ECE 4105.2	Analyze the working principle of CW and Frequency Modulated Radar.
		ECE 4105.3	Understand the basic concepts of MTI and Pulse Doppler Radar,
		ECE 4105.4	Analyze Tracking Radar working principle and tracking techniques, radar receivers for detection of signals in noise.
55	Bio Medical Signal Processing	ECE 4106.1	The student will be able to model a biomedical system and also have a basic understanding of diagnosing bio-signals and classifying them
		ECE 4106.2	The student will be able to understand various methods of acquiring bio signals.
		ECE 4106.3	The student will be able to understand various sources of bio signal distortions and its remedial techniques.
		ECE 4106.4	Understand efficient computation techniques such as DIT and DIF FFT Algorithms.

		ECE 4106.5	The students will be able to analyze ECG and EEG signal with characteristic feature points.
56	Artificial Neural Networks	ECE 4107.1	The student will be able to understand basics of AI. Understand various search methods.
		ECE 4107.2	The Student will be able to explain various search algorithms, identify the scope and limits of the artificial intelligence.
		ECE 4107.3	The student will be able to assess the applicability, strengths, and weaknesses of the basic knowledge representation.
		ECE 4107.4	The student will be able to understand computational development based on neural system and Understand neural based computation.
		ECE 4107.5	The students will able to assess the performance of Unsupervised and supervised Learning algorithm
57	Digital Communications Lab	ECE 4108.1	A/D and D/A Converters.
		ECE 4108.2	Continuously Variable Slope Delta Modulation
		ECE 4108.3	Phase Shift Keying (PSK) Modulator, Frequency Shift Keying (FSK) Modulator
		ECE 4108.4	Understand encoding and decoding techniques for digital communication systems
58	Microwave Engineering Lab	ECE 4109.1	VSWR
		ECE 4109.2	V-I characteristics of Gunn diode
		ECE 4109.3	coupling factor and directivity of a 4-port directional coupler
		ECE 4109.4	microwave frequency
59	Project/ Thesis work	ECE 4201.1	Identify and Investigate a complex problem in the area of Electronics and Communication Engineering
		ECE 4201.2	Apply the knowledge of Electronics and Communication Engineering concepts, algorithms, modern tools to provide an innovative solution to the identified problem.
		ECE 4201.3	Develop their analytical and ethical leadership skills necessary to address and help solve the issues.
		ECE 4201.4	Demonstrate their proficiency in written and/or oral communication skills and prepare a document and presentation in a professional manner, in all aspects.




 Principal
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Dr. Lankapalli Bullayya College of Engineering

New Resapuvani Palem, Visakhapatnam

Sponsored by Society of Collegiate Education

Approved by AICTE, Affiliated to Andhra University

Regulation: 2019-2020

Department: Electrical and Electronics Engineering

2.6.1 Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website

S No	Course Name	Course Outcome Number	Course Outcome Description
1.	Mathematics-I	ENG1101.1	Find the partial derivatives of functions of two or more variables
		ENG1101.2	Evaluate maxima and minima errors and approximations
		ENG1101.3	Solve the ordinary differential equations of first order and first degree.
		ENG1101.4	Solve Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay
		ENG1101.5	Evaluate the Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.
2.	Mathematics-II	ENG1102.1	Find rank, Eigen values and Eigen vectors of a matrix and understand the importance of Cayley-Hamilton theorem.
		ENG1102.2	Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.
		ENG1102.3	Understand Laplace transforms and its properties.
		ENG1102.4	Apply Laplace Transforms to ordinary differential equations.
		ENG1102.5	Expand a perfect periodical function as Fourier Series and half range Fourier series.
3.	Physics	ENG1104.1	Understand the fundamentals of Thermodynamics and Laws of thermodynamics. Understand the working of Carnot cycle and concept of entropy.
		ENG1104.2	Gain Knowledge on the basic concepts of electric and magnetic fields. Understand the concept of the nature of magnetic materials. Gain knowledge on electromagnetic induction and its applications .
		ENG1104.3	Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit.

		ENG1104.4	Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fiber. Realize their role in optical fiber communication.
		ENG1104.5	Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent one Dimensional Schrodinger's wave equation. Understand the fundamentals and synthesis processes of Nanophase materials
4.	Engineering Graphics	ENG1106.1	Understand the basics of Engineering Graphics and BIS conventions.
		ENG1106.2	Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings
		ENG1106.3	Demonstrate and practice the various profiles/curves used in engineering practice through standard procedures.
		ENG1106.4	Demonstrate and practice the orthographic projections of points, lines, planes, solids and section of solids
5.	Professional Ethics and Moral values	ENG1108.1	Grasp the meaning of the concept – Law and also Get an overview of the laws relating to Engineers and also Apprehend the importance of being a law abiding person and They would have better critical ability
		ENG1108.2	Self-explore by using different techniques to live in harmony at various levels
		ENG1108.3	Analyze themselves and understand their position with respect to the moral and ethical character needed for a successful and satisfactory work life
		ENG1108.4	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
		ENG1108.5	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society)
6.	Physics Lab	ENG1111.1	Ability to design and conduct experiments as well as to analyze and interpret .
		ENG1111.2	Ability to apply experimental skills to determine the physical quantities related to Electromagnetism and Optics.
		ENG1111.3	The student will learn to draw the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments.
7.	Workshop	ENG1113.1	Can be able to work with Wood Materials in real time applications.
		ENG1113.2	Can be able to build various parts with Sheet Metal in day-to-day life
		ENG1113.3	Can be able to apply Metal Fitting skills in various applications.
		ENG1113.4	Can be able to apply this knowledge to basic house electrical wiring and repairs.
8.	Mathematics-III	ENG1201.1	Evaluate double integration in cartesian and polar coordinates.
		ENG1201.2	Apply the Beta, Gamma functions in evaluation of integration.

		ENG1201.3	Find the area of curved surfaces and volume of solids
		ENG1201.4	Find the Limit and continuity of $f(z)$ - Derivative of $f(z)$. Verify Analytic Functions by using Cauchy- Reimann Equations, Orthogonal systems, Applications to flow problems, Geometrical representation of $f(z)$.Integration of complex functions, Cauchy's theorem, Cauchy's integral formula and their applications
		ENG1201.5	Obtain Conformal transformation, Bilinear transformation , Series of complex terms -Taylor's and Laurent's series (without proofs), Zero's and Singularities of analytic functions. Residues and Calculations of residues, Cauchy's Residue Theorem, Evaluation of real definite integrals: Integration around unit circle, semi circle
9.	Chemistry	ENG1202.1	Identify the importance of water treatment parameters and its applications.
		ENG1202.2	Understand the concepts of environmental influence on corrosion, its mechanism with metals and controlling methods.
		ENG1202.3	Educate Preparation methods of polymers and plastics.
		ENG1202.4	Analyse and design fuel technology lubrication mechanism.
		ENG1202.5	Identify the characteristics and applications of Nano- materials.
10.	Computer Programming using C & Numerical Methods	ENG1204.1	Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and apply them in problem solving.
		ENG1204.2	Apply various operations on derived data types like arrays and strings in problem solving.
		ENG1204.3	Design and implement of modular Programming and memory management using Functions, pointers.
		ENG1204.4	Apply Structure, Unions and File handling techniques to Design and Solve different engineering programs with minimal complexity.
11.	Fundamentals of Electrical Engineering	ENG 1206.1	Memorize the basic principles of electrical components.
		ENG 1206.2	Summarize the electric circuits using network laws and reduction techniques.
		ENG 1206.3	Illustrate the behavior of basic Circuit elements for an AC excitation.
		ENG 1206.4	Understand the working principle and construction of the measuring instruments.
		ENG 1206.5	Recognize appropriate wiring schemes.
12.	Essence of Indian Traditional Knowledge	ENG 1207.1	By the end of this course the students should be able to understand the contribution of Scientific and Technological developments for the benefit of society at large.
		ENG 1207.2	Students should be able to understand and appreciate the latest Technological developments and their impact on quality of human life.
		ENG 1207.3	Students should be able to effectively apply the contributions made by the Technological advancements to the overall growth of nation's economy.
		ENG 1207.4	Students should be able to identify the gaps and problems in the process of Technological transfer and find ways to avoid or bridge the gaps.
13.	English	ENG 1209.1	Students will be able to analyse a given text and discover the various aspects related to language and literature
		ENG 1209.2	Learn the various language structures, parts of speech and figures of speech
		ENG 1209.3	Develop one's reading and writing abilities for enhanced communication
		ENG 1209.4	Learn to apply the topics in real-life situations for creative and critical use
14.	Chemistry Lab	ENG1210.1	The course provides the quantitative determination of the amount of various species in solutions.
		ENG1210.2	The Student understand the titration and conduct the quantitative determination with accuracy

		ENG1210.3	The course provides to develop novel materials to be used in titrations.
15.	CPNM Lab	ENG1212.1	Understand various computer components, Installation of software. C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
		ENG1212.2	Analysing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
		ENG1212.3	Construct programs that demonstrate effective use of C features including arrays, strings, structures, pointers and files.
		ENG1212.4	Apply and practice logical ability to solve the real-world problems.
16.	Mathematics-IV	EEB2101.1	Apply the differential operator 'del' to the scalar and vector point functions, Calculate the Gradient, Divergence and Curl, Vector normal to a surface, evaluate the physical concepts like workdone, force and circulator using these operators.
		EEB2101.2	Understand the vector differentiation and integration to the engineering problems and Green's theorem in the plane, Stoke's theorem, Gauss Divergence theorem
		EEB2101.3	Formulate Partial differential equations and evaluate the linear and nonlinear, Homogeneous and Non-homogeneous partial differential equations.
		EEB2101.4	Apply and find the solutions of one-dimensional wave (string equation), one -and two-dimensional Heat flow equations, Laplace's equation in Cartesian and polar coordinates
		EEB2101.5	Find the Fourier transforms, Fourier Sine, Cosine and related inverse transforms of different functions and their applications in solving several Physical and Engineering problems
17.	Fluid Mechanics and Hydraulic machines	EEO2101.1	Student will be able to develop to gain basic knowledge on Fluid Statistics, Fluid Dynamics, closed conduit flows.
		EEO2101.2	Understand working principles of venturimeter and orificemeters
		EEO2101.3	Identify the various flows in the pipes.
		EEO2101.4	Student will be able to design various components of turbines and study their working principles.
		EEO2101.5	Student will be able to design various components of pumps and study their characteristics.
18.	Electrical Engineering Materials(Elective-2)	EEO2104.1	Understand various types of dielectric materials, their properties in various conditions.
		EEO2104.2	Evaluate magnetic materials and their behavior.
		EEO2104.3	Evaluate semiconductor materials and technologies
		EEO2104.4	Acquire Knowledge on Materials used in electrical engineering and applications.
		EEO2104.5	Acquire knowledge on the coolants, testing of transformer oil and applications of mineral oils .
19.	Network Theory	EEC2102.1	Apply network theorems for the analysis of electrical circuits.
		EEC2102.2	Obtain the transient and steady-state response of electrical circuits
		EEC2102.3	Analyze circuits in the sinusoidal steady-state.
		EEC2102.4	Analyze two port circuit behavior.
		EEC2102.5	Acquire knowledge on laplace transform techniques.
20.	Electronic Circuits	EEC2103.1	Understand the characteristics of transistors.
		EEC2103.2	Design and analyze various rectifier and amplifier circuits.
		EEC2103.3	Design sinusoidal and non-sinusoidal oscillators

		EEC2103.4	Understand the classification of power amplifiers and Tuned voltage amplifiers
		EEC2103.5	Understand the functioning of OP-AMP and design OP-AMP based circuits
21.	Engineering Mechanics & Strength of Materials	EES2105.1	Understand the concepts of co-ordinate systems
		EES2105.2	Analyze the three-dimensional motion.
		EES2105.3	Understand the concepts of rigid bodies
		EES2105.4	Analyze the free-body diagrams of different arrangements
		EES2105.5	Analyze torsional motion and bending moment.
22.	Electrical Networks Lab	EEL2101.1	Analyze and design DC and AC circuits.
		EEL2101.2	Apply concepts of electrical circuits throughout engineering
		EEL2101.3	Evaluate response in any given network using theorems
		EEL2101.4	Analyze a given network by applying various Network Theorem
23.	Fluid Mechanics and Hydraulic machines Lab	EEL2102.1	Demonstrate practical understanding of Venturimeter and orificemeter
		EEL2102.2	Demonstrate practical understanding of friction losses in pipe flows
		EEL2102.3	Demonstrate practical understanding of impact of jet
		EEL2102.4	Provide the student knowledge in calculating performance analysis in turbine
24.	Signals, Systems And Synthesis (Elective-3)	EEO2201.1	To classify the continuous and discrete time signals and systems.
		EEO2201.2	To apply also determine DTFT and Z- transform, fourier concepts for analysis the continuous and discrete time systems.
		EEO2201.3	To apply LTI systems in the time domain and also understand the sampling theorem
		EEO2201.4	To apply the concepts on Sampling theorems
		EEO2201.5	Synthesize passive one-port networks using standard foster and cauer forms and also identify the properties and characteristics of network functions.
25.	Digital Logic Design (Elective-4)	EEO2202.1	Apply the simplification of Boolean expressions using K – Map method and designing Combinational circuits.
		EEO2202.2	Outline the combinational building blocks & memory elements.
		EEO2202.3	Design the combinational and sequential circuits using hardware description language.
		EEO2202.4	Solve the asynchronous sequential circuits for given applications
		EEO2202.5	Explain the applications of digital electronics
26.	Electrical Machines-I	EEC2201.1	Understand the operation and applications of DC generators.
		EEC2201.2	Understand the operation and applications of DC motors.
		EEC2201.3	Understand the operation of Single-phase Transformer and analyse the performance of Single-phase Transformer under open-circuited and Short-circuited condition.
		EEC2201.4	Understand the operation of Three-phase Transformer and analyse the performance of Three-phase Transformers under open-circuited and Short-circuited condition.
27.	Electromagnetic Fields	EEC2202.1	Understand the basic mathematical concepts related to electromagnetic vector fields
		EEC2202.2	Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density.

		EEC2202.3	Apply the principles of magneto statics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.
		EEC2202.4	Apply Maxwell's equations to solutions of problems relating to transmission lines and uniform plane wave propagation lines and uniform plane wave propagation.
		EEC2202.5	Understand the depth of static and Time varying Fields governed by Maxwell's Equation.
28.	Pulse and Digital Circuits	EEC2203.1	Student will be having strong knowledge in the concept of linear wave shaping of sinusoidal and non sinusoidal signals.
		EEC2203.2	Student will be able to design the circuit of clipping and clamping circuits.
		EEC2203.3	Student will able to derive and design different multivibrators.
		EEC2203.4	With the basic understanding of the concept of synchronization, the student will be able to design time based generators and sweep circuits.
		EEC2203.5	Understand and analyze the different logic families like DTL, RTL, TTL,
29.	Environmental Science	EEH2201.1	Student will be able to gain Knowledge on the fundamental aspects of environment and the environmental management
		EEH2201.2	Student will be able to gain knowledge on the salient features of the important international conventions
		EEH2201.3	Student will be able to understand the importance of natural resources management for the sustenance of the life and the society.
30.	Electrical Machines Lab – I	EEL2201.1	Analyse the performance of DC motors by performing load test.
		EEL2201.2	Analyse the performance of DC generators by performing load test.
		EEL2201.3	Implement the speed control techniques for a DC shunt motor
		EEL2201.4	Develop equivalent circuit and predetermine their regulation and efficiency by performing OC & SC tests on transformer.
31.	Electronic Circuits Lab	EEL2202.1	Identify and utilize various electronic components and devices with their specifications to Implement and verify the outputs of hardware circuits.
		EEL2202.2	Construct and Analyze the characteristics of PN junction diode , Zener diode and LED
		EEL2202.3	Implement the rectifier circuits with and without filter and voltage regulator.
		EEL2203.4	Analyze the characteristics and calculate the parameters of transistors like BJT, FET.
		EEL2203.5	Design the Amplifiers like Common Emitter and Implement them using hardware and also observe their frequency responses.
32.	Communication Systems(Elective-5)	EEO3102.1	Explain the need of modulation.
		EEO3102.2	Describe various types of modulation.
		EEO3102.3	Describe the sampling theorem and spectra of pulse modulation.
33.	Power Electronics	EEC3101.1	understand the differences between signal level and power level devices
		EEC3101.2	Analyze controlled rectifier circuits
		EEC3101.3	Analyze the operation of DC-DC choppers
		EEC3101.4	Analyze the operation of voltage source inverters,choppers & Cyclo-converters
34.	Electrical Measurements	EEC3102.1	Classify the standard devices and galvanometers for the measurement of voltage and current
		EEC3102.2	Understand the operation of voltmeter, ammeter, wattmeter and energy meter in the measurement of voltage, current, power and energy.

		EEC3102.3	Analyze the bridges for the measurement of low, medium and high resistance, measurement of inductance and capacitance measurement.
		EEC3102.4	Understand the operation of flux meter, Ballistic Galvanometer for measuring magnetic parameters, how to measure iron loss and testing of ring and bar specimens
		EEC3102.5	Understand the operation of instrumentation transformer in the measurement of high values of current and voltage and potentiometers to measure AC and DC values of unknown voltage and current
35.	Electrical Machines-II	EEC3103.1	Acquire the basic knowledge about working principle, identify various control strategies and illustrate the parameters of a three phase induction motor.
		EEC3103.2	Acquire the basic knowledge about working principle, identify various control strategies and illustrate the parameters of a synchronous generator.
		EEC3103.3	Acquire the basic knowledge about working principle, identify various control strategies and illustrate the parameters of a synchronous motor.
		EEC3103.4	Acquire the basic knowledge about working principle, identify various control strategies and illustrate the parameters of single phase induction motors
36.	Power Systems - I	EEC 3104.1	To ability to calculate usage of electrical power
		EEC 3104.2	To ability to discuss functions of substation and to plot the power/energy demand
		EEC 3104.3	To design power system components for a specified system and application.
		EEC 3104.4	To ability to discuss various power sources for generation of power (merits/demerits) and renewable energy and non-renewable energy sources to power generation of their uses of components mostly used in it.
		EEC3104.5	Acquire knowledge on renewable energy and non-renewable energy sources to power generation of their uses of components mostly used in
37.	Computer Architecture and Organization(PEC)	EEE3101.1	Gain knowledge in problem solving and steps in Program development.
		EEE3101.2	Distinguish essential components of C programming structures like information types, expressions, control explanations, different basic capacities and Apply them in critical thinking.
		EEE3101.3	Apply various operations on derived data types like arrays and strings in problem solving.
		EEE3101.4	Apply Structure, Unions and File handling techniques to Design and Solve different engineering programs with minimal complexity.
		EEE3101.5	Apply Numerical methods to solve the complex Engineering problems.
38.	Electrical Measurements Lab	EEL3101.1	Measurement of single phase power for the AC Circuit.
		EEL3101.2	Measurement of three phase power for the AC Circuit.
		EEL3101.3	Measurement of R, L, C Parameters using A C Bridges
		EEL3101.4	Calibration of measuring instruments i.e., wattmeter and energy meter
39.	Electrical Machines-II lab	EEL3102.1	Analyse the performance and parameters of a three-phase alternator by performing suitable tests.
		EEL3102.2	Analyse the performance and parameters of a single-phase induction motor and three-phase induction motor by performing suitable tests.
		EEL3102.3	Analyse the performance and parameters of a single-phase transformer by performing suitable tests.
		EEL3102.4	Analyse the performance and parameters of a synchronous motor by performing suitable tests.


40.	Power Systems-II	EEC3201.1	Estimate the inductance and capacitance for different conductor configurations.
		EEC301.2	Analyze the performance of short, medium & long transmission lines.
		EEC3201.3	Evaluate the sag and tension of transmission line for various configurations under the effect of wind and ice
		EEC3201.4	Select a suitable insulator for a particular operating voltage, configuration and best method to improve string efficiency
		EEC3201.5	Analyze the effect of various factors on corona.
41.	Control Systems	EEC3202.1	Understand the concept of transfer function and Interpret different physical, mechanical systems in terms of electrical system to construct equivalent electrical models for analysis.
		EEC3202.2	Interpret the concept of Block diagrams, Signal flow graph methods and apply the reduction techniques to solve for the same.
		EEC3202.3	Understand the time response of First, Second order systems with standard input signals and dynamic performance of feedback control systems.
		EEC3202.4	Understand the concept of stability and to establish the stability of a system using the Routh array test and to analyse the control systems with root locus.
		EEC3202.5	Compute gain and phase margins from Bode diagrams & Nyquist plots and understand their implications in terms of stability.
42.	Microprocessors & Micro-controllers	EEC3203.1	Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system.
		EEC3203.2	Identify a detailed s/w & h/w structure of the Microprocessor.
		EEC3203.3	Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.
		EEC3203.4	Distinguish and analyze the properties of Microprocessors & Microcontrollers.
		EEC3203.5	Analyze the data transfer information through serial & parallel ports.
43.	Power System Analysis & Stability	EEC3204.1	Describe the per unit system of power system.
		EEC3204.2	Apply the concepts of addition or removal of element in the power system for determining the impedance matrix
		EEC3204.3	Formulate and solve the power flow problem of power system
		EEC3204.4	Develop and solve the positive, negative, and zero sequence networks for systems consisting of machines, transmission lines and transformers.
		EEC3204.5	Determine the fault voltages and currents for various faults.
44.	Utilization of Electrical Energy(PEC-2)	EEE3201.1	To understand the knowledge regarding the fundamentals and elementary design aspects of electric welding and heating.
		EEE3201.2	Understand and calculate the illumination level for a given application and then select the suitable specification for installation.
		EEE3201.3	To understand and analyse the electrical circuit used in various electrical appliances
		EEE3201.4	To understand the fundamentals of electrolytic processes.
		EEE3201.5	To understand the safety measures and importance of earthing in power system network and design different wiring circuits.
45.	Digital Control	EEE3205.1	Obtain discrete representation of LTI systems.
		EEE3205.2	Analyze the stability of open loop and closed loop discrete-time systems.

	Systems(PEC-3)	EEE3205.3	Design and analyze digital controllers.
		EEE3205.4	Design state feedback and output feedback controllers
46.	Industrial management and Entrepreneurship	EEO3201.1	Explain basic principles of engineering economics
		EEO3201.2	Apply cost – volume -profit (CVP) analysis in their business decision making
		EEO3201.3	Evaluate investment proposals through various capital budgeting methods
		EEO3201.4	Apply the knowledge to prepare the simple financial statements for measuring performance of business firm
		EEO3201.5	Analyze key issues of organization, management and administration
47.	Power Electronics Laboratory	EEL3201.1	Explain the characteristics of various power semiconductor derive and analyze the operation of diode bridge rectifier.
		EEL3201.2	Design firing circuits for SCR. Analyze the operation of AC voltage controller and half wave phase-controlled rectifiers.
		EEL3201.3	Explain the operation of single phase full-wave converters and analyze harmonics in the input current.
		EEL3201.4	Acquire the knowledge on operation of inverters and their characteristics
48.	Microprocessor and Microcontroller Laboratory	EEL3202.1	Ability to handle arithmetic operations using assembly language programming
		EEL3202.2	Demonstrate ability to handle logical operations using assembly language programming
		EEL3202.3	Demonstrate ability to handle string instructions using assembly language programming
		EEL3202.4	Demonstrate ability to handle sorting operations and using assembly language programming
		EEL3202.5	Ability to interface 8255PPI, Stepper Motor study cards with 8085/8086/8051
49.	Managerial Economics	EEH4101.1	Explain basic principles of engineering economics
		EEH4101.2	Apply cost – volume -profit (CVP) analysis in their business decision making
		EEH4101.3	Evaluate investment proposals through various capital budgeting methods
		EEH4101.4	Apply the knowledge to prepare the simple financial statements for measuring performance of business firm
		EEH4101.5	Analyze key issues of organization, management and administration
50.	Electrical Drives & Traction	EEC4101.1	Acquire the basic knowledge about operation and various types of the electric drives.
		EEC4101.2	Illustrate the speed control of DC motors with phase-controlled converters and choppers for verification of speed torque characteristics.

		EEC4101.3	Describe the working of various speed control methods and use those methods for both induction motor drives and synchronous motor drives.
		EEC4101.4	Acquire the basic knowledge about the classification, characteristics and components of electric traction.
51.	Power System Operation and Control	EEC4102.1	Evaluate optimal generation schedule with and without losses
		EEC4102.2	Compute loss coefficients and transmission losses
		EEC4102.3	Find the solution for short term hydrothermal scheduling problems
		EEC4102.4	Determine the steady state changes in frequency in single area and two area load frequency control.
		EEC4102.5	Suggest suitable voltage control method for different applications
52.	Operation Research(PEC-4)	EEE 4101.1	Analyze any real-life system with limited constraints and depict it in a model form and convert the problem into a mathematical model.
		EEE 4101.2	Understand variety of problems such as assignment, transportation, travelling, salesman
		EEE 4101.3	Understand different queuing situations and find the optimal solutions using models for different situations.
		EEE 4101.4	Solve the problems mentioned in point 4 using linear programming approach using software
		EEE 4101.5	Understand few inventory models.
53.	Advanced Control Systems(PEC-5)	EEE4105.1	Understand various design specifications.
		EEE4105.2	Design controllers using the state-space approach.
		EEE4105.3	Design a compensator for continuous time systems.
		EEE4105.4	Apply the concepts of controllability and observability in evaluating the performance of control system.
		EEE4105.5	Design an appropriate feedback controller and/or observer for physical plants.
54.	Power System Protection	EEE4108.1	Understanding the basic need and requirements of a Power System Protection
		EEE4108.2	Explain the working of different relays like Electromagnetic Relays and their usage in different protection schemes
		EEE4108.3	Explain the working of different relays Static Relays and their usage in different protection schemes
		EEE4108.4	Elucidate various protection schemes of various power system components like alternators, transformers and transmission lines.
		EEE4108.5	Explain the working of fuses, circuit breakers and design their ratings according to requirements.
55.	Control Systems Laboratory	EEL4101.1	Analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchronous motors.
		EEL4101.2	Design P,PI, and PID controllers and Control the temperature using PID controller

		EEL4102.4	understand various factors related to charged transmission lines
57.	Power System Protection Lab	EEL 4103.1	Calculate the ABCD parameters of transmission line.
		EEL 4103.2	Test the strength of transformer oil and also the fault occurred due to reduction of oil in transformer using Buchholz relay.
		EEL 4103.3	Measure the Sequence Impedance of 3- Φ Transformer.
		EEL 4103.4	Test the biased/unbiased differential relay using variable AC current source.
		EEL 4103.5	Obtain various characteristics of negative sequence current, Electro-Mechanical and Electro-Magnetic Earth fault type relay and also locating a cable fault.
58.	Project Work	EEL 4202.1	Conduct scientific, engineering experiments using hardware and software tools of their own, Analyse and Interpret data.
		EEL 4202.2	Demonstrate collaborative skills and independent learning through working in a team to complete a task within stipulated time using project management tools.
		EEL 4202.3	Demonstrate skills with ethical responsibility in writing project reports and oral presentation of the work to a panel of experts.




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