

KRISHNA CHAITANYA INSTITUTE OF TECHNOLOGY & SCIENCES,

MARKPAUR

PROGRAMME OUTCOMES

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.



KRISHNA CHAITANYA INSTITUTE OF TECHNOLOGY & SCIENCES

Devarajugattu (Post), Peddaraveedu (Mandal), Prakasam Dist. - 523 320.

(Approved by A.I.C.T.E., New Delhi, & Affiliated to JNTUK, Kakinada)

NAAC ACCREDITED INSTITUTION

DEPARTMENT OF CIVIL ENGINEERING

Program Specific Outcomes (PSOs)

PSO-1: The student has the ability to apply the knowledge of Physics, Chemistry, Mathematics, Programming Skills and Soft Skills to solve Civil Engineering problems

PSO-2: The student has the proficiency in streams of Civil Engineering to visualize and execute the systems for sustainable living.

PSO-3: The student has the practical knowledge and experimental skills to tackle Civil Engineering problems using technical and management skills, exhibiting professional ethics to meet the societal needs.

PSO-4: The program enables the faculty to develop academic proficiency by involving in research & innovation, interaction with industry and professional bodies through technical advice and Continuing Education Programs (CEP) to meet the needs of the user system.



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COURSE OUTCOMES AS PER R19, R16 REGULATIONS

S.No	Year /Sem	Course code	Course Name	Course Outcomes (After completion of the course student can able to:)
1	I/I	BS1101	Mathematics-I	CO1: utilize mean value theorems to real life problems solve the differential equations related to various engineering fields. CO2: familiarize with functions of several variables which is useful in optimization. CO3: Apply double integration techniques in evaluating areas bounded by region. CO4: Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3- dimensional coordinate systems.
2	I/I	BS1102	Mathematics-II	CO1: Develop the use of matrix algebra techniques that is needed by engineers for practical applications CO2: Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel CO2: Evaluate approximating the roots of polynomial and transcendental equations by different algorithms CO3: Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals CO4: Apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations.
3	I/I	BS1108	Engineering physics	CO1: Identify forces and moments in mechanical systems using scalar and vector techniques CO2: extend Newton's second law for inertial and non-inertial frame of reference CO3: explain simple harmonic motion and damped harmonic motions CO4: explain how sound is propagated in buildings analyze acoustic properties of typically used materials in buildings CO4: recognize sound level disruptors and their use in architectural acoustics CO4: Use of ultrasonic's in flaw detection using

				<p>NDT technique</p> <p>CO5: Understand the elasticity and plasticity concepts</p> <p>CO6: Study different types of moduli and their relation</p> <p>CO7: Analyze the concepts of shearing force and moment of inertia</p> <p>CO8: Study Different types of laser systems</p> <p>CO9: Identify different types of sensors and their working principles</p>
4	I/I	ES1104	Engineering Mechanics	<p>CO1: The students are to be exposed to the concepts of force and friction ,</p> <p>CO2: The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.</p> <p>CO3: The students are to be exposed to concepts of centre of gravity</p> <p>CO4: The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.</p> <p>CO5: The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.</p> <p>CO6: The students are to be exposed to concepts of work, energy and particle motion</p>
5	I/I	ES1103	Engineering drawing	<p>CO1: The student will learn how to visualize 2D & 3D objects.</p>
6	I/I	HS1102	English lab	<p>CO1: The student will learn Vowels, Consonants, Pronunciation, and Phonetic Transcription.</p> <p>CO2: The student will learn Past tense markers, word stress-di-syllabic words, Poly-Syllabic words</p> <p>CO3: The student will learn Rhythm & Intonation and Contrastive Stress.</p>

7	I/I	BS1109	Engineering physics lab	<p>CO1: Determination of Rigidity modulus of a material- Tensional Pendulum.</p> <p>CO2: Determination of Young's modulus by method of single cantilever oscillations.</p> <p>CO3: Determination of Acceleration due to Gravity and Radius of Gyration compound pendulum.</p> <p>CO4: Determination of spring constant of springs using coupled oscillators.</p> <p>CO5: Measurement of magnetic susceptibility by Gouy's method.</p> <p>CO6: Determination of Moment of Inertia of a Fly Wheel.</p> <p>CO7: Determination of particle size using Laser.</p> <p>CO8: Determination of ultrasonic velocity in liquid</p> <p>CO9: Determination of dielectric constant by charging and discharging method.</p>
8	I/I	PR1101	Engineering Exploration Project	<p>CO1: Use Design Thinking for problem solving methodology for investigating ill-defined problems.</p> <p>CO2: Undergo several design challenges and work towards the final design challenge</p>
9	I/II	HS1201	English	<p>CO1: understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.</p> <p>CO2: ask and answer general questions on familiar topics and introduce one/other.</p> <p>CO3: employ suitable strategies for skimming and scanning to get the more general idea of a text and locate specific information.</p> <p>CO4: recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs.</p> <p>CO5: form sentences using proper grammatical structures and correct word forms.</p>
10	I/II	BS1203	Mathematics – III	<p>CO1: Interpret the physical meaning of different operators such as gradient, curl and divergence</p> <p>CO2: Estimate the work done against a field, circulation and flux using vector calculus</p> <p>CO3: Apply the Laplace transform for solving differential equations</p> <p>CO4: Find or compute the Fourier series of</p>

				<p>periodic signals</p> <p>CO5: Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms</p> <p>CO6: Identify solution methods for partial differential equations that model physical processes</p>
11	I/II	BS1210	Engineering chemistry	<p>CO1: Explain the preparation, properties and applications of some plastic materials.</p> <p>CO2: Interpret the mechanism of conduction in conducting polymers.</p> <p>CO3: Discuss natural and synthetic rubbers and their applications.</p> <p>CO3: Explain the theory of construction of battery and fuel cells.</p> <p>CO4: Categorize the reasons for corrosion and study some methods of corrosion control.</p> <p>CO5: Explain the techniques that detect and measure changes of state of reaction.</p>
12	I/II	ES1201	Programming for problem solving using c	<p>CO1: To write algorithms and to draw flowcharts for solving problems</p> <p>CO2: To use different operators, data types and write programs that use two way/ multi way section.</p> <p>CO3: To apply file I/O operations.</p> <p>CO4: To select the best loop construct for a given problem.</p> <p>CO5: To design and implement programs to analyze the different pointer applications.</p> <p>CO6: To decompose a problem into functions and to develop modular reusable code</p> <p>CO7: To convert flowcharts/algorithms to C Programs, compile and debug programs</p>
13	I/II	ES1207	Computer aided engineering drawing	<p>CO1: Student get exposed on working of sheet metal with help of development of surfaces.</p> <p>CO2: Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids.</p> <p>CO3: Student shall exposed to modeling commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.</p>
14	I/II	ES1202	Programming for problem solving using c lab	<p>CO1: Gains Knowledge on various concepts of a C language.</p> <p>CO2: Able to draw flowcharts and write algorithms.</p>

				<p>CO3: Able design and development of C problem solving skills.</p> <p>CO4: Able to design and develop modular programming skills.</p> <p>CO5: Able to trace and debug a program.</p>
15	I/II	BS1211	Engineering chemistry lab	<p>CO1: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills</p>
16	I/II	ES1203	Communication skills lab	<p>CO1: The student will learn Telephonic Etiquette, Role Plays, and Poster Presentations.</p> <p>CO2: Oral Presentation skills, Public speaking, Data Interpretation.</p> <p>CO3: Group Discussions: Do's and Don'ts- Types, Modalities.</p> <p>CO4: Preparatory Techniques, Frequently asked questions, Mock Interviews.</p>
17	I/II	ES1219	Workshop practice lab	<p>CO1: To impart hands-on practice on basic engineering trades and skills.</p>
18	I/II	MC1201	Environmental science	<p>CO1: Overall understanding of the natural resources.</p> <p>CO2: Basic understanding of the ecosystem and its diversity.</p> <p>CO3: Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.</p> <p>CO4: An understanding of the environmental impact of developmental activities.</p> <p>CO5: Awareness on the social issues, environmental legislation and global treaties.</p>
19	II/I	BS301	Complex Variables and Statistical Methods	<p>CO1: apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic</p> <p>CO2: find the differentiation and integration of complex functions used in engineering problems</p> <p>CO3: make use of the Cauchy residue theorem to</p>

				<p>evaluate certain integrals</p> <p>CO4: apply discrete and continuous probability distributions</p> <p>CO5: design the components of a classical hypothesis test</p>
20	II/I	PC301	Strength of materials - i	<p>CO1: The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions</p> <p>CO2: The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces</p> <p>CO3: The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions</p> <p>CO4: The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lamé's equation.</p> <p>.</p>
21	II/I	PC302	Fluid mechanics	<p>CO1: Understand the various properties of fluids and their influence on fluid motion and analyze a variety of problems in fluid statics and dynamics.</p> <p>CO2: Calculate the forces that act on submerged planes and curves.</p> <p>CO3: Ability to analyze various types of fluid flows.</p> <p>CO4: Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces</p> <p>CO5: Able Measure the quantities of fluid flowing in pipes.</p>
22	II/I	ES301	Surveying and geometrics	<p>CO1: Apply the knowledge to calculate angles, distances and levels</p> <p>CO2: Identify data collection methods and prepare field notes</p> <p>CO3: Understand the working principles of survey instruments, measurement errors and corrective measures</p> <p>CO4: Interpret survey data and compute areas</p>

				and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies
23	II/I	PC303	Building materials, construction and planning	<p>CO1: The student should be able to identify different building materials and their importance in building construction.</p> <p>CO2: The student is expected to differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions.</p> <p>CO3: The student should have learnt the importance of building components and finishing's.</p> <p>CO4: The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.</p>
24	II/I	PC304	Transportation Engineering – i	<p>CO1: Plan highway network for a given area.</p> <p>CO2: Determine Highway alignment and design highway geometrics.</p> <p>CO3: Design Intersections and prepare traffic management plans</p> <p>CO4: Judge suitability of pavement materials and design flexible and rigid pavements</p>
25	II/I	PC305	STRENGTH OF MATERIALS LAB	<p>CO 1 : Evaluate Properties of material by impact test</p> <p>CO 2 : Evaluate Properties of material by hardness test.</p> <p>CO 3 : Evaluate Properties of material by tensile test..</p>
26	II/I	PC306	SURVEYING FILED WORK - I	<p>CO1: Apply the principle of surveying for civil Engineering Applications.</p> <p>CO2: Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level</p> <p>CO3: Write a technical laboratory report</p>
27	II/I	MC301	Constitution of	CO1: Understand the concept of Indian

			india	<p>constitution.</p> <p>CO2: Apply the knowledge on directive principle of state policy.</p> <p>CO3: Analyze the History, features of Indian constitution.</p> <p>CO4: Evaluate Preamble Fundamental Rights and Duties.</p> <p>CO5: Understand the structure of Indian government.</p> <p>CO6: Differentiate between the state and central government</p> <p>CO7: Explain the role of President and Prime Minister.</p> <p>CO8: Know the Structure of supreme court and High court</p> <p>CO9: Understand the local Administration.</p> <p>CO10: Analyze the role of Myer and elected representatives of Municipalities.</p> <p>CO11: Contrast and compare the role of Chief Election commissioner and Commission on erate.</p> <p>CO12: Evaluate various commissions of via SC/ST/OBC and women.</p>
28	II/II	PC401	Strength of materials - ii	<p>CO1: The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.</p> <p>CO2: The student can assess stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions</p>
29	II/II	PC402	Hydraulics and hydraulic machinery	<p>CO1: Solve uniform and non uniform open channel flow problems.</p> <p>CO2: Apply the principals of dimensional analysis and similitude in hydraulic model testing.</p> <p>CO3: Understand the working principles of various hydraulic machineries and pumps.</p>
30	II/II	ES401	Engineering geology	<p>CO1: Identify and classify the geological minerals</p> <p>CO2: Measure the rock strengths of various rocks</p> <p>CO3: Classify and measure the earthquake prone areas to practice the hazard zonation</p> <p>CO4: Classify, monitor and measure the Landslides</p>

				<p>and subsidence</p> <p>CO5: Prepares, analyses and interpret the Engineering Geologic maps</p> <p>CO6: Analyses the ground conditions through geophysical surveys.</p> <p>CO7: Test the geological material and ground to check the suitability of civil engineering project construction.</p> <p>CO8: Investigate the project site for mega/mini civil engineering projects. Site selection for megaengineering projects like Dams, Tunnels, disposal sites etc.</p>
31	II/II	PC403	Tranportation engineering – ii	<p>CO1: Design geometrics in a railway track.</p> <p>CO2: Plan track layouts and control movement of trains</p> <p>CO3: Design airport geometrics and airfield pavements.</p> <p>Plan, construct and maintain Docks and Harbours</p>
32	II/II	PC404	Environmental engineering- i	<p>CO1: Estimation of design population and water demand</p> <p>CO2: Identify the water source and select proper intake structure</p> <p>CO3: Characterization of water for drinking, industry and construction</p> <p>CO4: Design of water treatment plant for a village/city</p> <p>CO5: Selection and design of an ideal distribution system</p>
33	II/II	PC405	Engineering Geology Lab	<p>CO1: Identify Megascopic minerals & their properties.</p> <p>CO2: Identify Megascopic rocks & their properties.</p> <p>CO3: Identify the site parameters such as contour, slope & aspect for topography.</p> <p>CO4: Know the occurrence of materials using the strike & dip problems.</p>
34	II/II	PC406	Transportation Engineering Lab	<p>CO1: Test aggregates and judge the suitability of materials for the road construction</p> <p>CO2: Test the given bitumen samples and judge their suitability for the road construction</p> <p>CO3: Obtain the optimum bitumen content for Bituminous Concrete</p> <p>CO4: Determine the traffic volume, speed and</p>

				parking characteristics. CO5: Draw highway cross sections and intersections.
35	II/II	PC407	Fluid Mechanics and Hydraulic Machinery Lab	CO1: Select the suitable bearing based on the application of the loads and predict the life of the bearing. CO2: Design of IC Engines parts. CO3: Design of power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws. CO4: Design spur & helical gear for different engineering applications.
36	II/II	MC401	Essence of Indian Knowledge Traditional / Professional Ethics and Human Values	CO1: Understand philosophy of Indian culture. CO2: Distinguish the Indian languages and literature among difference traditions. CO3: Learn the philosophy of ancient, medieval and modern India. CO4: Acquire the information about the fine arts inIndia. CO5: Know the contribution of scientists of different eras. CO6: The essence of Yogic Science for Inclusiveness of society.
37	III/I	PC501	STRUCTURAL ANALYSIS	CO1: Distinguish between the determinate and indeterminate structures. CO2: Identify the behaviour of structures due to the expected loads, including the moving loads, acting on the structure. CO3: Estimate the bending moment and shear forces in beams for different fixity conditions. CO4: Analyze the continuous beams using various methods -, three moment method, slope deflection method, energy theorems. CO5: Draw the influence line diagrams for various types of moving loads on beams/bridges. CO6: Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.
38	III/I	PC502	CONCRETE TECHNOLOGY	CO1: understand basic concepts of concrete. CO2: realize importance of quality of concrete.

				<p>CO3: familiarize basic ingredients of concrete and their role in concrete and their behavior in the field.</p> <p>CO4: test fresh concrete properties and hardened concrete properties.</p> <p>CO5: evaluate ingredients of concrete through lab tests. Design concrete mix by IS method.</p> <p>CO6: familiarize basic concepts of special concrete and their production and applications. Understand the behavior of concrete in various environments.</p>
39	III/I	PC503	WATER RESOURCES ENGINEERING - I	<p>CO1: be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects</p> <p>CO2: develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures.</p> <p>CO3: ability to develop design storms and carry out frequency analysis</p> <p>CO4: be able to determine storage capacity and life of reservoirs and develop unit hydrograph and synthetic hydrograph.</p> <p>CO5: be able to estimate flood magnitude and carry out flood routing.</p> <p>CO6: be able to determine aquifer parameters and yield of wells.</p> <p>CO7: Ability to develop the hydrological models.</p>
40	III/I	PC504	ENVIRONMENTAL ENGINEERING - II	<p>CO1: Plan and design the sewerage systems by estimating the flow</p> <p>CO2: Design of Plumbing for an apartment, Gated community or Hotels or Individual houses and Select the appropriate appurtenances in the sewerage systems</p> <p>CO3: Estimation of BOD and COD and Suggest a suitable disposal method with respect to effluent standards, and Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the</p>

				<p>river</p> <p>CO4: Analyze sewage and design suitable treatment system for sewage treatment for a village/City.</p> <p>CO5: Design of sewage treatment systems like Septic tank soak pit system and FAB reactor for buildings and understanding tertiary treatment of sewage.</p>
41	III/I	PE501	Construction Technology & Management	<p>CO1: appreciate the importance of construction planning</p> <p>CO2: understand the functioning of various earth moving equipment</p> <p>CO3: Know the methods of production of aggregate products and concreting and usage of machinery required for the works.</p> <p>CO4: apply the gained knowledge to project management and construction techniques</p>
42	III/I	OE501	WASTEWATER TREATMENT	<p>CO1: Know the quality and quantity of water for various industries and Advanced water treatment methods</p> <p>CO2: Learn the common methods of treatment of wastewaters and Biological treatment methods</p> <p>CO3: Study of methods to reduce impacts of disposal of wastewaters into environment and CETPs.</p> <p>CO4: Study of methods of treatment of wastewaters from specific industries like steel plants, refineries, and power plants, that imply biological treatment methods</p> <p>CO4: Study of methods of treatment of wastewaters from industries like Aqua, dairy, sugar plants, and distilleries that imply biological treatment methods</p>
43	III/I	PC506	CONCRETE TECHNOLOGY LAB	<p>CO1: Determine consistency and fineness of cement.</p> <p>CO2: Determine setting times of cement.</p> <p>CO3: Determine specific gravity and soundness of cement.</p>

				<p>CO4: Determine compressive strength of cement.</p> <p>CO5: Determine workability of cement concrete by compaction factor, slump and Vee – Beetests</p> <p>CO6: Determine specific gravity of coarse aggregate and fine aggregate by Sieve analysis.</p> <p>CO7: Determine flakiness and elongation index of aggregates.</p> <p>CO8: Determine bulking of sand.</p> <p>CO9: Understand non-destructive testing procedures on concrete.</p>
44	III/I	PC507	SURVEYING FIELD WORK – II	<p>CO1: Apply the principle of surveying for civil Engineering Applications.</p> <p>CO2: Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level</p> <p>CO3: Write a technical laboratory report</p>
45	III/II	PC601	DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES	<p>CO1: Work on different types of design methods</p> <p>CO2: Carryout analysis and design of flexural members and detailing</p> <p>CO3: Design structures subjected to shear, bond and torsion</p> <p>CO4: Design different type of compression members and footings</p>
46	III/II	PC602	Water Resources Engineering – II	<p>CO1: be able to estimate irrigation water requirements</p> <p>CO2: ability to design irrigation canals and canal network.</p> <p>CO3: plan an irrigation system</p> <p>CO4: design irrigation canal structures</p> <p>CO5: plan and design diversion head works.</p> <p>CO6: analyze stability of gravity and earth dams</p> <p>CO7: design ogee spillways and energy dissipation works</p>
47	III/II	PC603	Geotechnical Engineering - I	<p>CO1: The student must know the definition of the various quantities related to soil mechanics and establish their inter-relationships.</p> <p>CO2: The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.</p> <p>CO3: The student should be able to know the importance of the different engineering properties of the soil such as compaction,</p>

				<p>permeability, consolidation and shear strength and determine them in the laboratory.</p> <p>CO4: The student should be able to apply the above concepts in day-to-day civil engineering practice.</p>
48	III/II	HS601	Managerial economics and financial analysis	<p>CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.</p> <p>CO2: The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.</p> <p>CO3: The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.</p> <p>CO4: The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.</p> <p>CO5: The Learner can be able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</p>
49	III/II	PE601	Pre-stressed Concrete	<p>CO1: At the end of this course the student will be able to</p> <p>CO2: Understand different methods of pre stressing</p> <p>CO3: Estimate effective pre stress including short and long term losses</p> <p>CO4: Analyze and design pre stressed concrete beams under flexure and shear</p> <p>CO5: Understand the relevant IS Code provisions for pre stressed concrete</p>
50	III/II	OE601	PROJECT MANAGEMENT	<p>CO1: appreciate the importance of construction planning</p> <p>CO2: understand the functioning of various earth moving equipment</p> <p>CO3: know the methods of production of aggregate products and concreting</p> <p>CO4: apply the gained knowledge to project management and construction techniques</p>
51	III/II	PC604	Cad lab	CO1: Model the geometry of real-world

				<p>structure Represent the physical model of structure/element/structure</p> <p>CO2:Perform analysis</p> <p>CO3:Interpret from the Post processing results</p> <p>CO4:Design the structural elements and a system as per IS Codes</p>
52	III/II	PC605	ENVIRONMENTAL ENGINEERING LAB	<p>CO1:Estimate some important characteristics of water, wastewater and soil in the laboratory</p> <p>CO2: Draw some conclusion and decide whether the water is suitable for Drinking/Construction /Agriculture/ Industry.</p> <p>CO3:Estimate Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture</p> <p>CO4:Estimation of the strength of the sewage in terms of BOD and COD and Decide whether the water body is polluted or not with reference to the stated parameters in the list of experiments</p> <p>CO5: Demonstration of various instruments used in testing of water and soil and study of Drinking water standards, WHO guidelines, Effluent standards and standards for Construction/ Agriculture/ Industry.</p>
53	III/II	PR601	Socially Relevant Project	<p>CO1:The student(s) are be able to provide a solutions the technological problems of society</p> <p>CO2:The student(s) is able suggest technological changes which suits current needs of society</p> <p>CO3:The student(s) are able to explain new technologies available for problems of the society</p>
54	III/II	MC601	Employability Skills	<p>CO1:Aptitude skill,</p> <p>CO2:Soft skills,</p> <p>CO3:Skills required for campus placement interview</p>

55	IV/I	PC701	Design & Drawing of Steel Structures	<p>CO1: Work with relevant IS codes</p> <p>CO2: Carryout analysis and design of flexural members and detailing</p> <p>CO3: Design compression members of different types with connection detailing</p> <p>CO4: Design Plate Girder and Gantry Girder with connection detailing</p> <p>CO5: Produce the drawings pertaining to different components of steel structures</p>
56	IV/I	PC702	Geotechnical Engineering – II	<p>CO1: The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.</p> <p>CO2: The student must be able to compute the magnitude of foundation settlement and decide on the size of the foundation accordingly.</p> <p>CO3: The student must be able to use the field test data and arrive at the bearing capacity.</p> <p>CO4: The student must be able to apply the principles of bearing capacity of piles and design them accordingly.</p>
57	IV/I	PC703	REMOTE SENSING AND GIS	<p>CO1: Be familiar with ground, air and satellite based sensor platforms.</p> <p>CO2: interpret the aerial photographs and satellite imageries</p> <p>CO3: create and input spatial data for GIS application</p> <p>CO4: apply RS and GIS concepts for application in Civil Engineering</p>
58	IV/I	PE701	Industrial Wastewater Treatment	<p>CO1: Know the quality and quantity of water for various industries and Advanced water treatment methods</p> <p>CO2: Learn the common methods of treatment of wastewaters and Biological treatment methods</p> <p>CO2: Study of methods to reduce impacts of disposal of wasters into environment and CETPs.</p>

				<p>CO4:Study of methods of treatment of wastewaters from specific industries like steel plants, refineries, and power plants, that imply biological treatment methods</p> <p>CO5:Study of methods of treatment of wastewaters from industries like Aqua, dairy, sugarplants, and distilleries that imply biological treatment methods</p>
59	IV/I	OE701	Traffic safety	<p>CO1: To understand fundamentals of Traffic Engg.</p> <p>CO2: To investigate and determine the collective factors & remedies of accident involved.</p> <p>CO3: To design and plan various road geometrics.</p> <p>CO4: To manage the traffic system from road safety point of view.</p>
60	IV/I	PC704	Remote Sensing & GIS Lab	<p>CO1: Work comfortably on GIS software</p> <p>CO2: Digitize and create thematic map and extract important features</p> <p>CO3:Develop digital elevation model</p> <p>CO4: Interpretation and Estimation of features from satellite imagery.</p> <p>CO5: Analyze and Modeling using GIS software.</p>
61	IV/I	PC705	Geotechnical Engineering Lab	<p>CO1: Determine index properties of soil and classify them.</p> <p>CO2: Determine permeability of soils.</p> <p>CO3: Determine Compaction, Consolidation and shear strength characteristics.</p>
62	IV/I	PR701	Industrial Training/ Internship or Seminar	<p>CO1: know the knowledge in work</p>
63	IV/I	PR702	Project Work Phase-I	<p>CO1: know the knowledge in work</p>
64	IV/II	PC801	Estimation Specifications and Contract	<p>CO1: The student should be able to determine the quantities of different components of buildings.</p>

				<p>CO2:The student should be in a position to find the cost of various building components. The student should be capable of finalizing the value of structures</p>
65	IV/II	PE801	Design & Drawing of Irrigation Structures	<p>CO1: At the end of the course the student will be able to To design various irrigation structures</p>
66	IV/II	PE802	Ground Improvement Techniques	<p>CO1:By the end of the course, the student should be able to possess the knowledge of various methods of ground improvement and their suitability to different field situations. CO2: The student should be in a position to design a reinforced earth embankment and check its stability. CO3: The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice. CO4: The student should be able to understand the concepts and applications of grouting.</p>
67	IV/II	PR801	PROJECT WORK	<p>CO1: Apply all levels of Engineering knowledge in solving the Engineering problems. CO2: Work together with team spirit. CO3: Use Civil Engineering software at least one. CO4: Document the projects</p>



KRISHNA CHAITANYA INSTITUTE OF TECHNOLOGY & SCIENCES

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(Approved by A.I.C.T.E., New Delhi, & Affiliated to JNTUK, Kakinada)

NAAC ACCREDITED INSTITUTION

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Program Specific Outcomes (PSOs)

PSO-1: Able to utilize the knowledge of Power Electronics in collaboration with Electrical Machines to provide an engineering solution in the areas related to Electrical Drives.

PSO-2: To develop new cutting edge Technologies in Power Systems associated with efficient conversion and control of electrical power.

PSO-3: Able to use software for design, simulation and analysis of electrical systems.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTCOMES AS PER R16, R19 REGULATIONS

S.NO	YEAR/SEM	COURSE CODE	COURSE NAME	Course outcomes (After completion of the course student can able to :)
1	II/I	R1621021	ELECTRICAL CIRCUIT ANALYSIS-II	<p>C01: Students are able to solve three-phase circuits under balanced and unbalanced Condition.</p> <p>C02: Students are able find the transient response of electrical networks for different types of excitations.</p> <p>C03: Students are able to find parameters for different types of network.</p> <p>C04: Students are able to realize electrical equivalent network for a given network transfer Function.</p> <p>C05: Students are able to extract different harmonics components from the response of a Electrical network.</p> <p>C06: To understand the application of Fourier series and Fourier transforms for analysis of electrical circuits.</p>
2	II/I	R1621022	ELECTRICAL MACHINES – I	<p>C01: Able to assimilate the concepts of electromechanical energy conversion.</p> <p>C02: Able to mitigate the ill-effects of armature reaction and improve commutation in dc Machines.</p> <p>C03: Able to understand the torque production mechanism and control the speed of dc Motors.</p> <p>C04: Able to analyze the performance of single phase transformers.</p>

				<p>C05: Able to predetermine regulation, losses and efficiency of single phase transformers.</p> <p>C06: Able to parallel transformers, control voltages with tap changing methods and achieve Three-phase to two-phase transformation.</p>
3	II/I	R1621023	BASIC ELECTRONICS AND DEVICES	<p>C01: Students are able to understand the basic concepts of semiconductor physics, which are useful to understand the operation of diodes and transistors.</p> <p>C02: Students are able to explain the operation and characteristics of PN junction diode and special diodes.</p> <p>C03: Ability to understand operation and design aspects of rectifiers and regulators.</p> <p>C04: Students are able to understand the characteristics of various transistor configurations. They become familiar with different biasing, stabilization and compensation techniques used in transistor circuits.</p> <p>C05: Students are able to understand the operation and characteristics of FET, Thyristors, Power IGBTs and Power MOSFETs.</p> <p>C06: Students are able to understand the merits and demerits of positive and negative feedback and the role of feedback in oscillators and amplifiers.</p>

4	II/I	R1621024	ELECTROMAGNETIC FIELDS	<p>C01: To Determine electric fields and potentials using gauss's law or solving Laplace's or Poisson's equations, for various electric charge distributions.</p> <p>C02: To Calculate and design capacitance, energy stored in dielectrics.</p> <p>C03: To Calculate the magnetic field intensity due to current, the application of ampere's law and the Maxwell's second and third equations.</p> <p>C04: To determine the magnetic forces and torque produced by currents in magnetic field.</p> <p>C05: To determine self and mutual inductances and the energy stored in the magnetic field.</p> <p>C06: To calculate induced e.m.f., understand the concepts of displacement current and Poynting vector.</p>
5	II/I	R1621025	THERMAL AND HYDRO PRIME MOVERS	<p>C01: To make the student learn about the constructional features, operational details of various types of internal combustion engines through the details of several engine systems and the basic air standard cycles, that govern the engines.</p> <p>C02: To train the student in the aspects of steam formation and its utilities through the standard steam data tables and charts.</p> <p>C03: To impart the knowledge of gas turbine fundamentals, the governing cycles and the methods to improve the efficiency of gas turbines.</p> <p>C04: To teach the student about the fundamental of fluid dynamic equations and its applications fluid jets.</p> <p>C05: To make the student learn about</p>

				<p>the constructional features, operational details of various types of hydraulic turbines.</p> <p>C06: To train the student in the areas of types of hydro electric power plants, Estimation and calculation of different loads by considering various factors.</p>
6	II/I	R1621026	<p>MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS</p>	<p>C01: The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.</p> <p>C02: One is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.</p> <p>C03: The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</p> <p>C04: The student is to learn different types of business organizations and business cycles .</p> <p>C05: The student is to learn introduction to accounting and</p>

				<p>financing analysis.</p> <p>C06: The student is to learn capital and capital budgeting.</p>
7	II/I	R1621027	THERMAL AND HYDRO LAB	<p>C01: To impart practical knowledge on the performance evaluation methods of various internal combustion engines.</p> <p>C02: To impart practical knowledge on the performance evaluation methods of flow measuring equipment.</p> <p>C03: To impart practical knowledge on the performance evaluation methods of hydraulic turbines.</p> <p>C04: To impart practical knowledge on the performance evaluation methods of hydraulic pumps.</p> <p>C05: To impart practical knowledge on the Calibration of Venturimeter.</p> <p>C06: : To impart practical knowledge on the boilers .</p>

8	II/I	R1621028	ELECTRICAL CIRCUITS LAB	<p>C01: Able to apply various theorms, determination of self and mutual inductances, two port parameters of a given electric circuits.</p> <p>C02: Able to draw locus diagrams.</p> <p>C03: Waveforms and phasor diagram for lagging and leading networks.</p> <p>C04: To verify and demonstrate various theorms, resonance and two port networks.</p> <p>C05: To verify and demonstrate transmission and hybrid parameters.</p> <p>C06: To verify and demonstrate parameters of a choke coil.</p>
9	II/II	R1622021	ELECTRICAL MEASUREMENTS	<p>C01: Able to choose right type of instrument for measurement of voltage and current for ac and dc.</p> <p>C02: Able to choose right type of instrument for measurement of power and energy – able to calibrate energy meter by suitable method.</p> <p>C03: Able to calibrate ammeter and potentiometer.</p> <p>C04: Able to select suitable bridge for measurement of electrical parameters.</p> <p>C05: Able to use the ballistic galvanometer and flux meter for magnetic measuring Instruments.</p> <p>C06: Able to measure frequency and phase difference between signals using CRO. Able to use digital instruments in electrical measurements.</p>

10	II/II	R1622022	ELECTRICAL MACHINES – II	<p>C01: Able to explain the operation and performance of three phase induction motor.</p> <p>C02: Able to analyze the torque-speed relation, performance of induction motor and induction generator.</p> <p>C03: Able to explain design procedure for transformers and three phase induction motors.</p> <p>C04: Implement the starting of single phase induction motors.</p> <p>C05: To perform winding design and predetermine the regulation of synchronous generators.</p> <p>C06: Avoid hunting phenomenon, implement methods of starting and correction of power factor with synchronous motor.</p>
11	II/II	R1622023	SWITCHING THEORY AND LOGIC DESIGN	<p>C01:The student able to learn about number system and codes.</p> <p>C02: The student able to learn about minimization techniques.</p> <p>C03: The student able to learn about combinational logic circuits design.</p> <p>C04: Able to analyze the PLDs</p> <p>C05: The student able to learn about SEQUENTIAL CIRCUITS I</p> <p>C06: The student able to learn about SEQUENTIAL CIRCUITS II</p>

12	II/II	R1622024	CONTROL SYSTEMS	<p>C01: Ability to derive the transfer function of physical systems and determination of Overall transfer function using block diagram algebra and signal flow graphs.</p> <p>C02: Capability to determine time response specifications of second order systems and to Determine error constants.</p> <p>C03: Acquires the skill to analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.</p> <p>C04: Capable to analyze the stability of LTI systems using frequency response methods.</p> <p>C05: Able to design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams.</p> <p>C06: Ability to represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.</p>
13	II/II	R1622025	POWER SYSTEMS-I	<p>C01: Students are able to identify the different components of thermal power plants.</p> <p>C02: Students are able to identify the different components of nuclear Power plants.</p> <p>C03: Students are able to distinguish between AC/DC distribution systems and also Estimate voltage drops of distribution systems.</p> <p>C04: Students are able to identify the different components of air and gas insulated Substations.</p> <p>C05: Students are able to identify</p>

				<p>single core and multi core cables with different Insulating materials.</p> <p>C06: Students are able to analyze the different economic factors of power generation and tariffs.</p>
14	II/II	R1622026	MANAGEMENT SCIENCE	<p>C01: The student will acquire the knowledge on management functions.</p> <p>C02: Will familiarize with the concepts of functional management.</p> <p>C03: Will familiarize with the concepts of strategic management.</p> <p>C04: Will familiarize with the concepts of project management.</p> <p>C05: The student will acquire the knowledge on global leadership.</p> <p>C06 : The student will acquire the knowledge on organizational behavior.</p>

15	II/II	R1622027	ELECTRICAL MACHINES – I LABORATORY	<p>C01: To determine and predetermine the performance of DC machines.</p> <p>C02: To control the speed of DC motor.</p> <p>C03: To achieve three phase to two phase transformation.</p> <p>C04: To determine and predetermine the performance of Transformers.</p> <p>C05: To plot the magnetizing characteristics of DC shunt generator and understand the Mechanism of self-excitation.</p> <p>C06: To predetermine the efficiency and regulation of transformers and assess their Performance.</p>
16	II/II	R1622028	ELECTRONIC DEVICES AND CIRCUITS LAB	<p>C01: The students are required to perform the experiment to obtain the V-I characteristics of rectifiers and to determine the relevant parameters from the obtained graphs.</p> <p>C02: The students are required to perform the experiment to obtain the V-I characteristics of BJT and to determine the relevant parameters from the obtained graphs.</p> <p>C03: The students are required to perform the experiment to obtain the V-I characteristics of PN junction diode and to determine the relevant parameters from the obtained graphs.</p> <p>C04: The students are required to perform the experiment to obtain the V-I characteristics of zenor diode and to determine the relevant parameters from the obtained graphs.</p> <p>C05: The students are required to perform the experiment to obtain the V-I characteristics of SCR and to determine the relevant parameters from the obtained graphs.</p>

				<p>C06: The students are required to perform the experiment to obtain the V-I characteristics of UJT and to determine the relevant parameters from the obtained graphs.</p>
17	III/I	R1631021	POWER SYSTEMS–II	<p>C01: Able to understand parameters of various types of transmission lines during different operating conditions.</p> <p>C02: Able to understand the performance of short and medium transmission lines.</p> <p>C03: Student will be able to understand travelling waves on transmission lines.</p> <p>C04: Will be able to understand various factors related to charged transmission lines.</p> <p>C05: Will be able to understand sag/tension of transmission lines and performance of line Insulators.</p> <p>C06: To study the performance and modeling of long transmission lines.</p>

18	III/I	R1631022	RENEWABLE ENERGY SOURCES	<p>C01: Analyze solar radiation data, extraterrestrial radiation, and radiation on earth's Surface.</p> <p>C02: Design solar thermal collectors, solar thermal plants.</p> <p>C03: Design solar photo voltaic systems.</p> <p>C04: Develop maximum power point techniques in solar PV and wind energy systems.</p> <p>C05: Explain wind energy conversion systems, wind generators, power generation.</p> <p>C06: Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.</p>
19	III/I	R1631023	SIGNALS & SYSTEMS	<p>C01: Characterize the signals and systems and principles of vector spaces, Concept of orthogonality.</p> <p>C02: Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.</p> <p>C03: Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.</p> <p>C04: Understand the relationships among the various representations of LTI systems.</p> <p>C05: Understand the Concepts of convolution, correlation, Energy and Power density spectrum and their relationships.</p> <p>C06: Apply z-transform to analyze discrete-time signals and systems.</p>

20	III/I	R1631024	PULSE AND DIGITAL CIRCUITS	<p>C01: Design linear and non-linear wave shaping circuits.</p> <p>C02: Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.</p> <p>C03: Design different multivibrators and time base generators.</p> <p>C04: Utilize the non sinusoidal signals in many experimental research areas.</p> <p>C05: To understand the concept of Switching Characteristics of diode and transistor.</p> <p>C06: To learn the working of logic families & Sampling Gates.</p>
21	III/I	R1631025	POWER ELECTRONICS	<p>C01: Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's.</p> <p>C02: Design firing circuits for SCR.</p> <p>C03: Explain the operation of single phase full-wave converters and analyze harmonics in the input current.</p> <p>C04: Explain the operation of three phase full-wave converters.</p> <p>C05: Analyze the operation of different types of DC-DC converters.</p> <p>C06: Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.</p> <p>C07: Analyze the operation of AC-AC regulators.</p>

22	III/I	R1631026	ELECTRICAL MACHINES – II LABORATORY	<p>C01: Able to assess the performance of single phase and three phase induction motors.</p> <p>C02: Able to control the speed of three phase induction motor.</p> <p>C03: Able to predetermine the regulation of three–phase alternator by various methods.</p> <p>C04: Able to find the X_d/ X_q ratio of alternator and assess the performance of three–phase synchronous motor.</p> <p>C05: To improve the power factor of single phase induction motor .</p> <p>C06: The student able to draw the V and Inverted V curves of a three— phase synchronous motor.</p>
23	III/I	R1631027	CONTROL SYSTEMS LAB	<p>C01: Able to analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchronous motors.</p> <p>C02: Able to design P,PI,PD and PID controllers.</p> <p>C03: Able to design lag, lead and lag–lead compensators.</p> <p>C04: Able to control the temperature using PID controller.</p> <p>C05: Able to determine the transfer function of D.C.motor.</p> <p>C06: Able to control the position of D.C servo motor performance.</p>

24	III/I	R1631028	ELECTRICAL MEASUREMENTS LABORATORY	<p>C01: To be able to measure the electrical parameters voltage, current, power, energy and electrical characteristics of resistance, inductance and capacitance.</p> <p>C02: To be able to test transformer oil for its effectiveness.</p> <p>C03: To be able to measure the parameters of inductive coil.</p> <p>C04:The student able to learn measurement of Power by 3 Voltmeter and 3 Ammeter method.</p> <p>C05: The student able to learn calibration of LPF wattmeter by direct loading.</p> <p>C06: The student able to learn Testing of P.T. using absolute null method.</p>
25	III/I		INTELLECTUAL PROPERTY RIGHTS AND PATENTS	<p>C01: IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents.</p> <p>C02: Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements.</p> <p>C03: To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines.</p> <p>C04: Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments.</p> <p>C05: The student know about trademarks.</p> <p>C06: The student know about cyberlaw and cyber crime.</p>

26	III/II	R1632021	POWER ELECTRONIC CONTROLLERS & DRIVES	<p>C01: Explain the fundamentals of electric drive and different electric braking methods.</p> <p>C02: Analyze the operation of three phase converter fed dc motors and four quadrant operations of dc motors using dual converters.</p> <p>C03: Describe the converter control of dc motors in various quadrants of operation.</p> <p>C04: Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.</p> <p>C05: Differentiate the stator side control and rotor side control of three phase induction motor.</p> <p>C06: Explain the speed control mechanism of synchronous motors.</p>
27	III/II	R1632022	POWER SYSTEM ANALYSIS	<p>C01: Able to draw impedance diagram for a power system network and to understand per unit quantities.</p> <p>C02: Able to form a Y_{bus} and Z_{bus} for a power system networks.</p> <p>C03: Able to understand the load flow solution of a power system using different methods.</p> <p>C04: Able to find the fault currents for all types faults to provide data for the design of protective devices.</p> <p>C05: Able to find the sequence components of currents for unbalanced power system network.</p> <p>C06: Able to analyze the steady state, transient and dynamic stability concepts of a power system.</p>

28	III/II	R1632023	MICROPROCESSORS AND MICROCONTROLLERS	<p>C01: To be able to understand the microprocessor capability in general and explore the evaluation of microprocessors.</p> <p>C02: To be able to understand the addressing modes of microprocessors.</p> <p>C03: To be able to understand the micro controller capability.</p> <p>C04: To be able to program mp and mc.</p> <p>C05: To be able to interface mp and mc with other electronic devices.</p> <p>C06: To be able to develop cyber physical systems.</p>
29	III/II	R1632024	DATA STRUCTURES THROUGH C++	<p>C01: Distinguish between procedures and object oriented programming.</p> <p>C02: Apply advanced data structure strategies for exploring complex data structures.</p> <p>C03: Compare and contrast various data structures and design techniques in the area of Performance.</p> <p>C04: Implement data structure algorithms through C++. • Incorporate data structures into the applications such as binary search trees, AVL and B Trees.</p> <p>C05: Implement all data structures like stacks, queues, trees, lists and graphs and compare their Performance and trade offs.</p> <p>C06:Sorting implementation,how to solve dis order formats.</p>
30	III/II	R163202A	UNIX AND SHELL PROGRAMMIN OPEN ELECTIVE	<p>C01: Documentation will demonstrate good organization and readability.</p> <p>C02: File processing projects will require data organization, problem solving and research.</p> <p>C03: Scripts and programs will</p>

				<p>demonstrate simple effective user interfaces.</p> <p>C04: Scripts and programs will demonstrate effective use of structured programming.</p> <p>C05: Scripts and programs will be accompanied by printed output demonstrating completion of a test plan.</p> <p>C06: Testing will demonstrate both black and glass box testing strategies.</p> <p>C07: Project work will involve group participation.</p>
31	III/II	R163202B	OOPs through Java	<p>C01: Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.</p> <p>C02: Apply an object-oriented approach to developing applications of varying complexities.</p> <p>C03: To strengthen their problem solving ability by applying the characteristics of an object-oriented approach.</p> <p>C04: To introduce object oriented concepts in C++ and Java.</p> <p>C05: The student able to learn about pointers and functions.</p> <p>C06: The student able to write different programs.</p>

32	III/II	R163202C	VLSI DESIGN	<p>C01: Understand the properties of MOS active devices and simple circuits configured when using them and the reason for such encumbrances as ratio rules by which circuits can be interconnected in silicon.</p> <p>C02: Know three sets of design rules with which CMOS designs may be fabricated.</p> <p>C03: Understand the scaling factors determining the characteristics and performance of MOS circuits in silicon.</p> <p>C04: Know three sets of design rules with which nMOS designs may be fabricated.</p> <p>C05: Design processes are aided by simple concepts such as stick and symbolic diagrams but the key element is a set of design rules, which are explained clearly.</p> <p>C06: Basic circuit concepts are introduced for MOS processes we can set out approximate circuit parameters which greatly ease the design process.</p>
33	III/II	R163202D	ROBOTICS	<p>C01: The Student must be able to design automatic manufacturing cells with robotic control Using.</p> <p>C02: The principle behind robotic drive system, end effectors, sensor, machine vision robot Kinematics and programming.</p> <p>C03: To introduce the basic concepts, parts of robots and types of robots.</p> <p>C04: To make the student familiar with the various drive systems for robot, sensors and Their applications in robots and programming of robots.</p> <p>C05: To discuss about the various applications of robots, justification and</p>

				<p>implementation of robot.</p> <p>C06: The student to know about Manipulators.</p>
34	III/II	R163202E	NEURAL NETWORKS AND FUZZY LOGIC	<p>C01: Know different models of artificial neuron.</p> <p>C02: Use learning methods of ANN.</p> <p>C03: Use different paradigms of ANN.</p> <p>C04: Classify between classical and fuzzy sets.</p> <p>C05: Use different modules of Fuzzy logic controller.</p> <p>C06: Apply Neural Networks and fuzzy logic for real-time applications.</p>
35	III/II	R163202F	ENERGY AUDIT, CONSERVATION & MANAGEMENT	<p>C01: Explain energy efficiency, conservation and various technologies.</p> <p>C02: Design energy efficient lighting systems.</p> <p>C03: Calculate power factor of systems and propose suitable compensation techniques.</p> <p>C04: Explain energy conservation in HVAC systems.</p> <p>C05: Calculate life cycle costing analysis and return on investment on energy efficient technologies.</p> <p>C06: The student able to learn about basic Principles of Energy Audit and management.</p>

36	III/II	R1632026	POWER ELECTRONICS LAB	<p>C01: Able to study the characteristics of various power electronic devices and analyze gate drive circuits of IGBT.</p> <p>C02: Able to analyze the performance of single-phase and three-phase full-wave bridge converters with both resistive and inductive loads.</p> <p>C03: Able to understand the operation of single phase AC voltage regulator with resistive and inductive loads.</p> <p>C04: Able to understand the working of Buck converter, Boost converter, single-phase square wave inverter and PWM inverter.</p> <p>C05: To study the characteristics of various power electronic devices and analyze firing circuits and commutation circuits of SCR.</p> <p>C06: Able to understand the working of single-phase square wave inverter and PWM inverter.</p>
37	III/II	R1632027	MICRO PROCESSORS AND MICRO CONTROLLERS LAB	<p>C01: Will be able to write assembly language program using 8086 micro based on arithmetic, logical, and shift operations.</p> <p>C02: Will be able to interface 8086 with I/O and other devices.</p> <p>C03: Will be able to do parallel and serial communication using 8051 & PIC 18 micro controllers.</p> <p>C04: To study programming based on 8086 microprocessor and 8051 microcontroller.</p> <p>C05: Will be able to converting packed BCD to unpacked BCD, BCD to ASCII conversion.</p>

				<p>C06: By using string operation and Instruction prefix.</p>
38	III/II	R1632028	DATASTRUCTURES THROUGH C LAB	<p>C01: Be able to design and analyze the time and space efficiency of the data structure</p> <p>C02: Be capable to identify the appropriate data structure for given problem.</p> <p>C03: Have practical knowledge on the application of data structures.</p> <p>C04: To develop skills to design and analyze simple linear and non linear data structures.</p> <p>C05:The Implementation of Breadth First Search Techniques and Implementation of Depth First Search Techniques.</p> <p>C06:To implementation of Dijkstra's Algorithm and implementation of Kruskal's Algorithm.</p>

39	III/II	R1632029	PROFESSIONAL ETHICS AND HUMAN VALUES	<p>C01: It gives a comprehensive understanding of a variety of issues that are encountered by every professional in discharging professional duties.</p> <p>C02: It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.</p> <p>C03: To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human being with proper personality.</p> <p>C04: Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.</p> <p>C05: To know about Engineers' Responsibilities towards Safety and Risk.</p> <p>C06: The student gets knowledge on Global Issues.</p>
40	IV/I	R1641021	UTILIZATION OF ELECTRICAL ENERGY	<p>C01: Able to identify a suitable motor for electric drives and industrial applications.</p> <p>C02: Able to identify most appropriate heating or welding techniques for suitable Applications.</p> <p>C03: Able to understand various levels of illuminosity produced by different illuminating Sources.</p> <p>C04: Able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.</p>

				<p>C05: Able to determine the speed/time characteristics of different types of traction motors.</p> <p>C06: Able to estimate energy consumption levels at various modes of operation.</p>
41	IV/I	R1641022	LINEAR IC APPLICATIONS	<p>C01: Design circuits using operational amplifiers for various applications.</p> <p>C02: Analyze and design amplifiers and active filters using Op-amp.</p> <p>C03: Diagnose and trouble-shoot linear electronic circuits.</p> <p>C04: Understand the gain-bandwidth concept and frequency response of the amplifier configurations.</p> <p>C05: Understand thoroughly the operational amplifiers with linear integrated circuits.</p> <p>C06: To learn the internal structure, operation and applications of different analog ICs.</p>
42	IV/I	R1641023	POWER SYSTEM OPERATION AND CONTROL	<p>C01: Able to compute optimal scheduling of Generators.</p> <p>C02: Able to understand hydrothermal scheduling.</p> <p>C03: Understand the unit commitment problem.</p> <p>C04: Able to understand importance of the frequency.</p> <p>C05: Understand importance of PID controllers in single area and two area systems.</p> <p>C06: Will understand reactive power</p>

				control and compensation for transmission line.
43	IV/I	R1641024	SWITCHGEAR AND PROTECTION	<p>C01: Able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF₆ gastype.</p> <p>C02: Ability to understand the working principle and operation of different types of electromagnetic protective relays.</p> <p>C03: Students acquire knowledge of faults and protective schemes for high power generator and transformers.</p> <p>C04: Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.</p> <p>C05: Able to understand different types of static relays and their applications.</p> <p>C06: Able to understand different types of over voltages and protective schemes required for insulation co-ordination.</p>

44	IV/I	R164102A	ELECTRICAL MACHINE MODELING & ANALYSIS	<p>C01: Develop modeling of dc machine.</p> <p>C02: Apply mathematical modeling concepts to 3-phase Induction machines.</p> <p>C03: Design control strategies based on dynamic modeling of 3-ph Induction machines and 3-phase synchronous machine.</p> <p>C04: Analyze BLDC Machine and switched reluctance machine based on mathematical modeling of BLDCM and SRM.</p> <p>C05: Establish unified theory of rotating machines.</p> <p>C06: To understand the concept of phase transformation.</p>
45	IV/I	R164102B	ADVANCED CONTROL SYSTEMS	<p>C01: State space representation of control system and formulation of different state models are reviewed.</p> <p>C02: Able to design of control system using the pole placement technique is given after introducing the concept of controllability and observability.</p> <p>C03: Able to analyse of nonlinear system using the describing function technique and phase plane analysis.</p> <p>C04: Able to analyse the stability analysis using lypnov method.</p> <p>C05: Minimization of functionals using calculus of variation studied.</p> <p>C06: Able to formulate and solve the LQR problem and riccati equation.</p>

46	IV/I	R164102C	PROGRAMMABLE LOGIC CONTROLLERS & APPLICATIONS	<p>C01: Understand the PLCs and their I/O modules.</p> <p>C02: Develop control algorithms to PLC using ladder logic.</p> <p>C03: Manage PLC registers for effective utilization in different applications.</p> <p>C04: Design PID controller with PLC.</p> <p>C05: To have knowledge on PLC.</p> <p>C06: acquire the knowledge on programming of PLC.</p>
47	IV/I	R164102D	INSTRUMENTATION	<p>C01: <input type="checkbox"/> Able to represent various types of signals.</p> <p>C02: Acquire proper knowledge to use various types of Transducers.</p> <p>C03: Able to monitor and measure various parameters such as strain, velocity, temperature, pressure etc.</p> <p>C04: Acquire proper knowledge and working principle of various types of digital voltmeters.</p> <p>C05: Able to measure various parameter like phase and frequency of a signal with the help of CRO.</p> <p>C06: Acquire proper knowledge and able to handle various types of signal analyzers.</p>

48	IV/I	R164102E	OPTIMIZATION TECHNIQUES	<p>C01: State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.</p> <p>C02: Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.</p> <p>C03: Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions.</p> <p>C04: Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solutions.</p> <p>C05: Able to apply Genetic algorithms for simple electrical problems.</p> <p>C06: Able to solve practical problems using PSO.</p>
49	IV/I	R164102F	ELECTRIC POWER QUALITY	<p>C01: Differentiate between different types of power quality problems.</p> <p>C02: Explain the sources of voltage sag, voltage swell, interruptions, transients, long duration over voltages and harmonics in a power system.</p> <p>C03: Analyze power quality terms and power quality standards.</p> <p>C04: Explain the principle of voltage regulation and power factor improvement methods.</p> <p>C05: Demonstrate the relationship</p>

				<p>between distributed generation and power quality.</p> <p>C06: Explain the power quality monitoring concepts and the usage of measuring instruments.</p>
50	IV/I	R164102G	SPECIAL ELECTRICAL MACHINES	<p>C01: Distinguish between brush dc motor and brush less dc motor.</p> <p>C02: Explain the performance and control of stepper motors, and their applications.</p> <p>C03: Explain theory of operation and control of switched reluctance motor.</p> <p>C04: Explain the theory of travelling magnetic field and applications of linear motors.</p> <p>C05: Understand the significance of electrical motors for traction drives.</p> <p>C06: To describe the operation and characteristics of permanent magnet dc motor.</p>
51	IV/I		ELECTRICAL SIMULATION LAB	<p>C01: Able to simulate integrator circuit, differentiator circuit.</p> <p>C02: Able to simulate transmission line by incorporating line models.</p> <p>C03: Able to perform transient analysis of RLC circuit and single machine connected to infinite bus(SMIB).</p> <p>C04: Able to simulate integrator circuit Boost converter, Buck Converter.</p> <p>C05: Able to simulate integrator circuit , full convertor and PWM inverter.</p>

				<p>C06: Able to simulate transmission line by load and transformer models.</p>
52	IV/I		POWER SYSTEMS LAB	<p>C01: The student is able to determine the parameters of various power system components which are frequently occur in power system studies and he can execute energy management systems functions at load dispatch center.</p> <p>C02: To impart the practical knowledge of functioning of various power system components and determination of various parameters.</p> <p>C03: To impart the practical knowledge of simulation of load flows.</p> <p>C04: To impart the practical knowledge of transient stability</p> <p>C05: To impart the practical knowledge of LFC</p> <p>C06: To impart the practical knowledge of Economic dispatch.</p>

53	IV/II	R1642021	DIGITAL CONTROL SYSTEMS	<p>C01: The students learn the advantages of discrete time control systems and the “know how” of various associated accessories.</p> <p>C02: The learner understand z–transformations and their role in the mathematical analysis of different systems(like Laplace transforms in analog systems).</p> <p>C03: The stability criterion for digital systems and methods adopted for testing the same are explained.</p> <p>C04: Finally, the conventional and state space methods of design are also introduced.</p> <p>C05: To examine the stability of the system using different tests.</p> <p>C06: To study the design of state feedback control by “the pole placement method.”</p>
54	IV/II	R1642022	H.V.D.C. TRANSMISSION	<p>C01: Learn different types of HVDC levels and basic concepts.</p> <p>C02: Know the operation of converters.</p> <p>C03: Acquire control concept of reactive power control and AC/DC load flow.</p> <p>C04: Understand converter faults, protection and harmonic effects.</p> <p>C05: Design low pass and high pass filters.</p> <p>C06: To analyze the converter configuration.</p>

55	IV/II	R1642023	ELECTRICAL DISTRIBUTION SYSTEMS	<p>C01: Able to understand various factors of distribution system.</p> <p>C02: Able to design the substation and feeders.</p> <p>C03: Able to determine the voltage drop and power loss.</p> <p>C04: Able to understand the protection and its coordination.</p> <p>C05: Able to understand the effect of compensation for p.f improvement.</p> <p>C06: Able to understand the effect of voltage control.</p>
56	IV/II		HIGH VOLTAGE ENGINEERING	<p>C01: To be acquainted with the performance of high voltages with regard to different configurations of electrode systems.</p> <p>C02: To be able to understand theory of breakdown and withstand phenomena of all types of dielectric materials.</p> <p>C03: To acquaint with the techniques of generation of AC,DC and Impulse voltages.</p> <p>C04: To be able to apply knowledge for measurement of high voltage and high current AC,DC and Impulse.</p> <p>C05: To be in a position to measure dielectric property of material used for HV equipment.</p> <p>C06: To know the techniques of testing various equipment's used in HV engineering.</p>

57	IV/II	R164202B	FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS	<p>C01: Understand power flow control in transmission lines using FACTS controllers.</p> <p>C02: Explain operation and control of voltage source converter.</p> <p>C03: Analyze compensation methods to improve stability and reduce power oscillations in the transmission lines.</p> <p>C04: Explain the method of shunt compensation using static VAR compensators.</p> <p>C05: Understand the methods of compensations using series compensators.</p> <p>C06: Explain operation of Unified Power Flow Controller (UPFC).</p>
58	IV/II		POWER SYSTEM REFORMS	<p>C01: Will understand importance of power system deregulation and restructuring.</p> <p>C02: Able to compute Available Transfer Capability.</p> <p>C03: Will understand transmission congestion management.</p> <p>C04: Able to compute electricity pricing in deregulated environment.</p> <p>C05: Will be able to understand power system operation in deregulated environment.</p> <p>C06: Will understand importance of ancillary services.</p>

HOD-EEE



KRISHNA CHAITANYA INSTITUTE OF TECHNOLOGY & SCIENCES

Devarajugattu (Post), Peddaraveedu (Mandal), Prakasam Dist. - 523 320.

(Approved by A.I.C.T.E., New Delhi, & Affiliated to JNTUK, Kakinada)

NAAC ACCREDITED INSTITUTION

B.Tech (MECHANICAL ENGINEERING)

PROGRAM SPECIFIC OUTCOMES (PSOS)

PSO-1: An ability to apply the engineering and fundamental knowledge in the areas of pneumatics, electro- pneumatics, robotics, automation, additive manufacturing, engineering and management to develop the solutions of mechanical engineering problems.

PSO-2: Graduates shall have an ability to enhance their technical and professional skills to utilize their knowledge in specification of fabrication, testing, operation of basic mechanical system/process and have the ability to apply the learned principles to the design, analysis, development and implementation of advanced mechanical systems.



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NAAC ACCREDITED INSTITUTION

Department of Mechanical Engineering

Course outcomes of B.E (ME)

MECHANICAL DEPARTMENT II YEAR I SEMESTER R19 REGULATION		
Course/Course Code		Course outcomes
		Upon Completion of Course, student will able to
PCC-ME Mechanics of solids	1	Model & Analyze the behavior of basic structural members subjected to various loading and support conditions based on
	2	principles of equilibrium. Understand the apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment.
	3	Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structural components. Students are able to analyze beams and draw correct and complete shear and bending moment diagrams for beams.
	4	Students attain a deeper understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior.
	5	Design and analysis of Industrial components like pressure vessels.
PCC-ME Materials science & metallurgy	1	Understand the crystalline structure of different metals and study the stability of phases in different alloy systems.
	2	Study the behavior of ferrous and non ferrous metals and alloys and their application in different domains
	3	Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals.
	4	Grasp the methods of making of metal powders and applications of powder metallurgy
	5	Comprehend the properties and applications of ceramic, composites and other advanced methods.
PCC-ME Production technology	1	Able to design the patterns and core boxes for metal casting processes.
	2	Able to design the gating system for different metallic components.
	3	Know the different types of manufacturing processes.
	4	Be able to use forging, extrusion processes.
	5	Learn about the different types of welding processes used for special fabrication.
	6	Principles of explosive forming, electromagnetic forming, Electro hydraulic forming, and rubber pad forming, advantages and limitations.

PCC-ME Thermodynamics	1	Basic concepts of thermodynamics.
	2	Laws of thermodynamics.
	3	Concept of entropy.
	4	Property evaluation of vapors and their depiction in tables and charts.
	5	Evaluation of properties of perfect gas mixtures.
PCC-ME Machine drawing	1	Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings.
	2	Draw different types of bearings showing different components.
	3	Assemble components of a machine part and draw the sectional assembly drawing showing the dimensions of all the components of the assembly as per bill of materials.
	4	Select and represent fits and geometrical form of different mating parts in assembly drawings.
	5	To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements.
PCC-Lab Metallurgy & mechanics of solids lab	1	Preparation and study of the Microstructure of pure metals like Iron, Cu and Al.
	2	Preparation and study of the Microstructure of Mild steel, Medium carbon steels, High carbon steels.
	3	Study of the Micro Structures of Cast Irons.
	4	Study of the Micro Structures of Non-Ferrous alloys.
	5	Study of the Micro structures of Heat treated steels.
	6	Hardeneability of steels by Jominy End Quench Test.
	7	To find out the hardness of various treated and untreated steels.
	8	Analyze the Direct tension test
	9	Analyze the Bending test.
	10	Analyze the Simple supported.
	11	Analyze the Cantilever beam.
	12	Analyze the Torsion test.
	13	Analyze the Hardness test.
	14	Analyze the Brinells hardness test.
	15	Analyze the Rockwell hardness test
	16	Analyze the Test on springs
	17	Analyze the Compression test on cube.
PCC-Lab Production technology lab	1	Student will able to study Study of deep drawing and extrusion operations, Basic powder compaction and sintering, TIG/MIG Welding, Resistance Spot Welding, Brazing and soldering, Plastic Molding Process.
	2	Student will able to Sand properties testing on Sieve analysis (dry sand), Clay content test, Moisture content test, Strength test (Compression test & Shear test), and Permeability test.
	3	Student will able to Mould preparation on Straight pipe, Bent pipe, dumble, Gear blank.
MECHANICAL DEPARTMENT II YEAR II SEMESTER R19 REGULATION		
Course/Course Code		Course outcomes
		Upon Completion of Course, student will able to

BSC Complex variables & statistical methods	1	apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic.
	2	find the differentiation and integration of complex functions used in engineering problems.
	3	make use of the Cauchy residue theorem to evaluate certain integrals.
	4	apply discrete and continuous probability distributions.
	5	design the components of a classical hypothesis test.
	6	infer the statistical inferential methods based on small and large sampling tests.
PCC-ME Kinematics of machinery	1	Contrive a mechanism for a given plane motion with single degree of freedom.
	2	Suggest and analyze a mechanism for a given straight line motion and automobile steering motion.
	3	Analyze the motion (velocity and acceleration) of a plane mechanism.
	4	Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.
	5	Select a power transmission system for a given application and analyze motion of different transmission systems.
PCC-ME Applied thermodynamics	1	Expected to learn the working of steam power cycles and also should be able to analyze and evaluate the performance of individual components.
	2	Student is able to learn the principles of combustion stoichiometry and flue gas analysis.
	3	Students will be able to design the components and calculate the losses and efficiency of the boilers, nozzles and impulse turbines.
	4	Students will be able to design the components and calculate the losses and efficiency of reactions turbines and condensers.
	5	Student is able to learn various types of compressors, principles of working and their performance evaluation.
PCC-ME Fluid mechanics & hydraulic machines	1	The basic concepts of fluid properties.
	2	The mechanics of fluids in static and dynamic conditions.
	3	Boundary layer theory, flow separation and dimensional analysis.
	4	Hydrodynamic forces of jet on vanes in different positions.
	5	Working Principles and performance evaluation of hydraulic pump and turbines.
PCC-ME Metal cutting & machine tools	1	Learned the fundamental knowledge and principals in material removal process.
	2	Acquire the knowledge on operations in conventional, automatic, Capstan and turret lathes. capable of understanding the working principles and
	3	operations of shaping, slotting, planning, drilling and boring machines.
	4	able to make gear and keyway in milling machines and understand the indexing mechanisms.
	5	Understand the different types of unconventional machining methods and principles of finishing Processes.
PCC-ME Design of machine members – I	1	Calculate different stresses in the machine components subjected to various static loads, failures and suitability of a material for an engineering application.
	2	Calculate dynamic stresses in the machine components subjected to

		variable loads.
	3	Design riveted, welded, bolted joints, keys, cotters and knuckle joints subjected to static loads and their failure modes
	4	Design the machine shafts and suggest suitable coupling for a given application.
	5	Calculate stresses in different types of springs subjected to static loads and dynamic loads.
MC Essence of Indian traditional knowledge	1	Understand the concept of Traditional knowledge and its importance.
	2	Know the need and importance of protecting traditional knowledge.
	3	Know the various enactments related to the protection of traditional knowledge.
	4	Understand the concepts of Intellectual property to protect the traditional knowledge.
	5	Understand the traditional knowledge.
	6	Contrast and compare characteristics importance kinds of traditional knowledge.
	7	Analyze physical and social contexts of traditional knowledge.
	8	Evaluate social change on traditional knowledge.
	9	Know the need of protecting traditional knowledge.
	10	Apply significance of TK protection.
	11	Analyze the value of TK in global economy.
	12	Evaluate role of government.
	13	Understand TK and IPR.
	14	Apply systems of TK protection.
	15	Analyze legal concepts for the protection of TK.
	16	Evaluate strategies to increase the protection of TK
PCC-Lab Machine tools lab	1	The students are required to understand the parts of various machine tools and operate them. They are required to understand the different shapes of products that can be produced on these machine tools.
	2	Able to learn machining economics.
	3	Able to operate lathe, drilling, milling, etc.
PCC-Lab Fluid mechanics & Hydraulic machinery lab	4	To impart practical exposure on the performance evaluation methods of various flow measuring equipment and hydraulic turbines and pumps.
	5	Able to perform the Pelton Wheel, Kaplan Turbine, Single Stage Centrifugal Pump, Venturimeter, Multi Stage Centrifugal Pump.
	6	Determination of loss of head due to sudden contraction in a pipeline.
	7	
MECHANICAL DEPARTMENT III YEAR I SEMESTER R19 REGULATION		
Course/Course Code		Course outcomes
		Upon Completion of Course, student will able to
DYNAMICS OF MACHINERY PCC-ME	1	To compute the frictional losses and transmission in clutches, brakes and dynamometers.
	2	
	3	To determine the effect of gyroscopic couple in motor vehicles, ships and aero planes.
	4	To analyze the forces in four bar and slider crank mechanisms and design a flywheel.
	5	To determine the rotary unbalanced mass in reciprocating equipment.

	6	To determine the unbalanced forces and couples in reciprocating and radial engines.
	7	To determine the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations.
PCC-ME Design of machine members-II	1	Select the suitable bearing based on the application of the loads and predict the life of the bearing.
	2	Design of IC Engines parts.
	3	Design of power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws.
	4	Design spur & helical gear for different engineering applications.
PCC-ME Mechanical measurements & metrology	1	Describe the construction and working principles of measuring instruments for measurement of displacement and speed and select appropriate instrument for a given application.
	2	Describe the construction and working principles of measuring instruments for strain, force, Torque, power, acceleration and Vibration and select appropriate instrument for a given application.
	3	Explain shaft basis system and hole basis systems for fits and represent tolerances for a given fit as per the shaft basis system and hole basis system and design limit gauges based on the Tolerances for quality check in mass production.
	4	Explain methods for linear, angle and flatness measurements and select a suitable method and its relevant instrument for a given application.
	5	To measure the threads, gear tooth profiles, surface roughness and flatness using appropriate instruments and analyze the data.
HSIMS Managerial economics and financial accountancy	1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product.
	2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
	3	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
	4	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
	5	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
PCC-ME IC Engines & Gas Turbines	1	Derive the actual cycle from fuel-air cycle and air- standard cycle for all practical applications.
	2	Explain working principle and various components of IC engine
	3	Explain combustion phenomenon of CI and SI engines and their impact on engine variables.
	4	Analyze the performance of an IC engine based on the performance parameters.
	5	Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine.
	6	Explain the applications and working principle of rockets and jet propulsion.
PCC-Lab Theory of machines	1	I.C. Engines valve and port timing diagrams.
	2	Testing of Fuels – Viscosity, flash point/fire point, carbon residue, calorific value.

lab	3	I.C. Engine performance test and Exhaust emission measurements (-stroke diesel engine)	
	4	I.C. Engine performance test and Exhaust emission measurements (-stroke petrol engine)	
	5	Evaluation of friction power by conducting Morse test on -stroke multi cylinder engine.	
	6	Determination of Friction Power by retardation or motoring test on IC engine.	
	7	I.C. Engine heat balance at different loads and show the heat distribution curve.	
	8	Economical speed test of an IC engine.	
	9	Performance test on variable compression ratio engines.	
	10	Performance test on reciprocating air compressor unit.	
	11	Dis-assembly / assembly of different parts of two wheelers. wheelers & wheelers. Tractor & Heavy duty engines covering -stroke and stroke, SI and CI engines.	
	12	Study of boilers, mountings and accessories.	
	PCC-Lab Mechanical measurements & metrology lab	1	Student will become familiar with the different instruments that are available for linear, angular, roundness and roughness measurements they will be able to select and use the appropriate measuring instrument according to a specific requirement (in terms of accuracy, etc).
		2	Students will be able to select proper measuring instrument and know requirement of calibration, errors in measurement etc. They can perform accurate measurements.
MECHANICAL DEPARTMENT III YEAR II SEMESTER R19 REGULATION			
Course/Course Code		Course outcomes	
		Upon Completion of Course, student will able to	
PCC-ME Operations research	1	Formulate the resource management problems and identify appropriate methods to solve them.	
	2	Apply LPP, transportation and assignment models to optimize the industrial resources.	
	3	Solve decision theory problems through the application of game theory.	
	4	Apply the replacement and queuing models to increase the efficiency of the system.	
	5	Model the project management problems through CPM and PERT.	
PCC-ME Heat transfer	1	Compute rate of heat transfer for D, steady state composite systems without heat generation.	
	2	Analyze the system with heat generation, variable thermal conductivity, fins and D transient conduction heat transfer problems.	
	3	Develop the empirical equations for forced convection problems by using Buckingham's pi theorem.	
	4	Compute the rate of heat transfer for natural convection systems and design and analysis of heat exchangers. Solve the heat transfer systems with phase change and radiation.	
	5	Compute rate of heat transfer for D, steady state composite systems without heat generation.	
PCC-ME CAD/CAM	1	Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using	

		transformation matrix.
	2	Describe the use of GT and CAPP for the product development.
	3	Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.
PEC-ME Composite Materials	1	Explain various composite materials with their constituents, advantages, limitations and applications.
	2	Enumerate different reinforcements with their application.
	3	Describe various manufacturing methods of polymer and metal matrix composites materials.
	4	Describe various manufacturing methods of metal matrix composites materials and their applications.
	5	synthesis and characterization procedure nano composites.
PEC-ME Unconventional Machining Processes	1	Understand the characteristics and importance of different types of unconventional machining processes.
	2	Identify the appropriate unconventional machining process for the implementation in a typical industrial scenario based on the applications.
	3	Understand the significance of tools and resources used for machining the components in unconventional machining.
	4	Machine the components through ECM / EDM and other machining processes.
	5	Perform experiments in the advanced unconventional machining processes such as laser beam machining and electron beam machining.
	6	Students will demonstrate basic understanding of friction, lubrication and wear processes.
PCC-Lab Simulation of mechanical systems lab	1	Students will be able to learn Mass-Spring-Damper with controller.
	2	Students will be able to learn Double Mass-Spring- Damper.
	3	Students will be able to learn Simple Mechanical System.
	4	Students will be able to learn Mechanical System with Translational Friction.
	5	Students will be able to learn Mechanical System with Translational Hard stop.
	6	Students will be able to learn Mechanical Rotational System with stick-slip motion.
	7	Students will be able to learn Linkage Mechanism.
	8	Students will be able to learn Steering Mechanism.
PCC-Lab Heat transfer lab	1	The student should be able to evaluate the amount of heat exchange for plane, cylindrical & spherical geometries and should be able to compare the performance of extended surfaces and heat exchangers.
	2	Determination of emissivity of a given surface.
	3	Determination of Stefan Boltzmann constant.
	4	Determination of heat transfer rate in drop and film wise condensation.
	5	Determination of critical heat flux.
	6	Determination of Thermal conductivity of liquids and gases.
	7	Investigation of Lambert's cosine law.
PCC-Lab CAD/CAM lab	1	The student will be able to appreciate the utility of the modeling tools in creating D and D drawings.
	2	Use of these tools for any engineering and real time applications.

	3	Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their Employment.
MECHANICAL DEPARTMENT IV YEAR I SEMESTER R19 REGULATION		
Course/Course Code		Course outcomes
		Upon Completion of Course, student will able to
HSIMS Industrial management	1	Design and conduct experiments, analyse, interpret data and synthesize valid conclusions
	2	Design a system, component, or process, and synthesize solutions to achieve desired needs.
	3	Use the techniques, skills, and modern engineering tools necessary for engineering practice.
	4	With appropriate considerations for public health and safety, cultural, societal, and environmental constraints.
	5	Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management.
PEC- Production planning & control	1	Apply the systems concept for the design of production and service systems.
	2	Make forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques.
	3	Apply the principles and techniques for planning and control of the production and service systems to optimize/make best use of resources.
	4	Understand the importance and function of inventory and to be able to apply selected techniques for its control and management under dependent and independent demand circumstances.
PCC-ME Finite element methods	1	Understand the concepts behind variational methods and weighted residual methods in FEM
	2	Identify the application and characteristics of FEA elements such as bars, beams, plane and isoperimetric elements, and -D element.
	3	Develop element characteristic equation procedure and generate global equations.
	4	Able to apply Suitable boundary conditions to global equations, and reduce it to a solvable form.
	5	Able to apply the FE procedure to field problems like heat transfer.
PEC- Power plant engineering	1	To understand thermal power plant
	2	To understand i.c engine power plant
	3	To understand hydro electric power plant
	4	To understand nuclear power plant
	5	To understand combined operations of different power plant
OEC- Nano technology	1	Learn the basic concepts of nanotechnology.
	2	Understand the synthesis of nanomaterials and their application.
	3	Apply their learned knowledge to develop Nanomaterial's.
PCC-ME Lab Finite element simulation lab	1	Determination of deflection and stresses in D and D trusses and beams.
	2	Determination of deflections component and principal and Von-misses stresses in plane
	3	stress, plane strain and Ax symmetric components.
	4	Determination of stresses in D and shell structures (at least one example in

		each case)
	5	Estimation of natural frequencies and mode shapes, Harmonic response of D beam.
	6	Casting processes - Study of Solidification, temperatures, Residual stresses, metallurgical phases etc.
	7	Forging processes - Study of cold working and hot working processes for extrusion, drawing, rolling, etc.
	8	Forming Processes – Study of blanking, bending, deep drawing, etc.
	9	Steady state heat transfer Analysis of plane and Ax symmetric components.
	10	Convective heat transfer – External flow (study both velocity and thermal boundary layers).
	11	Radiation heat transfer– Emissivity.
MECHANICAL DEPARTMENT IV YEAR II SEMESTER R19 REGULATION		
Course/Course Code		Course outcomes
		Upon Completion of Course, student will able to
PEC- Additive manufacturing	1	The student shall be able to identify the use of Rapid Prototyping Techniques in the manufacturing of complex components that are otherwise very difficult to manufacture.
NON - DESTRUCTIVE EVALUATION RB	1	The students are to be exposed to the concepts of various NDE techniques using radiography, ultrasonics, liquid penetrates, magnetic patches and Eddy currents
	2	They will learn basic principles of these methods and will be able to select a testing process
	3	They will understand the advantages and disadvantages of these techniques.
	4	Apply methods knowledge of non destructive testing to evaluate products of railways, automobiles, aircrafts, chemical industries etc.

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ECE DEPARTMENT

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Software Usage: Apply the simulation tools like VHDL, Verilog, MATLAB, MULTISIM and Mentor Graphics to design and analyze both Analog & Digital Circuits.

PSO2: Problem Solving Skills: Apply the principles of analog, digital, Instrumentation and signal processing concepts for Bio-Medical, Consumer Electronics, Advanced communication systems.

PSO3: Professional Knowledge: Apply the principles of Electronics & Communication Engineering to provide cost effective and appropriate models.



Department of Electronics and communication Engineering

Course Outcomes of all courses for the academic year 2019-2020 (Odd-Sem)

Course Name	Electronic Devices and Circuits			Course Code	C211
Course Code(U)	R1621041	Year/Sem	2/1	Regulation	R16
CO.NO	Course Outcome				
C211.1	Apply the basic concepts of semiconductor physics				
C211.2	Understand the formation of p-n junction and how it can be used as a pn junction as Diode in different modes of operation Diode in different modes of operation.				
C211.3	Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons relevant expressions and necessary comparisons .				
C211.4	Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.				
C211.5	Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expression stabilization concepts with necessary expressions.				
C211.6	Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations				

Course Name	Switching Theory and Logic Design			Course Code	C212
Course Code(U)	R1621042	Year/Sem	2/1	Regulation	R16
CO.NO	Course Outcome				
C212.1	Student Can Able to understand different Number Systems, Compliments, To generate different Binary Codes, & Able to Understand Boolean Theorems, Basic & Universal Logic Gates, Standard SOP and POS Forms and Realizations.				
C212.2	Able to Understand Boolean Theorems, K-maps, Tabular Method for minimization of Boolean Functions & Able to Understand Different types of Combinational circuits like Adders, Subtractors, Code Converters				
C212.3	Able to Understand Different types of Combinational circuits like Encoders, Decoders, Multiplexers, De-Multiplexers , Comparator & Able to Understand Different types of PLD's like PROM,PLA and PAL.				
C212.4	Able to Understand Different types of Sequential circuits (Synchronous and Asynchronous) like Flip-flops, Latches, Counters and Registers.				
C212.5	Able to Understand Different types of Finite State Machines like Mealy and Moore Machines.				
C212.6	To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines..				



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Course Name	Signals and Systems			Course Code	C213
Course Code(U)	R1621043	Year/Sem	2/1	Regulation	R16
CO.NO	Course Outcome				
C213.1	Define different basic continuous & discrete time signals and systems, and identify different orthogonal signals and its application in signal approximation				
C213.2	Develop Trigonometric & Exponential Fourier series with orthogonal signals and Analyze the signals in frequency domain with fourier transform				
C213.3	Explain the concepts of Sampling theorem for low pass and Bandpass signals, different sampling techniques and reconstruction of signal from its samples.				
C213.4	Identify different classifications of systems and concepts like convolution, Auto & cross correlation, Energy & Power spectral density, and also extraction of signals in the presence of noise				
C213.5	Identify the Laplace Transform of basic continuous time signals and ROC's and also analyze continuous time signals with Laplace Transform and its application in solving differential equations and electrical networks.				
C213.6	Identify the Z-Transform of basic discrete time signals and their ROC's, and also analyze discrete time signals with Z- Transform and its application in solving difference equations				

Course Name	Network Analysis			Course Code	C214
Course Code(U)	R1621044	Year/Sem	2/1	Regulation	R16
CO.NO	Course Outcome				
C214.1	gain the knowledge on basic network elements.				
C214.2	analyze the RLC circuits behavior in detailed.				
C214.3	Analyse the coupled circuits and resonance conditions				
C214.4	Gain the knowledge of network theorems				
C214.5	gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h & g).				
C214.6	Analyse the transient response of RLC circuits				

Course Name	Random Variable and Stochastic Processes			Course Code	C215
Course Code(U)	R1621045	Year/Sem	2/1	Regulation	R16
CO.NO	Course Outcome				
C215.1	Mathematically model the random phenomena and solve simple probabilistic problems .				
C215.2	Identify different types of single random variables and compute statistical averages of the random variables				
C215.3	Identify different types of multiple random variables and compute statistical averages of the random variables				
C215.4	Characterize the random processes in the time and frequency domains				



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C215.5	Analyze the LTI systems with random inputs
C215.6	Apply these techniques to analyze the systems in the presence of different types of noise.

Course Name	Managerial Economics & Financial Analysis		Course Code	C216	
Course Code(U)	R1621026	Year/Sem	2/1	Regulation	R16
CO.NO	Course Outcome				
C216.1	Analyze the demand for a product of a company & various factors influencing demand elasticity.				
C216.2	Estimate the optimum production & cost function with the graphical representation.				
C216.3	Explain the concept of price output relationship with different market structures.				
C216.4	Distinguish the various forms of companies and its rules and regulations.				
C216.5	Interpret the Financial Statements and the usage of various Accounting tools for Analysis.				
C216.6	List features, steps, merits, uses & limitations of capital budgeting techniques.				

Course Name	Electronic Devices and Circuits Lab		Course Code	C217	
Course Code(U)	R1621046	Year/Sem	2/1	Regulation	R16
CO.NO	Course Outcome				
C217.1	Understand the diode and transistor characteristics				
C217.2	Verify the rectifier circuits using diodes and implement them using hardware.				
C217.3	Design the biasing circuits like self-biasing				
C217.4	Design various amplifiers like CE, CC, common source amplifiers and implement Them using hardware and also observe their frequency responses				
C217.5	Analyze the concepts of SCR and observe its characteristics.				
C217.6	Remember the concepts of unipolar junction transistor and observe its characteristics.				

Course Name	Networks And Electrical Technology Lab		Course Code	C218	
Course Code(U)	R1621047	Year/Sem	2/1	Regulation	R16
CO.NO	Course Outcome				
C218.1	Able to analyze RLC circuits and understand resonant frequency and Q-factor.				
C218.2	Able to determine first order RC/RL networks of periodic non- sinusoidal waveforms				
C218.3	Able to apply network theorems to analyze the electrical network.				
C218.4	Able to describe the performance of dc shunt machine.				
C218.5	Able to investigate the performance of 1-phase transformer.				
C218.6	Able to perform tests on 3-phase induction motor and alternator to determine their performance characteristic				

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Course Name	Computer Architecture & Organization			Course Code	C311
Course Code(U)	R1631041	YEAR/SEM	III/I	Regulation	R16
CO.NO	Course Outcome				
C311.1	Understand the architecture of modern computer				
C311.2	Analyze the performance of a computer using performance equation				
C311.3	Understanding of different instruction types.				
C311.4	Calculate the effective address of an operand by addressing modes				
C311.5	Understand how computer stores positive and negative numbers				
C311.6	Understanding of how a computer performs arithmetic operation of positive and negative numbers				

Course Name	Linear IC Applications			Course Code	C312
Course Code(U)	R1631042	Year/Sem	3/1	Regulation	R16
CO.NO	Course Outcome				
C312.1	Design circuits using operational amplifiers for various applications.				
C312.2	Understand thoroughly the operational amplifiers with linear integrated circuits.				
C312.3	Design combinational logic circuits for different applications.				
C312.4	Understand the gain-bandwidth concept and frequency response of the amplifiers.				
C312.5	Analyze and design amplifiers and active filters using Op-amp.				
C312.6	Acquire skills required for designing and testing of data converters				

Course Name	Digital IC Applications			Course Code	C313
Course Code(U)	R1631043	Year/Sem	3/1	Regulation	R16
CO.NO	Course Outcome				
C313.1	Understand the structure of commercially available digital integrated circuit families				
C313.2	Learn the IEEE Standard 1076 Hardware Description Language (VHDL).				
C313.3	Extend the digital operations to any width by connecting the ICs and can also design, simulate their results using hardware description language.				
C313.4	Design the MSI combinational Circuits using VHDL code				
C313.5	Model complex digital systems at several levels of abstractions, behavioral, structural, simulation, synthesis and rapid system prototyping.				
C313.6	Analyze and design basic digital circuits with combinatorial and sequential logic circuits using VHDL.				

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Course Name	Digital Communication			Course Code	C314
Course Code(U)	R1631044	Year/Sem	3/1	Regulation	R16
CO.NO	Course Outcome				
C314.1	Determine the performance of different waveform coding techniques for the generation and digital representation of the signals.				
C314.2	Able to design a digital communication system.				
C314.3	Determine the probability of error for various digital modulation schemes				
C314.4	Analyze different source coding techniques				
C314.5	Compute and analyze Block codes				
C314.6	Compute and analyze different error control coding schemes for the reliable transmission of digital information over the channel.				

Course Name	Antennas and Wave Propagation			Course Code	C315
Course Code(U)	R1631045	Year/Sem	3/1	Regulation	R16
CO.NO	Course Outcome				
C315.1	Identify basic antenna parameters.				
C315.2	Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and micro strip antennas				
C315.3	Quantify the fields radiated by various types of antennas				
C315.4	Design and analyze antenna arrays				
C315.5	Analyze antenna measurements to assess antenna's performance				
C315.6	Identify the characteristics of radio wave propagation				

Course Name	Pulse and Digital Circuits Lab			Course Code	C316
Course Code(U)	R1631046	Year/Sem	3/1	Regulation	R16
CO.NO	Course Outcome				
C316.1	Understand the applications of diode as Integrator, differentiator, clippers and clamper circuits.				
C316.2	Learn various switching devices such as diode, transistor, SCR				
C316.3	Difference between logic gates and sampling gates				
C316.4	Design Multi vibrators for various applications, synchronization techniques and sweep circuits				
C316.5	Realize logic gates using diodes and transistors.				
C316.6	Design R-2R DAC using op-amp. Testing of the designed R-2R DAC.				



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Course Name	LIC Applications Lab			Course Code	C317
Course Code(U)	R1631047	Year/Sem	3/1	Regulation	R16
CO.NO	Course Outcome				
C317.1	a. Students will have a thorough understanding of operational amplifier(741) b. Students will be able to design circuits using operational amplifiers for various applications. c. Students will be able to design various combinational circuits using various Integrated IC's. d. They can know the differences between Linear and Digital Integrated IC's. e. Students will demonstrate their knowledge by designing analog circuits & digital circuits.				
C317.2	Study the second order low pass filter and its characteristics. Study the technique of generation of Amplitude modulation using transistor/FET				
C317.3	Understand the method of demodulation using Envelope detectors. Study simple circuit for the generation of Pulse amplitude modulation waveforms.				
C317.4	Study de- modulation technique				
C317.5	Study generation of Pulse Width Modulation and Pulse Position Modulation using 555 timer circuit				
C317.6	Study how the Frequency modulation output is generated using 8038/2206 Study Precision rectifier circuits – both Full Wave and Half Wave				

Course Name	Digital system Design &DICA Lab			Course Code	C318
Course Code(U)	R1631048	Year/Sem	3/1	Regulation	R16
CO.NO	Course Outcome				
C318.1	Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.				
C318.2	To understand and examine the structure of various number systems and its application in digital design.				
C318.3	The ability to understand, analyze and design various combinational and sequential circuits.				
C318.4	Ability to identify basic requirements for a design application and propose a cost effective solution				
C318.5	The ability to identify and prevent various hazards and timing problems in a digital design.				
C318.6	To develop skill to build, and troubleshoot digital circuits				

Course Name	RADAR SYSTEMS			Course Code	C411
Course Code(U)	R1641041	Year/Sem	4/1	Regulation	R16
CO.NO	Course Outcome				
C411.1	Identify basic principle of Radar and operation.				
C411.2	Identify Different types of radars; CW, FM-CW				
C411.3	Apply the Doppler effect to the Radars				
C411.4	Analyze different tracking techniques of radar				
C411.5	Analyze matched filter concept and Design phased array antennas				
C411.6	Understand the various components of radar receiver and its performance.				

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Course Name	Digital Image Processing			Course Code	C412
Course Code(U)	R1641042	Year/Sem	4/1	Regulation	R16
CO.NO	Course Outcome				
C412.1	Familiarize with basic concepts of digital image processing and different image transforms				
C412.2	Perform image manipulations.				
C412.3	Perform basic operations like – Enhancement, segmentation, compression, Image transforms and restoration techniques on image.				
C412.4	Analyze pseudo and fullcolor image processing techniques.				
C412.5	Do wavelet based image processing and image compression using wavelets				
C412.6	Apply various morphological operators on images				

Course Name	Computer Networks			Course Code	C413
Course Code(U)	R1641043	Year/Sem	4/1	Regulation	R16
CO.NO	Course Outcome				
C413.1	Understand OSI and TCP/IP models				
C413.2	Analyze MAC layer protocols and LAN technologies				
C413.3	Understand that there are fundamental limits to any communications system				
C413.4	Design applications using internet protocols				
C413.5	Understand routing and congestion control algorithms				
C413.6	Understand how internet works				

Course Name	Optical Communications			Course Code	C414
Course Code(U)	R1641044	Year/Sem	4/1	Regulation	R16
CO.NO	Course Outcome				
C414.1	Able to choose necessary components required in modern optical communications systems .				
C414.2	Design and build optical fiber experiments in the laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers.				
C414.3	Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems.				
C414.4	Choose the optical cables for better communication with minimum losses. Design, build and demonstrate optical fiber experiments in the laboratory.				
C414.5	Understanding of calculating fiber power coupling efficiency & designing of receiver circuit.				
C414.6	Understanding of optical system design				



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Course Name	ESS			Course Code	C415
Course Code(U)	R1641045	Year/Sem	4/1	Regulation	R16
CO.NO	Course Outcome				
C415.1	Student can able to understand evaluate the time and space parameters of a switched signal.				
C415.2	Able to understand establish the digital signal path in time and space, between two terminals.				
C415.3	Able to understand evaluate the inherent facilities within the system to test some of the SLIC, CODEC and digital switch functions				
C415.4	Able to understand Investigate the traffic capacity of the system				
C415.5	Able to understand Evaluate methods of collecting traffic data.				
C415.6	Evaluate the method of interconnecting two separate digital switches				

Course Name	Embedded Systems			Course Code	C416
Course Code(U)	R1641046	Year/Sem	4/1	Regulation	R16
CO.NO	Course Outcome				
C416.1	Understand the basic concepts of an embedded system				
C416.2	Able to know an embedded system design approach to perform a specific function.				
C416.3	Gain knowledge on the hardware components required for an embedded system				
C416.4	Understand design approach of an embedded hardware.				
C416.5	Gain knowledge on various embedded firmware design approaches on embedded environment.				
C416.6	Understand how to integrate hardware and firmware of an embedded system using real time operatingsystem.				

Course Name	DSP Lab			Course Code	C417
Course Code(U)	R1641047	Year/Sem	4/1	Regulation	R16
CO.NO	Course Outcome				
C417.1	Able to carry out simulation of DSP systems.				
C417.2	Able to demonstrate their abilities towards DSP processor based implementation of DSP systems				
C417.3	Able to analyze Finite word length effect on DSP systems.				
C417.4	Able to demonstrate the applications of FFT to DSP.				
C417.5	Able to implement adaptive filters for various applications of DSP.				
C417.6	Able to implement different windowing techniques of DSP systems.				

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Course Name	MWE & Optical Lab			Course Code	C418
Course Code(U)	R1641048	Year/Sem	4/1	Regulation	R16
CO.NO	Course Outcome				
C418.1	Gain knowledge and understanding of microwave analysis methods				
C418.2	Be able to apply analysis methods to determine circuit properties of passive/active microwave devices				
C418.3	Know how to model and determine the performance characteristics of a microwave circuit or system using computer aided design methods				
C418.4	Have knowledge of basic communication link design; signal power budget, noise evaluation and link carrier to noise ratio				
C418.5	Have knowledge of how transmission and waveguide structures and how they are used as elements in impedance matching and filter circuits.				
C418.6	knowledge and understanding of microwave tubes				



Department Of Electronics and Communication Engineering

Course outcomes of all courses for the academic year 2019-2020 (Even Sem)

Course Name	Electronic Circuit Analysis			Course Code	C221
Course Code(U)	R1622041	Year/Sem	2/2	Regulation	R16
CO.NO	Course Outcome				
C221.1	Design and analysis of small signal high frequency transistor amplifier using BJT and FET				
C221.2	Design and analysis of multistage amplifiers using BJT and FET and Differentia amplifier using BJT				
C221.3	know the feed back amplifiers and their analysis with performance comparison				
C221.4	Derive the expressions for frequency of oscillation and condition for oscillation of RCand LC oscillators and their amplitude and frequency stability concept				
C221.5	Know the classification of the power and their analysis with performance comparison				
C221.6	know the tuned amplifiers and their analysis with performance comparison				

Course Name	Control systems			Course Code	C222
Course Code(U)	R1622042	Year/Sem	2/2	Regulation	R16
CO.NO	Course Outcome				
C222.1	Express the basic elements and structures of feedback control systems.				
C222.2	Correlate the pole-zero configurations of transfer functions and their time-domain response to known test inputs.				
C222.3	Apply Routh-Hurwitz criterion, Root Locus, Bode Plot and Nyquist Plot to determine the domain of stability of linear time-invariant systems .				
C222.4	Determine the steady-state response, errors of stable control systems and design compensators to achieve the desired performance..				
C222.5	Express control system models on state space models.				
C222.6	the state space approach for the analysis of control systems is also introduced.				

Course Name	Electromagnetic Waves and Transmissions lines			Course Code	C223
Course Code(U)	R1622043	Year/Sem	2/2	Regulation	R16
CO.NO	Course Outcome				
C223.1	Explain the concepts of electrostatic fields for point charge, line, sheet, volume charges and Gauss's law and its application Develop Maxwell's equations two				



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	equations for electrostatic fields
C223.2	Explain the concepts of Magneto static fields for filamentary conductor, sheet currents, Amperes circuit law and its applications. Develop Maxwell's equations for time varying fields
C223.3	Explain the concepts of Magneto static fields for filamentary conductor, sheet currents, Amperes circuit law and its applications. Develop Maxwell's equations for time varying fields
C223.4	Analyze the reflection & refraction of plane waves under normal and oblique incidences on perfect conductor and dielectric. Explain the concepts like critical angle, Brewster angle and total internal reflection etc
C223.5	Derive the transmission line equations and analyze transmission lines with primary & secondary constants .
C223.6	Derive and calculate the input impedance of transmission lines of different lengths, reflection coefficient, VSWR etc. both theoretically and also using smith chart.

Course Name	Analog Communications			Course Code	C224
Course Code(U)	R1622044	Year/Sem	2/2	Regulation	R16
CO.NO	Course Outcome				
C224.1	Explain the Amplitude modulation technique				
C224.2	Compare various AM techniques used in communications				
C224.3	Explain the concepts of Frequency modulation and PLL				
C224.4	Describe the AM,FM Transmitter and Receiver circuits				
C224.5	Memorize the concepts of noise and noise sources, noise figure				
C224.6	Explain the Various Pulse modulation techniques				

Course Name	Pulse and Digital Circuits			Course Code	C225
Course Code(U)	RT1620445	Year/Sem	2/2	Regulation	R16
CO.NO	Course Outcome				
C225.1	Analyze responses of linear wave shaping circuits for different input signals with Different time constant conditions				
C225.2	Identifying the different clippers and clampers circuits				
C225.3	Analyze the Breakdown voltage consideration of a transistor				
C225.4	Describe the functionality of different Multivibrator				
C225.5	Analyze the different methods of voltage time base signal				
C225.6	Design the different Sampling gates using diodes and transistors				



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Course Name	Management Science			Course Code	C226
Course Code(U)	R1622026	Year/Sem	2/2	Regulation	R16
CO.NO	Course Outcome				
C226.1	listing the management functions through motivational theories				
C226.2	Estimate the statistical quality control through control charts				
C226.3	Familiarize the functions of HRM & MARKETING				
C226.4	Apply the PERT&CPM techniques to solve the network problems				
C226.5	Discuss the corporate planning process with SWOT analysis				
C226.6	Discuss the contemporary management issues like TQM,CMM,ERP & BSC				

Course Name	Electronic Circuit Analysis Lab			Course Code	C227
Course Code(U)	R1622046	Year/Sem	2/2	Regulation	R16
CO.NO	Course Outcome				
C227.1	Analyze the different types of diodes, operation and its characteristics				
C227.2	Design and analyze the DC bias circuitry of BJT and FET				
C227.3	Design circuits using the transistors, diodes and oscillators				
C227.4	Explore the operation and advantages of operational amplifiers.				
C227.5	Learn to design different types of filters and apply the same to oscillators and amplifiers				
C227.6	Exploring the circuitry which converts an analog signal to digital signal				

Course Name	Analog Communications Lab			Course Code	C228
Course Code(U)	R1622047	Year/Sem	2/2	Regulation	R16
CO.NO	Course Outcome				
C228.1	Design and simulate modulation and demodulation circuits such as AM,DSB-SC,FM.				
C228.2	Construct pre-emphasis and de-emphasis at the transmitter and receiver respectively				
C228.3	Construct diode detector and AGC circuit that are necessary for good reception of the signal				
C228.4	Design and simulate the PAM,PWM&PPM circuits				
C228.5	recognize the importance of pre-emphasis and de-emphasis				
C228.6	Know the need for diode detector, and AGC Substantiate pulse modulation techniques				

Course Name	Microprocessors and Microcontrollers			Course Code	C321
Course	R1632041	Year/Sem	3/2	Regulation	R16



KRISHNA CHAITANYA INSTITUTE OF TECHNOLOGY & SCIENCES

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(Approved by A.I.C.T.E., New Delhi, & Affiliated to JNTUK, Kakinada)

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Code(U)					
CO.NO	Course Outcome				
C321.1	Understand the basic concepts of microprocessor 8086 and its blocks. Develop programs for different addressing modes				
C321.2	Perform 8086 interfacing with different peripherals and implement programs.				
C321.3	Describe the key features of serial and parallel communication and able to perform that.				
C321.4	Understand the basic concepts of advanced microprocessor 80386,80486 and its blocks.				
C321.5	Understand the basic concepts of microprocessor 8051 and its blocks. Develop programs for different applications.				
C321.6	Design PIC microcontroller for simple applications				

Course Name	Microwave Engineering			Course Code	C322
Course Code(U)	R1632042	Year/Sem	3/2	Regulation	R16
CO.NO	Course Outcome				
C322.1	Gain knowledge of transmission lines and waveguide structures and how they are used as elements in impedance matching and filter circuits.				
C322.2	Apply analysis methods to determine circuit properties of passive or active microwave devices.				
C322.3	Gain knowledge and understanding of microwave analysis methods.				
C322.4	Distinguish between M-type and O-type tubes				
C322.5	Gain knowledge and understanding of microwave crossed Field Devices.				
C322.6	Analyze and measure various microwave parameters using a Microwave test bench.				

Course Name	VLSI Design			Course Code	C323
Course Code(U)	R1632043	Year/Sem	3/2	Regulation	R16
CO.NO	Course Outcome				
C323.1	Understand the properties of MOS active devices and simple circuits configured when using them and the reason for such encumbrances as ratio rules by which circuits can be interconnected in silicon.				
C323.2	Describe the electrical properties of MOS circuits such as $I_{ds} - V_{ds}$ relationship, gm, figure of merit, sheet resistance, area capacitance.				
C323.3	Know three sets of design rules with which nMOS and CMOS designs may be fabricated.				
C323.4	Understand the scaling factors determining the characteristics and performance of MOS circuits in silicon.				
C323.5	Learn design process in VLSI through a mini-project on the design of a CMOS sub-system				
C323.6	Describe the semiconductor IC design such as PLA's, PAL, FPGA, CPLD.				



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Course Name	Digital Signal Processing			Course Code	C324
Course Code(U)	R1632044	Year/Sem	3/2	Regulation	R16
CO.NO	Course Outcome				
C324.1	Estimate the spectra of signals that are to be processed by a discrete time filter				
C324.2	Design and simulate a digital filter				
C324.3	Design new digital signal processing systems.				
C324.4	Design and realize FIR, IIR filters				
C324.5	Program a DSP processor to filter signals				
C324.6	Verify the performance of a variety of modern and classical spectrum estimation techniques				

Course Name	Bio Medical Engineering			Course Code	C325
Course Code(U)	R1632045	Year/Sem	3/2	Regulation	R16
CO.NO	Course Outcome				
C325.1	Understand the Resources of human body and know the controlling total body				
C325.2	Analyse the working and interfacing of Electrodes and transducers to human body				
C325.3	Understand and measurement the cardiovascular system and Respiratory system				
C325.4	Analyse the patient caring through monitors in ICU and also understand working condition of prosthetic devices				
C325.5	Understand Various Diagnostic Technics How They Are Analyse The Problems In Human Body				
C325.6	Understand The How Shock Harzards Happen To Patients				

Course Name	Microprocessors and Microcontrollers lab			Course Code	C326
Course Code(U)	R1632046	Year/Sem	3/2	Regulation	R16
CO.NO	Course Outcome				
C326.1	Understand and apply the fundamentals of assembly level programming of microprocessors and microcontroller				
C326.2	Work with standard microprocessor real time interfaces including GPIO, serial ports, digital-to-analog converters and analog-to-digital converters				
C326.3	Troubleshoot interactions between software and hardware				
C326.4	Analyze abstract problems and apply a combination of hardware and software to address the problem				
C326.5	Use standard test and measurement equipment to evaluate digital interfaces.				
C326.6	Develop skill in simple program writing for 8051 & 8085 and applications				



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Course Name	VLSI Lab			Course Code	C327
Course Code(U)	R1632047	Year/Sem	3/2	Regulation	R16
CO.NO	Course Outcome				
C327.1	Apply the Concept of design rules during the layout of a circuit..				
C327.2	Model and simulate digital VLSI systems using hardware design language				
C327.3	Synthesize digital VLSI systems from register-transfer or higher level descriptions				
C327.4	Understand current trends in semiconductor technology, and how it impacts scaling and performance				
C327.5	To understand MOS transistor as a switch and its capacitance				
C327.6	Able to design digital systems using MOS circuits.				

Course Name	DC Lab			Course Code	C328
Course Code(U)	R1632048	Year/Sem	3/2	Regulation	R16
CO.NO	Course Outcome				
C328.1	Able to understand basic theories of Digital communication system in practical.				
C328.2	Able to design and implement different modulation and demodulation techniques				
C328.3	Able to analyze digital modulation techniques by using MATLAB tools.				
C328.4	Able to identify and describe different techniques in modern digital communications, in particular in source coding using MATLAB tools				
C328.5	Able to perform channel coding				
C328.6	Able to perform different modulation techniques of Digital communication system in practical.				

Course Name	Cellular Mobile Communication			Course Code	C421
Course Code(U)	R1642041	Year/Sem	4/2	Regulation	R16
CO.NO	Course Outcome				
C421.1	Identify the conventional cellular mobile radio systems				
C421.2	Design and analyze the concepts of interference in real time and design of antenna system				
C421.3	Identify the different antennas and analyze their patterns				
C421.4	Analyze the frequency management and channel assignment				
C421.5	Analyze the different concepts in mobile radio environment				
C421.6	Apply the concepts of GSM,TDMA and CDMA				

Course Name	Electronic Measurements and Instrumentation			Course Code	C422
Course Code(U)	R1642042	Year/Sem	4/2	Regulation	R16
CO.NO	Course Outcome				
C422.1	Select the instrument to be used based on the requirements.				
C422.2	Understand and analyze different signal generators and analyzers.				
C422.3	Understand the design of oscilloscopes for different applications.				
C422.4	Design different transducers for measurement of different parameters.				



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C422.5	Test and troubleshoot electronic circuits using various measuring instruments
C422.6	Maintain various types of test and measuring instruments

Course Name	Satellite Communication			Course Code	C423
Course Code(U)	R1642043	Year/Sem	4/2	Regulation	R16
CO.NO	Course Outcome				
C423.1	Understand the need of satellite communication and its basics.				
C423.2	Derive an orbit for different applications.				
C423.3	Understand working of different parts in satellite communication.				
C423.4	Knowledge on communication link establishment and different communication techniques..				
C423.5	Understand Earth station technology working and examples of LEO,MEO applications.				
C423.6	Understand the working of GPS satellites and navigation through the GPS satellites.				

Course Name	Wireless Sensors and Networks			Course Code	C424
Course Code(U)	R1642044	Year/Sem	4/2	Regulation	R16
CO.NO	Course Outcome				
C424.1	After going through this course the student will be able to Define Architecture of single node in WSN and its Applications & Advantages				
C424.2	Compare different networking topologies like as PAN,MANET & WANET and also define hidden node problem & exposed node problem				
C424.3	Classify Different types of MAC Protocols used in WSN with its advantages and limitations				
C424.4	Compare Different types of Routing Protocols used in WSN with help of its performance metrics				
C424.5	Analyze Transport Layer Protocols & security Protocols for Ad Hoc Wireless Networks				
C424.6	Identify the security issues in Ad Hoc Wireless Networks and applications of WSN				



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES AS PER R19 REGULATIONS

S.NO	Year /sem	Course code	Course Name	Course Outcomes (After completion of the course student can able to:)
1	I/I	HS1101	English	CO1: understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information CO2: ask and answer general questions on familiar topics and introduce oneself/others CO3: employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information CO4: recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs CO5: form sentences using proper grammatical structures and correct word forms
2	I/I	BS1101	Mathematics -I	CO1: Utilize mean value theorems to real life problems (L3) CO2: Solve the differential equations related to various engineering fields (L3) CO3: Familiarize with functions of several variables which is useful in optimization (L3) CO4: Apply double integration techniques in evaluating areas bounded by region (L3) CO5: Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems (L5)
3	I/I	BS1106	Applied Chemistry	CO1: Outline the properties of polymers and various additives added and different methods of forming plastic materials. CO2: Interpret the mechanism of conduction in conducting polymers, natural and synthetic rubbers and their applications CO3: the theory of construction of battery and fuel cells, categorize the reasons for corrosion and study some methods of corrosion control. CO4: Understand the importance of materials like nanomaterials and fullerenes and their uses, liquid crystals and superconductors, semiconductors. CO5: knowledge of computational chemistry, molecular machines, principles and applications of analytical instruments.
4	I/I	ES1112	Fundamental	CO1: Illustrate the concept of input and output devices of

			s Of Computer Science	Computers and how it works and recognize the basic terminology used in computer programming. C02: Recognize the Computer networks, types of networks and topologies. C03: Summarize the concepts of Operating Systems and Databases. C04: Recite the Advanced Computer Technologies like Distributed Computing & Wireless Networks.
5	I/I	ES1103	Engineering Drawing	C01: The student will learn how to visualize 2D & 3D objects.
6	I/I	HS1102	English Lab	C01: Learners learn how to pronounce words using the rules they have been taught. C02: Students learn the importance of speaking English using rhythm and intonation. C03: Students learn to overcome stage fear and make presentations with ease. C04: Students learn to use right words and phrases in keeping the demands of occasion. C05: Students learn to face different types of interviews with confidence. C06: Students learn to participate in group discussions. C07: Students learn to distinguish informal speech from formal speech through role plays. C08: Students learn to use the telephone etiquettes
7	I/I	BS1107	Applied Chemistry Lab	C01: The students entering into the professional course have practically very little exposure to lab classes. C02: The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. C03: The student is exposed to different methods of chemical analysis and use of some commonly employed instruments.
8	I/I	ES1105	IT Workshop	C01: Assemble and disassemble components of a PC C02: Construct a fully functional virtual machine, Summarize various Linux operating system commands, C03: Secure a computer from cyber threats, Learn and practice programming skill in Github, Hackerrank, Code chef, Hacker Earth etc. C04: Recognize characters & extract text from scanned images, Create audio files and podcasts C05: Create video tutorials and publishing, Use office tools for documentation, Build interactive presentations, Build websites, Create quizzes & analyze responses
9	I/I	MC1101	Environment al Science	C01: Overall understanding of the natural resources. C02: Basic understanding of the ecosystem and its diversity. C03: Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities. C04: An understanding of the environmental impact of

				developmental activities. CO5: Awareness on the social issues, environmental legislation and global treaties.
10	I/II	BS1202	Mathematics - II	CO1: develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) CO2: solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) CO3: evaluate approximating the roots of polynomial and transcendental equations by different algorithms (L5) CO4: apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3). CO5: apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations (L3)
11	I/II	BS1203	MATHEMATICS - III	CO1: Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) CO2: Estimate the work done against a field, circulation and flux using vector calculus (L5) CO3: Apply the Laplace transform for solving differential equations (L3) CO3: Find or compute the Fourier series of periodic signals (L3) CO4: Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) CO5: Identify solution methods for partial differential equations that model physical processes (L3)
12	I/II	BS1204	APPLIED PHYSICS	CO1: The need of coherent sources and the conditions for sustained interference. CO2: analyze the physical significance of wave function, energy values of a free particle, electron theories, calculate the Fermi energy, physical significance of wave function . CO3: interpret the effects of temperature on Fermi Dirac distribution function, types of solids based on band theory, properties of n-type and p-type semiconductors, using Hall effect. CO4: summarize various types of polarization of dielectrics, classification of the magnetic materials based on susceptibility and their temperature dependence. CO5: the applications of dielectric and magnetic materials , Apply the concept of magnetism to magnetic devices.
13	I/II	ES1201	PROGRAMMING FOR PROBLEM SOLVING USING C	CO1: write algorithms and to draw flowcharts for solving problems, convert flowcharts/algorithms to C Programs, compile and debug programs CO2: use different operators, data types and write programs that use two-way/ multi-way selection, to select the best loop construct for a given problem CO3: design and implement programs to analyze the different pointer applications.

				<p>CO4: decompose a problem into functions and to develop modular reusable code.</p> <p>CO5: Apply File I/O operations.</p>
14	I/II	ES1213	DIGITAL LOGIC DESIGN	<p>CO1: An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.</p> <p>CO2: An ability to understand the different switching algebra theorems and apply them for logic functions.</p> <p>CO3: An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.</p> <p>CO4: Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.</p> <p>CO5: Students will be able to design various sequential circuits starting from flip-flop to registers and counters.</p>
15	I/II	ES1205	APPLIED PHYSIC LAB	<p>CO1: Develop skills to impart practical knowledge in real time solution.</p> <p>CO2: Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.</p> <p>CO3: Design new instruments with practical knowledge.</p> <p>CO4: Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.</p> <p>CO5: Understand measurement technology, usage of new instruments and real time applications in engineering studies.</p>
16	I/II	HS1203	COMMUNICATION SKILLS LAB	<p>CO1: Better pronunciation and accent</p> <p>CO2: Ability to use functional English</p> <p>CO3: Competency in analytical skills and problem solving skills</p>
17	I/II	ES1202	PROGRAMMING FOR PROBLEM SOLVING USING C LAB	<p>CO1: Gains Knowledge on various concepts of a C language.</p> <p>CO2: Able to draw flowcharts and write algorithms.</p> <p>CO3: Able design and development of C problem solving skills.</p> <p>CO4: Able to design and develop modular programming skills.</p> <p>CO5: Able to trace and debug a program</p>
	I/II	PR1201	ENGINEERING EXPLORATION PROJECT	<p>CO1: Use scientific reasoning to gather, evaluate, and interpret ideas</p> <p>CO2: Analyze and design solutions to solve the ideas</p> <p>CO3: Use one or more creative tools to complete the projects</p>
	I/II	MC1204	CONSTITUTION OF INDIA	<p>CO1: Understand historical background of the constitution making and its importance for building a democratic India.</p> <p>CO2: Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.</p> <p>CO3: Understand the value of the fundamental rights and duties for becoming good citizen of India, analyze the decentralization of power between central, state and local self-government.</p> <p>CO4: Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for</p>

				<p>sustaining democracy, features and principles of Indian Constitution, about Union Government, State government and its administration.</p> <p>CO5: Get acquainted with Local administration and Pachayat Raj, be aware of basic concepts and developments of Human Rights, gain knowledge on roles and functioning of Election Commission</p>
18	II/I	CS2101	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	<p>CO1: Demonstrate skills in solving mathematical problems</p> <p>CO2: Comprehend mathematical principles and logic</p> <p>CO3: Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software</p> <p>CO4: Manipulate and analyze data numerically and/or graphically using appropriate Software</p> <p>CO5: Communicate effectively mathematical ideas/results verbally or in writing.</p>
19	II/I	CS2102	SOFTWARE ENGINEERING	<p>CO1: Ability to transform an Object-Oriented Design into high quality, executable code</p> <p>CO2: Skills to design, implement, and execute test cases at the Unit and Integration level</p> <p>CO3: Compare conventional and agile software methods</p>
20	II/I	ES2101	PYTHON PROGRAMMING	<p>CO1: Develop essential programming skills in computer programming concepts like data types, containers</p> <p>CO2: Apply the basics of programming in the Python language</p> <p>CO3: Solve coding tasks related conditional execution, loops</p> <p>CO4: Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming</p>
21	II/I	CS2103	DATA STRUCTURES	<p>CO1: Summarize the properties, interfaces, and behaviors of basic abstract data types</p> <p>CO2: Discuss the computational efficiency of the principal algorithms for sorting & searching</p> <p>CO3: Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs</p> <p>CO4: Demonstrate different methods for traversing trees</p>
22	II/I	CS2104	OBJECT ORIENTED PROGRAMMING THROUGH C++	<p>CO1: Classify object oriented programming and procedural programming</p> <p>CO2: Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling</p> <p>CO3: Build C++ classes using appropriate encapsulation and design principles</p> <p>CO4: Apply object oriented or non-object oriented techniques to solve bigger computing problems</p>
23	II/I	CS2105	COMPUTER ORGANIZATION	<p>CO1: Develop a detailed understanding of computer systems</p> <p>CO2: Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations.</p> <p>CO3: Develop a detailed understanding of architecture and functionality of central processing unit.</p> <p>CO4: Exemplify in a better way the I/O and memory organization</p>

				CO5: Illustrate concepts of parallel processing, pipelining and inter processor communication
24	II/I	ES2102	PYTHON PROGRAMMING LAB	CO1: Write, Test and Debug Python Programs CO2: Use Conditionals and Loops for Python Programs CO3: Use functions and represent Compound data using Lists, Tuples and Dictionaries CO4: Use various applications using python
25	II/I	CS2106	DATA STRUCTURES THROUGH C++ LAB	CO1: Apply the various OOPs concepts with the help of programs. CO2: Use basic data structures such as arrays and linked list. CO3: Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths. CO4: Use various searching and sorting algorithms.
26	II/I	MC2101	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	CO1: Understand the concept of Traditional knowledge and its importance CO2: Know the need and importance of protecting traditional knowledge CO3: Know the various enactments related to the protection of traditional knowledge CO4: Understand the concepts of Intellectual property to protect the traditional knowledge
27	II/I	MC2102	EMPLOYABILITY SKILLS –I	CO1: Establish effective communication with employers, supervisors, and co-workers CO2: Identify to explore their values and career choices through individual skill assessments CO3: Adapts positive attitude and appropriate body language CO4: Interpret the core competencies to succeed in professional and personal life
28	II/II	BS2201	PROBABILITY AND STATISTICS	CO1: Classify the concepts of data science and its importance (L4) or (L2) CO2: Interpret the association of characteristics and through correlation and regression tools (L4) CO3: Make use of the concepts of probability and their applications (L3) CO4: Apply discrete and continuous probability distributions (L3) CO5: Design the components of a classical hypothesis test (L6) CO6: Infer the statistical inferential methods based on small and large sampling tests (L4)
29	II/II	CS2201	JAVA PROGRAMMING	CO1: Able to realize the concept of Object Oriented Programming & Java Programming Constructs CO2: Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords CO3: Apply the concept of exception handling and Input/ Output operations CO4: Able to design the applications of Java & Java applet

				CO5: Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
30	II/II	CS2202	OPERATING SYSTEMS	CO1: Describe various generations of Operating System and functions of Operating System CO2: Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance CO3: Solve Inter Process Communication problems using Mathematical Equations by various methods CO4: Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques CO5: Outline File Systems in Operating System like UNIX/Linux and Windows
31	II/II	CS2203	DATABASE MANAGEMENT SYSTEMS	CO1: Describe a relational database and object-oriented database CO2: Create, maintain and manipulate a relational database using SQL CO3: Describe ER model and normalization for database design CO4: Examine issues in data storage and query processing and can formulate appropriate solutions CO5: Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage.
32	II/II	CS2204	FORMAL LANGUAGES AND AUTOMATA THEORY	CO1: Classify machines by their power to recognize languages. ☐ Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy CO2: Employ finite state machines to solve problems in computing CO3: Illustrate deterministic and non-deterministic machines CO4: Quote the hierarchy of problems arising in the computer science
33	II/II	CS2205	JAVA PROGRAMMING LAB	CO1: Evaluate default value of all primitive data type, Operations, Expressions, Control-flow, Strings CO2: Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism CO3: Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism CO4: Construct Threads, Event Handling, implement packages, developing applets
33	II/II	CS2206	UNIX OPERATING SYSTEM LAB	CO1: To use Unix utilities and perform basic shell control of the utilities CO2: To use the Unix file system and file access control CO3: To use of an operating system to develop software CO4: Students will be able to use Linux environment efficiently CO5: Solve problems using bash for shell scripting

34	II/II	CS2207	DATABASE MANAGEMENT SYSTEMS LAB	<p>CO1: Utilize SQL to execute queries for creating database and performing data manipulation operations</p> <p>CO2: Examine integrity constraints to build efficient databases</p> <p>CO3: Apply Queries using Advanced Concepts of SQL</p> <p>CO4: Build PL/SQL programs including stored procedures, functions, cursors and triggers</p>
35	II/II	MC2201	PROFESSIONAL ETHICS & HUMAN VALUES	<p>CO1: Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field</p> <p>CO2: Identify the multiple ethical interests at stake in a real-world situation or practice</p> <p>CO3: Articulate what makes a particular course of action ethically defensible</p> <p>CO4: Assess their own ethical values and the social context of problems</p> <p>CO5: Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects</p> <p>CO6: Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work</p> <p>CO7: Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.</p>
36	II/II	PR2201	SOCIALLY RELEVANT PROJECT	<p>CO1: Use scientific reasoning to gather, evaluate, and interpret ideas</p> <p>CO2: Analyze and design solutions to solve the ideas</p> <p>CO3: Use one or more creative tools to complete the projects</p>
37	III/I	CS3101	DATA WAREHOUSING AND DATA MINING	<p>CO1: Design a Data warehouse system and perform business analysis with OLAP tools</p> <p>CO2: Apply suitable pre-processing and visualization techniques for data analysis</p> <p>CO3: Apply frequent pattern and association rule mining techniques for data analysis</p> <p>CO4: Apply appropriate classification techniques for data analysis</p> <p>CO5: Apply appropriate clustering techniques for data analysis</p>
38	III/I	CS3102	COMPUTER NETWORKS	<p>CO1: Illustrate the OSI and TCP/IP reference model</p> <p>CO2: Analyze MAC layer protocols and LAN technologies</p> <p>CO3: Design applications using internet protocols</p> <p>CO4: Implement routing and congestion control algorithms</p> <p>CO5: Develop application layer protocols</p>
39	III/I	CS3103	COMPILER DESIGN	<p>CO1: Design, develop, and implement a compiler for any language</p> <p>CO2: Use LEX and YACC tools for developing a scanner and a parser</p> <p>CO3: Design and implement LL and LR parsers</p> <p>CO4: Design algorithms to perform code optimization in order to</p>

				<p>improve the performance of a program in terms of space and time complexity</p> <p>CO5: Apply algorithms to generate machine code</p>
40	III/I	CS3104	ARTIFICIAL INTELLIGENCE	<p>CO1: Outline problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem</p> <p>CO2: Apply the language/framework of different AI methods for a given problem</p> <p>CO3: Implement basic AI algorithms- standard search algorithms or dynamic programming</p> <p>CO4: Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports</p>
41	III/I	PE3101	Software Testing Methodologies	<p>CO1: Identify and understand various software testing problems, apply software testing knowledge and engineering methods and solve these problems by designing and selecting software test models, criteria, strategies, and methods</p> <p>CO2: Design and conduct a software test process for a software project</p> <p>CO3: Analyze the needs of software test automation ☐ Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects</p> <p>CO4: Basic understanding and knowledge of contemporary issues in software testing, such as component-based, web based and object oriented software testing problems</p> <p>CO5: Write test cases for given software to test it before delivery to the customer and write test scripts for both desktop and web based applications</p>
42	III/I	CS3105	COMPUTER NETWORKS LAB	<p>CO1: Apply the basics of Physical layer in real time applications</p> <p>CO2: Apply data link layer concepts, design issues, and protocols</p> <p>CO3: Apply Network layer routing protocols and IP addressing</p> <p>CO4: Implement the functions of Application layer and Presentation layer paradigms and Protocols</p>
43	III/I	CS3106	AI TOOLS & TECHNIQUES LAB	<p>CO1: Identify problems that are amenable to solution by AI methods</p> <p>CO2: Identify appropriate AI methods to solve a given problem</p> <p>CO3: Use language/framework of different AI methods for solving problems</p> <p>CO4: Implement basic AI algorithms</p> <p>CO5: Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports</p>
44	III/I	CS3107	DATA MINING LAB	<p>CO1: Extend the functionality of R by using add-on packages</p> <p>CO2: Examine data from files and other sources and perform various data manipulation tasks on them</p> <p>CO3: Code statistical functions in R</p>

				<p>CO4: Use R Graphics and Tables to visualize results of various statistical operations on data</p> <p>CO5: Apply the knowledge of R gained to data Analytics for real life applications</p>
45	III/I	MC3101	EMPLOYABILITY SKILLS -II	<p>CO1: Recite the corporate etiquette.</p> <p>CO2: Make presentations effectively with appropriate body language</p> <p>CO3: Be composed with positive attitude</p> <p>CO4: Apply their core competencies to succeed in professional and personal life</p>
46	III/II	CS3201	WEB TECHNOLOGIES	<p>CO1: Illustrate the basic concepts of HTML and CSS & apply those concepts to design static web pages</p> <p>CO2: Identify and understand various concepts related to dynamic web pages and validate them using JavaScript</p> <p>CO3: Outline the concepts of Extensible markup language & AJAX</p> <p>CO4: Develop web Applications using Scripting Languages & Frameworks</p> <p>CO5: Create and deploy secure, usable database driven web applications using PHP and RUBY</p>
47	III/II	CS3202	DISTRIBUTED SYSTEMS	<p>CO1: Elucidate the foundations and issues of distributed systems</p> <p>CO2: Illustrate the various synchronization issues and global state for distributed systems</p> <p>CO3: Illustrate the Mutual Exclusion and Deadlock detection algorithms in distributed systems</p> <p>CO4: Describe the agreement protocols and fault tolerance mechanisms in distributed systems</p> <p>CO5: Describe the features of peer-to-peer and distributed shared memory systems</p>
48	III/II	CS3202	DESIGN AND ANALYSIS OF ALGORITHMS	<p>CO1: Describe asymptotic notation used for denoting performance of algorithms</p> <p>CO2: Analyze the performance of a given algorithm and denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms</p> <p>CO3: List and describe various algorithmic approaches</p> <p>CO4: Solve problems using divide and conquer, greedy, dynamic programming, backtracking and branch and bound algorithmic approaches</p> <p>CO5: Apply graph search algorithms to real world problems</p> <p>CO6: Demonstrate an understanding of NP- Completeness theory and lower bound theory</p>
49	III/II	PE3201	PROFESSIONAL ELECTIVE –II (NPTEL/SWAYAM)	NPTEL/SWAYAM program.
50	III/II	OE3201	Artificial	CO1: Survey of attractive applications of Artificial Neural

			Neural Networks (OPEN ELECTIVE –I ECE)	<p>Networks.</p> <p>CO2: practically approach for using Artificial Neural Networks in various technical, organizational and economic applications</p>
51	III/II	HS3201	MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY	<p>CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.</p> <p>CO2: The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.</p> <p>CO3: The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.</p> <p>CO4: The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.</p> <p>CO5: The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</p>
52	III/II	CS3204	WEB TECHNOLOGIES LAB	<p>CO1: Analyze and apply the role of languages like HTML, CSS, XML</p> <p>CO2: Review JavaScript, PHP and protocols in the workings of the web and web applications</p> <p>CO3: Apply Web Application Terminologies, Internet Tools, E – Commerce and other web services</p> <p>CO4: Develop and Analyze dynamic Web Applications using PHP & MySql</p> <p>CO5: Install & Use Frameworks</p>
53	III/II	PR3201	Industrial Training / Skill Development Programmes / Research Project in higher learning institutes	<p>CO1: To enable students to learn the basic concepts of Project & Production Management.</p> <p>CO2: To be capable of self-education and clearly understand the value of achieving Perfection in the respective Project work.</p> <p>CO3: Effectively communicate through verbal/oral communication and improve the listening skills</p> <p>CO4: Write precise briefs or reports and technical documents</p> <p>CO5: Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.</p> <p>CO6: identify and discuss the issues and concepts salient to the research process</p>
54	IV/I	CS4101	CRYPTOGRAPHY AND NETWORK SECURITY	<p>CO1: Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory</p> <p>CO2: Compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication</p> <p>CO3: Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.</p>

				<p>CO4: Apply different digital signature algorithms to achieve authentication and create secure applications</p> <p>CO5: Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP</p> <p>CO6: Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications</p>
55	IV/I	CS4102	UML & DESIGN PATTERNS	<p>CO1: Illustrate software design with UML diagrams</p> <p>CO2: Design software applications using OO concepts</p> <p>CO3: Identify various scenarios based on software requirements</p> <p>CO4: Apply UML based software design into pattern based design using design patterns</p> <p>CO5: Illustrate the various testing methodologies for OO software</p>
56	IV/I	CS4103	MACHINE LEARNING	<p>CO1: Identify machine learning techniques suitable for a given problem</p> <p>CO2: Solve the problems using various machine learning techniques</p> <p>CO3: Apply Dimensionality reduction techniques</p> <p>CO4: Design application using machine learning techniques</p>
57	IV/I	OE4101	Block chain Technology (Open Elective –II ECE)	<p>CO1: Describe the basic concepts and technology used for block chain.</p> <p>CO2: Describe the primitives of the distributed computing and cryptography related to block chain.</p> <p>CO3: Illustrate the concepts of Bit coin and their usage.</p> <p>CO4: Implement Ethereum block chain contract.</p> <p>CO5: Apply security features in block chain technologies.</p> <p>CO6: Use smart contract in real world applications.</p>
58	IV/I	PE4101	MOBILE COMPUTING	<p>CO1: Interpret Wireless local area networks (WLAN): MAC design principles, 802.11 WIFI</p> <p>CO2: Discuss fundamental challenges in mobile communications and potential Techniques in GSM</p> <p>CO3: Demonstrate Mobile IP in Network layer</p> <p>CO4: Elaborate TCP/IP Protocols and database issues</p> <p>CO5: Illustrate different data delivery methods and synchronization protocols</p> <p>CO6: Develop applications that are mobile-device specific and demonstrate current Practice in mobile computing contexts</p>
59	IV/I	PE4101	DATA SCIENCE	<p>CO1: Describe what Data Science is and the skill sets needed to be a data scientist</p> <p>CO2: Illustrate in basic terms what Statistical Inference means. Identify probability distributions commonly used as foundations for statistical modeling, Fit a model to data</p> <p>CO3: Use R to carry out basic statistical modeling and analysis</p> <p>CO4: Apply basic tools (plots, graphs, summary statistics) to carry out EDA</p> <p>CO5: Describe the Data Science Process and how its components</p>

				<p>interact</p> <p>CO6: Use APIs and other tools to scrap the Web and collect data</p> <p>CO7: Apply EDA and the Data Science process in a case study</p>
60	IV/I	PE4101	NoSQL DATABASES	<p>CO1: Identify what type of NoSQL database to implement based on business requirements (key-value, document, full text, graph, etc.)</p> <p>CO2: Apply NoSQL data modeling from application specific queries</p> <p>CO3: Use Atomic Aggregates and renormalization as data modeling techniques to optimize query processing</p>
61	IV/I	PE4101	INTERNET OF THINGS	<p>CO1: Describe the usage of the term 'the internet of things' in different contexts</p> <p>CO2: Discover the various network protocols used in IoT and familiar with the key wireless technologies used in IoT systems, such as Wi-Fi, 6LoWPAN, Bluetooth and ZigBee</p> <p>CO3: Define the role of big data, cloud computing and data analytics in a typical IoT system Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software</p> <p>CO4: Build and test a complete working IoT system</p>
62	IV/I	PE4101	SOFTWARE PROJECT MANAGEMENT	<p>CO1: Apply the process to be followed in the software development life-cycle models.</p> <p>CO2: Apply the concepts of project management & planning.</p> <p>CO3: Implement the project plans through managing people, communications and change</p> <p>CO4: Conduct activities necessary to successfully complete and close the Software projects</p> <p>CO5: Implement communication, modeling, and construction & deployment practices in software development.</p>
63	IV/I	PE4102	WEB SERVICES	<p>CO1: Recite the advantages of using XML technology family</p> <p>CO2: Analyze the problems associated with tightly coupled distributed software architecture</p> <p>CO3: Learn the Web services building block</p> <p>CO4: Implement e-business solutions using XML based web services</p>
64	IV/I	PE4102	CLOUD COMPUTING	<p>CO1: Interpret the key dimensions of the challenge of Cloud Computing</p> <p>CO2: Examine the economics, financial, and technological implications for selecting cloud computing for own organization</p> <p>CO3: Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications</p> <p>CO4: Evaluate own organizations' needs for capacity building and training in cloud computing-related IT areas</p> <p>CO5: Illustrate Virtualization for Data-Center Automation</p>
65	IV/I	PE4102	MEAN STACK TECHNOLOGI	<p>CO1: Enumerate the Basic Concepts of Web & Markup Languages</p>

			ES	<p>CO2: Develop web Applications using Scripting Languages & Frameworks</p> <p>CO3: Make use of Express JS and Node JS frameworks</p> <p>CO4: Illustrate the uses of web services concepts like restful, react js</p> <p>CO5: Apply Deployment Techniques & Working with cloud platform</p>
66	IV/I	PE4102	AD-HOC AND SENSOR NETWORKS	<p>CO1: Evaluate the principles and characteristics of mobile ad hoc networks (MANETs) and what distinguishes them from infrastructure-based networks</p> <p>CO2: Determine the principles and characteristics of wireless sensor networks</p> <p>CO3: Discuss the challenges in designing MAC, routing and transport protocols for wireless ad-hoc sensor networks</p> <p>CO4: Illustrate the various sensor network Platforms, tools and applications</p> <p>CO5: Demonstrate the issues and challenges in security provisioning and also familiar with the mechanisms for implementing security and trust mechanisms in MANETs and WSNs</p>
67	IV/I	PE4102	CYBER SECURITY & FORENSICS	<p>CO1: Enumerate the computer forensics fundamentals</p> <p>CO2: Describe the types of computer forensics technology</p> <p>CO3: Analyze various computer forensics systems</p> <p>CO4: Illustrate the methods for data recovery, evidence collection and data seizure</p> <p>CO5: Identify the Role of CERT-In Security</p>
68	IV/I	CS4104	UML LAB	<p>CO1: Know the syntax of different UML diagrams</p> <p>CO2: Create use case documents that capture requirements for a software system</p> <p>CO3: Create class diagrams that model both the domain model and design model of a software system</p> <p>CO4: Create interaction diagrams that model the dynamic aspects of a software system</p> <p>CO5: Write code that builds a software system</p> <p>CO6: Develop simple applications</p>
69	IV/I	PR4101	PROJECT-I	<p>CO1: Understand the basic concepts & broad principles of real time software projects.</p> <p>CO2: Understand concepts of Project and Production Management</p> <p>CO3: Get capable of self education and clearly understand the value of achieving perfection in project implementation & completion.</p> <p>CO4: Apply the theoretical concepts to solve industrial problems with teamwork and multidisciplinary approach.</p>
70	IV/I	MC4101	IPR & PATENTS	<p>CO1: Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP.</p>

				<p>CO2: Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.</p> <p>CO3: Identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautions steps to be taken to prevent infringement of proprietary rights in products and technology development.</p> <p>CO4: Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy.</p> <p>CO5: Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.</p> <p>CO6: Be able to demonstrate a capacity to identify, apply and assess ownership rights and marketing protection under intellectual property law as applicable to information, ideas, new products and product marketing;</p>
71	IV/II	HS4201	MANAGEMENT AND ORGANIZATIONAL BEHAVIOR	<p>CO1: acquire the knowledge on management functions, global leadership and organizational structure</p> <p>CO2: Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments</p> <p>CO3: The learner is able to think in strategically through contemporary management practices</p> <p>CO4: The learner can develop positive attitude through personality development and can equip with motivational theories</p> <p>CO5: The student can attain the group performance and grievance handling in managing the organizational culture</p>
72	IV/II	OE4201	Smart Cities Open Elective – III(CIVIL)	
73	IV/II	PE4201	DEEP LEARNING	<p>CO1: Demonstrate the mathematical foundation of neural network</p> <p>CO2: Describe the machine learning basics</p> <p>CO3: Differentiate architecture of deep neural network</p> <p>CO4: Build a convolution neural network</p> <p>CO5: Build and train RNN and LSTMs</p>
74	IV/II	PE4201	QUANTUM COMPUTING	<p>CO1: Analyze the behavior of basic quantum algorithms</p> <p>CO2: Implement simple quantum algorithms and information channels in the quantum circuit model</p> <p>CO3: Simulate a simple quantum error-correcting code</p> <p>CO4: Prove basic facts about quantum information channels</p>
75	IV/II	PE4201	DevOps	CO1: Enumerate the principles of continuous development and

				<p>deployment, automation of configuration management, inter-team collaboration, and IT service agility</p> <p>CO2: Describe DevOps & DevSecOps methodologies and their key concepts</p> <p>CO3: Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models</p> <p>CO4: Set up complete private infrastructure using version control systems and CI/CD tools</p>
76	IV/II	PE4201	BLOCKCHAIN TECHNOLOGIES	<p>CO1: Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding.</p> <p>CO2: Identify the risks involved in building Block chain applications.</p> <p>CO3: Review of legal implications using smart contracts.</p> <p>CO4: Choose the present landscape of Block chain implementations and Understand Crypto currency markets</p> <p>CO5: Examine how to profit from trading crypto currencies.</p>
77	IV/II	PE4201	BIG DATA ANALYTICS	<p>CO1: Illustrate big data challenges in different domains including social media, transportation, finance and medicine</p> <p>CO2: Use various techniques for mining data stream</p> <p>CO3: Design and develop Hardtop</p> <p>CO4: Identify the characteristics of datasets and compare the trivial data and big data for various applications</p> <p>CO5: Explore the various search methods and visualization techniques</p>
78	IV/II	PR4201	PROJECT -II	<p>CO1: Understand the basic concepts & broad principles of real time software projects.</p> <p>CO2: Understand concepts of Project and Production Management</p> <p>CO3: Get capable of self education and clearly understand the value of achieving perfection in project implementation & completion.</p> <p>CO4: Apply the theoretical concepts to solve industrial problems with teamwork and multidisciplinary approach</p> <p>CO5: Demonstrate professionalism with ethics; present effective communication skills and relate engineering issues.</p>

HOD-CSE