**SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY**

Approved by AICTE, New Delhi and Affiliated to JNTUH.

Recognized under 2(f) of UGC Act 1956.

Sheriguda (V), Ibrahimpatnam (M), R.R. Dist., Telangana-501 510.

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## INDEX

## Course Outcomes for all Programmes

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**COURSE OUTCOMES (COs):**

Course Outcomes (COs) describe what students can able to do after completion of the course.

| Program : B.Tech-Electronics and Communication Engineering | Academic Year : 2019-20 | Semester : I & II |
|---|---|---|

| S.No | Year/ Sem | Course Code | Course Name | Course Outcomes (After completion of the course student can able to : ) |
|---|---|---|---|---|
| 1 | II/I | EC301PC | Electronic Devices & Circuits | **CO1:** Describe the applications of diode as rectifier, clippers, and clamper circuits. |
| | | | | **CO2:** Design various switching devices such as transistor, transistor biasing. |
| | | | | **CO3:** Analyse the operation of FET, special devices like Zener, Tunnel, Varactor diode, UJT and SCR. |
| | | | | **CO4:** Define explain transistor hybrid model. |
| | | | | **CO5:** Draw the operation of small signal model FET operation. |
| | | | | **CO6:** Explain the operation of diodes, BJT, FET, Transistor amplifiers. |
| 2 | II/I | EC302PC | Network Analysis and Transmission Lines | **CO1:** Gain the knowledge on basic network elements and magnetic circuits. |
| | | | | **CO2:** Analyze the RLC circuits in detail. |
| | | | | **CO3:** Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h & g). |
| | | | | **CO4:** Gain the knowledge in network function driving point in transfer function using s variables, poles and zeros. |
| | | | | **CO5:** Analyze the transmission line parameters and configurations. |
| | | | | **CO6:** Analyze smith chart configuration & applications. |
| 3 | II/I | EC303PC | Digital System Design | **CO1:** State the Boolean algebra, different number systems and codes. Change one number system into another number system. |
| | | | | **CO2:** Design the different combinational logic circuits. Modify and transform one form of Boolean equation to another form and simplify the Boolean equation in K-Map. |
| | | | | **CO3:** Design the different Sequential circuits. Analyze and compare the flipflops and transform one flipflop to |

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| | | | | | |
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| 5 | | | | | another flipflop. |
| | | | | | **CO4:** Design synchronous and asynchronous counters. Analyze and differentiate the sequential machine. |
| | | | | | **CO5:** Define, Differentiate between logic families and realization of logic gates using diodes and transistors |
| | | | | | **CO6:** Design the digital system. |
| 4 | II/I | EC304PC | Signals and Systems | | **CO1:** Explain any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function. |
| | | | | | **CO2:** Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrary signal (discrete) as Fourier transform to draw the spectrum. |
| | | | | | **CO3:** Analyze the characteristics of linear time invariant systems. |
| | | | | | **CO4:** Explain response can be obtained using Laplace transform and Z- Transform, properties and ROC of L.T and Z- Transform. |
| | | | | | **CO5:** Analyze the Sampling theorem, reconstruction, aliasing, and Nyquist's theorem to represent continuous time signals in discrete time. |
| | | | | | **CO6:** Compare auto Correlation and cross correlation and concept of power density spectrum. |
| 5 | II/I | EC305ES | Probability Theory and Stochastic Processes | | **CO1:** Attain the knowledge of Probability theory and random variables. |
| | | | | | **CO2:** Explain the Vector Random variables and joint distribution function. |
| | | | | | **CO3:** Understand the response of linear time Invariant system for a Random Processes. |
| | | | | | **CO4:** Analyze the random variable and random process, its properties. |
| | | | | | **CO5:** Determine the Spectral and temporal characteristics of Random Signals. |
| | | | | | **CO6:** Analyze the concepts of Noise in Communication systems. |
| 6 | II/I | EC306PC | Electronic Devices & Circuits Lab | | **CO1:** Describe the applications of diode as rectifier, clippers and clamper circuit. |
| | | | | | **CO2:** Design various switching devices such as transistor, transistor biasing. |
| | | | | | **CO3:** Analyze the operation of FET, Special devices like Zener, Tunnel. Varactor diode, UJT, SCR. |
| | | | | | **CO4:** Define explain transistor hybrid model. |

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| | | | | **CO5:** Draw the operation of small signal model FET operation. |
| | | | | **CO6:** Examine the operation of diodes, BJT, FET, Transistor amplifiers. |
| 7 | II/I | EC307PC | Digital System Design Lab | **CO1:** Identify the IC configurations of digital circuits. |
| | | | | **CO2:** Verify and compare different types of gates and comparators. |
| | | | | **CO3:** Develop the clock using universal gates. |
| | | | | **CO4:** Design and realization of sequential circuits. |
| | | | | **CO5:** Analyze and implementation of sequential circuits. |
| | | | | **CO6:** Compare combinational and sequential circuits. |
| 8 | II/I | EC308ES | Basic Simulation Lab | **CO1:** Identify the basic operations on matrices. |
| | | | | **CO2:** Identify and Analyze the various signals and sequences. |
| | | | | **CO3:** Point out even and odd signals and real and imaginary parts of signals. |
| | | | | **CO4:** Construct the convolution for signals and sequence, Linear-Non linear and time variant-Invariant of sequences. |
| | | | | **CO5:** Compare the auto correlation, cross correlation. |
| | | | | **CO6:** Describe sampling. |
| | | | | **CO6:** Express the fourier transform and laplace transform. |
| 9 | II/I | MC309 | Constitution of India | **CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism. |
| | | | | **CO2:** Describe fundamental rights, fundamental duties and its legal status. |
| | | | | **CO3: Describe** The constitution powers and status of the President of India. |
| | | | | **CO4:** Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency. |
| | | | | **CO5:** Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19. |
| | | | | **CO6:** Describe the Scope of the Right to Life and Personal Liberty under Article 21. |
| 10 | II/II | MA401BS | Laplace Transforms, Numerical Methods & Complex Variables | **CO1**: Describe the use of Laplace Transform techniques when solving ordinary differential equations. |
| | | | | **CO2:** Solve the polynomial and transcendental equations. |
| | | | | **CO3:** Determine the Numerical solutions for given ordinary differential equations. |
| | | | | **CO4:** Identify the Differential Numerical Methods. |
| | | | | **CO5:** Describe the Complex function with their |

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| | | | | analyticity, integration using Cauchy's Integral and Residue theorems. |
| | | | | **CO6:** Discuss the Taylor's and Laurent series expansions. |
| 11 | II/II | EC402PC | Electromagnetic Fields and Waves | **CO1:** Apply the basic laws to derive the Maxwell's Equation in Differential and Integral form for solving the engineering problems in Electrostatics. |
| | | | | **CO2:** Describe the knowledge of Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law. |
| | | | | **CO3:** Distinguish between static and Time varying fields, apply these concepts to derive the Maxwell's Equation in Differential, Integral form and boundary conditions for solving the engineering problems. |
| | | | | **CO4:** Analyze the wave equation for good conductors and good dielectrics, criticize and apply the characteristics of uniform plane wave for practical problems. |
| | | | | **CO5:** To analyze the characteristics of Uniform Plane Waves (UPW), determine their propagation parameters and estimate the same for dielectric and dissipative media. |
| | | | | **CO6:** Analyze the rectangular waveguides, their mode characteristics, and design waveguides for solving practical problems. |
| 12 | II/II | EC403PC | Analog and Digital Communications | **CO1:** Design various continuous wave modulation and demodulation techniques. |
| | | | | **CO2:** Analyze Frequency Modulation (FM) Techniques. |
| | | | | **CO3:** Analyze Phase Modulation (PM) Techniques. |
| | | | | **CO4:** Design various AM and FM transmitters. |
| | | | | **CO5:** Describe various Pulse Modulation Techniques. |
| | | | | **CO6:** Analyze various digital modulation techniques and baseband transmission. |
| 13 | II/II | EC404PC | Linear IC Applications | **CO1:** Identify the significance and applications of Integrated Circuits. |
| | | | | **CO2:** Implement various Mathematical and Circuit applications Using IC 741. |
| | | | | **CO3:** Design filters using IC 741. |
| | | | | **CO4:** Design Wave form generators using Op-Amp 741. |
| | | | | **CO5:** Discuss applications of IC 555 and IC 565. |
| | | | | **CO6:** Analyze various ADC's and DAC's. |

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| 14 | II/II | EC405PC | Electronic Circuit Analysis | **CO1:** Design the multistage amplifiers and develop& analyze transistor amplifier circuits using Hybrid $\pi$ model at high frequencies. |
| | | | | **CO2:** Design of Feedback amplifiers and their frequency response. |
| | | | | **CO3:** Understand the design of various oscillators such as RC Phase Shift Oscillator, Wein Bridge Oscillator, Crystal, LC oscillator. |
| | | | | **CO4:** Design and compare various Power amplifiers such as Class A, Class B, Class AB amplifiers, Analysis of various tuned amplifiers etc. |
| | | | | **CO5:** Design Multivibrators. |
| | | | | **CO6:** Understand sweep circuits for various applications. |
| 15 | II/II | EC406PC | Analog and Digital Communications Lab | **CO1:** Identify the basics of analog and digital communication systems. |
| | | | | **CO2:** Design and Implement different modulation and demodulation techniques. |
| | | | | **CO3:** Analyze and implement analog to digital, digital to analogy converters. |
| | | | | **CO4:** Describe practical implementation of baseband modulation techniques. |
| | | | | **CO5:** Design and implement different pulse modulation techniques like PAM, PWM and PPM. |
| | | | | **CO6:** Compare analog and digital modulation techniques. |
| 16 | II/II | EC407PC | IC Applications Lab | **CO1:** Design inverting and non inverting, adder and subtractor or amplifier using op-amp. |
| | | | | **CO2:** Verify a comparator, Integrator and Differentiator using op-amp and voltage regulator using IC723. |
| | | | | **CO3:** Design active filters, PLL. |
| | | | | **CO4:** Analysis of IC741 waveform generator sine, square, triangular waves. |
| | | | | **CO5:** Design a Monostable, Astable Multivibrator and Schmitt trigger. |
| | | | | **CO6:** Identify and verify the functionalities of the linear integrated circuits. |
| 17 | II/II | EC408PC | Electronic Circuit Analysis Lab | **CO1:** Design and simulate different BJT amplifiers: CE amplifier, Two stage RC coupled amplifier, Cascode, Darlington pair. |
| | | | | **CO2:** Design and simulate feedback amplifiers: Current shunt feedback amplifier, Voltage series feedback amplifiers. |

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| | | | | **CO3:** Design and simulate different oscillators: RC phase shift oscillator, Hartley and colpitt's oscillators. |
| | | | | **CO4:** Design and simulate power amplifiers: Class A power amplifier, Class B complementary symmetry amplifier. |
| | | | | **CO5:** Design Monostable Multivibrator. |
| | | | | **CO6:** Design Miller sweep circuit. |
| 18 | II/II | EC408PC | Gender Sensitization Lab | **CO1:** Develop sensibility with regard to issues of gender in contemporary India. |
| | | | | **CO2:** Provide a critical perspective on the socialization of men and women. |
| | | | | **CO3:** Determine information about some key biological aspects of genders. |
| | | | | **CO4:** Debate on the politics and economics of work. |
| | | | | **CO5:** Reflect critically on gender violence. |
| | | | | **CO6:** Expose more egalitarian interactions between men and women. |
| 19 | III/I | EC501PC | Electromagnetic Theory and Transmission Lines | **CO1:** Apply the concepts of Electric fields in different applications. |
| | | | | **CO2:** Differentiate between static and Time varying fields, establish the Maxwell's Equations and boundary conditions for solving the engineering problems. |
| | | | | **CO3:** Evaluate and analyze propagation characteristics of EM waves and solve the wave equations. |
| | | | | **CO4:** Determine the transmission line parameters for different lines and characterize the distortions. |
| | | | | **CO5:** Design transmission lines terminated with suitable stubs and analyze the Smith Chart profile. |
| | | | | **CO6**: Apply the concepts of Electromagnetic Theory and Transmission lines to design a communication system. |
| 20 | III/I | EC502PC | Linear and Digital IC Applications | **CO1:** Define &classify the op amps with their working modes (inverting, npn inverting, differential) in applications (integrator, differentiator, comparator, Schmitt trigger, VCO). |
| | | | | **CO2:** Design and describe different waveform generators using IC555. |
| | | | | **CO3:** Explain various techniques to design analog to digital and digital to Analog converters. |
| | | | | **CO4:** Design different logic families of digital integrated circuit and their Characteristics. |
| | | | | **CO5:** Describe different types of sequential logic ICs and memories. |

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| | | | | **CO6:** Compare linear IC and digital IC and design simple circuit using op-amp. |
| 21 | III/I | EC503PC | Digital Communications | **CO1:** Explain the basic elements of digital communication. |
| | | | | **CO2:** Compare code efficiency of widely used digital encoding techniques like Shannon Coding and Huffman coding. |
| | | | | **CO3:** Describe different types of error detecting and error correcting code like linear block codes, cyclic codes, convolution codes. |
| | | | | **CO4:** Analyze the performance of base band and pass band digital communication systems. |
| | | | | **CO5:** Classification of digital modulation techniques. |
| | | | | **CO6:** Explain the two types of spread spectrum techniques Direct sequence spread spectrum and Frequency hopping spread spectrum. |
| 22 | III/I | SM504MS | Fundamentals of Management | **CO1:** Write the working principle of fundamentals of management basics. |
| | | | | **CO2:** Setup Planning Process and develops the Decision Making and Problem Solving skills. |
| | | | | **CO3:** Explains Organization principles, Design, Structures and basic fundamentals of Organization. |
| | | | | **CO4:** Analyze Leadership styles and handling employee and customer complaints, and motivational theories. |
| | | | | **CO5**: What is controlling, types, strategies, steps characteristics and process of controlling. |
| | | | | **CO6:** What are HRM and Human Resource Planning, Recruitment and Selection, & Training and development. |
| 23 | III/I | CS511OE | Operating Systems | **CO1:** Describe operating system goals and functions. |
| | | | | **CO2:** Get the knowledge of process, various CPU scheduling algorithms and synchronization. |
| | | | | **CO3:** Explain memory management and several page replacement algorithms. |
| | | | | **CO4:** Classify storage management and file system implementation. |
| | | | | **CO5:** Analyze the methods for handling deadlocks. |
| | | | | **CO6:** Express the various system protection methods. |
| | | | | **CO1:** Design inverting and non inverting, adder and subtractor amplifier using op-amps. |
| | | | | **CO2:** Design a comparator using op-amp. |
| | | | | **CO3:** Design active filters, Integrator and Differentiator |

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| 24 | III/I | EC505PC | Linear IC Applications Lab | using op-amp. |
| | | | | **CO4:** Analysis of IC-741 waveform generator sine, square, triangular waves. |
| | | | | **CO5:** Design a Monostable, Astable multivibrator, Schmitt trigger circuits. |
| | | | | **CO6:** Identify and Verify the functionalities of the linear integrated circuits. |
| 25 | III/I | EC506PC | Digital IC Applications Lab | **CO1:** Design 16*4 priority encoder, 16 bit comparator ,16*1 multiplier. |
| | | | | **CO2:** Design a 16 bit adder/subtractor using 4-bit adder/subtractor IC's. |
| | | | | **CO3:** Design a 4 bit gray to binary and binary to gray converter. |
| | | | | **CO4:** Design a 7 segment display & counters. |
| | | | | **CO5:** Design a 8 bit serial in & serial out and Parallel load & serial out shift registers using two 4 bit shift registers. |
| | | | | **CO6:** Identify and verify the functionalities of the digital IC's. |
| 26 | III/I | EC506PC | Digital Communications Lab | **CO1:** Identify the basic theories of digital communication systems. |
| | | | | **CO2:** Design and implement different modulation and demodulation techniques. |
| | | | | **CO3:** Analyze and implement analog to digital converters like PCM,DM. |
| | | | | **CO4:** Describe practical implementation of baseband modulation techniques. |
| | | | | **CO5:** Show the spectral characteristics of PAM,PWM and QAM. |
| | | | | **CO6:** Compare the analog and digital modulation techniques. |
| 27 | III/I | MC500HS | Professional Ethics | **CO1:** Understand importance of values and ethics in their personal lives & professional careers. |
| | | | | **CO2:** Describe basic theories like virtue theory, rights theory, casuist theory. |
| | | | | **CO3:** Understand professional practices in engineering field. |
| | | | | **CO4:** Describe central responsibilities of engineers. |
| | | | | **CO5:** Understand work place rights and responsibilities. |
| | | | | **CO6:** Analyze various global issues in professional ethics. |
| | | | | **CO1:** Understand oops concepts and basics of java programming. |

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| 28 | III/II | CS621OE | Java Programming | **CO2:** The Skill to apply OOP concepts in problem solving. |
| | | | | **CO3:** Able to develop Error free applications using Exception handling. |
| | | | | **CO4:** Able to develop multi threaded applications with Synchronization. |
| | | | | **CO5:** Solving problems using java collection framework and io streams. |
| | | | | **CO6:** Creating web applications using applets and GUI. |
| 29 | III/II | EC612PE | Digital Image Processing | **CO1:** Define digital image fundamentals, sampling and quantization, relationship between pixels, different types of image transforms. |
| | | | | **CO2:** Design concepts including the topics of filtering and types of operations. |
| | | | | **CO3:** Solve the derivations of different types of restoration filters. |
| | | | | **CO4**: Compare different types of segmentation and morphing concepts. |
| | | | | **CO5:** Classify compression models and their redundancies. |
| | | | | **CO6:** Have the skill base summary to further explore advance the topics of digital image processing. |
| 30 | III/II | EC601PC | Antennas and Wave Propagation | **CO1:** Investigate the different types of antennas like short dipole, half wave dipole, quarter Wave monopole and small loops. And its parameters with mathematical relations. |
| | | | | **CO2:** Design and analysis of folded dipole, yagi uda, helical and horn antennas based on the Frequency with its radiation patter. |
| | | | | **CO3:** Design and analysis of micro strip rectangular patch antenna and parabolic reflector Antenna according to their relevant feed structure. |
| | | | | **CO4**: Perpetrate the Linear array analysis, estimate the array factor, characteristics and Sketch the pattern for 2-element array, N-element BSA, EFA, modified EFA, Binomial arrays. |
| | | | | **CO5:** Interpret the requirement of microwave measurement for antenna far zone pattern and Gain measurements. |
| | | | | **CO6:** Classify the different wave propagation mechanisms, identify their frequency ranges, determine the characteristic features of ground wave, ionosphere wave, space wave, duct and troposphere propagations, and estimate the parameters involved. |

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| 31 | III/II | EC602PC | Microprocessors and Microcontrollers | **CO1**: Basic understanding of 8086 microprocessors architectures and its functionalities. |
| | | | | **CO2**: Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP. |
| | | | | **CO3**: Basic understanding of 8051 microcontroller's architectures and its functionalities. |
| | | | | **CO4:** Discuss the input /output memory interface Serial Communication and Bus Interface device. |
| | | | | **CO5:** Analyze the internal architecture of ARM. |
| | | | | **CO6:** Classify the internal architecture of CORTEX ARM Processor and MAP ARM Processor. |
| 32 | III/II | EC603PC | Digital Signal Processing | **CO1:** Analyze and process signals in the discrete domain. |
| | | | | **CO2:** Express time, frequency and Z -transform analysis on signals and systems. |
| | | | | **CO3:** Identify the inter-relationship between DFT and various transforms and fast computation of DFT and appreciate the FFT processing. |
| | | | | **CO4:** Design IIR digital filters for a given specification. |
| | | | | **CO5:** Design FIR digital filters for a given specification. |
| | | | | **CO6:** Describe the tradeoffs between normal and multi rate DSP techniques and finite length word effects. |
| 33 | III/II | EC604PC | Digital Signal Processing Lab | **CO1:** Apply knowledge of digital filter design for various applications. |
| | | | | **CO2:** Analyze various signals in transform domain. |
| | | | | **CO3:** Apply MultiMate concepts in different areas. |
| | | | | **CO4:** Perform real time experiments on processors such as audio and speak processing. |
| | | | | **CO5:** Work with MATLAB functions. |
| | | | | **CO6:** Analyze and design different signals & filters using MATLAB. |
| 34 | III/II | EC605PC | Microprocessors & Microcontrollers Lab | **CO1**: Basic understanding of 8086 microprocessors architectures and its functionalities. |
| | | | | **CO2**: Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP. |
| | | | | **CO3**: Basic understanding of 8051 microcontroller's architectures and its functionalities. |
| | | | | **CO4:** Discuss the input /output memory interface Serial Communication and Bus Interface device. |
| | | | | **CO5:** Analyze the internal architecture of ARM. |

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| | | | | **CO6:** Classify the internal architecture of CORTEX ARM Processor and MAP ARM Processor. |
| 35 | III/II | EN606HS | Advanced English Communication Skills Lab | **CO1:** Speak effectively. |
| | | | | **CO2:** Express and communicate fluently and appropriately in social professional contexts. |
| | | | | **CO3:** Develop the comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects. |
| | | | | **CO4:** The awareness of English lab enriches their communication and soft skills contributing to their overall development and success. |
| | | | | **CO5:** Draft various letters and reports for all official purpose. |
| | | | | **CO6:** Take part in social and professional communication. |
| 36 | IV/I | EC701PC | Microwave Engineering | **CO1:** Recognize the microwave bands, applications and rectangular waveguides. |
| | | | | **CO2:** Analyze the waveguide components and cavity resonators. |
| | | | | **CO3:** Classify O type and M type microwave tubes. |
| | | | | **CO4:** Explain the microwave solid state devices and applications. |
| | | | | **CO5:** Illustrate microwave measurements by using microwave bench. |
| | | | | **CO6:** Describe the significance of microwave transmission lines and wave guides. |
| 37 | IV/I | EC721PE | Computer Networks | **CO1:** Compare the layers of the OSI model and TCP/IP. Explain the function(s) of each layer. |
| | | | | **CO2:** Identify different MAC mechanism (Aloha, slotted Aloha, and FDMA). |
| | | | | **CO3:** Analyze & Building the skills of sub netting and routing. |
| | | | | **CO4:** Describe the different types of network devices and their functions within a network. |
| | | | | **CO5:** Design and implement a peer to peer file sharing application utilizing application layer protocol & such as HTTP, DNS and Transportation layer protocol. |
| | | | | **CO6:** Distinguish the ethical, legal, security and social issues related to computer networks. |
| 38 | IV/I | EC734PE | Embedded System Design | **CO1:** Describe the basics of an embedded system. |
| | | | | **CO2:** Interpret the types of memory and interfacing to external world. |
| | | | | **CO3:** Analyze the embedded firmware design |

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Recognized under 2(f) of UGC Act 1956.

Sheriguda (V), Ibrahimpatnam (M), R.R. Dist., Telangana-501 510.

Ph.No:9347187999, 8096951507, 9640590999. E-mail: principalsiiet@gmail.com

| | | | | approaches. |
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| | | | | **CO4:** Design the RTOS based embedded system for multitasking. |
| | | | | **CO5:** Express the task communication/synchronization issues. |
| | | | | **CO6:** Assess the method of designing an embedded system for any type of application. |
| 39 | IV/I | EC744PE | Artificial Intelligence | **CO1:** Describe knowledge of building blocks of AI in terms of intelligent agent. |
| | | | | **CO2:** identify intelligent algorithm for constraint satisfaction problems and also design intelligent system for game playing using propositional logic to prove theorems. |
| | | | | **CO3:** Analyze various real life problem domain using logic based techniques and knowledge based systems using first order logic. |
| | | | | **CO4:** Describe and understand different classical planning algorithm techniques to design AI and enveloping for real world problems. |
| | | | | **CO5:** Implement a Bayesian network that solves a simple version of problem and also to make probabilistic and qualitative inferences. |
| | | | | **CO6:** Describe the ability to apply AI techniques to solve problems of game playing and machine learning. |
| 40 | IV/I | EC702PC | VLSI Design | **CO1:** Acquire knowledge of the Fabrication of IC using various MOS circuits and can be able to compute electrical properties of MOS circuits. |
| | | | | **CO2:** Understand vlsi design flow and design rules for layout of IC. |
| | | | | **CO3:** Design various gates, adders, Multipliers and Memories using stick diagrams, layouts. |
| | | | | **CO4:** Design various forms of memories. |
| | | | | **CO5:** Demonstrate semiconductor IC design such as PLA's, PAL, FPGA, CPLDs. |
| | | | | **CO6:** Understand differential strategies for testing of IC's and CMOS. |
| 41 | IV/I | EC703PC | VLSI and E-CAD Lab | **CO1:** Design and implement all logic gates. |
| | | | | **CO2:** Design and implement 2 to 4 decoder and 8 to 3 encoder. |
| | | | | **CO3:** Design and implement 8 to 1 multiplex and 1 to 8 demultiplex. |
| | | | | **CO4:** Design and implement gray code converter, comparator, counters and adder. |
| | | | | **CO5:** Design and implement flipflops : SR,D,JK,T. |

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| | | | | **CO6:** Design Finite state machine. |
|---|---|---|---|---|
| 42 | IV/I | EC704PC | Microwave Engineering Lab | **CO1:** Evaluate the V-I characteristics of microwave sources like reflex klystron and Gunn diode. |
| | | | | **CO2:** Analyze and measure the waveguide parameters of passive microwave components and VSWR measurement using standard microwave bench. |
| | | | | **CO3:** Determine the scattering parameter of E-Plane, H-Plane, Magic Tee, circulator and characteristics of directional coupler. |
| | | | | **CO4:** Attain the knowledge of impedance measurement of matched load and attenuation measurement. |
| | | | | **CO5:** Discuss the VSWR measurement of open and short circuit load and frequency measurement. |
| | | | | **CO6:** Illustrate the antenna pattern measurement of various antennas like horn antenna, helical antenna. |
| 43 | IV/I | EC705PC | Industry Oriented Mini Project | **CO1:** Analyze new problems, identify and define the appropriate requirements for their solutions. |
| | | | | **CO2:** Understand team work to complete to reach the target. |
| | | | | **CO3:** Learn new technologies in the engineering fields. |
| 44 | IV/I | EC706PC | Seminar | **CO1:** Express public speaking during presentations. |
| | | | | **CO2:** Analyze new technologies in all engineering fields. |
| | | | | **CO3:** Effectively communicate by making an oral presentation. |
| 45 | IV/II | CS831OE | Linux Programming | **CO1:** Understand different LINUX utilities. |
| | | | | **CO2:** Understand files and directories in LINUX programming. |
| | | | | **CO3:** Analyze the concept of process in LINUX programming. |
| | | | | **CO4:** Analyze the concept of signals and related functions in LINUX programming. |
| | | | | **CO5:** Differentiate IPC between single computer system and multiple systems. |
| | | | | **CO6:** Understand the concept of shared memory in LINUX programming. |
| 46 | IV/II | EC853PE | Optical Communications | **CO1:** Classify the basic elements of optical fiber transmission link, fiber modes configurations and structures. |
| | | | | **CO2:** Analyze the different kind of losses, signal distortion, SM fibers. |
| | | | | **CO3:** Identify the various optical sources, materials and fiber splicing. |
| | | | | **CO4:** Illustrate the behaviour of optical transmitters & |

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| | | | | receivers for analog & digital mode of operation. |
| | | | | **CO5:** Compare the fiber optical receivers and noise performance in photo detector. |
| | | | | **CO6:** Design the link budget, WDM, Solutions and SONET/SDH network. |
| 47 | IV/II | EC863PE | Global Positioning System | **CO1:** Understand the overview of GPS. |
| | | | | **CO2:** Analyze different GPS signal characteristics. |
| | | | | **CO3:** Describe the architecture of GPS receivers. |
| | | | | **CO4:** Differentiate data errors and clock errors in GPS. |
| | | | | **CO5:** Analyze GEO system. |
| | | | | **CO6:** Describe the different applications of GPS. |
| 48 | IV/II | EC801PC | Major Project | **CO1:** Analyze new problems, identify and define the appropriate requirements for its solutions. |
| | | | | **CO2:** Understand of the impact of engineering solutions. |
| | | | | **CO3:** Understand team work to complete a common goal. |

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| Program : B.Tech-Computer Science and Engineering | Academic Year : 2019-20 | Semester : I & II |
|---|---|---|

| S.No | Year /Sem | Course Code | Course Name | Course Outcomes (After completion of the course student can able to : ) |
|---|---|---|---|---|
| 1 | II/I | CS301ES | Analog and Digital Electronics | **CO1:** Acquire knowledge of electrical characteristics of ideal and practical diodes under forward and reverse bias to analyze and design diode application circuits such as rectifiers. |
| | | | | **CO2:** Utilize operational principles of bipolar to derive appropriate small-signal models and use them for the analysis of basic circuits. |
| | | | | **CO3:** Understand the basic concept of number systems, Boolean algebra principles. |
| | | | | **CO4:** Understand minimization techniques for Boolean algebra. |
| | | | | **CO5:** Analyze Combination logic circuit such as multiplexers, adders, decoders. |
| | | | | **CO6:** Understand about synchronous and asynchronous sequential logic circuits. |
| 2 | II/I | CS302PC | Data Structures | **CO1:** Choose appropriate data structures to represent data items. |
| | | | | **CO2:** Analyze the time and space complexities of algorithms. |
| | | | | **CO3:** Design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs and B-trees. |
| | | | | **CO4:** Analyze and implement various kinds of searching and sorting methods. |
| | | | | **CO5:** Describe how arrays, linked structures, stacks, queues, trees, and graphs are represented in memory. |
| | | | | **CO6:** Design programs using c language. |
| 3 | II/I | MA303BS | Computer Oriented Statistical Methods | **CO1:** Describe the conditional probability and state the Baye's theorem and solve its applications. |
| | | | | **CO2:** Solve the problems on random variables and compare the difference between probability distributions. |
| | | | | **CO3:** Construct the area of normal curve and distinguish binominal, gamma and exponential distributions. |
| | | | | **CO4:** Formulate the sampling distribution of means and sampling distribution of variances. |

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| | | | | **CO5:** Classify the methods of estimations and errors of estimations. |
| | | | | **CO6:** Identify the test of hypothesis for single mean , proportion and difference between the means , proportions and learn the concept of Markov process and different types of states. |
| 4 | II/I | CS304PC | Computer Organization and Architecture | **CO1:** Describe basics of computer organization and register transfer languages and micro operations such as arithmetic, logic, shift micro operations. |
| | | | | **CO2:** Explain about computer instructions, computer registers and instruction cycle and interrupt cycle. |
| | | | | **CO3:** Describe the design of control unit with address sequencing and microprogramming concept and CPU with instruction formats, addressing modes and types of instructions such as data transfer, manipulation and program control. |
| | | | | **CO4:** Describe various data representations and explain how arithmetic operations are performed by computer. |
| | | | | **CO5:** Illustrate the concepts of Input-Output Organization and Memory Organization. |
| | | | | **CO6:** Describe the parallel processing and multiprocessors concept. |
| 5 | II/I | CS305PC | Object Oriented Programming using C++ | **CO1:** Develop application for a range of problem using object oriented programming concepts. |
| | | | | **CO2:** Construct programs on various methodology using class and object. |
| | | | | **CO3:** Illustrate the different forms of inheritance. |
| | | | | **CO4:** Construct and develop programs with reusability using polymorphism and virtual function. |
| | | | | **CO5:** Develop programs for file handling. |
| | | | | **CO6:** Identify and can handle exceptions in programming. |
| 6 | II/I | CS306ES | Analog & Digital Electronics Lab | **CO1:** Know the characteristics of various components. |
| | | | | **CO2:** Understand the utilization of components. |
| | | | | **CO3:** Design and analyze small signal amplifier circuits. |
| | | | | **CO4:** Postulates of Boolean algebra and to minimize combinational functions. |
| | | | | **CO5:** Design and analyze combinational and sequential circuits. |
| | | | | **CO6:** Known about the logic families and realization of logic gates. |
| | | | | **CO1:** Summarize different categories of data Structures. |
| | | | | **CO2:** Analyze the performance of an algorithm. |

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| 7 | II/I | CS307PC | Data Structures Lab | **CO3:** Develop C programs for computing control statements. |
| | | | | **CO4:** Understand C programs for computing arrays, functions, pointers, strings. |
| | | | | **CO5:** Understand stacks, queues and linked lists. |
| | | | | **CO6:** Ability to Implement searching and sorting algorithms. |
| 8 | II/I | CS308PC | IT Workshop Lab | **CO1:** Identify the parts of CPU and able to learn knowledge for computer assembling and disassembling. |
| | | | | **CO2:** Resolve the Software installation. |
| | | | | **CO3:** Ability to solve the trouble shooting problems. |
| | | | | **CO4:** Apply the techniques and netiquettes while using internet. |
| | | | | **CO5:** Model a web page by using HTML |
| | | | | **CO6:** Apply the tools for preparation of PPT, Documentation and budget sheet etc. |
| 9 | II/I | CS309PC | C++ Programming Lab | **CO1:** Identify and able to develop applications for a range of problems on operators such as scope resolution and new delete memory allocation. |
| | | | | **CO2:** Write a basic concepts on initializing and displaying contents of class member and structure of class. |
| | | | | **CO3:** Develop basic programs on inheritance. |
| | | | | **CO4:** Identify and able to do programs to use pointer for both base and derived classes and call the member function by using Virtual keyword. |
| | | | | **CO5:** Develop basic programs on console i/o operations. |
| | | | | **CO6:** Develop programs on arrays and inline functions. |
| 10 | II/I | MC309 | Gender Sensitization Lab | **CO1:** Develop sensibility with regard to issues of gender in contemporary India. |
| | | | | **CO2:** Provide a critical perspective on the socialization of men and women. |
| | | | | **CO3:** Determine information about some key biological aspects of genders. |
| | | | | **CO4:** Debate on the politics and economics of work. |
| | | | | **CO5:** Reflect critically on gender violence. |
| | | | | **CO6:** Expose more egalitarian interactions between men and women. |
| 11 | II/II | CS401PC | Discrete Mathematics | **CO1:** Understand and construct precise mathematical proofs. |
| | | | | **CO2:** Use logic and set theory to formulate precise statements. |
| | | | | **CO3:** Analyze and solve counting problems on finite |

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| | | | | and discrete structures. |
|---|---|---|---|---|
| | | | | **CO4:** Describe and manipulate sequences. |
| | | | | **CO5:** Apply graph theory in solving computing problems. |
| 12 | II/II | SM402MS | Business Economics & Financial Analysis | **CO1:** The students will understand various forms of Business and the impact of economic variables on the business. |
| | | | | **CO2:** Understand the significance of elasticity of demand and its forecasting, law of demand and its exceptions and supply analysis. |
| | | | | **CO3:** Understand production analysis function with different variables and cost analysis functions. |
| | | | | **CO4:** To adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts. |
| | | | | **CO5:** Understand the Ratio analysis to give an idea about financial forecasting, financial planning, controlling and decision making. |
| | | | | **CO6:** Understand the implementation of different structures of markets covering how price-output is determined under different market structures. |
| 13 | II/II | CS403PC | Operating Systems | **CO1:** Describe operating system goals and functions. |
| | | | | **CO2:** Get the knowledge of process, various CPU scheduling algorithms and synchronization. |
| | | | | **CO3:** Analyze the methods for handling deadlocks. |
| | | | | **CO4:** Understand the memory management and several page replacement algorithms. |
| | | | | **CO5:** Classify the storage management and file system implementation. |
| | | | | **CO6:** Express the various system protection methods. |
| 14 | II/II | CS404PC | Database Management Systems | **CO1:** Identify and understand the underlying concepts of database techniques and query a database using DML/DDL commands and able to design entity relationship diagrams. |
| | | | | **CO2:** Explain the concepts of relational data model, entity-relationship model and relational database design. |
| | | | | **CO3:** Apply relational algebra and calculus, understands the use of sql and learns sql syntax. |
| | | | | **CO4:** Develop and improve database design by normalization. |
| | | | | **CO5:** Define transaction and understand its properties. Learns techniques for controlling the consequences of concurrent data access. |
| | | | | **CO6:** Describe basic database storage structures and access techniques: file and page organisations, index |

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|  |  |  |  | methods including B tree and Hashing. |
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| 15 | II/II | CS405PC | Java Programming | **CO1:** Analyze Object Oriented Programming Concepts. |
|  |  |  |  | **CO2:** Develop the Abstract Classes and know the importance of the Inheritance, Encapsulation and Polymorphism. |
|  |  |  |  | **CO3:** Implementing interfaces and creating packages and create files and directories using g Java I/O Streams. |
|  |  |  |  | **CO4:** Get the importance of Exception handling and knowledge of multithreading and java collection classes concepts. |
|  |  |  |  | **CO5:** Design web applications by using applets and swings. |
|  |  |  |  | **CO6:** Recognize event handling concepts in java. |
| 16 | II/II | CS406PC | Operating Systems Lab | **CO1:** Develop programs on CPU scheduling algorithms. |
|  |  |  |  | **CO2:** Construct the programs on file organisation and file allocation techniques. |
|  |  |  |  | **CO3:** Solve deadlock avoidance and deadlock prevention using Bankers' algorithm. |
|  |  |  |  | **CO4:** Classify and construct programs on memory management techniques. |
|  |  |  |  | **CO5:** Develop application programs using system calls. |
|  |  |  |  | **CO6:** Describe inter processes communication between the processes using semaphores and named pipes. |
| 17 | II/II | CS406PC | Database Management Systems Lab | **CO1:** Identify and understand the underlying relational data model, entity-relationship model and relational database design. **CO2:** Develop and improve database design by normalization. |
|  |  |  |  | **CO3:** Identify and understand the underlying concepts of database techniques and query a database using DML/DDL commands. |
|  |  |  |  | **CO4:** Identify and understands the use of sql and learns sql syntax of set difference operators and joins. |
|  |  |  |  | **CO5:** Write basic database query using Aggregate operators. |
|  |  |  |  | **CO6:** Write basic database on Triggers and procedures. |
| 18 | II/II | CS408PC | Java Programming Lab | **CO1:** Construct the programs for Abstract classes, Inheritance and Interface. |
|  |  |  |  | **CO2:** Write the program for Multithreading and Files operations. |
|  |  |  |  | **CO3:** Prepare the programs for applets. |
|  |  |  |  | **CO4:** Develop the basic applications by using Swing components. |

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| | | | | **CO5:** Construct the programs for collection Framework. |
| | | | | **CO6:** Recognize the concept of Event Listeners and implements the Event components. |
| 19 | II/II | MC409 | Constitution of India | **CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism. |
| | | | | **CO2:** Describe fundamental rights, fundamental duties and its legal status. |
| | | | | **CO3:** Describe The constitution powers and status of the President of India. |
| | | | | **CO4:** Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency. |
| | | | | **CO5:** Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19. |
| | | | | **CO6:** Describe the Scope of the Right to Life and Personal Liberty under Article 21. |
| 20 | III/I | CS501PC | Design and Analysis of Algorithms | **CO1:** Analyze the Performance of an Algorithm. |
| | | | | **CO2:** Solve the problems using divide and conquer approach. |
| | | | | **CO3**: Develop constraint satisfied solutions using backtracking. |
| | | | | **CO4:** Evaluate feasible solutions using Greedy method. |
| | | | | **CO5:** Developing solutions to problems using dynamic programming. |
| | | | | **CO6:** Define np hard and no complete problems. |
| 21 | III/I | CS502PC | Data Communication and Computer Networks | **CO1:** Analyze the features and services of various protocol layers in network. |
| | | | | **CO2:** Apply the error free techniques to send data from source to destination. |
| | | | | **CO3:** Making and analyze the skills of subneting and routing mechanisms. |
| | | | | **CO4:** Identify the processes to processes mechanisms. |
| | | | | **CO5:** Design the congestion free network and maintain QoS. |
| | | | | **CO6:** Analyze how an e-mail will be processing and know the worldwide web concepts. |
| 22 | III/I | CS503PC | Software Engineering | **CO1:** Analyze various data base techniques for data warehouse and able to perform OLAP Operations. |
| | | | | **CO2:** Ability to perform the Pre-processing of data and apply mining techniques on data. |
| | | | | **CO3:** Understand frequent set and apply association Rule on Data Set. |
| | | | | **CO4:** Evaluate the data mining ask like Classification, Regression Clustering on large data set. |
| | | | | **CO5:** Ability to solve real world Problems in business |

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| | | | | and scientific information using data mining. |
| | | | | **CO6:** Ability to understand clustering Concepts in the real world and apply Various clustering techniques. |
| 23 | III/I | SM504MS | Fundamentals of Management | **CO1:** Write the working principle of fundamentals of management basics. |
| | | | | **CO2:** Setup Planning Process and develops the Decision Making and Problem Solving skills. |
| | | | | **CO3:** Explains Organization principles, Design, Structures and basic fundamentals of Organization. |
| | | | | **CO4:** Analyze Leadership styles and handling employee and customer complaints, and motivational theories. |
| | | | | **CO5:** What is controlling, types, strategies, steps characteristics and process of controlling. |
| | | | | **CO6:** What is HRM and Human Resource Planning, Recruitment and Selection, & Training and development. |
| 24 | III/I | EM511OE | Scripting Languages | **CO1:** State the importance of scripting languages and working principle of linux operating system. |
| | | | | **CO2:** Illustrate the principles of linux networking in Linux RHEL6/7/ubuntu operating systems. |
| | | | | **CO3:** Discover the importance of scripting languages with the help of the perl scripting language. |
| | | | | **CO4:** Design application using TCL/TK scripts for automation of scripts in Linux. |
| | | | | **CO5:** Develop the web applications master and understanding of python especially the object oriented concepts in python. |
| | | | | **CO6:** Prepare and run scripts at server side using PERL/TCI/Python in Linux environment. |
| 25 | III/I | CS505PC | Design and Analysis of Algorithms Lab | **CO1:** Solve the Problems by using the Technique of Divide and Conquer. |
| | | | | **CO2:** Write the programs for Graph Searching Methods. |
| | | | | **CO3:** Illustrate the Problems by using the Technique of Backtracking. |
| | | | | **CO4:** Analyze the cost of minimum spanning tree. |
| | | | | **CO5:** Develop the programs using Greedy method. |
| | | | | **CO6:** Solve the Problems by using the Technique of Dynamic programming. |
| 26 | III/I | CS506PC | Computer Networks Lab | **CO1:** Analyze the data link layer protocols by Analyse error detection and error correction codes. |
| | | | | **CO2:** Design mathematical foundations to solve computational problems in computer networking. |
| | | | | **CO3:** Analyze the performance of various communication protocols. |

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| | | | | **CO4:** Compare routing algorithms. |
| | | | | **CO5:** Analyse and Implement routing and congestion issues in network design. |
| | | | | **CO6:** Compare and implement various kinds of encryption and decryption techniques. |
| 27 | III/I | CS507PC | Software Engineering Lab | **CO1:** Understand the software engineering methodologies involved in the phases for project development. |
| | | | | **CO2:** Gain knowledge about open source tools used for implementing software engineering methods. |
| | | | | **CO3:** Exercise developing product-start-ups implementing software engineering methods. |
| | | | | **CO4:** Study the problem and identify the project scope, Objectives and Infrastructure. |
| | | | | **CO5:** Identify the modules of the project and differentiate the functional and non-functional requirements. |
| | | | | **CO6:** Create prototypes for the projects. |
| 28 | III/I | MC500HS | Professional Ethics | **CO1:** Understand importance of values and ethics in their personal lives & professional careers. |
| | | | | **CO2:** Describe basic theories like virtue theory, rights theory and casuist theory. |
| | | | | **CO3:** Understand professional practices in engineering. |
| | | | | **CO4:** Describe central responsibilities of engineers. |
| | | | | **CO5:** Understand work place rights and responsibilities. |
| | | | | **CO6:** Analyze various global issues in professional ethics. |
| 29 | III/II | CS601PC | Compiler Design | **CO1:** Describe structure of a compiler and basics of programming languages. |
| | | | | **CO2:** Design Lexical analyzer generator by using regular expressions and finite automata. |
| | | | | **CO3:** Design and implement LL and LR parsers and use YACC Tool for developing a parser. |
| | | | | **CO4:** Explain the applications of SDT and different types of intermediate-code generation. |
| | | | | **CO5:** Identify the storage organization used to support the run-time environment of a program and effectively generate machine codes. |
| | | | | **CO6:** Apply the several algorithms for collecting and optimizing the information using data flow analysis. |
| | | | | **CO1:** Construct the web applications using HTML language. |
| | | | | **CO2:** Explain server side scripting with PHP language. |
| | | | | **CO3:** Identify well formed/valid XML documents. |

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| 30 | III/II | CS602PC | Web Technologies | **CO4:** Develop server side applications using servlets. |
| | | | | **CO5:** Get the knowledge on Java Server Pages. |
| | | | | **CO6:** Evaluate the validation of forms using Java Script and Explain AJAX. |
| 31 | III/II | CS603PC | Cryptography and Network Security | **CO1:** Understand various attacks on the network and understanding the need for security. |
| | | | | **CO2:** Apply various classical encryption techniques on messages and analyze various security services and mechanisms. |
| | | | | **CO3:** Compare and contrast symmetric and asymmetric key cryptographic systems. |
| | | | | **CO4:** Describe the cryptographic hash functions, message authentication codes and various key management and distribution techniques. |
| | | | | **CO5:** Explain different protocols like SSL, TLS, HTTPS, SSH and various wireless network standards. |
| | | | | **CO6:** Analyze how PGP and S/MIME is used to protect messages transmitted through E- Mail and explains IPSEC. |
| 32 | III/II | CS611PE | Mobile Computing | **CO1:** Write the working principle of mobile computing basics and GSM architecture. |
| | | | | **CO2:** Describe the principle of operation of MAC and Mobile IP. |
| | | | | **CO3:** Explain the transport layer protocols and query processing in mobile database. |
| | | | | **CO4:** Analyze the software's and protocols in data dissemination and synchronization. |
| | | | | **CO5:** Setup new ad hoc network applications and apply algorithms &amp; protocols. |
| | | | | **CO6:** Write about various protocols and platforms for mobile computing. |
| 33 | III/II | CS604PC | Cryptography & Network Security Lab | **CO1:** Develop and execute basic encryption and decryption programs using XOR, OR and AND operator. |
| | | | | **CO2:** Implement substitution technique programs in java. |
| | | | | **CO3:** Understand mechanism involved in symmetric key cryptography and implement DES AES blowfish algorithm programs in java. |
| | | | | **CO4:** Design and develop stream cipher technique for RC4 algorithm programs in java. |
| | | | | **CO5:** Develop and execute programs of asymmetric key cryptography. |
| | | | | **CO6:** Implement hash functions like MD4 and SHA-1 |

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| | | | | |
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| | | | | in java. |
| 34 | III/II | CS605PC | Web Technologies Lab | **CO1:** Use XAMP Stack for web applications. |
| | | | | **CO2:** Creating static client application by using HTML. |
| | | | | **CO3:** Creating server side applications using PHP. |
| | | | | **CO4:** Parsing the data by using XML'SC. |
| | | | | **CO5:** Usage of apache tomcat server for deploying JSP and servlets. |
| | | | | **CO6:** Learn client side script languages like java script. |
| 35 | III/II | EN606HS | Advanced English Communication Skills Lab | **CO1:** Speak effectively. |
| | | | | **CO2:** Express and communicate fluently and appropriately in social professional contexts. |
| | | | | **CO3:** Develop the comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects. |
| | | | | **CO4:** The awareness of English lab enriches their communication and soft skills contributing to their overall development and success. |
| | | | | **CO5:** Draft various letters and reports for all official purpose. |
| | | | | **CO6:** Take part in social and professional communication. |
| 36 | IV/I | CS701PC | Data Mining | **CO1:** Analyze various data base techniques for data warehouse and able to perform OLAP Operations. |
| | | | | **CO2:** Ability to perform the Pre-processing of data and apply mining techniques on data. |
| | | | | **CO3:** Understand frequent set and apply association Rule on Data Set. |
| | | | | **CO4:** Evaluate the data mining ask like Classification, Regression Clustering on large data set. |
| | | | | **CO5:** Ability to solve real world Problems in business and scientific information using data mining. |
| | | | | **CO6:** Ability to understand clustering Concepts in the real world and apply Various clustering techniques. |
| 37 | IV/I | CS702PC | Principles of Programming Languages | **CO1:** Express the important features of the Programming Languages. |
| | | | | **CO2:** Develop the skills for expressing syntax and semantics in formal notation. |
| | | | | **CO3:** Compare different Programming Domains. |
| | | | | **CO4:** Choose Specific Programming Language for the Development of Specific Applications. |
| | | | | **CO5:** Analyze the Importance of Implementation Process. |
| | | | | **CO6:** Apply a suitable programming paradigm for a given computing application. |

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| 38 | IV/I | CS721PE | Python Programming | **CO1:** Examine python syntax and semantics and be fluent in the use of python flow control and functions. |
| | | | | **CO2:** Demonstrate proficiency in handling strings and file systems. |
| | | | | **CO3:** Create run and manipulate python programs using core data structures like lists, dictionaries and use regular expressions. |
| | | | | **CO4:** Interpret the concepts of object oriented programming as used in python. |
| | | | | **CO5:** Recognize exemplary applications related to network programming and web services. |
| | | | | **CO6:** Summarize the applications related to databases in python. |
| 39 | IV/I | CS732PE | Distributed Systems | **CO1:** Describe the knowledge of the basic elements and concepts related to distributed system technologies. |
| | | | | **CO2:** Understand about distributed algorithms for locking, synchronization and concurrency, scheduling. |
| | | | | **CO3:** Discover knowledge of details the main underlying components of distributed systems (such as RPC, file systems). |
| | | | | **CO4:** Understand the properties of file which are used in networks. (Knowledge). |
| | | | | **CO5** : Apply important methods in distributed systems to support scalability and fault tolerance |
| | | | | **CO6:** Illustrate the experience in building large-scale distributed applications. |
| 40 | IV/I | CS742PE | Cloud Computing | **CO1:** Distinguish different types of Distributed System models and enabling technologies. |
| | | | | **CO2:** Ability to perform four cloud deployment models. |
| | | | | **CO3:** Ability to manage cloud applications, migrate applications to cloud. |
| | | | | **CO4:** Explore the Iaas service providers, Paas, Saas service providers. |
| | | | | **CO5:** Originates and manage applications on Amazon Web Services cloud. |
| | | | | **CO6:** Solve with different workflow engines like Aneka, Azure and IBM smart cloud, SAP Labs. |
| 41 | IV/I | CS703PC | Data Mining Lab | **CO1:** Add mining algorithms as a component to the exiting tools. |
| | | | | **CO2:** Apply mining techniques for realistic data. |
| | | | | **CO3:** Perform the Pre-processing of data and apply mining techniques on data. |
| | | | | **CO4:** Understand frequent set and apply association Rule on Data Set. |

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| | | | | **CO5:** Evaluate the data mining ask like Classification, Regression Clustering on large data set. |
| | | | | **CO6:** Solve real world Problems in business and scientific information using data mining. |
| 42 | IV/I | CS751PC | Python Programming Lab | **CO1:** Student should be able to understand the basic concepts scripting and the Contributions of scripting language. |
| | | | | **CO2:** Ability to explore python especially the object oriented concepts, and the built in Objects of Python. |
| | | | | **CO3:** Understand the concept of modules in python script. |
| | | | | **CO4:** Handling the files using python. |
| | | | | **CO5:** Ability to create practical and contemporary applications such as Web applications. |
| | | | | **CO6:** Understand the applications based on Database concept. |
| 43 | IV/I | CS705PC | Industry Oriented Mini Project | **CO1:** Apply fundamental concepts and methods of their engineering field. |
| | | | | **CO2:** Use effectively oral, written and visual communication. |
| | | | | **CO3:** Understand working with teams. |
| 44 | IV/I | CS706PC | Seminar | **CO1:** Understand advanced research methodologies in the field of computer science engineering. |
| | | | | **CO2:** Demonstrate their understanding of discussions and spark further discussion. |
| | | | | **CO3:** Identify understand and discuss current issues in the engineering field. |
| 45 | IV/II | CE511OE | Disaster Management | **CO1:** Identify the types of disaster and vulnerabilities. |
| | | | | **CO2:** Describe the basic concepts of the emergency management cycle (mitigation, preparedness, response, and recovery). |
| | | | | **CO3:** Describe the understanding in capacity building concepts and planning of disaster managements. |
| | | | | **CO4:** Describe the coping with disaster and strategies. |
| | | | | **CO5:** Explain the roles of government agencies in emergency management. |
| | | | | **CO6:** Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. |
| 46 | IV/II | CS852PE | Real Time Systems | **CO1:** Identify and use Linux utilities to create and manage simple file processing operations. |
| | | | | **CO2:** Analyze the services and scheduling in data Concurrency and synchronization. |
| | | | | **CO3:** Design and implement Building blocks using |

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| | | | | components and named Pipes. |
| | | | | **CO4:** Write the brief history of basic I/O concepts and its subsystems technique. |
| | | | | **CO5:** Apply common applications to incremental development. |
| | | | | **CO6:** Evaluate software source code using different kind of Embedded Linux and Tiny OS. |
| 47 | IV/II | CS862PE | Web Services and Service Oriented Architecture | **CO1:** Interpret the evolution of web services and their challenges in distributed computing. |
| | | | | **CO2:** Develop emerging and proposed standards for the main components of Web services architecture. |
| | | | | **CO3:** Create the role of security-as-a-service for signing xml documents. |
| | | | | **CO4:** Describe the core fundamentals of soap and their message exchange models related to security. |
| | | | | **CO5** : Apply the publish, find, bind architecture for Web services and to use the corresponding standards, In particular, Web Services Description Language (WSDL), Simple Object Access Protocol (SOAP),and Universal Description, Discovery and Integration (UDDI). |
| | | | | **CO6:** Discover new technologies in Web services that provide security. |
| 48 | IV-II | CS801PC | Major Project | **CO1:** Analyze engineering problems, identify an appropriate solution, implement the methodology and propose a meaningful solution. |
| | | | | **CO2:** Develop confidence for self-education and ability for lifelong learning. |
| | | | | **CO3:** Learn to work as a team and to focus on getting a working project done within a stipulated period of time. |

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| Program : B.Tech-Civil Engineering | Academic Year : 2019-20 | Semester : I & II |
|---|---|---|

| S.No | Year /Sem | Course Code | Course Name | Course Outcomes (After completion of the course student can able to : ) |
|---|---|---|---|---|
| 1 | II/I | CE301PC | Surveying and Geomatics | **CO1:** Define the principles of surveying and its phases and measure the directions by using chain and prismatic compass. |
| | | | | **CO2:** Analyzing the levels of ground and computing the area and volumes. |
| | | | | **CO3:** Explain the theodalite surveying and analyse the methods of traversing. |
| | | | | **CO4:** Explain the principles of tachometry surveying and differentiate types of curves. |
| | | | | **CO5:** Explain the total station and global positioning system. |
| | | | | **CO6:** Define contouring and study its characteristics and its uses. |
| 2 | II/I | CE302PC | Engineering Geology | **CO1:** Write about importance of geology from civil engineering point of view. |
| | | | | **CO2:** Distinguish weathered rocks from fresh rocks. |
| | | | | **CO3:** Identify geological structures and processes for rock mass quality. |
| | | | | **CO4:** Identify subsurface information and groundwater potential sites through geophysical Investigations. |
| | | | | **CO5:** Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels. |
| | | | | **CO6:** Develop understanding on impact of geological features on civil engineering projects. |
| 3 | II/I | CE303PC | Strength of Materials – I | **CO1:** Describe the basic concept of stress and strain. |
| | | | | **CO2:** Draw SFD and BMD for different beams subjected to different loads. |
| | | | | **CO3:** Formulate flexural stresses, shear stresses and its distribution for various sections. |
| | | | | **CO4:** Assess slope and deflection of beams subjected to loads. |
| | | | | **CO5:** Apply the principal stresses and strains in structural members. |
| | | | | **CO6:** Analyze of the principles and basics of strength of materials in the civil engineering structures. |
| | | | | **CO1:** Describe the use of Baye's theorem techniques when solving the problems. |

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| 4 | II/I | MA304BS | Probability and Statistics | **CO2:** Discuss the properties of Discrete and continuous probability distributions. |
| | | | | **CO3:** Solve the problems on Binomial and Geometric distributions and also normal distribution. |
| | | | | **CO4:** Determine the testing of Hypothesis by using Type- I and Type- II errors. |
| | | | | **CO5:** Identify the different types of hypothesis. |
| | | | | **CO6:** Create the new problems on correlations and Regressions. |
| 5 | II/I | CE305PC | Fluid Mechanics | **CO1:** Explain the properties of the fluids. |
| | | | | **CO2:** Describe and classification of the flows. |
| | | | | **CO3:** Identify the discharge through the various discharge meters. |
| | | | | **CO4:** Explain the How to move the fluid various flows and finding the discharge. |
| | | | | **CO5:** Differentiate the fluid flow in layer by layer. |
| 6 | II/I | CE306PC | Surveying Lab | **CO1:** Prepare the surveying of an area by chain, and compass survey (closed traverse) & plotting. |
| | | | | **CO2:** Solve and Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level. |
| | | | | **CO3:** Recognize Trigonometric leveling using theodalite. |
| | | | | **CO4:** Apply the principle of surveying for civil Engineering Applications. |
| | | | | **CO5:** Draw determination of height, remote elevation, and distance between inaccessible points using total station. |
| 7 | II/I | CE307PC | Strength of Materials Lab | **CO1:** Identify modulus of rigidity using spring test. |
| | | | | **CO2:** Examine the properties of steel under different loads like tension, compression etc. |
| | | | | **CO3:** Distinguish between simply supported beams and cantilever beams under shear stresses. |
| | | | | **CO4:** Assess the deflection of beams under given loads. |
| | | | | **CO5:** 5 Investigate the hardness of materials like stainless steel, aluminium, brass etc. |
| | | | | **CO6:** Judge the resistance of mild steel under impact loads. |
| | | | | **CO1:** Study of physical properties and identification of minerals referred under theory. |
| | | | | **CO2:** Megascopic and microscopic identification of |

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| | | | | minerals. |
|---|---|---|---|---|
| 8 | II/I | CE308PC | Engineering Geology Lab | **CO3:** Interpretation and drawing of sections for geological maps showing titled beds, faults, Uniformities, etc. |
| | | | | **CO4:** Solve simple structural geology problems. |
| 9 | II/I | MC309 | Constitution of India | **CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism. |
| | | | | **CO2:** Describe fundamental rights, fundamental duties and its legal status. |
| | | | | **CO3:** Describe The constitution powers and status of the President of India. |
| | | | | **CO4:** Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency. |
| | | | | **CO5:** Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19. |
| | | | | **CO6:** Describe the Scope of the Right to Life and Personal Liberty under Article 21. |
| 10 | II/II | EE401ES | Basic Electrical and Electronics Engineering | **CO1:** Understand the basic electrical circuit elements and different ac circuits. |
| | | | | **CO2:** Understand the installation of different electrical equipments. |
| | | | | **CO3:** Describe the working of different transformers. |
| | | | | **CO4:** Understand the principles of DC motors. |
| | | | | **CO5:** Analyze the different diodes, rectifiers and filters. |
| | | | | **CO6:** Understand the principle, applications of BJT and FET. |
| 11 | II/II | CE402ES | Basic Mechanical Engineering for Civil Engineers | **CO1:** Understand the Mechanical equipment for the usage cams, riveted joint and discuss the materials. |
| | | | | **CO2:** Analyze the working of power transmission elements like gears, belt drive, chain drive & material handling equipment. |
| | | | | **CO3:** Illustrate the working features of IC engines, the basic principles of refrigeration and laws of heat transfer. |
| | | | | **CO4:** Describe different types of welding process for joining & classify the process of casting. |
| | | | | **CO5:** Differentiate understand working of lathe, drilling, milling & grinding machines. |
| 12 | II/II | CE403PC | Building Materials, Construction and Planning | **CO1:** Identification of suitable construction materials building stones properties and bricks wood structures. |
| | | | | **CO2:** Apply the manufacture type of cements, cement hydration properties and field test and uses of admixtures minerals. |
| | | | | **CO3:** Identify the components of building and differentiate various types of building materials depending on its function. |

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| | | | | **CO4:** Prepare of various construction related activities like stone masonry, plastering, painting, Form work. |
| | | | | **CO5:** Classify the principles of building planning and building by laws. |
| | | | | **CO6:** Illustrate the various precautionary measures pertaining to construction materials. |
| 13 | II/II | CE404PC | Strength of Materials - II | **CO1:** Illustrate the various precautionary measures pertaining to construction materials. |
| | | | | **CO2:** Asses to understand the behaviour of columns and struts under axial loading. |
| | | | | **CO3:** Evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading. |
| | | | | **CO4:** Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses. |
| | | | | **CO5:** Understand and evaluate the shear center and unsymmetrical bending. |
| | | | | **CO6:** Appraise strengths of different materials. |
| 14 | II/II | CE405PC | Hydraulics and Hydraulic Machinery | **CO1:** Explain the properties of the fluids. |
| | | | | **CO2:** Describe and classification of the flows. |
| | | | | **CO3:** Identify the discharge through the various discharge meters. |
| | | | | **CO4:** Explain the How to move the fluid various flows and finding the discharge. |
| | | | | **CO5:** Differentiate the fluid flow in layer by layer. |
| | | | | **CO6:** Discuss the classification of fluid and its properties find out the discharge & amp various conditions flows in fluids. |
| 15 | II/II | CE406PC | Structural Analysis - I | **CO1:** Analyze perfect, imperfect and redundant frames. |
| | | | | **CO2:** Compare different frames. |
| | | | | **CO3:** Apply classical methods for one dimensional and two dimensional problems. |
| | | | | **CO4:** Analyze indeterminate structures. |
| | | | | **CO5:** Apply slope-deflection and moment distribution method for continuous beams with and without settlement of supports. |
| | | | | **CO6:** Analyze structures for gravity loads, moving loads and lateral loads. |
| 16 | II/II | CE407PC | Computer Aided Civil Engineering Drawing | **CO1:** Summarize the AutoCAD commands for drawing 2D & 3D building drawings required for different civil engineering applications. |
| | | | | **CO2:** Plan and draw Civil Engineering Buildings as per aspect and orientation. |

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| | | | | **CO3:** Categorize drawings as per user requirements and preparation of technical report. |
| | | | | **CO4:** Draw a plan of a Building and with dimensioning the plan. |
| | | | | **CO5:** Define the tools like Draw tools, Modify tools which are used in AutoCAD. |
| | | | | **CO6:** Develop sections and elevations for given Single storied buildings, multi storied buildings. |
| 17 | II/II | CE409PC | Hydraulics And Hydraulic Machinery Lab | **CO1:** Understand the properties of the fluids. |
| | | | | **CO2:** Describe and classification of the flows. |
| | | | | **CO3:** Identify the discharge through the various discharge meters. |
| | | | | **CO4:** Understand the How to move the fluid various flows and finding the discharge. |
| | | | | **CO5:** Differentiate the fluid flow in layer by layer. |
| 18 | II/II | EE409ES | Basic Electrical & Electronics Engineering Lab | **CO1:** Understand behavior of different electrical components. |
| | | | | **CO2:** Formulate and solve AC,DC circuits. |
| | | | | **CO3:** Realize the requirement of transformers. |
| | | | | **CO4:** Explain the properties of electromagnetic circuit. |
| | | | | **CO5:** Understand the principles of various electrical circuits. |
| | | | | **CO6:** Understand working principles of various analogue electrical measuring instruments. |
| 19 | II/II | MC409 | Gender Sensitization Lab | **CO1:** Develop sensibility with regard to issues of gender in contemporary India. |
| | | | | **CO2:** Provide a critical perspective on the socialization of men and women. |
| | | | | **CO3:** Determine information about some key biological aspects of genders. |
| | | | | **CO4:** Debate on the politics and economics of work. |
| | | | | **CO5:** Reflect critically on gender violence. |
| | | | | **CO6:** Expose more egalitarian interactions between men and women. |
| 20 | III/I | CE501PC | Concrete Technology | **CO1:** Write about chemical composition and the process of hydration of cement. |
| | | | | **CO2**: Write about alkali aggregate reaction and explain factors affecting it. |
| | | | | **CO3**: Write about concept of workability and workability tests. |
| | | | | **CO4:** Analyzing the strength of hardened concrete by Non Destructive Test methods. |
| | | | | **CO5:** Calculation of mix proportion by IS method. |
| | | | | **CO6:** Discuss about the special concretes. |

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| 21 | III/I | CE502PC | Design of Reinforced Concrete Structures | **CO1:** Analyze of the Reinforced concrete beams using limit state design. |
| | | | | **CO2:** Define Reinforced concrete structural elements. |
| | | | | **CO3:** Design of the reinforced concrete slabs. |
| | | | | **CO4:** Design the different types Footings. |
| | | | | **CO5:** Explain about the structures for serviceability. |
| | | | | **CO6:** Design of the staircases. |
| 22 | III/I | SM504MS | Fundamentals of Management | **CO1:** Write the working principle of fundamentals of management basics. |
| | | | | **CO2:** Setup Planning Process and develops the Decision Making and Problem Solving skills. |
| | | | | **CO3:** Explains Organization principles, Design, Structures and basic fundamentals of Organisation. |
| | | | | **CO4:** Analyze Leadership styles and handling employee and customer complaints, and motivational theories. |
| | | | | **CO5:** What is controlling, types, strategies, steps characteristics and process of controlling. |
| | | | | **CO6:** What is HRM and Human Resource Planning, Recruitment and Selection, & Training and Development. |
| 23 | III/I | CE503PC | Water Resources Engineering | **CO1**: Understand various techniques and parameters of irrigation. |
| | | | | **CO2:** Classify the canal and tube well irrigation and applicability of various theories on it. |
| | | | | **CO3:** Analyze the design of lined canal and its problems. |
| | | | | **CO4:** Illustrate various irrigation projects. |
| | | | | **CO5:** Analyses the design and classification of river training works according to ISI recommendations. |
| 24 | III/I | ME514OE | Fundamentals of Mechanical Engineering | **CO1:** Recognize the importance of fundamental concepts of mechanical in civil engineering systems. |
| | | | | **CO2**: Understand and appreciate significance of mechanical engineering in different fields of engineering. |
| | | | | **CO3:** Apply fundamental principles of mechanical engineering in various civil systems. |
| | | | | **CO4:** Solve the different mechanical problems. |
| | | | | **CO5:** Classify the mechanical systems based on the different applications of engineering field. |
| 25 | III/I | CE505PC | Concrete Technology Lab | **CO1:** Define the properties of concrete material. |
| | | | | **CO2:** Describe the behavior of concrete & properties of fresh concrete. |
| | | | | **CO3:** Describe the behavior of concrete & properties of hardened concrete. |
| | | | | **CO4:** Recognize the Workability of freshly mix concrete. |
| | | | | **CO5:** Appraise the difference between Self Compacting Concrete and normal. |

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| | | | | **CO6:** Examine the Non Destructive test's on concrete. |
| 26 | III/I | CE506PC | Geographical Information Systems Lab | **CO1:** Develop the points with reference from topographic maps. |
| | | | | **CO2:** Identify the locations of ground control points. |
| | | | | **CO3:** Create spatial data from tabular information that includes a spatial reference. |
| | | | | **CO4:** Select the features by using Software. |
| | | | | **CO5:** Modify the existing data sources for use in a project. |
| | | | | **CO6:** Solve the field problems of road/water network by mapping. |
| 27 | III/I | CE507PC | Hydraulics and Hydraulic Machinery Lab | **CO1:** Understand the properties of the fluids. |
| | | | | **CO2:** Describe and classification of the flows. |
| | | | | **CO3:** Identify the discharge through the various discharge meters. |
| | | | | **CO4:** Understand the How to move the fluid various flows and finding the discharge. |
| | | | | **CO5:** Differentiate the fluid flow in layer by layer. |
| 28 | III/I | MC500HS | Professional Ethics | **CO1:** Understand importance of values and ethics in their personal lives & professional careers. |
| | | | | **CO2:** Describe basic theories like virtue theory, rights theory, casuist theory. |
| | | | | **CO3:** Understand professional practices in engineering field. |
| | | | | **CO4:** Describe central responsibilities of engineers. |
| | | | | **CO5:** Understand work place rights and responsibilities. |
| | | | | **CO6:** Analyze various global issues in professional ethics. |
| 29 | III/II | CE601PC | Design of steel structures | **CO1:** Understand the behaviour and properties of structural steel members to resist bending, shear, tension and compression and apply the relevant codes of practice. |
| | | | | **CO2:** Able to analyses the behaviour of structural steel members and undertake design at both serviceability and ultimate limit states. |
| | | | | **CO3:** Able to design bolted and welded connections for tension and compression members and beams. |
| | | | | **CO4:** Able to design the various steel structures. |
| 30 | III/II | CE602PC | Environmental Engineering | **CO1:** Analyze the characteristics of water source and water supply scheme. |
| | | | | **CO2:** Define theory and working principles of water treatment units. |
| | | | | **CO3:** Classify procedures of distribution system and wastewater treatment units. |
| | | | | **CO4:** Examine the characteristics of sewage and the |

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| | | | | |
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| | | | | disposal of sewage. |
| | | | | **CO5:** Design components of wastewater treatment plants and oxidation pond. |
| | | | | **CO6:** Assess the quantity of drinking water and domestic waste water generated. |
| 31 | III/II | CE613PE | Ground water Development and Management | **CO1:** Evaluate groundwater resources using geophysical methods. |
| | | | | **CO2:** Evaluate groundwater resources using geophysical methods. |
| | | | | **CO3:** Model regional ground water flow. |
| | | | | **CO4:** Different types and procedures for analysis of geophysical studies well hydraulics. |
| | | | | **CO5:** Design water wells. |
| | | | | **CO6**: Understand ground water occurrence, ground water movement well constructional etc. |
| 32 | III/II | CE604PC | Soil Mechanics | **CO1**: Distinguish the properties and classification of the Soils. |
| | | | | **CO2**: Describe the Factors affecting permeability of the Soils. |
| | | | | **CO3**: Develop the Stress Distribution of the compaction effects on soil properties. |
| | | | | **CO4**: Develop the Stress Distribution of the Consolidation effects on soil properties. |
| | | | | **CO5**: Classify the Shear Strength Of Soils Importance of parameters. |
| | | | | **CO6**: Describe the classification of soil and its properties find out the permeability &amp; various conditions flows in soil. |
| 33 | III/II | ME623OE | Fabrication process | **CO1**: Classify the process of casting and different allowances occurred during the casting and also different material selection for the patterns. |
| | | | | **CO2**: Design core, core print and gating system in metal casting system. |
| | | | | **CO3**: Describe different types of welding process for joining of similar and dis-similar metals |
| | | | | **CO4:** Analyze the welding defects by different processes. |
| | | | | **CO5:** Classify the different types of joining process like hot working, cold working blanking and piercing-Bending and forming wire drawing and tub drawing. |
| | | | | **CO6**: Apply the different types extrusion process and forging process. |
| | | | | **CO1**: Examine the use of differential free swelling index. |
| | | | | **CO2**: Classify and evaluate the behavior of the soils subjected to various loads. |

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| | | | | |
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| 34 | III/II | CE604PC | Soil Mechanics Lab | **CO3**: Assess the permeability of soil by constant and variable head method. |
| | | | | **CO4**: Summarize the field density of the soil sample by core cutter and sand replacement method. |
| | | | | **CO5**: Analyze the specific gravity of the soil by the grain size distribution of sieve analysis. |
| 35 | III/II | CE605PC | Computer Aided Drafting-II Lab | **CO1:** Draw of Steel bolted and welded connections. |
| | | | | **CO2**: Draw the detailing of reinforcement in Cantilever, Simply supported and Continuous Beams (Both Singly & Doubly Reinforced Beams). |
| | | | | **CO3**: Draw steel roof truss, steel plate girder. |
| | | | | **CO4**: Design and detailing of reinforcement in RC one-way, two-way slabs and dog-legged staircases. |
| | | | | **CO5**: Design detailing of reinforcement in canopy & columns both uni axial & biaxial. |
| 36 | III/II | EN606HS | Advanced English Communication Skills Lab | **CO1:** Speak effectively. |
| | | | | **CO2:** Express and communicate fluently and appropriately in social professional contexts. |
| | | | | **CO3:** Develop the comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects. |
| | | | | **CO4:** Enrich their communication and soft skills contributing to their overall development and success. |
| | | | | **CO5:** Draft various letters and reports for all official purpose. |
| | | | | **CO6:** Take part in social and professional communication. |
| 37 | IV/I | CE701PC | Transportation Engineering | **CO1:** Highway Development in India. |
| | | | | **CO2:** Importance of Geometric Design. |
| | | | | **CO3:** Introduction to traffic and Design of Traffic Signals. |
| | | | | **CO4:** Explain the Intersection Design and Types of Intersections. |
| | | | | **CO5:** Explain the Design of Pavements. |
| | | | | **CO6:** Explain the highway engineering and design of pavements and to analysis the traffic signals. |
| 38 | IV/I | CE702PC | Estimation Quantity Surveying and Valuation | **CO1:** Assess of quantities for a Residential Building & Abstract cost Estimate. |
| | | | | **CO2:** Design and Prepare Bar bending schedule for reinforcement works. |
| | | | | **CO3:** Estimate the calculation of earth work quantity for roads and canals. |
| | | | | **CO4:** Analyze the rates of work quantities and labour. |
| | | | | **CO5:** Compare different types of contracts, tender document |

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| | | | | for building & valuation. |
|---|---|---|---|---|
| | | | | **CO6:** To provide the student with the ability to and preparation of reports for estimation of various items. |
| 39 | IV/I | CE733PE | Ground Improvement Techniques. | **CO1:** Identify the type of problems in problematic soils and solve their problems using different ground improvement techniques. |
| | | | | **CO2:** Design of reinforced earth retaining structures. |
| | | | | **CO3:** Design drainage and dewatering systems for various civil engineering problems. |
| | | | | **CO4:** Apply knowledge on ground improvement techniques such as reinforced earth, drainage and dewatering and grouting techniques on stabilization of expansive soils. |
| | | | | **CO5:** Understand the need of ground improvement for stable engineered structures using various techniques. |
| | | | | **CO6:** Understand the ground improvement techniques such as ground anchors, rock bolting and soil nailing. |
| 40 | IV/I | CE741PE | Traffic Engineering | **CO1:** Use statistical concepts and applications in traffic engineering. |
| | | | | **CO2:** Identify traffic stream characteristics. |
| | | | | **CO3:** Use modern software tools to estimate traffic measures such as delay and LOS for signalized and unsignalized intersections. |
| | | | | **CO4:** Design a pre-timed signalized intersection, and determine the signal splits. |
| | | | | **CO5:** Design an actuated signalized intersection. |
| | | | | **CO6:** Understand Warrants and ability to use them to evaluate intersections. |
| 41 | IV/I | CE723PE | Foundation Engineering | **CO1:** Identify a suitable foundation system for a structure. |
| | | | | **CO2:** Evaluate the importance of raft foundation and principles of design for buildings and tower structures. |
| | | | | **CO3:** Analyze and design pile foundations. |
| | | | | **CO4:** Examine and discuss various machine foundations. |
| | | | | **CO5:** Analyze and design Sheet piles and cofferdams. |
| 42 | IV/I | CE703PC | Transportation Engineering Lab | **CO1:** Identifying the aggregate strength. |
| | | | | **CO2:** Analyze aggregate size and shape. |
| | | | | **CO3:** Identifying the bituminous strength. |
| | | | | **CO4:** Determine the bituminous elongation point. |
| | | | | **CO5:** Determine traffic volume studies. |
| | | | | **CO6:** Analyze the aggregate strengths and bituminous strengths. |
| | | | | **CO1:** Define physical, chemical, biological characteristics of water and wastewater. |

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| 43 | IV/I | CE704PC | Environmental Engineering Lab | **CO2:** Examinee break-point chlorination. |
| | | | | **CO3:** Assess optimum dosage of coagulant. |
| | | | | **CO4:** Assess the quality of water and wastewater. |
| | | | | **CO5:** Examine the use of Nephloturbidity meter. |
| | | | | **CO6:** Analyze the difference of Total Solids, Total Dissolved Solids and Settle able solids. |
| 44 | IV/I | CE705PC | Industry Oriented Mini Project | **CO1:** Impart skills in preparing detailed project report describing the project and results. |
| | | | | **CO2:** Manage a team to complete a project within a given time frame. |
| | | | | **CO3:** Find the solution of identified problem with help of modern technology. |
| 45 | IV/I | CE706PC | Seminar | **CO1:** Adapt a factual approach to decision making |
| | | | | **CO2:** Effectively communicate by making an oral presentation before an evaluation committee. |
| | | | | **CO3:** Analyze new technologies in all engineering fields. |
| 46 | IV/II | CE864PE | Industrial Waste Water Treatment | **CO1:** Identify the characteristics of industrial wastewaters. |
| | | | | **CO2:** Describe pollution effects of disposal of industrial effluent. |
| | | | | **CO3:** Identify and design treatment options for industrial wastewater. |
| | | | | **CO4:** Formulate environmental management plan. |
| | | | | **CO5:** Identify waste water generation from various industries. |
| 47 | IV/II | CE851PE | Waste Management | **CO1:** Identify the physical and chemical composition of wastes. |
| | | | | **CO2:** Analyze the functional elements for solid waste management. |
| | | | | **CO3:** Analyze the functional elements for liquid waste management. |
| | | | | **CO4:** Describe the effluent treatment Plants and its disposal. |
| 48 | IV/II | ME519OE | Total Quality Management | **CO1:** Memorize the concept of TQM, quality and business performance attitude, and involvement of top management. |
| | | | | **CO2:** Analyze Measuring Quality Costs, Accounting Systems and Quality Management. |
| | | | | **CO3:** Summarize the evolution of bench marking, meaning of bench marking. |
| | | | | **CO4:** Memorize Universal Standards of Quality: ISO around the world. |
| | | | | **CO5:** Describe the evolution of bench marking, meaning |

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| | | | | of bench marking. |
|---|---|---|---|---|
| 49 | IV/II | CE801PC | Major Project | **CO1:** Learn to work as a team and to focus on getting a working project done within a stipulated period of time. |
| | | | | **CO2:** demonstrate the understanding of impact of engineering solutions on the society. |
| | | | | **CO3:** Plan, analyze, design and implement using different tools. |

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| Program :<br>B.Tech- Mechanical Engineering | Academic Year : 2019-20 | Semester :<br>I & II |
|---|---|---|

| S.No | Year /Sem | Course Code | Course Name | Course Outcomes<br>(After completion of the course student can able to :) |
|---|---|---|---|---|
| 1 | II/I | MA301BS | Probability and Statistics & Complex Variables | **CO1:** Describe the use of Baye's theorem techniques when solving the problems. |
| | | | | **CO2:** Solve the problems on Binomial and Geometric Distributions. |
| | | | | **CO3:** Determine the testing of Hypothesis by using Type-I and Type-II errors. |
| | | | | **CO4:** Identify the Different types of Hypothesis. |
| | | | | **CO5:** Describe the complex function with their analyticity, integration using Cauchy's Integral and Residue theorem. |
| | | | | **CO6:** Discuss the Taylor's and Laurent series expansions. |
| 2 | II/I | ME302PC | Mechanics of Solids | **CO1:** Define the fundamental of stress and strain and the relationship between both equations in order to solve problems for simple tri-dimensional elastic solids & thermal stress, strain energy. |
| | | | | **CO2:** Differentiate the different type of beams & loads and also calculate the sheer force and bending moments diagram and their relations. |
| | | | | **CO3:** Explain the Flexural Stresses, Assumptions & equations and also Shear stress distribution across various beams sections. |
| | | | | **CO4:** Analyze Principal Stresses and Strains problem identification, formulation and solution using a range of analytical methods and also calculate the Various theories of failure. |
| | | | | **CO5:** Apply the loads Torsion of Circular Shafts and also calculate Theory of pure torsion, Assumptions & Thin Cylinders Derivation of formula for stress & strain. |
| 3 | II/I | ME303PC | Material Science and Metallurgy | **CO1**: Analyze the Structure of materials at different levels, basic concepts of crystalline materials like unit cell, FCC, BCC, HCP, APF (Atomic Packing Factor), Co-ordination Number etc. |
| | | | | **CO2:** Identify concept of mechanical behaviours, strength & properties of different metallic materials. |
| | | | | **CO3:** Differentiate different phase& phase diagram & |

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| | | | | understand the basic terminologies associated with metallurgy. Construction and identification of phase diagrams and reactions. |
| | | | | **CO4:** Identify and suggest the heat treatment process & types. Significance of properties Vs microstructure . Surface hardening & its types. Introduce the concept of harden ability & demonstrate the test used to find harden ability of steels. |
| | | | | **CO5:** Summarize the different classification & application of advanced materials like ceramics, polymers & composites. |
| | | | | **CO6:** Study the different classification & application of advanced materials like composites, polymers & ceramics. |
| 4 | II/I | ME304PC | Production Technology | **CO1:** Formulate the process of casting and different allowances occurred during the casting and also different material selection for the patterns. |
| | | | | **CO2:** Design core, core print and Gating System in metal Casting System. |
| | | | | **CO3:** Describe different types of welding process for joining of similar and dis-similar metals. |
| | | | | **CO4:** Analyze the welding defects by different processes. |
| | | | | **CO5:** Classify the different types of joining process like Hot working, cold working Blanking and piercing – Bending and forming wire drawing and Tube drawing. |
| | | | | **CO6:** Apply the different types Extrusion process & Forging process. |
| 5 | II/I | ME305PC | Thermo Dynamics | **CO1:** Differentiate between different thermodynamic systems and processes and compare Macroscopic and Microscopic Approaches of Thermodynamics. |
| | | | | **CO2:** Apply the laws of thermodynamics to different types of systems. Undergoing various processes and flow system, prepare efficiency of Heat Engine and COP of Heat Pump, Refrigerator. |
| | | | | **CO3:** Define the various properties of pure substances, the concept of perfect Gas laws, Carnot engine and also draw the P-V,T-S,P-T and H-S diagrams of pure substance. |
| | | | | **CO4:** Define the various non-flow processes, flow processes heat & work Transfer, Vader Waals equation, dryness fraction, Dalton's law of partial pressure, Avogadro's law, enthalpy and entropy. |
| | | | | **CO5:** Define the various non-flow processes, flow |

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| | | | | processes heat & work Transfer, Vader Waals equation, dryness fraction, Dalton's law of partial pressure, Avogadro's law, enthalpy and entropy. |
| | | | | **CO6:** Analyze the thermodynamic cycles and evaluate performances Parameters. |
| 6 | II/I | ME306PC | Production Technology Lab | **CO1:** Understand the properties of moulding sands. |
| | | | | **CO2:** Understand the properties of Pattern making. |
| | | | | **CO3:** Understand Fabricate joints using gas welding and arc welding. |
| | | | | **CO4:** Evaluate the quality of welded joints. |
| | | | | **CO5:** Basic idea of press working tools. |
| | | | | **CO6:** Perform molding studies on plastics. |
| 7 | II/I | ME307PC | Machine Drawing Practice | **CO1:** Prepare engineering and working drawings with dimensions and bill of material during design and development. Develop assembly drawings using part drawings of machine components. |
| | | | | **CO2:** Understand representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs. |
| | | | | **CO3:** Analyze types of sections – selection of section planes and drawing of sections and auxiliary sectional views. |
| | | | | **CO4:** Understand Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features. |
| | | | | **CO5:** Analyze title boxes, their size, location and details - common abbreviations and their liberal usage. |
| | | | | **CO6:** Compare types of Drawings – working drawings for machine parts. |
| 8 | II/I | ME308PC | Material Science and Mechanics of Solids Lab | **CO1:** Students will be able to understand basic concepts of stress, strain and their relations based on linear elasticity. Material behaviours due to different types of loading will be discussed. |
| | | | | **CO2:** Predict the behaviour of the material under impact conditions. |
| | | | | **CO3:** Understand the procedure of doing hardness test for different materials. |
| | | | | **CO4:** Analyze the different materials applying loads due to compression, tension, shear, torsion. |
| | | | | **CO5:** Understand to beams of different type loads duo to the bending moment. |
| | | | | **CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism. |
| | | | | **CO2:** Describe fundamental rights, fundamental duties |

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| 9 | II/I | MC309 | Constitution of India | and its legal status. |
| | | | | **CO3: Describe** The constitution powers and status of the President of India. |
| | | | | **CO4:** Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency. |
| | | | | **CO5:** Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19. |
| | | | | **CO6:** Describe the Scope of the Right to Life and Personal Liberty under Article 21. |
| 10 | II/II | EE401ES | Basic Electrical and Electronics Engineering | **CO1:** Understand the basic electrical circuit elements and different ac circuits. |
| | | | | **CO2:** Understand the installation of different electrical equipments. |
| | | | | **CO3:** Describe the working of different transformers. |
| | | | | **CO4:** Understand the principles of DC motors. |
| | | | | **CO5:** Analyze the different diodes, rectifiers and filters. |
| | | | | **CO6:** Understand the principle, applications of BJT and FET. |
| 11 | II/II | ME402PC | Kinematics of Machinery | **CO1:** Differentiate suitable mechanisms like four bar chain mechanism, crank slatter quick return motion mechanism for different applications (shaping machine and slotting machine. |
| | | | | **CO2:** Draw velocity and displacement diagrams by applying different methods such as instantaneous centre method, graphical method and analysis of mechanism. |
| | | | | **CO3:** Different mechanisms in different situations like straight line mechanisms and steering gear mechanisms. |
| | | | | **CO4:** Knowledge of the principles to draw the different CAM profiles with different followers. |
| | | | | **CO5:** Select the gear and gear trains for the various applications Pinion &gear& pinion and rock arrangement. |
| 12 | II/II | ME403PC | Thermal Engineering - I | **CO1:** Explain the working principle and the components of Internal Combustion engines. |
| | | | | **CO2:** Analyze the losses occurs during combustion process and expertise in the concept of combustion process. |
| | | | | **CO3:** Describe the operations of reciprocating air compressor and apply their knowledge in compressed air applications. |
| | | | | **CO4:** Gain the knowledge in working principles of rotary air compressors such as single and multiple vane, roots, screw and scroll type. |
| | | | | **CO5:** Explain and Analyze the various gas turbine |

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| | | | | power plant and its cycles. |
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| 13 | II/II | ME404PC | Fluid Mechanics and Hydraulic Machines | **CO1:** Classify the effect of fluid properties on a flow system and also point out pressure and its measurements. |
| | | | | **CO2:** Classify type of fluid flow patterns and apply continuity equation, momentum equation, Euler's and Bernoulli's equations for flow along a stream line. |
| | | | | **CO3:** Classify boundary layer concepts and submerged objects and also point out drag and lift Force. |
| | | | | **CO4:** Develop a variety of practical fluid flow and flow measuring devices and utilize fluid mechanics principles in flow through pipes design. |
| | | | | **CO5:** To develop an appropriate turbine with reference to given situation in power plants and also develop impact of jet on vanes. |
| | | | | **CO6:** To summarize performance parameters of a given Centrifugal and Reciprocating pumps. |
| 14 | II/II | ME405PC | Instrumentation and Control Systems | **CO1:** Understand knowledge of filed instrumentations. |
| | | | | **CO2:** Understand the study of measurement of displacement, temperature, pressure measurements. |
| | | | | **CO3:** Understand measurement of liquid level and flow, speed, acceleration, vibration measurement. |
| | | | | **CO4:** Understand the application of strain gauges. |
| | | | | **CO5:** Understand the measurement of humidity, force, torque and power. |
| | | | | **CO6:** Understand the study of control systems in processes. |
| 15 | II/II | ME407PC | Fluid Mechanics & Hydraulic Machines Lab | **CO1:** Identify importance of various fluid properties at rest and in transit. |
| | | | | **CO2:** Apply general governing equations for various fluid flows. |
| | | | | **CO3:** Understand the concept of boundary layer theory and flow separation. |
| | | | | **CO4:** Plot velocity and pressure profiles for any given fluid flow. |
| | | | | **CO5:** Evaluate the performance characteristics of hydraulic turbines. |
| | | | | **CO6:** Evaluate the performance characteristics of pumps. |
| 16 | II/II | ME408PC | Instrumentation & Control Systems Lab | **CO1:** Characterize and calibrate measuring devices. |
| | | | | **CO2:** Identify and analyze errors in measurement. |
| | | | | **CO3:** Analyze measured data using regression analysis. |
| | | | | **CO4:** Calibration of Pressure Gauges, temperature, LVDT, capacitive transducer and rotameter. |
| | | | | **CO5:**Analyze use of a Seismic pickup for the |

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| | | | | measurement of vibration amplitude of an engine bed at Various loads. |
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| | | | | **CO6:** Understand the SCADA system. |
| 17 | II/II | EE409ES | Basic Electrical and Electronics Engineering Lab | **CO1:** Understand behavior of different electrical components. |
| | | | | **CO2:** Formulate and solve AC,DC circuits. |
| | | | | **CO3:** Realize the requirement of transformers. |
| | | | | **CO4:** Explain the properties of electromagnetic circuit. |
| | | | | **CO5:** Understand the principles of various electrical circuits. |
| | | | | **CO6:** Understand working principles of various analogue electrical measuring instruments. |
| 18 | II/II | MC409 | Gender Sensitization Lab | **CO1:** Develop sensibility with regard to issues of gender in contemporary India. |
| | | | | **CO2:** Provide a critical perspective on the socialization of men and women. |
| | | | | **CO3:** Determine information about some key biological aspects of genders. |
| | | | | **CO4:** Debate on the politics and economics of work. |
| | | | | **CO5:** Reflect critically on gender violence. |
| | | | | **CO6:** Expose more egalitarian interactions between men and women. |
| 19 | III/I | ME501PC | Design of Machine Members-I | **CO1:** The student acquires the knowledge about the principles of design, material selection, selection of manufacturing process, component behavior subjected to loads, and criteria of failure. |
| | | | | **CO2:** Understands the concepts of principal stresses, stress concentration in machine members and fatigue loading. |
| | | | | **CO3:** An ability to select the appropriate joints according to the various applications. |
| | | | | **CO4:** An ability to select the appropriate joints according to the various applications. |
| | | | | **CO5:** Design of solid shaft and hollow shaft on the basis of strength and rigidity and analyze the stresses and strains induced in a machine element. |
| 20 | III/I | ME502PC | Thermal Engineering-I | **CO1:** Explain the working principle and the components of Internal Combustion engines. |
| | | | | **CO2:** Analyze the losses occurs during combustion process and expertise in the concept of combustion process. |
| | | | | **CO3:** Describe the operations of reciprocating air compressor and apply their knowledge in compressed air applications. |

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| | | | | **CO4:** Gain the knowledge in working principles of rotary air compressors such as single and multiple vane, roots, screw and scroll type. |
| | | | | **CO5:** Explain and Analyze the various gas turbine power plant and its cycles. |
| 21 | III/I | ME503PC | Metrology & Machine Tools | **CO1:** Differentiate Understand working of lathe, shaper, planner, drilling, milling and grinding machines. |
| | | | | **CO2:** Differentiate Comprehend speed and feed mechanisms of machine tools. |
| | | | | **CO3:** Estimate machining times for machining operations on machine tools. |
| | | | | **CO4:** Identify techniques to minimize the errors in measurement. |
| | | | | **CO5:** Identify methods and devices for measurement of length, angle, and gear& thread parameters, surface roughness and geometric features of parts. |
| | | | | **CO6:** Handle the various measuring instruments in quality assurance department of industries. |
| 22 | III/I | SM504MS | Fundamentals of Management | **CO1:** Write the working principle of fundamentals of management basics. |
| | | | | **CO2:** Setup Planning Process and develops the Decision Making and Problem Solving skills. |
| | | | | **CO3:** Explains Organization principles, Design, Structures and basic fundamentals of Organization. |
| | | | | **CO4:** Analyze Leadership styles and handling employee and customer complaints, and motivational theories. |
| | | | | **CO5:** What is controlling, types, strategies, steps characteristics and process of controlling? |
| | | | | **CO6:** What is HRM and Human Resource Planning, Recruitment and Selection, & Training and Development. |
| 23 | III/I | CE511OE | Disaster Management | **CO1:** Identify the types of disaster and vulnerabilities. |
| | | | | **CO2:** Describe the basic concepts of the emergency management cycle (mitigation, preparedness, response, and recovery). |
| | | | | **CO3:** Describe the understanding in capacity building concepts and planning of disaster managements. |
| | | | | **CO4:** Describe the coping with disaster and strategies. |
| | | | | **CO5:** Explain the roles of government agencies in emergency management. |
| | | | | **CO6:** Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. |
| | | | | **CO1:** Mention working principles of different engines. |

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| 24 | III/I | ME505PC | Thermal Engineering Lab | **CO2:** Evaluate the performance of IC engines and compressors under the given operating conditions. |
| | | | | **CO3:** Test the power in the engine cylinder. |
| | | | | **CO4:** Find the efficiencies of different engines. |
| | | | | **CO5:** Test the frictional power of the engine. |
| | | | | **CO6:** Draw timing diagrams for SI/CI engines. |
| 25 | III/I | ME506PC | Machine Tools Lab | **CO1:** Study the various parts and working principles of lathe, Drilling Machine, Milling Machine and Shaper Machine. |
| | | | | **CO2:** Study the various parts and working principles of Planning Machine, Slotting Machine, Cylindrical Grinder, Surface Grinder and Tool and Cutter Grinder. |
| | | | | **CO3:** Perform step turning and taper turning operations on lathe machine. |
| | | | | **CO4:** Perform Thread Cutting and Knurling operation on lathe machine. |
| | | | | **CO5:** Perform Drilling and Tapping operation on Radial Drilling Machine. |
| | | | | **CO6:** Produce Flat surfaces and Cut key ways on shaper and planner machine. |
| 26 | III/I | ME507PC | Engineering Metrology Lab | **CO1:** Students able to study the different parameters related to Gear's Chrodal Addendum & Chrodal height by using vernier callipers. |
| | | | | **CO2:** Examine the Errors in Alignment of tools on machine by using Dial indicator. |
| | | | | **CO3:** Study the Application of Microscope in Tool making. |
| | | | | **CO4:** Angles and Tappers of different sections are studied by Bevel Protractor & Sinebar's. |
| | | | | **CO5:** Study the flatness of surface plate by using the spirit level. |
| 27 | III/I | MC500HS | Professional Ethics | **CO1:** Understand importance of values and ethics in their personal lives & professional careers. |
| | | | | **CO2:** Describe basic theories like virtue theory, rights theory, casuist theory. |
| | | | | **CO3:** Understand professional practices in engineering field. |
| | | | | **CO4:** Describe central responsibilities of engineers. |
| | | | | **CO5:** Understand work place rights and responsibilities. |
| | | | | **CO6:** Analyze various global issues in professional ethics. |
| | | | | **CO1:** Gain the Knowledge on journal bearing design using different empirical relations. |
| | | | | **CO2:** Select and design a rolling contact bearing for |

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| 28 | III/II | ME602PC | Design of Machine Members-II | different types of loads and estimate the life of rolling contact bearings. |
| | | | | **CO3:** Design the various internal combustion engine components like connecting rod, piston. |
| | | | | **CO4:** Design the helical coil springs for different applications under fatigue loading condition. |
| | | | | **CO5:** Compare the belts and rope ways based on their power transmission and Application. |
| | | | | **CO6:** Knowledge on the strength of gears and various places used different gears depend upon various applications. |
| 29 | III/II | ME603PC | Heat Transfer | **CO1:** Explain the basic modes and mechanisms of heat transfer. |
| | | | | **CO2:** Analyze one dimensional steady state and unsteady state conduction heat transfer. |
| | | | | **CO3:** Solve convective heat transfer problems of natural and forced convection heat transfer. |
| | | | | **CO4:** Design the different heat exchanger for various industrial applications like Chemical industry, food processing and refrigeration plants. |
| | | | | **CO5:** Compare the boiling, Condensation and radiation heat transfer. |
| | | | | **CO6:** Apply the knowledge of heat transfer in aerospace industries. |
| 30 | III/II | ME612PE | Refrigeration & Air conditioning | **CO1:** Learn the working principle of air refrigeration systems, vapor refrigeration systems and air conditioning systems. |
| | | | | **CO2:** Understand the construction and working of various components of Refrigeration and Air conditioning systems. |
| | | | | **CO3:** Find out the COP of various refrigeration system and air conditioning systems. |
| | | | | **CO4:** Differentiate between different types of refrigeration systems with respect to application as well as conventional and unconventional refrigeration systems. |
| | | | | **CO5:** Apply the thermodynamic principles to design the refrigeration and air conditioning loads for the industrial applications. |
| 31 | III/II | ME601PC | Thermal Engineering – II | **CO1:** Explain working principle and components of steam power plant and boilers. |
| | | | | **CO2**: Apply the laws of thermodynamics to analyze thermodynamic cycles. |
| | | | | **CO3**: Describe the classification and principle operation |

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| | | | | of steam turbine. |
| | | | | **CO4**: Differentiate of methods to reduce rotor speed, velocity compounding, pressure    compounding and classification of steam turbine**s.** |
| | | | | **CO5:** Infer from property charts and tables and to apply the data for the evaluation of performance parameters of the steam condenser and gas turbine plants. |
| | | | | **CO6**: Understand the principle operation, classification of jet propulsion and rockets. |
| 32 | III/II | ME604PC | Heat Transfer Lab | **CO1**: Perform steady state conduction experiments to estimate thermal conductivity of different materials. |
| | | | | **CO2**: Perform transient heat conduction experiment. |
| | | | | **CO3**: Estimate heat transfer coefficients in forced convection, free convection, condensation and correlate with theoretical values. |
| | | | | **CO4**: Obtain variation of temperature along the length of the pin fin under forced and free convection. |
| | | | | **CO5**: Perform radiation experiments: Determine surface emissivity of a test plate and Stefan- Boltzmann's constant and compare with theoretical value. |
| | | | | **CO6**: Study of heat pipe and its demonstration. |
| 33 | III/II | ME605PC | CADD and MATLAB | **CO1 :** Find out the  different between CAD and CAM |
| | | | | **CO2:** Learn the modified and zoom commands under the given design conditions. |
| | | | | **CO3:** Design different components of automobile. |
| | | | | **CO4:** Test the part program in the CNC machine. |
| | | | | **CO5:** Observe the group technology. |
| | | | | **CO6:** Test the quality of SI /CI engines parts. |
| 34 | III/II | EN606HS | Advanced English Communicati on Skills Lab | **CO1:** Speak effectively. |
| | | | | **CO2:** Express and communicate fluently and appropriately in social professional contexts. |
| | | | | **CO3:** Develop the comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects. |
| | | | | **CO4:** The awareness of English lab enriches their communication and soft skills contributing to their overall development and success. |
| | | | | **CO5:** Draft various letters and reports for all official purpose. |
| | | | | **CO6:** Take part in social and professional communication. |
| | | | | **CO1:** Development Of Part Drawings For Various Components In The Form Of Orthographic And Isometric. Representation Of Dimensioning And |

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| | | | | Tolerances. |
| | | | | **CO2:** Generation Of Various 3D Models Through Protrusion, Revolve, Sweep Creation Of Various Features Study Of Boolean Based Modeling And Assembly Modeling. Study Of Various Standard Translators. Design Of Simple Components, Differentiate Surfaces And Curves. |
| 35 | IV/I | ME701PC | CAD/CAM | **CO3:** Apply G- Codes and M-Codes for various applications. |
| | | | | **CO4:** Able To Study Of Various Post Processors Used In NC Machines. Development Of NC Code For Free Form And Sculptured Surfaces Using CAM Software. |
| | | | | **CO5:** Able To Study Of Group Technology And Machining Operations Flexible Manufacturing. |
| | | | | **CO6:** Able To Study Of Computer Integrated Technology And Quality Of Control. |
| 36 | IV/I | ME702PC | Instrumentation and Control System | **CO1:** The student will be able to understand knowledge of filed instrumentations. |
| | | | | **CO2:** The student will be able to understand the study of measurement of displacement, temperature, pressure measurements. |
| | | | | **CO3:** The student will be able to understand measurement of liquid level and flow, speed, acceleration, vibration measurement. |
| | | | | **CO4:** The student will be able to understand the application of strain gauges. |
| | | | | **CO5:** The student will be able to understand the measurement of humidity, force, torque and power. |
| | | | | **CO6:** The student will be able to understand the study of control systems in processes. |
| 37 | IV/I | ME723PE | Power Plant Engineering | **CO1:** Able to Generalize the working of different power plant circuits and different handling systems. |
| | | | | **CO2:** Able to Describe different combustion process and water treatment methods. |
| | | | | **CO3:** Able to Distinguish construction and working of diesel power plant gas turbine power plant and solar energy conversion. |
| | | | | **CO4:** Able to Summarize hydroelectric power plant and its characteristics. |
| | | | | **CO5:** Able to Assess the working of nuclear power plant, different types of reactors, lifespan of an atom. |
| | | | | **CO6:** Able to Analyze the power plant economics and environmental considerations. |
| | | | | **CO1** : Describe various NC and CNC machines for |

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| 38 | IV/I | ME734PE | CNC Technology | various operations like milling, drilling, turning, grinding etc. |
| | | | | **CO2** : Describe various part models to write NC part programming on given part like taper turning, drilling, surface milling etc. |
| | | | | **CO3** : Describe various part models to write APT part programming on given part like taper turning, drilling, surface milling etc. |
| | | | | **CO4:** Explain and summarize the principles and key characteristics of Adaptive control system, Adaptive control with optimization, Adaptive control with constraints and Direct Numerical Control system (DNC). |
| | | | | **CO5:** Explain and summarize typical Microcontrollers & PLC's applications in mechanical industry. |
| 39 | IV/I | ME744PE | Additive Manufacturing Technology | **CO1:** Describe various CAD issues for 3D printing and rapid prototyping and related operations for STL model manipulation. |
| | | | | **CO2:** Formulate and solve typical problems on reverse engineering for surface reconstruction from physical prototype models through digitizing and spline-based surface fitting. |
| | | | | **CO3:** Formulate and solve typical problems on reverse engineering for surface reconstruction from digitized mesh models through topological modelling and subdivision surface fitting. |
| | | | | **CO4:** Explain and summarize the principles and key characteristics of additive manufacturing technologies and commonly used 3D printing and additive manufacturing systems. |
| | | | | **CO5:** Explain and summarize typical rapid tooling processes for quick batch production of plastic and metal parts. |
| 40 | IV/I | ME703PC | CAD/CAM Lab | **CO1:** Find out the difference between CAD and CAM . |
| | | | | **CO2:** Learn the modified and zoom commands under the given design conditions. |
| | | | | **CO3:** Design of different automobile components. |
| | | | | **CO4:** Test the part program in the CNC machine. |
| | | | | **CO5:** Observe the group technology. |
| | | | | **CO6:** Test the quality of SI /CI engines parts. |
| 41 | IV/I | ME704PC | Instrumentation and Control Systems Lab | **CO1:** Understand knowledge of filed instrumentations. |
| | | | | **CO2:** Understand the study of measurement of displacement, temperature, pressure measurements. |
| | | | | **CO3:** Understand measurement of liquid level and flow, |

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| | | | | speed, acceleration, vibration measurement. |
| | | | | **CO4:** Understand the application of strain gauges. |
| | | | | **CO5:** Understand the measurement of humidity, force, torque and power. |
| | | | | **CO6:** Understand the study of control systems in processes. |
| 42 | IV/I | ME705PC | Industry Oriented Mini project | **CO1:** Able to collaborate with others as they work on intellectual projects. |
| | | | | **CO2:** Plan, analyze, design and implement using different tools. |
| | | | | **CO3:** Learn to work as a team and to focus on getting a working project done within a stipulated period of time. |
| 43 | IV/I | ME706PC | Seminar | **CO1:** Learn public speaking skills by presentations. |
| | | | | **CO2:** Understand new technologies in all engineering fields. |
| | | | | **CO3:** Improve problem solving skills. |
| 44 | IV/II | CE833OE | Entrepreneurship & Small business Enterprises | **CO1**: Define Entrepreneurship, Types, and Competencies, Training methods, Motivations, Models and Process of Entrepreneurial Development. |
| | | | | **CO2**: Create New Venture, with an effective business plan considering central and state level entrepreneur opportunities. |
| | | | | **CO3**: Explains the management of MSMEs and sick enterprises. Its Symptoms, Process and Rehabilitation. |
| | | | | **CO4**: Analyze different markets, cost and pricing, Branding and International trade. |
| | | | | **CO5**: Explains the strategic perspectives in Entrepreneurship and Women Entrepreneurs**.** |
| 45 | IV/II | ME854PE | Production Planning & Control | **CO1:** Explain various Necessary concepts of production, planning and control aspects in manufacturing industry. |
| | | | | **CO2:** Apply forecasting techniques like qualitative and quantitative methods to the production system. |
| | | | | **CO3:** Compare the concepts of PPC, inventory & MRP, ERP, LOB system. |
| | | | | **CO4:** Apply routing, scheduling techniques to the production control and management system. |
| | | | | **CO5:** Choose dispatching techniques to the production control and management system. |
| | | | | **CO6:** Apply the use of computers to design the Production planning and control system. |
| | | | | **CO1:** After completion of course, the, student shall understand the principle and working, various |

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| 46 | IV/II | ME863PE | Unconventional Machining Processes | mechanism involved in metal removal process of Unconventional machining process. |
| | | | | **CO2:** Become compact to design and analyze problems of engineering relevant to manufacturing. |
| | | | | **CO3:** To categorize the various Unconventional machining processes on energy sources and mechanism employed. |
| | | | | **CO4:** To analyze the thermal and non thermal processes involved in Unconventional machining process. |
| | | | | **CO5:** To select the best suitable advanced machining process for processing of Unconventional materials employed in modern manufacturing industries. |
| | | | | **CO6:** Develop methods of working for minimizing the production cost. |
| 47 | IV/II | ME801PC | Major Project | **CO1:** Apply fundamental concepts of areas of study to solve a problem. |
| | | | | **CO2:** Use effectively oral, written and visual communication. |
| | | | | **CO3:** Work with teams to meet the requirement and to reach the targets. |

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| Program :<br><br>I B.TECH | **Academic Year :** 2019-20 | **Semester :** I & II |
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| 1 | I/I | MA101 BS | Mathematics – I | **CO1:** Analyze the solution of the system of linear equations in matrix representation. |
| | | | | **CO2:** Find the diagonalization of the matrix. |
| | | | | **CO3:** Compare the convergence between two tests for the given sequence. |
| | | | | **CO4:** Evaluate Improper integrals using Beta and Gamma functions. |
| | | | | **CO5:** Explain the concept of total derivative. |
| | | | | **CO6:** Find the Maxima and Minima of functions of two variables and three variables. |
| 2 | I/I | AP102BS | Applied Physics | **CO1:** Explain the fundamental concepts on Quantum behavior of matter. |
| | | | | **CO2:** Explain the working principle and structure of various semiconductors. |
| | | | | **CO3:** Describe the characteristics of semiconductor photo detectors. |
| | | | | **CO4:** Distinguish the principle of lasers. |
| | | | | **CO5:** Apply the fiber optics principles in various communications. |
| | | | | **CO6:** Analyze the Characteristics of dielectric and magnetic material. |
| 3 | I/I | CS103ES | Programming for Problem Solving | **CO1:** Recognize various types of operators, data types and understand the definition of algorithm and flowchart. |
| | | | | **CO2:** Apply various Branching/Looping statements, structure of c program to solve the given problem. |
| | | | | **CO3:** Classify homogeneous derived data types and use them to solve the problems. |
| | | | | **CO4:** Distinguish Text files and Binary Files and define the pre-processor directives, write simple c program using File handling functions. |
| | | | | **CO5:** Illustrate how structured programming, Recursion works and write programs using recursion to solve problems and memory allocation. |
| | | | | **CO6:** Apply Algorithms for searching and sorting techniques. |
| | | | | **CO1:** Broad idea in engineering drawing and conventions. Application of geometric and curves drawing in tool design such as helical curve in the design of drill bits. |
| | | | | **CO2:** Understanding orthographic projections in sense |

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| 4 | I/I | ME104 ES | Engineering Graphics | projections of points, lines, Planes. |
| | | | | **CO3:** Developing a clear idea on projections of solids and auxiliary views and sectional views. |
| | | | | **CO4:** Acquiring practical knowledge by means of development of surface drawing, and intersection of solids. |
| | | | | **CO5:** Thorough knowledge in Isometric views and conversion of isometric views into orthographic views and vice versa also acquiring prerequisite knowledge in CAD commands and package. |
| 5 | I/I | CH102B S | Chemistry | **CO1:** Analyze the type of crystal field splitting in complexes. |
| | | | | **CO2:** Develop the water free from hardness using water technology. |
| | | | | **CO3:** Solve the problems of E.M.F, Electrode Potential. |
| | | | | **CO4:** Recognize which part of alloy acts as Anode. |
| | | | | **CO5:** Predict the Configuration of the given compound. |
| | | | | **CO6:** Apply the spectral data to find the structure of a compound. |
| 6 | I/I | EE103E S | Basic Electrical Engineering | **CO1:** Known's the knowledge about basic components of electrical and reduction method in network analysis in DC. |
| | | | | **CO2:** Gains the knowledge about AC quantities. |
| | | | | **CO3:** Gains the knowledge about the energy transfer. |
| | | | | **CO4:** Gains the knowledge about use of 3-ph transformers. |
| | | | | **CO5:** Analysing the energy conversion systems in electrical. |
| | | | | **CO6:** Gains knowledge about basic electrical installation. |
| 7 | I/I | EN105H S | English | **CO1:** Use English language effectively in spoken and written forms. |
| | | | | **CO2:** Inculcate reading habits & gain effective reading skills and vocabulary. |
| | | | | **CO3:** Develop listening skills. |
| | | | | **CO4:** Comprehend the given text and respond appropriately. |
| | | | | **CO5:** Communicate confidently in various contexts and different cultures. |
| | | | | **CO6:** Acquire basic proficiency in English including L.S.R.W skills. |
| 8 | I/I | PH102B S | Engineering Physics | **CO1:** Explain the fundamental concepts on Quantum behaviour of matter. |
| | | | | **CO2:** Explain the working principle and structure of various semiconductors. |
| | | | | **CO3:** Describe the characteristics of semiconductor photo detectors. |
| | | | | **CO4:** Distinguish the principle of lasers. |
| | | | | **CO5:** Apply the fibre optics principles in various communications. |
| | | | | **CO6:** Analyze the Characteristics of dielectric and magnetic material. |

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| 9 | I/I | AP105BS | Applied Physics Lab | **CO1:** Classify the matter wave behavior using quantum principles. |
| | | | | **CO2:** Distinguish the intrinsic and extrinsic semiconductors. |
| | | | | **CO3:** Recognize the fundamental characteristics of optoelectronic devices. |
| | | | | **CO4:** Recognize the fundamental applications of optoelectronic devices. |
| | | | | **CO5:** Demonstrate competency and understanding of the concepts found in lasers and fiber optics on a broad base of knowledge in physics. |
| | | | | **CO6:** Define the Basic principle of Electromagnetic laws and their applications in different materials. |
| 10 | I/I | CS106ES | Programming for Problem Solving Lab | **CO1:** Solve the Problems by using Operators and type casting. |
| | | | | **CO2:** Write the programs based on Branching and Looping statements. |
| | | | | **CO3:** Illustrate the Problems by using the recursion and Functions. |
| | | | | **CO4:** Analyze the programs based on Derived Data type. |
| | | | | **CO5:** Develop the programs using Files. |
| | | | | **CO6:** Solve the Problems by using the Searching and Sorting Technique. |
| 11 | I/I | CH106BS | Engineering Chemistry Lab | **CO1:** Acquire the scientific attitude by means of distinguishing, analyzing and solving Engineering problems. |
| | | | | **CO2:** Interpret the knowledge of atomic orbital's, molecular and electronic changes, Band theory related to Conductivity. |
| | | | | **CO3:** Differentiate between hard & soft water and their effects when used in Thermal Power Plants. |
| | | | | **CO4:** Summarize the principles and concepts of Electrochemistry, Corrosion and Mechanism associated with corrosion control methods. |
| | | | | **CO5:** Apply the concept of basic Spectroscopy to medical and other fields. |
| | | | | **CO6:** Compare the Configurational and conformational analysis of molecules and Reaction mechanisms. |
| 12 | I/I | EN107HS | English Language and Communication Skills Lab | **CO1:** Better understanding of nuances of English language through audio-visual experience and group activities. |
| | | | | **CO2:** Neutralization of accent for intelligibility. |
| | | | | **CO3:** Speaking skills with clarity and confidence which in turn enhance their employability skills. |
| | | | | **CO1:** Classify the Newton's laws both in Cartesian, cylindrical and spherical coordinates. |
| | | | | **CO2:** Distinguish the different types of mechanical and electrical harmonic oscillators. |

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|---|---|---|---|---|
| 13 | I/I | PH105BS | Engineering Physics Lab | **CO3:** Recognize the fundamentals of transverse waves of strings in one dimension. |
| | | | | **CO4:** Recognize the fundamentals of longitudinal waves of strings in one dimension. |
| | | | | **CO5:** Demonstrate competency and understanding of the concepts found in Wave Optics on a broad base of knowledge in physics. |
| | | | | **CO6:** Define the Basic principle of LASERS and their application as light propagation in fiber optics and optical fibers Properties. |
| 14 | I/II | MA201BS | Mathematics – II | **CO1:** Identify whether the given differential equation of first order is exact or not and analyze the applications of differential equations. |
| | | | | **CO2:** Solve the second and higher order differential equations find the particular integrals for the given non homogeneous differential terms. |
| | | | | **CO3:** Evaluate the multiple integrals and apply the concept to find areas, volumes of sphere and rectangular parallelepiped. |
| | | | | **CO4:** Analyze the double integral and triple integral concept in polar form and cartetian form. |
| | | | | **CO5:** Differentiate the problems on gradient,divergent and curl of a vectors. |
| | | | | **CO6:** Summerize the line,surface and volume integrals and converting them in theorems. |
| 15 | I/II | ME203ES | Engineering Mechanics | **CO1:** Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces. |
| | | | | **CO2:** Describe static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. |
| | | | | **CO3:** Solve problem of bodies subjected to friction. |
| | | | | **CO4:** Find the location of centroid and calculate moment of inertia of given section. |
| | | | | **CO5:** Understand kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion. |
| | | | | **CO6:** Solve the problems using work energy equations for translations, fixed axis of rotation and plane motion. |
| 16 | I/II | EE208ES | Basic Electrical Engineering Lab | **CO1:** Understand behavior of different electrical components. |
| | | | | **CO2:** Formulate and solve AC, DC circuits. |
| | | | | **CO3:** Realize the requirement of transformers. |
| | | | | **CO4:** Explain the properties of electromagnetic circuit. |
| | | | | **CO5:** Understand the principles of various electrical circuits. |
| | | | | **CO6:** Understand working principles of various analogue electrical measuring instruments. |
| | | | | **CO1:** Study and practice on hand operated tools and their uses. |

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| 17 | I/II | ME205 ES | Engineering Workshop | **CO2:** Design and model the prototypes by using carpentry and tin Smithy tools. |
| | | | | **CO3:** Join the metals by using welding and fitting trade |
| | | | | **CO4:** Produce casting using foundry. |
| | | | | **CO5:** Perform various basic house wiring functions. |
| | | | | **CO6:** Bend and design the model using blacksmith trade. |