



DR. V.R.K WOMEN'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ISO 9001:2015 CERTIFIED INSTITUTION
Approved by AICTE & Permitted by Government of Telangana State
Affiliated to Jawaharal Nehru Technological University Hyderabad
Azinagar (V), Moinsabad (M), R.R. Dist, 500 075 - T.S.
Contact No. 7893044962 / 08413235962
Website : www.drvrkwomenscollege.com

DEPARTMENT : SCIENCE AND HUMANITIES(R22)

Course Outcomes(COs) :B.Tech I YEAR – I and II Semesters

BRANCH : EEE

Academic Year : 2022 -2023

| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------------|-----|---|
| MA101BS | Matrices And Calculus | CO1 | Students are able to do the matrix representation of a set of linear equations and analyse the solution of the system of equations. |
| | | CO2 | Students are able to find the Eigenvalues and Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations. |
| | | CO3 | Students are able to do the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions. |
| | | CO4 | Students are trained to find the extreme values of functions of two variables with/ without constraints. |
| | | CO5 | Students are able to evaluate the multiple integrals and apply the concept to find areas, volumes. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------|-----|---|
| CH102BS | Engineering Chemistry | CO1 | Students are able to understand the basic properties of water and its usage in domestic and industrial purposes. |
| | | CO2 | Students acquired the basic knowledge of electrochemical procedures related to corrosion and its control. |
| | | CO3 | Students learned the fundamentals and general properties of polymers and other engineering materials. |
| | | CO4 | Students imbibe the basic concepts of petroleum and its products and predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs. |
| | | CO5 | Students are able to acquire required knowledge about engineering materials like cement, smart materials and Lubricants. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------------------|-----|--|
| EE103ES | C Programming and Data Structures | CO1 | Students understand the various steps in Program development and explore the basic concepts in C Programming Language. |
| | | CO2 | Students learn to develop modular and readable C Programs. |
| | | CO3 | Students understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures. |
| | | CO4 | Students learn to apply data structures such as stacks, queues in problem solving. |
| | | CO5 | Students are able to understand and analyze various searching and sorting algorithms. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------------------|-----|--|
| EE105ES | Electrical Circuit Analysis - I | CO1 | Students gained the knowledge in circuits and to understand the fundamentals of derived circuit laws. |
| | | CO2 | Students are able to understand network analysis, techniques using mesh and node analysis. |
| | | CO3 | Students are able to evaluate steady state and transient behavior of circuits for DC and AC excitations. |
| | | CO4 | Students are able to understand Theorems and concepts of coupled circuits. |
| | | CO5 | Students are able to analyze electric circuits using network theorems and concepts of coupled circuits. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------------------|-----|--|
| ME105ES | Computer Aided Engineering Graphics | CO1 | Students are able to apply computer aided drafting tools to create 2D and 3D objects. |
| | | CO2 | Students are able to sketch conics and different types of solids. |
| | | CO3 | Students are able to appreciate the need of Sectional views of solids and Development of surfaces of solids. |
| | | CO4 | Students are able to read and interpret engineering drawings. |
| | | CO5 | Students are enabled to do the Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|--|
| EE106ES | Elements of Electrical and Electronics Engineering | CO1 | Students are able to measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach. |
| | | CO2 | Students are made to study the transient response of various R, L and C circuits using different excitations. |
| | | CO3 | Students are able to determine the performance of different types of DC machines and Transformers. |
| | | CO4 | Students are able to verify the basic Electrical circuits through different experiments. |
| | | CO5 | Students are able to analyse the transient responses of R, L and C circuits for different input conditions. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|---|
| EE108ES | C Programming and Data Structures Laboratory | CO1 | Students are able to develop modular and readable C Programs. |
| | | CO2 | Students are able to solve problems using strings, functions. |
| | | CO3 | Students learned to handle data in files. |
| | | CO4 | Students learned to implement stacks, queues using arrays, linked lists. |
| | | CO5 | Students are able to understand and analyze various searching and sorting algorithms. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------------------------|-----|---|
| CH107BS | Engineering Chemistry Laboratory | CO1 | Students are able to estimate the hardness of water to check its suitability for drinking purpose. |
| | | CO2 | Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods. |
| | | CO3 | Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory. |
| | | CO4 | Students are able to determine the parameters of rate of corrosion of mild steel in various conditions. |
| | | CO5 | Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils. |



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I Year – II Semester

| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|--|
| MA201BS | Ordinary Differential Equations and Vector Calculus | CO1 | Students learned to identify whether the given differential equation of first order is exact or not . |
| | | CO2 | Students are able to solve higher differential equation and apply the concept of differential equation to real world problems. |
| | | CO3 | Students are enabled to solve ordinary differential equations using Laplace transforms techniques. |
| | | CO4 | Students are able to understand the physical quantities involved in engineering field related to vector valued functions. |
| | | CO5 | Students learned the basic properties of vector valued functions and their applications to line, surface and volume integrals |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------|-----|--|
| PH202BS | Applied Physics | CO1 | Students are able to understand the basic principles of quantum physics and band theory of solids. |
| | | CO2 | Students are able to understand the underlying mechanism involved in construction and working principles of various semiconductor devices. |
| | | CO3 | Students are able to explore the fundamental properties of dielectric, magnetic materials and energy for their applications |
| | | CO4 | Students are able to identify the importance of nanoscale, quantum confinement and various fabrications techniques. |
| | | CO5 | Students are able to understand various aspects of Lasers and Optical fiber and their applications in diverse fields. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------------|-----|---|
| ME203ES | Engineering Workshop | CO1 | Students are provided with hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field. |
| | | CO2 | Students are enabled to study and practice on machine tools and their operations. |
| | | CO3 | Made students to practice on manufacturing components using workshop trades including carpentry and fitting. |
| | | CO4 | Students are able to apply basic electrical engineering knowledge for house wiring. |
| | | CO5 | Students are able to produce welding and joining processes. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|--|
| EN208HS | English Language and Communication Skills Laboratory | CO1 | Students are enabled to develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation. |
| | | CO2 | Students are able to understand the nuances of English language through audio- visual experience and group Activities. |
| | | CO3 | Students are able to neutralise their accent for intelligibility. |
| | | CO4 | Students are trained to use language appropriately for public speaking, group discussions and interviews . |
| | | CO5 | Students are able to speak with clarity and confidence which in turn enhances their employability skills. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|---|
| EE205ES | Electrical Circuit Analysis - II | CO1 | Students observe the response of various R, L and C circuits for different excitations. |
| | | CO2 | Students are able to examine the behavior of circuit using laplace transform and transformation of single port network. |
| | | CO3 | Students are able to examine the behavior of circuit using two single port network. |
| | | CO4 | Students are able to examine the behavior of circuits using Fourier. |
| | | CO5 | Students are able to obtain two port network parameters and applications and design of various filters. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|---|-----|---|
| EE206ES | Applied Python Programming Laboratory | CO1 | Students are able to install and run the Python interpreter and learn control structures. |
| | | CO2 | Students are able to develop the application specific codes using python. |
| | | CO3 | Students are able to understand Strings, Lists, Tuples and Dictionaries in Python |
| | | CO4 | Students are able to verify programs using modular approach, file I/O, Python standard library. |
| | | CO5 | Students are able to implement Digital Systems using Python. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------------------|-----|--|
| PH207BS | Applied Physics Laboratory | CO1 | Students gain the knowledge on the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment. |
| | | CO2 | Students are able to appreciate quantum physics in semiconductor devices and optoelectronics. |
| | | CO3 | Students gain the knowledge of applications of dielectric constant. |
| | | CO4 | Students are able to understand the variation of magnetic field and behavior of hysteresis curve. |
| | | CO5 | Students are able to carry out data analysis. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|--|
| EN208HS | English Language and Communication Skills Laboratory | CO1 | Students are enabled to develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation. |
| | | CO2 | Students are able to understand the nuances of English language through audio- visual experience and group Activities. |
| | | CO3 | Students are able to neutralise their accent for intelligibility. |
| | | CO4 | Students are trained to use language appropriately for public speaking, group discussions and interviews . |
| | | CO5 | Students are able to speak with clarity and confidence which in turn enhances their employability skills. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|---|-----|--|
| EE209ES | Electrical Circuit Analysis Laboratory | CO1 | Students are able to design electrical systems and analyse them by applying various Network Theorems. |
| | | CO2 | Students are able to measure three phase Active and Reactive power. |
| | | CO3 | Students are able to understand the locus diagrams and concept of resonance. |
| | | CO4 | Students are able to analyze complex DC and AC linear circuits Apply concepts of electrical circuits across engineering. |
| | | CO5 | Students are enabled to evaluate response of a given network by using theorems. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------------------------|-----|---|
| *MC210 | Environmental Science | CO1 | Students are able to understand the importance of ecological balance for sustainable development. |
| | | CO2 | Students are able to understand the impacts of developmental activities and mitigation measures. |
| | | CO3 | Students are able to understand the environmental policies and regulations |
| | | CO4 | Students will be evaluate technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development |
| | | CO5 | Students will be develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development |



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DEPARTMENT : ELECTRICAL AND ELECTRONICS ENGINEERING(R22)

Course Outcomes(COs) :B.Tech II YEAR – I Semester

Academic Year : 2022 -2023

| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|--|
| MA301BS | Numerical Methods and Complex variables | CO1 | Students are able to express any periodic function in terms of sine and cosine and find the root of a given polynomial and transcendental equations. |
| | | CO2 | Students are able to estimate the value for the given data using interpolation |
| | | CO3 | Students are able to find the numerical solutions for a given first order ODE's. |
| | | CO4 | Students are able to analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems. |
| | | CO5 | Students are able to Taylor's and Laurent's series expansions in complex function |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------|-----|--|
| EE302PC | Electrical Machines-I | CO1 | Students are able to study and understand different types of DC machines and their performance evaluation through various testing methods. |
| | | CO2 | Students are enabled to understand the operation of single and ploy-phase Transformers |
| | | CO3 | Students are able to identify different parts of a DC machines & understand their operation |
| | | CO4 | Students are able to carry out different excitation, starting, speed control methods and testing of DC machines |
| | | CO5 | Students are able to analyze single & three phase transformers and their performance through testing. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------------------------|-----|--|
| EE304PC | Analog Electronic Circuits | CO1 | Students learn the characteristics, utilization of various components. |
| | | CO2 | Students are able to understand the biasing techniques. |
| | | CO3 | Students learn to design and analyze various rectifiers, small signal amplifier circuits |
| | | CO4 | Students learn to design sinusoidal and non-sinusoidal oscillators. |
| | | CO5 | Students learn the designs of OP-AMP based circuits with linear integratedcircuits. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------|-----|---|
| EE303PC | Power System-I | CO1 | Students are able to understand the power generation through conventional and non-conventional sources |
| | | CO2 | Students are able to illustrate the economic aspects of power generation and tariff methods. |
| | | CO3 | Students are able to understand the operation of conventional and renewable electrical power generating stations. |
| | | CO4 | Students are able to evaluate the power tariff methods and Economics associated with power generation |
| | | CO5 | Students are enabled to analyze the operations of AIS & GIS, Insulators and Distribution systems |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------|-----|--|
| EE305PC | Electro Magnetic Fields | CO1 | Students are introduced to the concepts of electric field and magnetic field. |
| | | CO2 | Students learn the applications of electric and magnetic fields in the development of the theory for power transmission lines and electrical machines. |
| | | CO3 | Students are able to understand the basic laws of electromagnetism and their applications. |
| | | CO4 | Students are enabled to analyze time varying electric and magnetic fields. |
| | | CO5 | Students are able to understand the propagation of EM waves. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|--|
| EE306PC | Electrical Machines Laboratory-I | CO1 | Students are exposed to the operation of DC Generators. |
| | | CO2 | Students gained the knowledge in the operation of various types of DC Motors. |
| | | CO3 | Students learned to start and control the Different DC Machines. |
| | | CO4 | Students are able to assess the performance of different machines using different testing methods. |
| | | CO5 | Students are able to evaluate the performance of different Transformers using different testing methods. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|---|
| EE308PC | Electrical Simulation tools Laboratory | CO1 | Students are able to understand basic block sets of different simulation platform used in electrical/electronic circuit design. |
| | | CO2 | Students are able to understand use and coding in different software tools used in electrical/ electronic circuit Design. |
| | | CO3 | Students develop the knowledge of software packages to model and program electrical and electronics Systems. |
| | | CO4 | Students learn to model different electrical and electronic systems and analyze the results |
| | | CO5 | Students learn to articulate importance of software packages used for simulation in laboratory experimentation by analyzing the simulation results. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------------------------|-----|--|
| EE307PC | Analog Electronic Circuits Laboratory | CO1 | Students learn the characteristics, utilization of various components. |
| | | CO2 | Students are able to understand the biasing techniques. |
| | | CO3 | Students learn to design and analyze various rectifiers, small signal amplifier circuits |
| | | CO4 | Students learn to design sinusoidal and non-sinusoidal oscillators. |
| | | CO5 | Students learn the designs of OP-AMP based circuits with linear integrated circuits. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------------------|-----|---|
| *MC309 | Gender Sensitization Laboratory | CO1 | Students will have developed a better understanding of important issues related to gender in contemporary India. |
| | | CO2 | Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film. |
| | | CO3 | Students will attain a finer grasp of how gender discrimination works in our society and how to counter it. |
| | | CO4 | Students will acquire insight into the gendered division of labor and its relation to politics and economics. |
| | | CO5 | Students will develop a sense of appreciation of women in all walks of life |



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II Year – II Semester

| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------------------|-----|---|
| EE401PC | Solid Mechanics & Hydraulic Machines | CO1 | Students are enabled to identify an appropriate structural system and work comfortably with basic engineering mechanics and types of loading & support conditions that act on structural systems. |
| | | CO2 | Students are able to understand the meaning of centers of gravity, centroids, moments of Inertia and rigid body dynamics. |
| | | CO3 | Students are able to solve problems dealing with forces, beam and cable problems and understand distributed force systems. |
| | | CO4 | Students are able to solve friction problems and determine moments of Inertia and centroid of practical shapes. |
| | | CO5 | Students are enabled to apply knowledge of mechanics in addressing problems in hydraulic machinery and its principles that will be utilized in Hydropower development and for other practical usages. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------------------------|-----|---|
| EE402PC | Measurements and Instrumentation | CO1 | Students are introduced to the basic principles of all measuring instruments. |
| | | CO2 | Students are enabled to deal with the measurement of voltage, current, Power factor, power, energy and magnetic measurements. |
| | | CO3 | Students are able to understand different types of measuring instruments, their construction, operation and characteristics and identify the instruments suitable for typical measurements. |
| | | CO4 | Students are able to apply the knowledge about transducers and instrument transformers to use them effectively |
| | | CO5 | Students are able to apply the knowledge of smart and digital metering for industrial applications. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|------------------------|-----|--|
| EE403PC | Electrical Machines-II | CO1 | Students learn the detailed analysis of poly-phase induction motors & Alternators. |
| | | CO2 | Students are able to understand operation, construction and types of single-phase motors and their applications in household appliances and control systems. |
| | | CO3 | Students are enabled to understand the concepts of rotating magnetic fields |
| | | CO4 | Students learn to examine the operation of ac machines. |
| | | CO5 | Students learn to analyze the performance characteristics of ac machines. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------|-----|--|
| EE404PC | Digital Electronics | CO1 | Students learn the fundamental concepts of digital system design and common forms of number representations and their conversions. |
| | | CO2 | Students are enabled to implement and design logical operations using combinational logic circuits and sequential logic circuits. |
| | | CO3 | Students are able to understand the working of logic families and logic gates |
| | | CO4 | Students learn to design and implement Combinational and Sequential logic circuits |
| | | CO5 | Students are able to implement the given logical problems using programmable logic devices. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------------|-----|---|
| EE406PC | Digital Electronics Laboratory | CO1 | Students learn the basic techniques for the design of digital circuits and number conversion systems. |
| | | CO2 | Students learn to implement simple logical operations using combinational logic circuits. |
| | | CO3 | Students are able to understand the working of logic families and logic gates. |
| | | CO4 | Students learn to design and implement Combinational and Sequential logic circuits. |
| | | CO5 | Students are able to analyze different types of semiconductor memories. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------|-----|---|
| EE405PC | Power System-II | CO1 | Students study the performance of transmission lines and travelling waves. |
| | | CO2 | Students are able to understand the concept of voltage control, compensation methods and per unit representation of power systems. |
| | | CO3 | Students learn to analyze transmission line performance and Apply load compensation techniques to control reactive power. |
| | | CO4 | Students are able to understand the application of per unit quantities in power systems. |
| | | CO5 | Students learn to design over voltage protection, insulation coordination and determine the fault currents for symmetrical and unbalanced faults. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|---|-----|---|
| EE407PC | Measurements and Instrumentation Laboratory | CO1 | Students learn to calibrate Watt, Energy and PF Meter and determination of three phase active & reactive powers |
| | | CO2 | Students are able to determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges & A. C Bridges. |
| | | CO3 | Students learn to choose and test any measuring instruments |
| | | CO4 | Students are able to find the accuracy of any instrument by performing experiments. |
| | | CO5 | Students are able to calculate the various parameters using different types of measuring instruments. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|---|-----|--|
| EE408PC | Electrical Machines Laboratory-II | CO1 | Students are able to understand the operation of Induction, Synchronous machines and Transformers. |
| | | CO2 | Students study the performance analysis of Induction and Synchronous Machines through various testing methods. |
| | | CO3 | Students are able to assess the performance of different types of AC machines using different testing methods. |
| | | CO4 | Students learn to analyze the suitability of AC machines and Transformers for real word applications. |
| | | CO5 | Students are able to design the machine models based on the application requirements. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------|-----|---|
| *MC410 | Constitution of India | CO1 | Students will be able to understand the premises informing the twin themes of liberty and freedom from a civil rights perspective. |
| | | CO2 | Students will be able to discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. |
| | | CO3 | Students are able to discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. |
| | | CO4 | Students will be able to discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution |
| | | CO5 | Students will be able to address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism |



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DEPARTMENT: ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTCOME'S (CO's): B.Tech I YEAR I AND II SEMESTERS

ACADEMIC YEAR: 2018 – 2019/2019 – 2020/2020 – 2021/2021 – 2022

I YEAR: I SEMESTER

| Subject Code | Course Name | CO's | Outcomes |
|--------------|-----------------|------|--|
| MA101BS | Mathematics - I | CO1 | Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations |
| | | CO2 | Find the Eigen values and Eigen vectors |
| | | CO3 | Reduce the quadratic form to canonical form using orthogonal transformations. |
| | | CO4 | Analyse the nature of sequence and series. Solve the applications on the mean value theorems. |
| | | CO5 | Evaluate the improper integrals using Beta and Gamma functions. Find the extreme values of functions of two variables with/ without constraints. |

| Subject Code | Course Name | CO's | Outcomes |
|--------------|-------------|------|---|
| CH102BS | Chemistry | CO1 | The knowledge of atomic, molecular and electronic changes, band theory related to conductivity. |
| | | CO2 | The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments. |
| | | CO3 | The required skills to get clear concepts on basic spectroscopy and application to medical and other fields. |
| | | CO4 | The knowledge of configurational and conformational analysis of molecules and reaction mechanisms. |
| | | CO5 | The knowledge of Spectroscopic techniques and applications |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------------------|-----|---|
| EN508HS | Advanced Communication Skills Lab | CO1 | Acquire vocabulary and use it contextually |
| | | CO2 | Listen and speak effectively, confidently in formal and informal contexts |
| | | CO3 | Develop proficiency in academic reading and writing |
| | | CO4 | Increase possibilities of job prospects |
| | | CO5 | Communicate confidently in formal and informal contexts. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|------------------------------|-----|--|
| MC510 | Intellectual Property Rights | CO1 | Distinguish and Explain various forms of IPRs |
| | | CO2 | Identify criteria's to fit one's own intellectual work in particular form of IPRs |
| | | CO3 | Apply statutory provisions to protect particular form of IPRs. |
| | | CO4 | Identify procedure to protect different forms of IPRs national and international level |
| | | CO5 | Develop skill of making search using modern tools and techniques. |





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III YEAR – II SEMESTER

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------------|-----|---|
| EE613PE | Wind and Solar Energy Systems | CO1 | To study the physics of wind power and energy |
| | | CO2 | To understand the principle of operation of wind generators |
| | | CO3 | To know the solar power resources |
| | | CO4 | To analyze the solar photo-voltaic cell |
| | | CO5 | To discuss the solar thermal power generation |

| Subject Code | Course Name | COs | Outcomes |
|--------------|------------------------------------|-----|---|
| ME800OE | Non Conventional Sources of Energy | CO1 | Identify renewable energy sources and their utilization. |
| | | CO2 | Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems |
| | | CO3 | Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas and hydrogen |
| | | CO4 | Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator |
| | | CO5 | Identify methods of energy storage for specific applications |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------|-----|---|
| EE601PC | Signals and Systems | CO1 | Differentiate various signal functions. |
| | | CO2 | Represent any arbitrary signal in time and frequency domain. |
| | | CO3 | Understand the characteristics of linear time invariant systems. |
| | | CO4 | Analyze the signals with different transform technique |
| | | CO5 | Analyze discrete time signals and systems by using appropriate mathematical tools |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------------------|-----|--|
| EE602PC | Microprocessors and Microcontrollers | CO1 | Understands the internal architecture, organization and assembly language programming of 8086 processors |
| | | CO2 | Understands the internal architecture, organization and assembly language programming of 8051 microcontrollers |
| | | CO3 | Understands the interfacing techniques to 8086 and 8051 based systems |
| | | CO4 | Understands the internal architecture of ARM processors and basic concepts of advanced ARM Processors. |
| | | CO5 | Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices. |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|------------------|-----|--|
| EE605PC | Power System Lab | C01 | Perform various load flow techniques |
| | | C02 | Understand Different protection method |
| | | C03 | Analyze the experimental data and draw the conclusions. |
| | | C04 | Perform various load flow techniques |
| | | C05 | Students will be able to find sequence impedance of three phase synchronous machine and transformer. |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------|-----|---|
| EE603PC | Power System Protection | CO1 | Compare and contrast electromagnetic, static and microprocessor-based relays |
| | | CO2 | Apply technology to protect power system components. |
| | | CO3 | Select relay settings of over current and distance relays. |
| | | CO4 | Analyze quenching mechanisms used in air, oil and vacuum circuit breakers |
| | | CO5 | To understand the phenomenon of over voltages and its characteristics and neutral grounding for overall protection. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|------------------------------------|-----|--|
| EE604PC | Power System Operation and Control | CO1 | To know the importance of frequency control |
| | | CO2 | Understand operation and control of power systems. |
| | | CO3 | Analyze various functions of Energy Management System (EMS) functions. |
| | | CO4 | Analyze whether the machine is in stable or unstable position. |
| | | CO5 | Understand power system deregulation and restructuring |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|---|-----|---|
| EE606PC | Microprocessors and Microcontrollers Lab | CO1 | Identify relevant information to supplement to the Microprocessor and Microcontroller course. Arithmetic, Logical, String Operations on 16 Bit and 32-Bit Data Bit level Logical Operations, Rotate, Shift, Swap and Branch Operations |
| | | CO2 | Set up programming strategies and select proper mnemonics and run their program on the training boards. |
| | | CO3 | Practice different types of programming Assembly Language Programs to Perform Arithmetic (Both Signed and Unsigned) 16 Bit Data Operations, Logical Operations (Byte and Bit Level Operations), Rotate, Shift, Swap and Branch Instructions Time delay Generation using Timers of 8051. Serial Communication from/to 8051 to/from I/O devices |
| | | CO4 | Develop testing and experimental procedures on Program Using Interrupts to Generate Square Wave 10 KHZ Frequency on P2.1 Using Timer 0 8051 in 8 bit Auto reload Mode and Connect a 1 HZ Pulse to INT1 pin and Display on Port 0. Assume Crystal Frequency as 11.0592 MHZ |
| | | CO5 | Prepare Interfacing I/O Devices to 8051, 7 Segment Display to 8051. Matrix Keypad to 8051, Sequence Generator Using Serial Interface in 8051. 8 bit ADC Interface to 8051. Triangular Wave Generator through DAC interfaces to 8051. |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------|-----|---|
| EE607PC | Signals and Systems lab | CO1 | Understand the concepts of continuous time and discrete time systems. |
| | | CO2 | Analyze systems in complex frequency domain. |
| | | CO3 | Understand sampling theorem and its implications |
| | | CO4 | Understand the concepts of continuous time and discrete time systems. |
| | | CO5 | To analyze sampling principles and various transform techniques. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------|-----|--|
| | Cyber Security | CO1 | To familiarize various types of cyber-attacks and cyber-crimes |
| | | CO2 | To give an overview of the cyber laws |
| | | CO3 | To study the defensive techniques against these attacks |
| | | CO4 | To study cybersecurity challenges and implications. |
| | | CO5 | To know about Cyber Security. |





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IV YEAR – I SEMESTER

| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|--|
| SM701MS | Fundamentals of Management for Engineers | CO1 | The students understand the significance of Management in their Profession. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area. |
| | | CO2 | Understand the management concepts |
| | | CO3 | Analyze the concepts of management |
| | | CO4 | Development of managerial skills for engineers |
| | | CO5 | Applications of concepts in practical aspects |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------------|-----|---|
| EE711PE | Electrical and Hybrid Vehicles | CO1 | Understand the models to describe hybrid vehicles and their performance. |
| | | CO2 | Understand the different possible ways of energy storage. |
| | | CO3 | Understand the different strategies related to energy storage systems. |
| | | CO4 | To understand the fundamentals concepts, principles, analysis and design of hybrid and electric vehicles. |
| | | CO5 | Students will be able to know the various aspects of hybrid and electric drive train. |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------------|-----|---|
| EE721PE | HVDC Transmission | CO1 | Compare EHV AC and HVDC system and to describe various types of DC links |
| | | CO2 | Analyze Graetz circuit for rectifier and inverter mode of operation |
| | | CO3 | Describe various methods for the control of HVDC systems and to perform power flow analysis |
| | | CO4 | To study AC/DC systems |
| | | CO5 | Describe various protection methods for HVDC systems and classify Harmonics and design |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------------|-----|--|
| MN700OE | Health and Safety in Mines | CO1 | Students are able to understand the basics of health and safety in mines |
| | | CO2 | Evaluate the concept of health and safety in underground |
| | | CO3 | Understand the techniques, system engineering approach and the generic approach to safety in mining operations. |
| | | CO4 | Understand the concept of safety |
| | | CO5 | Gain the knowledge and be able to understand the importance of health and safety including the role of safety risk assessment in the mining industry |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------------------------|-----|--|
| EE701PC | Electrical and Electronics Design Lab | CO1 | Get practical knowledge related to electrical |
| | | CO2 | Fabricate basic electrical circuit elements/networks |
| | | CO3 | Trouble shoot the electrical circuits |
| | | CO4 | Design filter circuit for application |
| | | CO5 | Get hardware skills such as soldering, winding etc. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|---|
| EE702PC | Industrial Oriented Mini Project / Summer Internship | CO1 | Students will be able to practice acquired knowledge within the chosen area of technology for project development. |
| | | CO2 | Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. |
| | | CO3 | Reproduce, improve and refine technical aspects for engineering projects. |
| | | CO4 | Work as an individual or in a team in development of technical projects. |
| | | CO5 | Communicate and report effectively project related activities and findings |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------|-----|--|
| EE703PC | Seminar | CO1 | Establish motivation for any topic of interest and develop a thought process for technical presentation. |
| | | CO2 | Organize a detailed literature survey and build a document with respect to technical publications. |
| | | CO3 | Analysis and comprehension of proof-of-concept and related data |
| | | CO4 | Effective presentation and improve soft skills. |
| | | CO5 | Make use of new and recent technology (e.g. Latex) for creating technical reports |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------|-----|--|
| EE704PC | Project Stage - I | CO1 | Demonstrate a sound technical knowledge of their selected project topic. |
| | | CO2 | Undertake problem identification, formulation and solution. |
| | | CO3 | Design engineering solutions to complex problems utilising a systems approach |
| | | CO4 | Conduct an engineering project |
| | | CO5 | Communicate with engineers and the community at large in written an oral forms |





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IV YEAR – II SEMESTER

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------|-----|--|
| EE811PE | Power Quality and FACTS | CO1 | The student will be able to Know the severity of power quality problems in distribution system and Understand the concept of voltage sag transformation from up-stream (higher voltages) to down-stream (lower voltage). |
| | | CO2 | knowledge of FACTS Concept and general system considerations and Series/shunt reactive compensation at mid point & its comparison. |
| | | CO3 | Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping |
| | | CO4 | Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC |
| | | CO5 | Knowledge of the Unified Power Flow Controller including its circuit arrangement, Operation and control. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------------------|-----|---|
| EE822PE | Electrical Distribution Systems | CO1 | To distinguish between transmission and distribution systems and feeder analysis. |
| | | CO2 | To understand Substation installation and to analyze the power loss in Substation and Voltage drop. |
| | | CO3 | Design protection of distribution systems. Coordination of Protective devices. |
| | | CO4 | To understand the importance of compensation and pf improvement |
| | | CO5 | To understand the importance of protection of voltage control and pf improvement |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|---|-----|---|
| ME800OE | Non Conventional Sources of Energy | CO1 | Identify renewable energy sources and their utilization. |
| | | CO2 | Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems |
| | | CO3 | Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas and hydrogen |
| | | CO4 | Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator |
| | | CO5 | Identify methods of energy storage for specific applications |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------|-----|---|
| EE704PC | Project Stage - II | CO1 | Demonstrate a sound technical knowledge of their selected project topic. |
| | | CO2 | Undertake problem identification, formulation and solution. |
| | | CO3 | Design engineering solutions to complex problems utilizing a systems approach. |
| | | CO4 | Communicate with engineers and the community at large in written and oral forms |
| | | CO5 | Conduct an engineering project |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------|-----|--|
| EE403PC | Digital Electronics | CO1 | Understand working of logic families and logic gates. |
| | | CO2 | Design and implement Combinational and Sequential logic circuits. |
| | | CO3 | Understand the process of Analog to Digital conversion and Digital to Analog conversion. |
| | | CO4 | Students will be able to use PLDs to implement the given logical problem. |
| | | CO5 | To implement synchronous state machines using flip-flops |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------|-----|---|
| EE405PC | Control Systems | CO1 | Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form. |
| | | CO2 | Characterize any system in Laplace domain to illustrate different specification of the system using transfer function concept. |
| | | CO3 | Interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis. |
| | | CO4 | Employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions. |
| | | CO5 | Formulate different types of analysis in frequency domain to explain the nature of stability of the system. |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------|-----|--|
| EE404PC | Power Systems - I | CO1 | Understand the concepts of power systems. |
| | | CO2 | Understand the operation of conventional generating stations and renewable sources of electrical power |
| | | CO3 | Evaluate the power tariff methods. |
| | | CO4 | Determine the electrical circuit parameters of transmission lines |
| | | CO5 | Understand the layout of substation and underground cables and corona. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------|-----|---|
| EE406PC | Digital Electronics Lab | CO1 | Understand working of logic families and logic gates. |
| | | CO2 | Design and implement Combinational and Sequential logic circuits. |
| | | CO3 | Understand the process of Analog to Digital conversion and Digital to Analog conversion |
| | | CO4 | Be able to use PLDs to implement the given logical problem |
| | | CO5 | To implement synchronous state machines using flip flops. |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|------------------------------------|-----|---|
| EE407PC | Electrical Machines Lab - II | CO1 | Assess the performance of different machines using different testing methods |
| | | CO2 | To convert the Phase from three phase to two phase and vice versa |
| | | CO3 | Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods |
| | | CO4 | Control the active and reactive power flows in synchronous machines |
| | | CO5 | Start different machines and control the speed and power factor. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|------------------------|-----|--|
| EE408PC | Control Systems Lab | CO1 | To improve the system performance by selecting a suitable controller and/or a compensator for a specific application |
| | | CO2 | Apply various time domain and frequency domain techniques to assess the system performance |
| | | CO3 | Apply various control strategies to different applications(example: Power systems, electrical drives etc) |
| | | CO4 | Test system controllability and observability using state space representation and applications of state space representation to various systems |
| | | CO5 | To design various controllers and compensators to improve system performance. |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------|-----|--|
| MC409 | Constitution of India | CO1 | To realize the significance of constitution of India to students from all walks of life and help them to understand the basic concepts of Indian constitution. |
| | | CO2 | To identify the importance of fundamental rights as well as fundamental duties |
| | | CO3 | To understand the functioning of Union, State and Local Governments in Indian federal system. |
| | | CO4 | To learn procedure and effects of emergency, composition and activities of election commission and amendment procedure. |
| | | CO5 | To learn procedure and effects of emergency, composition and activities of election commission and amendment procedure. |





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III YEAR – I SEMESTER

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------|-----|--|
| EE501PE | Power Electronics | CO1 | Students ability to Understand the differences between signal level and power level devices and types of components & its characteristics. |
| | | CO2 | Analyze the controlled rectifier circuits of single phase and three phase for different loads. |
| | | CO3 | Analyze the operation of DC-DC choppers and its types |
| | | CO4 | Analyze the operation of voltage source inverters of single phase and three phase for different loads |
| | | CO5 | Analyze the AC-AC controlled circuits of single phase and three phase for different loads and principle of cyclo converter. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------|-----|--|
| EE502PE | Power System - II | CO1 | Analyze transmission line performance. |
| | | CO2 | Apply load compensation techniques to control reactive power |
| | | CO3 | Understand the application of per unit quantities. |
| | | CO4 | Design over voltage protection and insulation coordination |
| | | CO5 | Determine the fault currents for symmetrical and unbalanced faults |





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| Subject Code | Course Name | CO's | Outcomes |
|--------------|-------------|------|---|
| EN105HS | English | CO1 | Use English Language effectively in spoken and written forms. |
| | | CO2 | Comprehend the given texts and respond appropriately. |
| | | CO3 | Communicate confidently in various contexts and different cultures. |
| | | CO4 | Acquire basic proficiency in English including reading and listening comprehension, |
| | | CO5 | Acquire basic proficiency in English for writing and speaking skills. |

| Subject Code | Course Name | CO's | Outcomes |
|--------------|---------------------------|------|---|
| CH106BS | Engineering Chemistry Lab | CO1 | Determination of parameters like hardness and chloride content in water. |
| | | CO2 | Estimation of rate constant of a reaction from concentration – time relationships. |
| | | CO3 | Determination of physical properties like adsorption and viscosity. |
| | | CO4 | Calculation of R _f values of some organic molecules by TLC technique. |
| | | CO5 | Understand the Spectroscopic techniques and applications for important organic compounds. |



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| Subject Code | Course Name | CO's | Outcomes |
|--------------|------------------------------|------|---|
| EE103ES | Basic Electrical Engineering | CO1 | To analyze and solve electrical circuits using network laws and theorems. |
| | | CO2 | To understand and analyze basic Electric and Magnetic circuits |
| | | CO3 | To study the working principles of Electrical Machines |
| | | CO4 | To introduce components of Low Voltage Electrical Installations |
| | | CO5 | To understand the types of Batteries and Important Characteristics for Batteries. |

| Subject Code | Course Name | CO's | Outcomes |
|--------------|----------------------|------|--|
| ME105ES | Engineering Workshop | CO1 | Study and practice on machine tools and their operations. |
| | | CO2 | Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding. |
| | | CO3 | Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling. |
| | | CO4 | Explains the construction, function, use and application of different working tools, equipment and machines. |
| | | CO5 | Apply basic electrical engineering knowledge for house wiring practice. |



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| Subject Code | Course Name | CO's | Outcomes |
|--------------|---|------|---|
| 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 enhances their employability skills |
| | | CO4 | Able to spoken English and neutralize their mother tongue influence |
| | | CO5 | able to use language appropriately for public speaking and interviews |

| Subject Code | Course Name | CO's | Outcomes |
|--------------|----------------------------------|------|---|
| EE108ES | Basic Electrical Engineering Lab | CO1 | Get an exposure to basic electrical laws. |
| | | CO2 | Understand the response of different types of electrical circuits to different excitations. |
| | | CO3 | Understand the measurement, calculation and relation between the basic electrical parameters. |
| | | CO4 | Understand the basic characteristics of transformers and electrical machines. |
| | | CO5 | Understand No-Load Characteristics of a Three-phase Alternator |



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I YEAR: II SEMESTER

| Subject Code | Course Name | CO's | Outcomes |
|--------------|------------------|------|--|
| MA201BS | Mathematics - II | CO1 | Identify whether the given differential equation of first order is exact or not |
| | | CO2 | Solve higher differential equation and apply the concept of differential equation to real world Problems. |
| | | CO3 | Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped. |
| | | CO4 | Evaluate the line, surface and volume integrals and converting them from one to another. |
| | | CO5 | Knowledge in Vector Integration |

| Subject Code | Course Name | CO's | Outcomes |
|--------------|-----------------|------|--|
| AP202BS | Applied Physics | CO1 | The student would be able to learn the fundamental concepts on Quantum behaviour of matter in its micro state. |
| | | CO2 | The knowledge of fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre Optics enable the students to apply to various systems like communications, solar cell, photo cells and so on. |
| | | CO3 | Knowledge in Optoelectronics |
| | | CO4 | Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications. |
| | | CO5 | The course also helps the students to be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials |



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| Subject Code | Course Name | CO's | Outcomes |
|--------------|---------------------------------|------|--|
| CS203ES | Programming for Problem Solving | CO1 | To write algorithms and to draw flowcharts for solving problems. |
| | | CO2 | To convert the algorithms/flowcharts to C programs. |
| | | CO3 | To code and test a given logic in C programming language. |
| | | CO4 | To decompose a problem into functions and to develop modular reusable code. |
| | | CO5 | To use arrays, pointers, strings and structures to write C programs. Searching and sorting problems. |

| Subject Code | Course Name | CO's | Outcomes |
|--------------|----------------------|------|---|
| ME204ES | Engineering Graphics | CO1 | Preparing working drawings to communicate the ideas and information. |
| | | CO2 | Read, understand and interpret engineering drawings |
| | | CO3 | Development of Surfaces of Right Regular Solids, Prism, Cylinder, Pyramid and Cone, |
| | | CO4 | Understand the Principles of Isometric Projection. |
| | | CO5 | Knowledge to CAD Software Package Commands |

| Subject Code | Course Name | CO's | Outcomes |
|--------------|---------------------|------|---|
| AP205BS | Applied Physics Lab | CO1 | Understand the V-I Characteristics of solar cell |
| | | CO2 | determine magnetic field along the axis of a current carrying coil. |
| | | CO3 | determine Hall co-efficient of a given semiconductor |
| | | CO4 | determine the bending losses of Optical fibres.□ |
| | | CO5 | determine the Quality factor of LCR Circuit. |



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| Subject Code | Course Name | CO's | Outcomes |
|--------------|-------------------------------------|------|---|
| CS206ES | Programming for Problem Solving Lab | CO1 | formulate the algorithms for simple problems |
| | | CO2 | translate given algorithms to a working and correct program. |
| | | CO3 | correct syntax errors as reported by the compilers. Identify and correct logical errors encountered during execution. |
| | | CO4 | represent and manipulate data with arrays, strings and structures and use pointers of different types |
| | | CO5 | □ create, read and write to and from simple text and binary files and modularize the code with functions so that they can be reused |

| Subject Code | Course Name | CO's | Outcomes |
|--------------|-----------------------|------|--|
| MC209ES | Environmental Science | CO1 | understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development |
| | | CO2 | Classify Living and Non-Living resources |
| | | CO3 | Define Biodiversity and Biotic Resources |
| | | CO4 | Understand the Environmental Pollution and Control Technologies |
| | | CO5 | Understand Environmental Policy, Legislation & EIA |



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COURSE OUTCOMES FOR II YEAR TO IV YEAR (R18)

Academic Year – 2018-2019/2019-2020/2020-2021/2021-2022

| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------|-----|---|
| EE301ES | Engineering Mechanics | CO1 | Students are able to determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces. |
| | | CO2 | Students can solve the problem of bodies subjected to friction. |
| | | CO3 | Students are able to find the location of centroid and calculate moment of inertia of a given section |
| | | CO4 | Students are able to Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion. |
| | | CO5 | To solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------------------|-----|--|
| EE503PE | Measurement and Instrumentation | CO1 | Identify various types of electronic instrument suitable for specific measurement and Classify various errors present in measuring instruments. |
| | | CO2 | Understand construction, working principle and types of oscilloscopes. |
| | | CO3 | Comprehend different types of signal generators and analyzers, their construction and operation |
| | | CO4 | Describe the working principle, selection criteria and applications of various transducers used in measurement systems. |
| | | CO5 | Identify various types of electronic instrument suitable for specific measurement. And Classify various errors present in measuring instruments. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------|-----|--|
| EE512PE | High Voltage Engineering | CO1 | Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials. |
| | | CO2 | Knowledge of generation and measurement of DC. |
| | | CO3 | Knowledge of tests on HV equipment and on insulating materials |
| | | CO4 | Knowledge of how over-voltages arise in a power system |
| | | CO5 | Understanding high voltage testing methods |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|--|-----|--|
| SM504MS | Business Economics and Financial Analysis | CO1 | The students will understand the various Forms of Business and the impact of economic variables on the Business. |
| | | CO2 | The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt |
| | | CO3 | To Acquire knowledge on pricing strategies for the products |
| | | CO4 | The Students can study the firm's financial position by analysing the Financial Statements of a Company. |
| | | CO5 | Familiarize with Finical Analysis through ratios. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|------------------------------------|-----|---|
| EE505PC | Power System Simulation Lab | CO1 | Perform various transmission line calculations |
| | | CO2 | Understand Different circuits time constants |
| | | CO3 | Analyze the experimental data and draw the conclusions. |
| | | CO4 | To analyze the data using software tools |
| | | CO5 | To understand the high frequency transitions. |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------|-----|--|
| EE506PC | Power Electronics Lab | CO1 | Students must be able to correlate theoretical and practical analysis of AC-AC, DC-AC converters, AC and DC drives |
| | | CO2 | Analyze the characteristics of MOSFET, IGBT, SCR and SCR firing CKTs, |
| | | CO3 | Able to understand these commutation techniques. |
| | | CO4 | Able to understand about series and parallel inverters. |
| | | CO5 | Able to understand about converter fed to AC and DC drives. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------------------|-----|---|
| EE507PC | Measurement and Instrumentation Lab | CO1 | The student is able to choose instruments |
| | | CO2 | The student is able to test any instrument |
| | | CO3 | Find the accuracy of any instrument by performing experiment |
| | | CO4 | Calibrate PMMC instrument using D.C potentiometer |
| | | CO5 | Students will be determined ratio and phase angle errors of current and potential transformer |





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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------|-----|---|
| EE303PC | Analog Electronics | CO1 | Know the characteristics, utilization of various components. |
| | | CO2 | Understand the biasing techniques |
| | | CO3 | Design and analyze various rectifiers, small signal amplifier circuits |
| | | CO4 | Design sinusoidal and non-sinusoidal oscillators. |
| | | CO5 | A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------------|-----|---|
| EE302PC | Electrical Circuit Analysis | CO1 | Apply network theorems for the analysis of electrical circuits. |
| | | CO2 | Obtain the transient and steady-state response of electrical circuits |
| | | CO3 | Analyze circuits in the sinusoidal steady-state (single-phase and three-phase). |
| | | CO4 | Analyze the Laplace transform to circuits |
| | | CO5 | Analyze two port circuit behaviour. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|----------------------------|-----|--|
| EE304PC | Electrical Machines - I | CO1 | Students are able to identify different parts of a DC machine & understand its operation |
| | | CO2 | Students can carry out different testing methods to predetermine the efficiency of DC machines |
| | | CO3 | Students understand different excitation and starting methods of DC machines. |
| | | CO4 | Students are able to understand and control the voltage and speed of a DC machines |
| | | CO5 | Analyze single phase and three phase transformers circuits |

| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------------|-----|--|
| EE305PC | Electromagnetic Fields | CO1 | Understand the basic mathematical concepts related to electromagnetic vector fields. . |
| | | CO2 | Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density |
| | | CO3 | Apply the principles of magneto statics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density. |
| | | CO4 | Understand the concepts related to Faraday's law, induced emf and Maxwell's equations. |
| | | CO5 | Apply Maxwell's equations to solutions of problems relating to transmission lines and uniform plane wave propagation. |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|-----------------------------------|-----|--|
| EE306PC | Electrical Machines Lab - I | CO1 | Acquire knowledge about the working of DC machines as generators and motors and start and control the Different DC Machines. |
| | | CO2 | Assess the performance of different machines using different testing methods |
| | | CO3 | Identify different conditions required to be satisfied for self – excitation of DC Generators |
| | | CO4 | Separate iron losses of DC machines into different components |
| | | CO5 | Analyze single phase and three phase transformer circuits |

| Subject Code | Course Name | COs | Outcomes |
|--------------|---------------------------|-----|---|
| EE307PC | Analog Electronics Lab | CO1 | Know the characteristics, utilization of various components. |
| | | CO2 | Understand the biasing techniques |
| | | CO3 | Design and analyze various rectifiers, small signal amplifier circuits. |
| | | CO4 | Design sinusoidal and non-sinusoidal oscillators. |
| | | CO5 | A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear |



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| Subject Code | Course Name | COs | Outcomes |
|--------------|-------------------------|-----|--|
| EE308PC | Electrical Circuits Lab | CO1 | Student should be able to analyze complex DC and AC linear circuits |
| | | CO2 | Student should be able to Evaluate response in a given network by using theorems |
| | | CO3 | Apply concepts of electrical circuits across engineering |
| | | CO4 | Student should be able to measure active and reactive powers for star and delta connected balanced loads |
| | | CO5 | Student should be able to express given Electrical Circuit in terms of A, B, C, D and Z, Y Parameter Model and Solve the circuits. |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------|-----|---|
| MC309 | Gender Sensitization Lab | CO1 | Students will have developed a better understanding of important issues related to gender in contemporary India. |
| | | CO2 | Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film. |
| | | CO3 | Students will attain a finer grasp of how gender discrimination works in our society and how to counter it. |
| | | CO4 | Students will acquire insight into the gendered division of labour and its relation to politics and economics. |
| | | CO5 | Men and women students and professionals will be better equipped to work and live together as Year 2 equals. |



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DR. V.R.K WOMEN'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ISO 9001:2015 CERTIFIED INSTITUTION
Approved by AICTE & Permitted by Government of Telangana State
Affiliated to Jawaharlal Nehru Technological University Hyderabad
Aziznagar (V), Moinsabad (M), R.R. Dist. 500 075 - T.S.
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II YEAR – II SEMESTER

| Subject Code | Course Name | COs | Outcomes |
|--------------|---|-----|--|
| MA401BS | Laplace Transforms, Numerical Methods and Complex Variables | CO1 | Analyze the Laplace transforms techniques for solving ODE's |
| | | CO2 | Evaluate the root of a given equation. Estimate the value for the given data using interpolation. |
| | | CO3 | Students are able to find the numerical solutions for a given ODE' |
| | | CO4 | Analyze the complex function with reference to their analyticity, integration using Cauchy's Integral and residue theorems |
| | | CO5 | Students are able to understand Taylor's and Laurent's series expansions of complex Function |

| Subject Code | Course Name | COs | Outcomes |
|--------------|--------------------------|-----|---|
| EE402PC | Electrical Machines - II | CO1 | Understand the concepts of rotating magnetic fields. |
| | | CO2 | Understand the operation of ac machines. |
| | | CO3 | Analyze performance characteristics of AC machines. |
| | | CO4 | To understand operation, construction and types of single phase motors and their applications in house hold appliances and control systems. |
| | | CO5 | Analyze the concept of regulation and its calculations and special machines. |



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