

Department of Electrical and Electronics Engineering

2015 TO 2019 BATCH

COURSE	COURSE OUTCOMES	
<p align="center">English – I C101</p>	<p align="center">C101.1</p>	<p>Acquired listening, speaking, reading and writing skills necessary for the survival in the postmodern society through task-based and skill-based communication practices with judicious integration of modern tools.</p>
	<p align="center">C101.2</p>	<p>Realization of technical communicative competence and attainment of group dynamism and problem solving skills through standard oral and written language models.</p>
	<p align="center">C101.3</p>	<p>Development of fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.</p>
	<p align="center">C101.4</p>	<p>Imbibe lifelong reading habit among the learners to grow both professionally and socially with ethical principles and values.</p>
	<p align="center">C101.5</p>	<p>Application of own ideas as informed opinions that are in dialogue with a larger community of interpreters, and understand how their own approach compares to the variety of critical and theoretical approaches.</p>
	<p align="center">C101.6</p>	<p>Demonstration of intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.</p>
<p align="center">Mathematics – I C102</p>	<p align="center">C102.1</p>	<p>Identify and solve the first order differential equations. Able to model the real world problems using differential equations and analyze their solutions</p>
	<p align="center">C102.2</p>	<p>Solve the higher order linear differential equations and model the electrical circuits using differential equations.</p>
	<p align="center">C102.3</p>	<p>Understand and determine Laplace and Inverse Laplace transform of certain functions and solve an initial value problem for a differential equation using Laplace transform.</p>
	<p align="center">C102.4</p>	<p>Acquire knowledge on partial differentiation and calculate total derivative, Jacobian and Maxima and Minima of function of several variables.</p>
	<p align="center">C102.5</p>	<p>Form a partial differential equation and solve first order linear and non-linear partial differential equations.</p>
	<p align="center">C102.6</p>	<p>Solve higher order homogeneous and non-homogeneous partial differential equations. Also able to classify second order partial differential equations.</p>

Applied Chemistry C103	C103.1	Understand the properties & the need of polymers in every section of the Society like Education, construction, transport, agriculture, education, and IT etc.
	C103.2	Recognizes the Composition, Properties & the uses of various fuels for both domestic & industrial purpose economically, & The problems arise in Internal Combustion Engine
	C103.3	Understand how the metals & its structures are getting destructed due to electrochemical reactions & identify its protective methods. Also learns the reactions & applications of various used for diff. Purposes.
	C103.4	Understand the different advanced materials & their applications in various fields of science and technology.
	C103.5	Understand how solids can make modern technology to sustain in Engg. & architecture and their use as semiconductors in power distribution & IT.
	C103.6	Realizes how to protect & conserve natural resources for future generation and the various applications of Fuel cells.
Engineering Mechanics C104	C104.1	To find the resultant of any number of forces and can apply friction concept for a given body. (RBT Level 4: Analyze)
	C104.2	To draw free body diagram for a given body can calculate the forces in members of the truss. (RBT Level 4: Analyze)
	C104.3	To find the centroids and Centre of gravity of composite sections. (RBT Level 4: Analyze)
	C104.4	To evaluate and find the moment of inertia of composite sections. (RBT Levels 2: Understand & Evaluate & 4: Analyze)
	C104.5	To analyze the motion of the bodies and the forces causing the motion. (RBT Level 4: Analyze)
	C104.6	To apply Work-Energy and Impulse-Momentum equations to find out the different parameters. (RBT Level : 3. Apply & Level 4: Analyze)
Computer Programming C105	C105.1	Understand the basic terminology used in computer programming.
	C105.2	Write, compile and debug programs in C language also able to use operators in the programming.
	C105.3	Design and analyze programs involving decision structures, loops and functions.
	C105.4	Apply arrays, strings and dynamic memory allocation concepts to solve problems.
	C105.5	Design and develop programs using different user defined data types

	C105.6	Analyze ,Design and develop file handling programs
Environmental Studies C106	C106.1	Student will be able to know about the environment, components, structure, functions of the environment and ecosystem.
	C106.2	Understands about the natural resources and environmental impacts and which kind of methods are to be applied for the sustainable development.
	C106.3	Ability to understand the biodiversity of India and identifies its threats. Apply the knowledge about the conservation practices to protect the biodiversity.
	C106.4	Acquire knowledge on environmental pollution and their effects on biotic and a biotic components and control measures of pollution.
	C106.5	Able to identify social issues both rural and urban environment and the possible means to apply the environmental legislations of India towards sustainable development
	C106.6	Able to acquire the knowledge on environmental assessment and stages involved in EIA and environmental audit for the self-sustaining and eco-friendly green campus
Applied / Engineering Chemistry Laboratory C107	C107.1	Enabling students to use Computer assisted Language Laboratory (CALL) to enhance their pronunciation through stress, intonation and rhythm for routine and spontaneous interaction
	C107.2	Attainment of communicative competence for the fulfillment of academic, professional and social purposes.
	C107.3	Attainment of language Proficiency through Contextualized, Task Based Activities to realize employment potential at the end of the course.
	C107.4	Acquired listening, speaking, reading and writing skills necessary for the survival in the postmodern society through task-based and skill-based communication practices with judicious integration of modern tools.
	C107.5	Development of fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.
	C107.6	Realization of technical communicative competence and attainment of group dynamism and problem solving skills through standard oral and written language models.
English-Communication Skills Laboratory – I	C108.1	Students have practical exposure on volumetric analysis
	C108.2	Students acquire the skill to perform the Acid-Base titration in the real lab.

C108	C108.3	Students acquire the skill to perform the Alkalinity of a sample in the real lab.
	C108.4	Students acquire the skill to perform the Redox titrations of a sample in the real lab
	C108.5	Students acquire the skill to prepare standard solutions of Mohr's salt.
	C108.6	Students acquire the skill to perform the Iodometric titration in the real lab
	C108.7	Students acquire the skill to perform the quality of raw water in the real lab
	C108.8	Students acquire the skill to perform the Complex metric-titration in the real lab
	C108.9	Students would be aware of instrumental methods of chemical analysis
	C108.10	Students acquire the skill to determine the concentration of H ⁺ ions for a given water sample using. Ph Meter in the real lab.
	C108.11	Students would be aware of instrument like conductivity meter
	C108.12	Students would be aware of instrument like potentiometer
	C108.13	Students acquire the skill to determine the Vitamin – C concentration using volumetric analysis
COURSE	COURSE OUTCOMES	
C Programming Laboratory C109	C109.1	Apply and practice logical ability to solve the problems.
	C109.2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
	C109.3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
	C109.4	Understand and apply User defined data types the pointers, memory allocation techniques.
	C109.5	Understand and apply the use of files for dealing with variety of problems.
COURSE	COURSE OUTCOMES	
English – II C110	C110.1	Acquired listening, speaking, reading and writing skills necessary for the survival in the postmodern society through task-based and skill-based communication practices with judicious integration of modern tools.
	C110.2	Realization of technical communicative competence and attainment of group dynamism and problem solving skills through standard oral and written language models.

	C110.3	Development of fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.
	C110.4	Imbibe lifelong reading habit among the learners to grow both professionally and socially with ethical principles and values.
	C110.5	Application of own ideas as informed opinions that are in dialogue with a larger community of interpreters, and understand how their own approach compares to the variety of critical and theoretical approaches.
	C110.6	Demonstration of intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.
COURSE	COURSE OUTCOMES	
Mathematics – II C111	C111.1	Solve an algebraic or transcendental equation using an appropriate numerical method
	C111.2	Acquire knowledge on the process of interpolation. Able to apply suitable interpolation methods to find the interpolation polynomials/values for the given data.
	C111.3	Able to apply numerical integration to evaluate definite integral and solving ordinary differential equations by using Taylor's series, Picard's method, Euler's method, Modified Euler's method and Runge-Kutta method.
	C111.4	Skill to find the Fourier series of different functions.
	C111.5	Attain knowledge on Wave equation, one dimensional heat equation and two dimensional heat equation (Laplacian equation) and obtain solutions of these Partial differential equations using method of separation of variables.
	C111.6	Understand the concept of Fourier transforms and find Fourier transforms for different functions.
COURSE	COURSE OUTCOMES	
Mathematics – III C112	C112.1	Determine the rank of a matrix by reducing to echelon form, normal form & solve system of simultaneous linear equations and apply these methods to find the current in electrical circuits using matrices.
	C112.2	Solve the problems related to Eigen values & Eigen vectors of a given matrix, determine the inverse and powers of a matrix using Cayley – Hamilton theorem and identify the rank, nature and index of a Quadratic form.
	C112.3	Identify the given curve by interpreting different properties of the curve. Able to determine Double integral over a surface and triple integral over a volume and find the areas and volumes of solids using double and triple integrals.

	C112.4	Understand Beta & Gamma functions and able to evaluate improper integrals using beta, gamma functions
	C112.5	Find the gradient of a scalar function, divergence & curl of a vector function and determine normal, flux and scalar potential using vector differentiation.
	C112.6	Determine line, surface and volume integrals and able to verify Green's, Stoke's and Gauss divergence theorems
COURSE	COURSE OUTCOMES	
Applied Physics C113	C113.1	Apply the basic principles and properties of light to construct and understanding the working mechanism of instruments such as Interferometer and Diffraction meter (RBT Levels: 2.Understand & 3. Apply)
	C113.2	Construct the Polarimeter by the polarization of light. (RBT Level : 3. Apply)
	C113.3	Describe the applications of lasers by utilizing its characteristic properties and principles of laser. (RBT Levels: 1.Remember & 3. Apply)
	C113.4	Verify the velocity of EM wave in isotropic medium by studying its propagation through dielectric medium. (RBT Levels 2:Understand & Evaluate)
	C113.5	Classify the solid state materials based on the band theory by applying the principles of Quantum Mechanics & free electron theory. (RBT Level 4: Analyze)
	C113.6	Identify the given semiconductor by studying its charge carriers through the Hall effect. (RBT Level: 2.Understand)
COURSE	COURSE OUTCOMES	
Electrical Circuit Analysis – I C114	C114.1	Able to study the concepts of passive elements, types of sources and various network reduction techniques.
	C114.2	Able to understand the behavior of RLC networks for sinusoidal excitations. Concept of Power factor its importance
	C114.3	Able to study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.
	C114.4	Able to study the concept of magnetic coupled circuit their Applications in power Transmission
	C114.5	Able to understand the applications of network topology to electrical circuits.
	C114.6	Able to understand the applications of network theorems for analysis of electrical networks
COURSE	COURSE OUTCOMES	
Engineering	C115.1	Describe the construct polygons , curves and scales

Drawing C115	C115.2	Impart the significance of projection of points and lines
	C115.3	Understand to draw orthographic projections of lines inclined to both planes
	C115.4	Understand to draw the projection of planes
	C115.5	Understand to draw the projection of solids
	C115.6	Impart the visualization of 3D –objects and draw the orthographic, isometric views
COURSE	COURSE OUTCOMES	
English - Communication Skills Laboratory – II C116	C116.1	Enabling students to use Computer assisted Language Laboratory (CALL) to enhance their pronunciation through stress, intonation and rhythm for routine and spontaneous interaction
	C116.2	Attainment of communicative competence for the fulfillment of academic, professional and social purposes.
	C116.3	Attainment of language Proficiency through Contextualized, Task Based Activities to realize employment potential at the end of the course.
	C116.4	Acquired listening, speaking, reading and writing skills necessary for the survival in the postmodern society through task-based and skill-based communication practices with judicious integration of modern tools.
	C116.5	Development of fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.
	C116.6	Realization of technical communicative competence and attainment of group dynamism and problem solving skills through standard oral and written language models.
COURSE	COURSE OUTCOMES	
Applied / Engineering Physics Laboratory C117	C117.1	Newton rings & parallel fringes are obtained by the interference in thin air films in addition the radius of curvature of a given convex lens and thickness of given thin paper are computed.
	C117.2	The wavelengths of various spectral lines in the polychromatic source (Hg source) are determined as well as the wavelength of Laser source is estimated using Diffraction.
	C117.3	The T-R characteristics of thermistor are studied & the energy band gap of semiconductor is calculated by Understanding & Analyzing the variation of resistance with temperature in devices such as thermistor , semiconductors, etc.,
	C117.4	The rigidity modulus of the given wire & acceleration due to gravity at a given point are determined by

		studying the modified Simple Harmonic oscillations using a Torsional and compound pendulums respectively.
	C117.5	The intensity variation of magnetic field with distance along the axis of a circular coil carrying current is studied.
	C117.6	The laws vibrations of stretched string are verified & the velocity of sound in air is determined by using the resonance phenomenon.
COURSE	COURSE OUTCOMES	
Engg. Workshop & IT Workshop C118	C118.1	Student should able to Understand the basics of carpentry and able to make different carpentry joints.
	C118.2	Student should able to Understand the basics of fitting and able to make different fits.
	C118.3	Student should able to Understand the basics of black smithy and able to make different forged jobs.
	C118.4	Student should able to Understand the basics of house wiring and able to make different house wiring techniques used in our daily life.
	C118.5	Present and Describe how PCs and larger computer systems are used in the business community and the positive/negative impacts of that technology in business and society.
	C118.6	Assembling, Disassembling and Identification of various computer components, Installation of software.
	C118.7	Acquire the knowledge of various components like Storage Devices, I/O Port, Device Drivers, Assemblers, Compilers, Interpreters, Linkers, and Loaders.
	C118.8	Use various productivity tools like MS office.

COURSE	COURSE OUTCOMES	
Electrical Circuit Analysis-II C201	C201.1	Analyze and determine three phase circuit parameters under balanced conditions
	C201.2	Analyze and determine three phase circuit parameters under unbalanced conditions
	C201.3	Understand the transient and steady state behavior of passive elements for DC and AC excitations.
	C201.4	Determine and relate two port network parameters and understand stability of network functions.
	C201.5	Design and synthesis of complex electrical circuits.
	C201.6	Understand wave symmetry and harmonics, representation of a finite series into an infinite series.
Thermal and Hydro Prime movers C202	C202.1	Students are able to understand the working principle of IC engines.
	C202.2	Students are able to calculate the efficiency and performance of a steam turbine.
	C202.3	Students are able to calculate the efficiency and performance of gas turbines.
	C202.4	Students are able to understand the working and construction of pumps.
	C202.5	Students are able to understand the working and construction hydraulic turbines.
	C202.6	Students are able to understand working principle of power plant.
Basic Electronics And Devices C203	C203.1	Understand the basic concepts of semiconductor physics.
	C203.2	Construction, operation and characteristics of PN junction diode and special diodes.
	C203.3	Operation of rectifiers and regulators and design of filter circuits
	C203.4	Acquire the knowledge about working principle of transistor & their characteristics. Concepts of biasing, stabilization and compensation techniques used in transistor circuits.
	C203.5	Explain the operation and characteristics of FET, Thyristors, Power IGBTs and Power MOSFETs.
	C203.6	Operating principles of feedback amplifiers, and importance of feedback in oscillators & amplifiers.
Complex Variables and Statistical Method C204	C204.1	Understand the concept of analyticity of the complex functions, C-R equations and to find the velocity potential and flux functions of flow problems using C-R equations.
	C204.2	Evaluation of definite integration over a closed region by using complex integration and find the series expansions of analytical functions using Taylor's, Maclaurin's and Laurent's series expansion.
	C204.3	Complex integrals will be evaluated using Cauchy

		Residue theorem and evaluation of improper integrals
	C204.4	Understand how to find Bilinear Transformation of different functions – fixed point – cross ratio – properties – invariance of circles
	C205.5	Acquire knowledge on normal distribution and apply it to find the population parameters
	C206.6	Student able to know the procedure for testing of hypothesis and apply it for Tests concerning one mean and proportion, two means- Proportions and their differences using Z-test, Student's t-test - F-test and Chi -square test
Electro Magnetic Fields C205	C205.1	Able to calculate electric field and potentials using Gauss's law and solve Laplace's or Poisson's equations.
	C205.2	Understand the concepts of capacitance, energy stored in dielectrics and concepts of conduction and convection currents.
	C205.3	To find magnetic field intensity due to current, the application of ampere's law and the Maxwell's second and third equations.
	C205.4	Able to calculate the magnetic forces and torque produced by currents in magnetic field.
	C205.5	Ability to calculate self and mutual inductances and the energy stored in the magnetic field.
	C205.6	Acquires knowledge on time varying fields and get to calculate induced Emf and know about displacement current and Pointing vector.
Electrical Machines-I C206	C206.1	Understand the concepts of electro2agnetic energy conversion.
	C206.2	Explain the construction and operation of dc generators ar2ature reaction and co2tutation
	C206.3	Study the performance characteristics of different types of dc generators.
	C206.4	Study the No-load, internal and external characteristics of different types of dc motors.
	C206.5	Design of armature resistance for starting of DC motors, different types of starters. Testing of dc motors.
	C206.6	Explain the design aspects of a dc machine
Thermal and Hydro Lab C207	C207.1	By learning the concept, a student can understand the working principle of IC engine and can able to draw valve and port timing diagrams.
	C207.2	The student can able to study the performance and can calculate the efficiency for a multi-cylinder petrol engine.
	C207.3	By understanding the above concept a student can easily know about diesel engines and can calculate the

		performance under varying loads.
	C207.4	The student can able to understand the various classification of boilers and their working principles
	C207.5	By learning the calibration techniques student can able to understand how to control the flow of fluids in a piping system.
	C207.6	Student can able to evaluate performance of a pumps and turbines
Electrical Circuits Lab C208	C208.1	Design and analyze basic electrical circuits
	C208.2	Understand the simplification analogy of electrical circuits with the application of various network theorems
	C208.3	Study the behavior of RLC circuits at resonant frequency
	C208.4	Determination of 3- ϕ power of balanced and unbalanced systems
	C208.5	Understand and determine two-port network parameters & choke coil parameters
	C208.6	Analyze various inductive circuits and determine co-efficient of coupling
Environmental studies C209	C209.1	Student will be able to know about the environment, components, structure, functions of the environment and ecosystem.
	C209.2	Understands about the natural resources and environmental impacts and which kind of methods are to be applied for the sustainable development.
	C209.3	Ability to understand the biodiversity of India and identifies its threats. Apply the knowledge about the conservation practices to protect the biodiversity.
	C209.4	Acquire knowledge on environmental pollution and their effects on biotic and a biotic components and control measures of pollution.
	C209.5	Able to identify social issues both rural and urban environment and the possible means to apply the environmental legislations of India towards sustainable development
	C209.6	Able to acquire the knowledge on environmental assessment and stages involved in EIA and environmental audit for the self-sustaining and eco-friendly green campus
Switching Theory and Logic Design C210	C210 .1	Understand the numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, gray, and BCD.
	C210 .2	Understand the simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions
	C210.3	Understand the to design and analyze small

		combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
	C210.4	Understand the design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits
	C210.5	Understand the design and analyze flip flops ,registers and counters
	C210.6	Understand the design and analyze state diagrams for flip flops
Pulse & Digital Circuits C211	C211.1	Understand the response of RC low pass & high pass filter for sinusoidal and non-sinusoidal signals. Acquired knowledge about Switching Characteristics of various switching devices such as diode, transistor.
	C211.2	Design the nonlinear wave shaping circuits for generating the desired waveforms.
	C211.3	Design Bitable, Monostable and Astable Multivibrators using discrete components.
	C211.4	Realize logic gates using diodes and transistors.
	C211.5	Analyze voltage and current sweep circuits and identify methods to mitigate sweep errors.
	C211.6	Design and understand the Synchronization techniques, sweep circuits & Sampling Gates.
Power Systems-I C212	C212.1	Analyze and understand the generation of electrical power
	C212.2	Design the distribution of DC power system & AC power system
	C212.3	Study the operation and maintenance of Substations
	C212.4	Understand the concept of under Ground Cables
	C212.5	Understand the concept of load curves at all seasons.
	C212.6	Understand the concept of tariff and methods
Electrical Machines-II C213	C213.1	Study the construction and operation of single phase transformer.
	C213.2	Explain different tests performed on transformers to determine the performance characteristics.
	C213.3	Discuss about the types of three phase transformer connection, tap changing methods and 3-phase to 2-phase transformation.
	C213.4	Explain the construction, working and classification of three phase induction motor.
	C213.5	Determine the performance characteristics of induction motor and explain different phenomenon on the operation of induction motor
	C213.6	Design procedure for transformers and three phase induction motors
Control Systems	C214.1	Derive the transfer function of physical systems and

C214		determination of overall transfer function using block diagram algebra and signal flow graphs.
Electrical Measurements	C214.1	Determine time domain specifications of second order systems and error constants.
	C301.1	Design and analysis of the operation of various Electrical measuring instruments.
	C214.3	Analyze absolute and relative stability of LTI systems using Routh's stability criterion and Root Locus method.
	C214.4	Stability analysis of LTI systems using frequency domain techniques.
	C214.5	Design Lag and Lead compensators to improve system performance from frequency domain plots.
	C214.6	Representation and understand physical systems as state models and the concepts of controllability & Observability.
Electrical Machines -I Lab C215	C215.1	Determine the Performance of OCC, External Characteristics of DC Shunt, Series & Compound Generator.
	C215.2	Determine Performance of OCC , Internal & External Characteristics of DC Shunt Generator
	C215.3	Pre-determine the Efficiency of DC Generator and DC Motor & DC Generator,
	C215.4	Analyze the Performance Characteristics of DC Machine.
	C215.5	Study the Speed Control DC Shunt Motor
	C215.6	Determine the Moment of Inertia of DC Shunt Machine
Electronic Devices & Circuits Lab C216	C216.1	Understand the design, working and operation of different electronic and power devices.
	C216.2	Study the working and characteristics of different electronic devices.
	C216.3	Study the working and characteristics of different power devices.
	C216.4	Design and analysis of amplifiers using different transistor configurations with different biasing techniques.
	C216.5	Design and study the operation of the diode rectifier's with and without filter.
	C216.7	Study the operation of different oscillator's

	C301.2	Design and working of power, energy, pf and frequency measuring devices. Calibration of energy meters.
	C301.3	Understand the calibration process of measuring instruments using potentiometer and measurement of resistance, voltage and current..
	C301.4	Apply the concepts of Ac & DC bridges for measurement of electrical parameters.
	C301 .5	Study the construction and working of ballistic galvanometer and flux meter used for magnetic measurement.
	C301.6	Understand the concepts of various digital meters and application of lissajious patterns.
Managerial Economics and Financial Analysis C302	C302.1	Analyze macro, micro economic concepts useful for business units and determine influences of demand and supply analysis
	C302.2	Specifications of production functions , types of costs and solving engineering problems by applying knowledge of economics
	C302.3	Equipped with the consciousness about market structures and pricing methods of industries
	C302.4	Create awareness to start an enterprise in their own and identification of different stages of business cycle
	C302.5	Knowledge of preparation of accounts, financial statements and their analysis through ratios etc.,
	C302.6	Significant value with financing methods, their applicability in decision making and problem-solving skills according to new trends.
Power Systems-II C303	C303.1	Computation of inductance and capacitance of transmission lines using the concepts of GMD, GMR.
	C303.2	Classify & representation of transmission lines, and determination of their performance characteristics.
	C303.3	Study the performance and modeling of long transmission lines.
	C303.4	Understand the transient behavior of transmission lines.
	C303.5	Study the factors affecting the performance of transmission lines and power factor improvement methods.
	C303.6	Design of sag and tension of transmission lines. Overhead insulators and their application.
Electrical Machines-III C304	C304.1	Construction & Operation of Single Phase IM and their Application.
	C304.2	Explain the Construction & Operation of 3-Ph Alternator and different types of Armature Winding
	C304.3	Understand the Concepts of Voltage Regulation and Explain the Two Reaction Theory.

	C304.4	State Necessary & Sufficient Condition for Parallel operation and Explain the Concept of Load Sharing
	C304.5	Explain the Operation principle of Synchronous Motor and its Analysis.
	C304.6	Understand the Concepts of Hunting and Methods of Starting of Synchronous Motor
Power Electronics C305	C305.1	Explain the characteristics of various power semiconductor devices and analyze the operation of diode bridge rectifier
	C305.2	Design firing circuits for SCR. Analyze the operation of AC voltage controller and half-wave phase controlled rectifiers
	C305.3	Explain the operation of single phase full-wave converters and analyze harmonics in the input current.
	C305.4	Explain the operation of three phase full-wave converters and dual Converter
	C305.5	Analyze the operation of single phase cyclo converters and high frequency dc-dc converters
	C305.6	Explain the working of inverters and application of PWM techniques for voltage control and harmonic mitigation
Linear & Digital IC Applications C306	C306.1	Understanding the basic concepts of Differential Amplifiers and operational amplifiers Architecture.
	C306.2	Understanding the concepts relevant to various Op-Amp parameters and voltage rectifier circuits.
	C306.3	Examine the Design of Op-Amp circuits suitable for various Linear and Non-Linear Applications.
	C306.4	Analyze the design of active filters, analog multipliers and Modulators using Op-amps.
	C306.5	Utilize the architecture and working of 555 Timer for use in various applications.
	C306.6	Outline the different architecture of different digital to analog and analog to digital converters.
Electrical Machines-II Lab C307	C307.1	Determine the Efficiency & Regulation of Transformers and draw their Performance curves
	C307.2	Student can understand the concepts of Scott Connection Of Transformers
	C307.3	Pre-determine the Regulation of Three Phase Alternator by Various Methods, Find X_d / X_q Ratio of Alternator and asses the performance of Three Phase Synchronous Motor.
	C307.4	perform Various Tests in Induction Motor for assessing its performance characteristics
	C307.5	Perform Synchronization Of Alternator By Dark Lamp Method
Control Systems	C308.1	Time Response Analysis of Second Order Systems

Lab C308	C308.2	Characteristics of Synchro's, AC & DC Motors and Magnetic Amplifiers
	C308.3	Effect of P,PI & PID controllers on Second Order Systems
	C308.4	Temperature Controller using PID, Lead and Lag Compensators and Effect of Feedback on DC Shunt Motor
	C308.5	Transfer Function of DC motor
IPR & Patents C309	C309.1	Knowledge on basic concepts of Intellectual Property , Innovations and Inventions of Intellectual Property Law
	C309.2	Evaluate the principles and rights afforded by Copyright, its infringement and International Copyright Law .
	C309.3	Analyze Patent registration requirements, infringement and Litigation, new developments and international laws
	C309.4	Registration Process of Trade Marks, Inter-parties proceedings, litigations , claims and global factors related to trade marks
	C309.5	Conceptual awareness about trade Secrets, Employee Confidentiality Agreement, Trade Secret Litigation and breach of law
	C309.6	Elucidate Cyber Law and Cyber Crimes , E-commerce, International aspects of Computer and Online Crime
Microprocessors & Microcontrollers C310	C310.1	Illustrate the internal architecture and working of various features of 8086 microprocessor and its successors 80286, 80386, 80486, Pentium.
	C310.2	Extend the 8086 functions with various operating modes, instruction set and addressing modes.
	C310.3	Identify assembler directives and apply the assembly language programming to solve different problems.
	C310.4	Outline various peripheral control ICs such as 8255, 8279, 8257 and 8259 and also write programs to develop different applications using them.
	C310.5	Illustrate the architecture, memory, timer, serial communication, controlling functions of 8051 microcontroller.
	C310.6	Develop assembly language programs of 8051 microcontroller to control push button, LED, hex keypad, relay and latches commonly used in real world applications.
Switchgear and Protection C311	C311.1	Analyze the principles of arc interruption. Working principles of high voltage circuit breakers, their applications and comparison
	C311.2	Understand the working principle and constructional features of different types of electromagnetic

		protective relays
	C311.3	Acquire knowledge of various faults that occur in high power generators, transformers and their respective protective schemes
	C311.4	Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.
	C311.5	Understand the working principle and constructional features of different types of Static Relays.
	C311.6	Study the protection against over voltages and different grounding methods
Utilization of Electrical Energy C312	C312.1	Identify a suitable motor for electric drives and industrial Applications.
	C312.2	Identify most appropriate heating or welding techniques for suitable applications.
	C312.3	Understand various level of luminosity produced by different illuminating sources.
	C312.4	Estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting.
	C312.5	Determine the speed/time characteristics of different types of traction motors.
	C312 .6	Estimate energy consumption levels at various modes of operation.
Power System Analysis C313	C313.1	Application of Graph theory. Representation of reactance diagram and formation of Y_{BUS}
	C313.2	Application of numerical methods for the power flow studies
	C313.3	Formation of Z_{BUS} and algorithm for Z_{BUS} modifications
	C313.4	Analysis of symmetrical fault analysis
	C313.5	Understand the concept of symmetrical component theory and its application for unsymmetrical fault analysis
	C313.6	Define stability and explain the various methods to improve stability of the power system
Management Science C314	C314 .1	Analyze and evaluate management concept and its implementation in aim of achieving organizational goals.
	C314 .2	To Equip with the concepts of operations, project management through technical relationships of input and output and inventory control
	C314 .3	To understand the importance and vital role of human resources power in the main functional areas of organization i.e., Marketing Management, Human Resource Management
	C314 .4	Project handling and controlling techniques for

		optimum utilization of resources
		Describes the concept and practical issues relating to strategic management and its role in long-term decision making.
COURSE	C314.5	COURSE OUTCOMES
Renewable Energy	C401.1	Explain the basic concepts of solar radiation and its
	C314.6	Apply modern management techniques MIS, MRP, JIT and ERP etc to meet global challenges in effective manner
Power Semiconductor Drives C315	C315.1	Understand the fundamentals of electric drive and different electric braking methods.
	C315.2	Analyze the operation of three phase converter controlled dc motors and four quadrant operation of dc motors using dual converters.
	C315.3	Understand and analyze the converter control of dc motors in four quadrants.
	C315.4	Understand the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.
	C315.5	Understand the principles of static rotor resistance control and various slip power recovery schemes.
	C315.6	Understand the speed control mechanism of synchronous motors
Power Electronics Lab C316	C316.1	Design and development of Power electronic based hardware circuits
	C316.2	Study the characteristics of various solid state devices
	C316.3	Study of Power conversion from AC to DC and vice versa using appropriate converter circuits (Single phase and Three phase)
	C316.4	Understand the operation of various power electronic circuits for variable voltages in both AC and DC circuits.
	C316.5	Understand the operation of various power electronic circuits for variable frequencies.
	C316.6	Application of Power electronic converters for four quadrant operation of DC machines
Electrical Measurements Lab C317	C317.1	Understand the concepts of measurements of electrical quantities and calibration of different electrical measuring instruments.
	C317.2	Determination of 3-phase power of balanced loads using wattmeters and CT'S.
	C317.3	Testing and calibration of various electrical quantity measuring instruments.
	C317.4	Measurement of the basic elements (R, L & C) in electrical circuits using different AC & DC Bridges.
	C317.5	Study the three voltmeter and 3 ammeter concept to measure various parameters of electrical circuits.

Sources and Systems C401		data on earth's surface.
	C401.2	Design of different types of solar thermal energy collectors
	C401.3	Design and selection of direct solar energy conversion system
	C401.4	Analyze the concepts of Wind energy conversion systems
	C401.5	Analyze the concepts of water energy to electrical conversion systems
	C401.6	Analyze the methods of generation of electricity from chemical and geothermal resources
HVAC & DC Transmission C402	C402.1	To be able to acquaint with HV transmission system with regard to power handling capacity, losses, conductor resistance and electrostatic field associate with HV. Further knowledge is gained in area of bundle conductor system to improve electrical and mechanical performance.
	C402.2	To develop ability for determining corona, radio interference, audible noise generation and frequency spectrum for single and three phase transmission lines.
	C402.3	To be able to acquire knowledge in transmission of HVDC power with regard to terminal equipment's, type of HVDC connectivity and planning of HVDC system.
	C402.4	To be able to develop knowledge with regard to choice of pulse conversion, control characteristic, firing angle control and effect of source impedance.
	C402.5	To develop knowledge of reactive power requirements of conventional control, filters and reactive power compensation in AC side of HVDC system
	C402.6	To able calculate voltage and current harmonics, and design of filters for 6 and 12 pulse conversion
Power System Operation & Control C403	C403.1	Compute optimal scheduling of Generators.
	C403.2	Study and understand the Optimal scheduling of hydrothermal systems
	C403.3	Computation of Cost function formulation and understand the unit commitment problem.
	C403.4	Modeling of Turbine Generator sets and understands role of the frequency.
	C403.5	Significance of Economic dispatch control and load frequency control in single area and two area systems
	C403.6	Design of reactive power control and line power compensation in transmission systems
Instrumentation C404	C404.1	Represent of various types of signals and their performance characteristics
	C404.2	Classification and operation of different types of transducers
	C404.3	Measurement of different types of Non-electrical quantities.
	C404.4	Understand the construction and working principle of various types of digital voltmeters

	C404.5	Block diagram representation and operation of CRO, measurement of different parameters (phase and frequency) of a signal.
	C404.6	Study the concepts of different types of signal analyzers
Electrical Distribution system C405	C405.1	Explain the various factors of distribution system and understand the planning of distribution system
	C405.2	Design the substations and understand the need of feeder voltage levels.
	C405.3	Determine the voltage drop and power loss for different load areas.
	C405.4	Analyze and Compare the various protection schemes and its coordination Procedure.
	C405.5	Understand the effect of compensation on P.F improvement and Analyze various voltage control methods
	C405.6	
Microprocessors & Microcontrollers Lab C406	C406.1	Develop Assembly language programs to demonstrate the arithmetic operations of binary, BCD, ASCII and Boolean logical operations.
	C406.2	Examine different string based operations in assembly language such as moving string, finding length of string, reverse of string, insertion, deletion, sorting.
	C406.3	Develop programs for different peripheral control ICs for 8086.
	C406.4	Develop assembly language programs to make use of different features of 8051 like parallel ports, timers and serial port.
	C406.5	Construct real world embedded applications with PIC18 microcontroller.
Electrical Simulation Lab C407	C407.1	Analyze and study the PSPICE & MATLAB simulations in application to electrical systems.
	C407.2	Design and Analyze the behaviour of RLC electrical circuits with different inputs.
	C407.3	Understand and Simulate the significant power system aspects like, Transmission line simulation, Transformer modeling, Load flow studies and Load frequency control.
	C407.4	Design and Simulate various electronic circuits.
	C407.5	Understand the Modeling and Stability analysis of different electrical systems by Transfer function approach.
	C407.6	Understand the Modeling and simulation of electrical machines
Power systems lab C408	C408.1	Determine the sequence impedance of Transformer.
	C408.2	Determine the sequence impedance of Alternator.
	C408.3	Determine the transmission line parameters and study the Ferranti Effect.

	C408.4	Estimate the dielectric breakdown voltage of liquid insulants.
	C408.5	Study the operation and calibrate tong tester.
	C408.6	Design and simulation of load frequency controllers, stability analysis and load flow studies of power system network.
Digital Control Systems C409	C409.1	Able to learn the advantages of discrete time control systems and the “know how” of various associated accessories.
	C409.2	Understand the concepts of z–transformations and their role in the mathematical analysis of different systems. (Like Laplace transforms in analog systems).
	C409.3	Ability to understand about State Space Representation of discrete time systems and test Controllability and Observability.
	C409.4	Acquire the knowledge to understand stability criterion for digital systems and methods adopted for testing the same are explained.
	C409.5	Capable to design discrete time control system by conventional methods for Lead, Lag and Lead-Lag compensators and digital PID controllers.
	C409.6	Design of state feedback controller through pole placement.
Special Electrical Machines C410	C410.1	Understand the operation, design and control of switched reluctance motor.
	C410.2	Study the operation, performance and different control of stepper motors.
	C410.3	Acquire knowledge about the construction, operation and characteristics of permanent magnet DC motor.
	C410.4	Understand the operation of brushless DC motor.
	C410.5	Explain the construction, operation and applications of linear induction motors.
	C410.6	Significance of electrical motors applicable for traction drives.
Advanced control systems C411	C411.1	State space representation of control system and formulation of different state models are reviewed.
	C411.2	Able to design, control system using the pole placement technique is given after introducing the concept of controllability and observability.
	C411.3	Analyze the nonlinear system using the describing function technique and phase plane analysis.
	C411.4	Able to analyze the stability using lypunov method.
	C411.5	Minimization of functionals using calculus of variation studied.
	C411.6	Able to formulate and solve the LQR problem and riccati equation
Electrical Power Quality C412	C412.1	Differentiate between different types of power quality problems.
	C412.2	Explain the sources of voltage sag, voltage swell, interruptions, transients, long duration over voltages

		and harmonics in a power system.
	C412.3	Explain the principle of voltage regulation and power factor Improvement methods.
	C412.4	Analyze the effects of Harmonic Distortion & their solutions.
	C412.5	Demonstrate the relationship between distributed generation and power quality.
	C412.6	Explain the power quality monitoring concepts and the usage of measuring instruments
Flexible AC Transmission System C413	C413.1	Understand the concept of power flow control in transmission lines using FACTS controllers.
	C413.2	Acquire knowledge on operation and control of voltage source converter.
	C413.3	Explain compensation methods to improve stability and reduce power oscillations in the transmission lines.
	C413.4	Application of static VAR compensators for shunt compensation.
	C413.5	Appreciate the methods of compensations by using series compensators.
	C413.6	Explain the operation of modern power electronic controllers
Power system reforms C414	C414.1	Able to understand fundamentals of power system deregulation and restructuring
	C414.2	Able to understand OASIS and available power transfer capability calculations
	C414.3	Able to understand concept of congestion management and methods to relieve congestion management
	C414.4	Able to understand electricity pricing
	C414.5	Able to understand operation of power system in deregulated environment.
	C414.6	Able to understand importance of Ancillary services management.
Project C415	C415.1	Apply the concepts of electrical engineering to analyze the ideas students and design the physical/simulation model.
	C415.2	Enable students to work as an individual in a team inculcating leadership, management and financial oriented skills
	C415.3	Identify state of the art in the fields of electrical engineering through literature survey and implement the ideas using modern tools while enabling lifelong learning.
	C415.4	Design and develop models that are useful for the society/environment by following research ethics and values.
	C415.5	Improve writing and presentation skills of students so as to enable the work done by them to get published.