



NRI INSTITUTE OF TECHNOLOGY

(Approved by AICTE, New Delhi :: Affiliated to JNTUK, Kakinada)
POTHAVARAPPADU (V), (via) Nunna, Agiripalli (M), Krishna District, A.P., PIN : 521 212
Ph : 08656-324999 Website : nrigroupofcolleges.com e-mail : nrigroupofcolleges@gmail.com

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	English - I	Course Index:	C111
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C111.1	Infer how Gandhi grew in introspection and maturity. The learner will be in a position to emulate G.D. Naidu and take to practical applications.
C111.2	Adapt a higher quality of life, strength and sovereignty of a developed nation. Like G.R. Gopinath, the learners will be able to achieve much at a low cost and help the common man.
C111.3	Develop a scientific attitude to solve many problems which we find difficult to tackle. The learner will take interest in multiple fields of knowledge and make life worthwhile through social service.
C111.4	Tell, think & write clearly & logically emulating him and producing memorable things.
C111.5	Interpret that all men can come together and avert the peril
C111.6	Imagine & interpret the scientific phenomena from a different angle and also exposes the readers to poetic expressions. The story is humorous in that it contains a lot of irony. Thus this develops in the learner understand humorous texts and use of words for irony.



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Mathematics - I	Course Index:	C112
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C112.1	Solve linear diff equations of first order and first degree and the application related questions like Newton's law of cooling , growth an decay ,
C112.2	Solve second and higher order linear diff equations and the applications related to LCR circuits and simple harmonic motion
C112.3	Determine the linear transformations and inverse linear transformations of various functions. And make use of Laplace Transformation to determine the general solutions of linear Differential equations
C112.4	Estimate the total derivatives and jacobian and maxima and minima of functions of two variables.
C112.5	Rephrase the partial differential equations by eliminating arbitrary constants and functions for solving the first order linear equations and non linear equations
C112.6	Solve the heat equations and wave equation by using higher order partial differential equations.



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Mathematics – II (Mathematical Methods)	Course Index:	C113
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C113.1	Find a root of a algebraic and transcendental equations
C113.2	Explain the relation between finite difference operators and compute the interpolating polynomials for given data
C113.3	Solve ordinary differential equations numerically by using Taylors series method, Picard’s method, Euler’s method and Runge kutta methods
C113.4	Find the Fourier series of several functions in different intervals
C113.5	Find the Fourier transform of different functions
C113.6	Find the z-transforms of various functions



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Course Name:	Engineering Physics	Course Index:	C114
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C114.1	Illustrate the concepts of interference by relating to coherent sources, diffraction by relating to grating equation and polarization
C114.2	Illustrate the concepts of X-Ray diffraction techniques
C114.3	Summarize the magnetic, electric field responses of materials and superconductivity
C114.4	Summarize the concepts of Electromagnetic Fields & acoustics
C114.5	Illustrate the concepts of quantum mechanics & Free electron theory
C114.6	Explain Hall effect in semiconductors



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Professional Ethics and	Course Index:	C115
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C115.1	Explain the capabilities of both humans and computers from the viewpoint of human information processing.
C115.2	Build typical human-computer interaction (HCI) models, styles, and various historic HCI paradigms.
C115.3	Apply an interactive design process and universal design principles to designing HCI systems.
C115.4	Make use of HCI design principles, standards and guidelines.
C115.5	Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
C115.6	Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.



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Course Name:	Engineering Drawing	Course Index:	C116
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C116.1	Explain simple geometric construction like polygons, engineering curves (ellipses, parabola, hyperbola, cycloids and involutes)
C116.2	Explain geometric construction like scales (plain, diagonal and vernier scales) and to draw orthographic projection of points, straight lines inclined to one plane
C116.3	Outline the orthographic projection of straight lines inclined to both the planes
C116.4	Construct orthographic projection of planes inclined to single reference plane and inclined to both the planes
C116.5	Construct the orthographic projections of solids (prisms, pyramids, cylinder and cone axis inclined to single reference plane
C116.6	Imagine and draw engineering objects in 3D using isometric drawing and convert isometric to orthographic and vice versa



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	English Communication	Course Index:	C117
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C117.1	Improve introducing to someone and learns how to greet people
C117.2	Improve communication and listening skills
C117.3	Make use of role plays for improving communication
C117.4	Make use of role plays for improving speaking skills
C117.5	Build & strengthen their communication skills in different contexts
C117.6	Influence & improve their overall improvement in pronunciation skills ,tone, accent and Rhythm

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Course Name:	Engineering Physics	Course Index:	C118
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C118.1	Compare the sketches of the Frequency Response curves of RLC Series and Parallel Circuits.
C118.2	Find out the frequency of electronic vibrator in both modes and verify the transverse laws of a stretched string.
C118.3	Determine the value of magnetic induction at different places from axis of circular coil using Magnetic field along the axis of a current carrying coil by making use of Stewart and Gee's apparatus.
C118.4	Find of wavelength of a source-Diffraction Grating-Normal incidence for different colors
C118.5	Find the radius of curvature of Plano - Convex Lens and thickness of given object by forming parallel fringes
C118.6	Determine the I-V characteristics of semiconductor diode and breakdown voltage of Zener diode in reverse bias condition



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Course Name:	Engineering Workshop & IT	Course Index:	C119
REGULATION:	R13	YEAR-SEM:	I-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C119.1	Demonstrate the knowledge of various trades (Carpentry, Fitting, Tinsmith, Blacksmith and House wiring) of tools and its applications, assembling and disassembling of basic Hardware Components of PC
C119.2	Make use of available work material for forming carpentry joints in the given object and demonstrate the usage of MS-WORD, MS-EXCELL, POWERPOINT, MS-ACCESS to various Applications
C119.3	Build Fitting joints in the given object with the available work material, To understand different types of Operating systems Installation and Working.
C119.4	Build Tin-smithy work in the given object with the available work material, Get the Knowledge about basic Networking Infrastructure and Trouble shooting of both software and hardware
C119.5	Take part in performing Black smithy work in the given object with the available work material
C119.6	Take part in House wiring connection with the given Circuit and make use of MAT-LAB and LATEX Softwares

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Course Name:	English – II	Course Index:	C121
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C121.1	Infer how Gandhi grew in introspection and maturity. The learner will be in a position to emulate G.D.Naidu and take to practical applications.
C121.2	Adapt a higher quality of life, strength and sovereignty of a developed nation. Like G.R.Gopinath, the learners will be able to achieve much at a low cost and help the common man.
C121.3	Develop a scientific attitude to solve many problems which we find difficult to tackle. The learner will take interest in multiple fields of knowledge and make life worthwhile through social service.
C121.4	Tell, think & write clearly & logically emulating him and producing memorable things.
C121.5	Interpret that all men can come together and avert the peril
C121.6	Imagine & interpret the scientific phenomena from a different angle and also exposes the readers to poetic expressions. The story is humorous in that it contains a lot of irony. Thus this develops in the learner understand humorous texts and use of words for irony.



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Mathematics – III	Course Index:	C122
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C122.1	Determine the rank of a matrix and solve simultaneous linear equations using Gauss elimination, gauss-jordan, gauss seidel methods and solve the application related problems in current and electrical circuits
C122.2	Find Eigen values and Eigen vectors of a given matrix and the inverse of a matrix using cayley Hamilton theorem and solve the application related problems of free vibrations of two mass systems.
C122.3	Find the double integrals over a region and triple integrals over a volume using this integrals they find the areas and volumes
C122.4	Evaluate various types of integrals using beta and gamma functions
C122.5	Find gradient, divergence and curl of a vector point function.
C122.6	Find the line, surface, volume integrals and they also apply the greens, gauss, stokes theorems for the calculation of the integrals



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Course Name:	Engineering Chemistry	Course Index:	C123
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C123.1	Illustrate the chemistry of hard water, boiler troubles and modern methods of softening
C123.2	Develop the knowledge of galvanic cells, electrode potentials & understand corrosion problem with its control methods. This knowledge also helps in understanding modern biosensors, fuel cells and improves them.
C123.3	Recall the corrosion problems and know how to counter those effects.
C123.4	Illustrate physical and mechanical properties of plastics & polymers which helps in selecting correct and suitable materials for different purposes.
C123.5	Infer important fuels utilized on a large scale enabling them to understand about energy & its related problems along with solutions.
C123.6	Recall new advanced materials in advancing technology along with their characteristics



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Course Name:	Engineering Mechanics	Course Index:	C124
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C124.1	Explain the concepts of force, friction, direction and its applications.
C124.2	Illustrate the concept of free body diagrams and its applications.
C124.3	Extend the concept of centroids to their applications.
C124.4	Illustrate the concept of moment of inertia, mass moment of inertia including transfer methods and their applications.
C124.5	Explain basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts)
C124.6	Solve dynamics problems based on the Work-Energy principle, Impulse-Momentum principle and learn to appraise given information, determine which concepts to apply, and choose an appropriate solution strategy.



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Course Name:	Electrical Circuit Analysis - I	Course Index:	C125
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C125.1	Summarize the concepts of passive elements, types of sources and various network reduction techniques and solve various electrical networks in presence of active and passive elements.
C125.2	Illustrate the applications of network topology to electrical circuits by solving Electrical networks with network topology concepts.
C125.3	Illustrate the concept of magnetic coupled circuit and solve any magnetic circuit with various dot conventions.
C125.4	Explain the behavior of RLC networks for sinusoidal excitations and solve Any R, L, C network with sinusoidal excitation.
C125.5	Examine 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 and solve Any R, L, network with variation of any one of the parameters i.e. R, L, C. and f.
C125.6	Make use of network theorems for analysis of electrical networks and solve Electrical networks by using principles of network theorems.



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Course Name:	Computer Programming	Course Index:	C126
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C126.1	Explain the basic terminology used in computer programming
C126.2	Select data types for compiling and debugging programs in C language
C126.3	Design programs involving decision structures, loops and functions
C126.4	Explain the difference between call by value and call by reference
C126.5	Illustrate the dynamics of memory by the use of pointers
C126.6	Create or update basic data files by using different data structures



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Course Name:	Engineering Chemistry Lab	Course Index:	C127
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C127.1	Explain and learn these aspects in the lab class of engineering chemistry
C127.2	Experiment with volumetric analysis and can understand the neutralisation reaction.
C127.3	Experiment with redox reaction and the student will learn about the oxidation and reduction
C127.4	Experiment with complexometric titration and can understand about the buffers and can estimate the hardness of water
C127.5	Utilize an instrument called colorimeter by which we can estimate metals and other ions by converting them into coloured solutions.
C127.6	Utilize instruments called conductivitymeter, potentiometer and pH meter by which we can estimate the substances very easily.

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Course Name:	English Communication	Course Index:	C128
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C128.1	Take part in non verbal communication
C128.2	Improve their communication skills
C128.3	Demonstrate their interview skills
C128.4	Show enhanced communication skills while participating in group discussions
C128.5	Show enhanced presentation skills
C128.6	Improve their persuasive skills through debates



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	C Programming lab	Course Index:	C129
REGULATION:	R13	YEAR-SEM:	I-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C129.1	List steps of algorithms, present the flowcharts and explain programs in form of user-manuals by identifying various computer components and installing softwares
C129.2	Demonstrate C programming development environment by compiling, debugging, linking and executing a program
C129.3	Solve the problems using selection and iterative statements
C129.4	Analyze the complexity of problems; modularize them into programs by understanding and applying the in-built or customized functions for solving the problems.
C129.5	Solve the various problems using arrays
C129.6	Experiment with application of pointers, memory allocation techniques and make use of files for dealing with variety of problems.



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Course Name:	Electrical Circuit Analysis-II	Course Index:	C211
REGULATION:	R13	YEAR-SEM:	II-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C211.1	Analyze the star-delta connection, differ voltages and currents in balanced system and measure three phase power
C211.2	Measure three phase power using two wattmeter method in unbalanced system
C211.3	Determine the transient response for DC and AC circuits and obtain the solution using mathematical methods
C211.4	Develop the different two port network parameters
C211.5	Model the time domain and s-domain equivalents for electrical circuits
C211.6	Predict the harmonic content in the electrical circuits



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Course Name:	Thermal and Hydro Prime	Course Index:	C212
REGULATION:	R13	YEAR-SEM:	II-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C212.1	Demonstrate the constructional features ,operational details of various types of internal combustion engines
C212.2	Identify the aspects of steam formation and its utilities through the standard steam data tables and charts
C212.3	Recall the gas turbine fundamentals, the governing cycles and the methods to improve the efficiency of gas turbines
C212.4	Illustrate the fundamental of fluid dynamic equations and its applications fluid jets.
C212.5	Build the constructional features, operational details of various types of hydraulic turbines
C212.6	Outline in the areas of types of hydro electric power plants, estimation and calculation of different loads by considering various factors.



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Course Name:	Basic Electronics And Devices	Course Index:	C213
REGULATION:	R13	YEAR-SEM:	II-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C213.1	Summarize the working of CRO.
C213.2	Demonstrate the characteristics of various diodes.
C213.3	Make use of the knowledge of diode characteristics to design the rectifier circuits.
C213.4	Design circuits for stabilization and compensation of a BJT.
C213.5	Analyze BJT Amplifiers for different modes of operation.
C213.6	Develop FET based amplifiers.



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Course Name:	Complex Variables and Statistical	Course Index:	C214
REGULATION:	R13	YEAR-SEM:	II-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C214.1	able to Relate about Cartesian and polar coordinates. Harmonic and conjugate harmonic functions
C214.2	able to demonstrate Cauchy's integral theorem , Cauchy's integral formula, Generalized integral formula
C214.3	able to match Isolated, pole of order m, essential - Residues – Residue theorem
C214.4	abe to analyze Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio
C214.5	able to evaluate residue, residue theorem
C214.6	able to compose Type I and Type II errors -Maximum error- One tail, two-tail tests

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Course Name:	Electro Magnetic Fields	Course Index:	C215
REGULATION:	R13	YEAR-SEM:	II-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C215.1	Solve Laplace's or Poisson's equations and find electric field and potentials using Gauss's law.
C215.2	Understand energy stored in dielectrics, conduction and convection currents.
C215.3	Find magnetic field intensity due to current, the application of ampere's law and the Maxwell's second and third equations.
C215.4	Derive the torque produced by currents in magnetic field using the magnetic forces
C215.5	Calculate self and mutual inductances and the energy stored in the magnetic field.
C215.6	Apply the knowledge on time varying fields and induced EMF for understanding concepts of displacement current and Poynting vector



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Course Name:	Electrical Machines-I	Course Index:	C216
REGULATION:	R13	YEAR-SEM:	II-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C216.1	Explain the concepts of electromagnetic energy conversion
C216.2	Explain the operation of dc generator, armature reaction and commutation
C216.3	Analyze the characteristics and performance of dc generatorS
C216.4	Explain the torque developed and performance of dc motors
C216.5	Analyze the speed control and testing methods of dc motors
C216.6	Propose design aspects of a dc machine



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Thermal and Hydro Lab	Course Index:	C217
REGULATION:	R13	YEAR-SEM:	II-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C217.1	Test for the IC Engines valve/port timing diagram
C217.2	Test for an I.C. Engines- 4 -stroke Diesel engine
C217.3	Test on I.C. Engines 2-stroke petrol engine.
C217.4	Analyze by the Study of boilers
C217.5	Identify the Test conducted on Pelton Wheel, Francis Turbine, Kaplan Turbine
C217.6	Choose on Reciprocating Pump, and can Calibrate the Venturimeter

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Electrical Circuits Lab	Course Index:	C218
REGULATION:	R13	YEAR-SEM:	II-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C218.1	Evaluate the different circuit parameters using network theorems and verify them practically.
C218.2	Illustrate concepts of locus diagrams
C218.3	Simplify the resonance parameters and verify them practically
C218.4	Illustrate concepts of inductances and determine the coefficient of coupling.
C218.5	Examine two port network parameters.
C218.6	Illustrate the concept of power measurement and compute types of power



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Environmental studies	Course Index:	C221
REGULATION:	R13	YEAR-SEM:	II-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C221.1	Tell the importance of environment
C221.2	Discover the importance and need to conserve the natural resources for the sustenance of the life
C221.3	Find the need of protecting the producers and consumers in various ecosystems and their role in the food web.
C221.4	Define the biodiversity of India and conservation practices to protect the biodiversity
C221.5	Identify problems due to human interactions with the environment
C221.6	Analyze various attributes of the pollution and their impacts and measures to reduce the pollution along with waste management practices.



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Switching Theory and Logic Design	Course Index:	C222
REGULATION:	R13	YEAR-SEM:	II-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C222.1	Simplify the various number systems and the utilization of 4-bit BCD codes for the representation of the numbers
C222.2	Illustrate the theory of Boolean Algebra & the underlying features of various number systems.
C222.3	Make use of the concepts of Boolean Algebra for the analysis & design of various combinational - I Circuits
C222.4	Design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays
C222.5	Make use of the concepts of Boolean Algebra for the analysis & design of various sequential logic - I circuits.
C222.6	Make use of the concepts of Boolean Algebra for the analysis & design of various sequential logic II circuits.



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Course Name:	Pulse & Digital Circuits	Course Index:	C223
REGULATION:	R13	YEAR-SEM:	II-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C223.1	Relate about High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs RL and RLC circuits and their response
C223.2	Classify about Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper
C223.3	Define Diode and Transistor as switches, Break down voltage consideration of transistor, saturation parameters of Transistor
C223.4	Analyze about positive and negative logic, Diode OR gate, Diode AND gate
C223.5	Categorize Analysis & Design of Bistable Multivibrators : Fixed bias & self biased transistor binary, Commutating capacitors
C223.6	Design of Monostable Multivibrator



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Power Systems-I	Course Index:	C224
REGULATION:	R13	YEAR-SEM:	II-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C224.1	Elucidate the different components of thermal power station
C224.2	Explain the different components of Nuclear power station
C224.3	Distinguish between AC & Dc distribution systems and also estimate voltage drops in both types of distribution systems
C224.4	Classify the different components of an air and gas insulated substations
C224.5	Recognize single core and multi core cables with different insulating materials
C224.6	Identify the effect of load factor, demand factor, and diversity factor on the cost of generation of electrical power and also able to identify the types of tariff applicable to consumers based on their load demand



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Electrical Machines-II	Course Index:	C225
REGULATION:	R13	YEAR-SEM:	II-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C225.1	Describe the operation and performance of single phase transformer
C225.2	Explain the regulation losses and efficiency of single phase transformer
C225.3	Elucidate types of three phase transformer connection, tap changing methods and 3-phase to 2-phase transformation
C225.4	Evaluate the operation and performance of three phase induction motor
C225.5	Analyze the torque-speed relation, performance of induction motor and induction generator
C225.6	Estimate design procedure for transformers and three phase induction motors



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Course Name:	Control Systems	Course Index:	C226
REGULATION:	R13	YEAR-SEM:	II-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C226.1	Understand Closed/Open Loop Control Systems, derive the transfer function of physical systems and determine overall transfer function using block diagram algebra & signal flow graphs.
C226.2	Study different types of standard inputs, find the output response of first and second order systems, determine time response specifications of second order systems and determine steady state error along with error constants.
C226.3	Acquire the skill to analyze absolute and relative stability of LTI systems using Routh-Hurwitz stability criterion and the Root Locus Plot.
C226.4	Analyze the stability of LTI systems using frequency response methods such as Bode plots, Polar Plots & Nyquist Plots.
C226.5	Design Lag, Lead & Lag-Lead compensators to improve system performance by analyzing data from Bode plots
C226.6	Represent physical systems as state models and determine the output response by understanding the concepts of controllability and observability

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Electrical Machines -I Lab	Course Index:	C227
REGULATION:	R13	YEAR-SEM:	II-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C227.1	Evaluate the magnetization characteristics of a self-excited DC generator.
C227.2	Determine the characteristics of DC generators at load condition.
C227.3	Estimate the efficiency of DC shunt machine both as generator and motor by indirect method.
C227.4	Determine the performance of DC motors at load condition by brake test.
C227.5	Examine the speed of DC shunt motor by different speed control methods.
C227.6	Analyze the performance of DC series machines by Field's test.



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Course Name:	Electronic Devices & Circuits Lab	Course Index:	C228
REGULATION:	R13	YEAR-SEM:	II-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C228.1	Determine the characteristics of PN junction diode, zever diode
C228.2	Experiment with rectifiers with and without C filters
C228.3	Determine the characteristics of BJT, FET, UJT and SCR
C228.4	Explain transistor biasing and CRO operation
C228.5	Examine the characteristics of various amplifiers such as BJT -CE, Emitter Follower CC, FET-CS
C228.6	Utilize several equipment such as Ammeters, Voltmeters, Active & Passive Electronic Components, Regulated Power supplies, CRO's, Function Generators, Digital Multimeters, Résistance Boxes/Rheostats, Decade Capacitance



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Course Name:	Managerial Economics and Financial Analysis	Course Index:	C311
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C311.1	Tell the knowledge of estimating the Demand for a product and the relationship between Price and Demand
C311.2	Find the Cost Concepts for decision making and to estimate the least cost combination of inputs
C311.3	Measure the nature of different markets and Price Output determination under various market conditions
C311.4	Compare the different Business Units
C311.5	Demonstrate the Financial Statements and the usage of various Accounting tools for Analysis
C311.6	Evaluate various investment project proposals with the help of capital budgeting techniques for decision making



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Electrical Measurements	Course Index:	C312
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C312.1	Illustrate the principle of operation and working of different types of instruments. Measurement of voltage and current.
C312.2	Discuss the working principle of operation of different types of instruments for measurement of power and energy.
C312.3	Summarize the principle of operation and working of dc and ac potentiometers.
C312.4	Conclude the principle of operation and working of various types of bridges for measurement of parameters –resistance,
C312.5	Explain the principle of operation and working of various types of magnetic measuring instruments.
C312.6	List the applications of CRO for measurement of frequency, phase difference and hysteresis loop using Lissajous patterns.



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Course Name:	Power Systems-II	Course Index:	C313
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C313.1	Derive transmission line parameters for analyzing the behavior under different operating conditions.
C313.2	Analyze the performance of short & medium transmission lines.
C313.3	Analyze the performance of long transmission lines.
C313.4	Understand the surge propagation, reflection and refraction in transmission lines and design the level of insulation coordination at various high voltages.
C313.5	Utilize the knowledge on surge behavior of transmission line for protection of power equipments, viz. power transformer and system connected shunt reactors.
C313.6	Formulate physical and geometrical parameters of transmission line useful for its safe and efficient performance.



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Electrical Machines-III	Course Index:	C314
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C314.1	Analyze the performance of single phase induction and ac series motors.
C314.2	Explain the structure of synchronous machines and designs of its windings.
C314.3	Develop solutions for regulation of both non salient pole and salient pole synchronous generators.
C314.4	Justify the role of synchronous generators operation when connected to an infinite bus or when operating in parallel.
C314.5	Examine the performance of synchronous motor for development of torque and power factor correction.
C314.6	Illustrate the hunting phenomenon and starting methods of synchronous motor.



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Course Name:	Power Electronics	Course Index:	C315
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C315.1	Demonstrate basic theory of operation of SCR, characteristics of power MOSFET & power IGBT and to design Uncontrolled converters along with protection circuits.
C315.2	Design various Firing circuit for SCR & Analyze various converters like 1- Φ AC Voltage Controllers & 1- Φ Half Wave Controlled Rectifier with & without effect Of freewheeling diode.
C315.3	Explore and interpret 1- Φ Full Bridge & Semi Controlled converters with various inductive loads, calculation of power factor & input harmonics.
C315.4	Analyze various 3- Φ uncontrolled & controlled rectifier circuits and Understand their Applications
C315.5	Analyze & design various AC-AC and DC-DC Converters like Single phase Bridge type CYCLO CONVERTER, BUCK, BOOST & BUCK – BOOST converters in different modes with ripple calculation & operation of different modes with ripple calculation
C315.6	Analyze steady –state performance of 1- Φ & 3- Φ inverters, applications of PWM techniques for VSI along with harmonic analysis.



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Course Name:	Linear & Digital IC Applications	Course Index:	C316
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C316.1	Construct a block diagram representing a typical op-amp with various definitions.
C316.2	Construct and Illustrate the open-loop configuration and feedback configuration and can determine Voltage gain, the input resistance, the output resistance.
C316.3	Distinguish between Ideal and Non-Ideal Op-Amp, Determination of closed loop voltage gain, the input resistance, the output resistance for Non-Ideal Op-Amp Circuits.
C316.4	Examine various mathematical Operations, Trigonometric & Logarithmic Operations, and Instrumentation Amplifier with relevant Circuits.
C316.5	Design waveform generators (Astable, Monostable, Schmitt Trigger) using Single Op-Amp.
C316.6	Examine 555 timer & its applications using Astable and Monostable Operations.



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Course Name:	Electrical Machines-II Lab	Course Index:	C317
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C317.1	Evaluate the parameters of a single-phase transformer and estimate their performance.
C317.2	Determine the different performance characteristics of a three-phase induction motor.
C317.3	Illustrate the performance parameters of three-phase alternator.
C317.4	Analyze V and Inverted V curves of a three-phase synchronous motor.
C317.5	Determine the performance parameters of single-phase induction motor.
C317.6	Demonstrate three phase to two phase conversion using Scott transformers.



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Course Name:	Control Systems Lab	Course Index:	C318
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C318.1	Perform the characteristics of synchros and time response of the second order system.
C318.2	Demonstrate the effect of feedback on DC Servo motor and AC servo motor.
C318.3	Distinguish the characteristics of magnetic amplifier, DC Servo motor and AC servo motor.
C318.4	Construct the transfer function of DC motor
C318.5	Distinguish the variations in the temperature controller using PID and effect of P, PI, PD, PID controller on second order systems.
C318.6	Distinguish the variations in design of lag, lead and lag-lead compensators



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Course Name:	IPR & Patents	Course Index:	C319
REGULATION:	R13	YEAR-SEM:	III-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C321.1	Illustrate the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF ₆ gas type
C321.2	Explain the working principle and constructional features of different types of electromagnetic protective relays
C321.3	Relate the acquired in depth knowledge of faults that is observed in high power generator and transformers and protective schemes used for all protections
C321.4	Improve the ability to understand various types of protective schemes used for feeders and bus bar protection
C321.5	Compare different types of static relays with a view to application in the system.
C321.6	Explain different types of over voltages appearing in the system, including existing protective schemes



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Course Name:	Switchgear and Protection	Course Index:	C321
REGULATION:	R13	YEAR-SEM:	III-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C321.1	Illustrate the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF ₆ gas type
C321.2	Explain the working principle and constructional features of different types of electromagnetic protective relays
C321.3	Relate the acquired in depth knowledge of faults that is observed in high power generator and transformers and protective schemes used for all protections
C321.4	Improve the ability to understand various types of protective schemes used for feeders and bus bar protection
C321.5	Compare different types of static relays with a view to application in the system.
C321.6	Explain different types of over voltages appearing in the system, including existing protective schemes



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Course Name:	Microprocessors & Microcontrollers	Course Index:	C322
REGULATION:	R13	YEAR-SEM:	III-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C322.1	Explain the microprocessor capability in general and explore the evaluation of microprocessors.
C322.2	Explain the addressing modes of microprocessors
C322.3	Explain the micro controller capability
C322.4	Compile program mp and micro controller
C322.5	Develop an interface of mp and micro controller with other electronic devices
C322.6	Develop cyber physical systems



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Course Name:	Utilization of Electrical Energy	Course Index:	C323
REGULATION:	R13	YEAR-SEM:	III-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C323.1	Understand the operating principles and characteristics of traction motors with respect to speed, temperature, loading conditions.
C323.2	Get acquainted with the different types of heating and welding techniques.
C323.3	Learn the basic principles of illumination and its measurement.
C323.4	Differentiate different types of lightning system including design.
C323.5	Realize the basic principle of electric traction including speed-time curves of different traction services.
C323.6	Perform the calculations of various traction system for braking, acceleration and other related parameters, including demand side management of energy.



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Course Name:	Power System Analysis	Course Index:	C324
REGULATION:	R13	YEAR-SEM:	III-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C324.1	Draw impedance/reactance diagram for a power system network and to understand per unit quantities & form Ybus matrix by direct inspection and singular transformation methods.
C324.2	Perform the load flow analysis of a power system using Gauss Seidel (GS), Newton Raphson (NR), Decoupled Load Flow (DLF) and Fast Decoupled Load Flow(FDLF) Methods
C324.3	Formulate Zbus matrices for a power system networks by step by step building algorithm & modify Zbus matrix by adding/removing a link.
C324.4	Determine the Fault Currents and Fault MVA for symmetrical faults such as LLL and LLL-G to provide data for the design of protective devices.
C324.5	Determine the Fault currents, sequence components and Sequence networks for unsymmetrical faults in a power system network, to provide data for the design of protective devices.
C324.6	Analyze the steady state, transient and dynamic stability concepts of a power system with the help of Power angle curve, Swing Equation and Equal Area Criterion.



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Course Name:	Power Semiconductor Drives	Course Index:	C325
REGULATION:	R13	YEAR-SEM:	III-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C325.1	Demonstrate the fundamentals of Electric Drives, Steady state stability and Load Equalization different Braking Techniques
C325.2	Develop the 3-phase full converter controlled dc motor and also using Dual converter for multi quadrant operations and observe their Voltage current wave forms
C325.3	Explain the Chopper circuit differs with Converter circuits and also Classes of chopper circuits for Closed loop operations
C325.4	Construct AC Voltage controller and VSC Converter for speed control of induction motor drive .
C325.5	Design Slip ring induction Motor drive for Rotor Resistance control and also for Slip Power schemes of scheirbius Drive
C325.6	Illustrate Various electrical and mechanical speed control Characteristics of Synchronous motor Drive.



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Management Science	Course Index:	C326
REGULATION:	R13	YEAR-SEM:	III-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C326.1	Make use of acquired the knowledge on functional management
C326.2	Make use of acquired the knowledge on project management
C326.3	Make use of acquired the knowledge on strategic management
C326.4	Recall the concepts of functional management
C326.5	Recall the concepts of project management
C326.6	Recall the concepts of strategic management



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Power Electronics Lab	Course Index:	C327
REGULATION:	R13	YEAR-SEM:	III-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C327.1	Analyze the performance of 1- Φ rectifiers along with 1- Φ dual converters and compare the results for R & R-L loads
C327.2	Analyze the performance of AC voltage controllers and cyclo-converters
C327.3	Illustrate the working of BUCK and BOOST converters
C327.4	Make use of various power electronic devices and study their characteristics
C327.5	Analyze the firing circuits of SCR
C327.6	Illustrate the working of various forced commutation circuits



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Course Name:	Electrical Measurements Lab	Course Index:	C328
REGULATION:	R13	YEAR-SEM:	III-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C328.1	Make use of energy meter and wattmeter for calibration.
C328.2	Illustrate the three phase reactive power measurement.
C328.3	Analyze the PMMC ammeter and voltmeter for calculating choke coil parameters
C328.4	Evaluate electrical parameters using different DC and AC bridges.
C328.5	Test the dielectric strength of insulating oil.
C328.6	Determine the characteristics of LVDT and Capacitive pick-up.

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Renewable Energy Sources and Systems	Course Index:	C411
REGULATION:	R13	YEAR-SEM:	IV-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C411.1	Analyze solar radiation data, extraterrestrial radiation, radiation on earth's surface
C411.2	Evaluate solar thermal collections
C411.3	Design solar photo voltaic systems.
C411.4	Develop maximum power point techniques in solar PV and wind
C411.5	Describe wind energy conversion systems, Betz coefficient, tip speed ratio.
C411.6	Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems



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Course Name:	HVAC & DC Transmission	Course Index:	C412
REGULATION:	R13	YEAR-SEM:	IV-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C412.1	Infer 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.
C412.2	Determining corona, radio interference, audible noise generation and frequency spectrum for single and three phase transmission lines.
C412.3	Developing transmission of HVDC power with regard to terminal equipments, type of HVDC connectivity and planning of HVDC system.
C412.4	Evaluate choice of pulse conversion, control characteristic, firing angle control and effect of source impedance.
C412.5	Examine reactive power requirements of conventional control, filters and reactive power compensation in AC. side of HVDC system.
C412.6	Determine voltage and current harmonics, and design of filters for six and twelve pulse conversion.



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Power System Operation & Control	Course Index:	C413
REGULATION:	R13	YEAR-SEM:	IV-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C413.1	Understand Economic Operation, derive the Loss Coefficients of Power systems and determine overall Generation schedule using I/O Characteristics
C413.2	Study Hydroelectric Power Plant Model by I/O Characteristics of the Power systems and short- and long-term problems by solving problems of Scheduling by Kirchmayer's method
C413.3	Acquire the skill to analyze Unit commitment by knowing the constraint Equations and solve the Cost function by priority ordering and dynamic programming method (solution methods)
C413.4	Model Turbine, Generator and Governor for developing the Isolated power system for the single area control and tie line bias control
C413.5	Analyze the Proportional Plus Integral Control to control load frequency and economic dispatch control by steady state and dynamic response
C413.6	Design Compensating Equipment of compensated and uncompensated transmission line by controlling the reactive power and understand the FACTS Controllers



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Instrumentation	Course Index:	C414
REGULATION:	R13	YEAR-SEM:	IV-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C414.1	Represent various types of signals.
C414.2	Acquire proper knowledge to use various types of Transducers.
C414.3	Monitor and measure various parameters such as strain, velocity, temperature, pressure etc.
C414.4	Acquire proper knowledge and working principle of various types of digital voltmeters.
C414.5	Measure various parameter like phase and frequency of a signal with the help of CRO.
C414.6	Acquire proper knowledge and able to handle various types of signal analyzers.



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Course Name:	Electrical Distribution Systems	Course Index:	C415
REGULATION:	R13	YEAR-SEM:	IV-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C415.1	Analyze the distribution systems, Load modeling, Classification of loads and their characteristics.
C415.2	Construct the substations and design of distribution feeders, Voltage levels of different feeders
C415.3	Evaluate the Voltage drop power-loss for Three phase balanced primary lines and radial networks
C415.4	Explain distribution system protection, fault calculations and coordination procedure for protective devices, Residual current circuit breaker and fuses.
C415.5	Design Capacitive compensation for power factor improvement using Protective devices, power capacitors and Economic justification for best capacitor location
C415.6	Demonstrate the voltage control using series capacitors, Automatic Voltage booster (AVB) Automatic Voltage Regulators(AVR)



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Name:	Microprocessors & Microcontrollers Lab	Course Index:	C416
REGULATION:	R13	YEAR-SEM:	IV-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C416.1	Compile assembly language programs for 8086 microprocessor
C416.2	Make use of microcontroller kit to execute simple programs in Assembly language
C416.3	Make use of Assembly language in implementing high-level language structures.
C416.4	Compile a program and interface peripherals to the microprocessor and microcontroller
C416.5	Make use of DAC and generate different waveforms
C416.6	Make use of interrupts and timers to achieve real time control.



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Course Name:	Electrical Simulation Lab	Course Index:	C417
REGULATION:	R13	YEAR-SEM:	IV-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C417.1	Analyze various power system and power electronics networks.
C417.2	Examine the transient response of RLC circuits for different inputs.
C417.3	Analyze the voltage and current waveforms of power system components during normal and disturbance conditions.
C417.4	Compute the power flow solution of power System.
C417.5	Evaluate the performance of transformer and lossy transmission line.
C417.6	Examine the operation single phase full converter, AC voltage controller, resonant pulse commutation and chopper circuits.



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Course Name:	Power Systems Lab	Course Index:	C418
REGULATION:	R13	YEAR-SEM:	IV-I

The student will be able to:

CO INDEX	COURSE OUTCOME
C418.1	Evaluate the sequence impedances of transformer & alternator
C418.2	Test the dielectric strength of transformer oil & Calibrate a tong tester.
C418.3	Determine the ABCD parameters for a transmission network.
C418.4	Compile a program to analyze the load flow studies by any two methods
C418.5	Compile a program to evaluate economic load dispatch.
C418.6	Design a model implementing load frequency control.



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Course Name:	Digital Control Systems	Course Index:	C421
REGULATION:	R13	YEAR-SEM:	IV-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C421.1	Learn the advantages of discrete time control systems and the “know how” of various associated accessories
C421.2	Understand z-transformations and their role in the mathematical analysis of different systems
C421.3	Perform State space analysis using the concepts of Controllability and Observability
C421.4	Apply the stability criterion for digital systems and methods adopted for testing the same
C421.5	Differentiate the conventional and state-space methods of design
C421.6	Design of state feedback controllers



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Course Name:	Special Electrical Machines	Course Index:	C422
REGULATION:	R13	YEAR-SEM:	IV-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C422.1	Explain theory of operation and control of switched reluctance motor.
C422.2	Explain the performance and control of stepper motors, and their applications.
C422.3	Demonstrate the operation and characteristics of permanent magnet dc motor.
C422.4	Compare dc motor with and without brushes
C422.5	Explain the theory of travelling magnetic field and applications of linear motors.
C422.6	Illustrate the significance of electrical motors for traction drives.



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Course Name:	FACTS: Flexible Alternating Current Transmission Systems.	Course Index:	C423
REGULATION:	R13	YEAR-SEM:	IV-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C423.1	Understand Power flow for Loading Capability Limits of Power systems and Controlling facts controllers of high-power devices
C423.2	Study Voltage Source Converter by determining bridge converter and current source converter
C423.3	Acquire the skill to analyze shunt compensation for determining voltage regulation and support and improve transient stability
C423.4	Analyze the Thyristor switched capacitor for developing the slope of transfer function and dynamic performance and power oscillation damping
C423.5	Design the different series compensators like GSC, TSSC and TCSC for improving transient stability, power oscillation damping and functional requirements
C423.6	Study the principal of Unified power flow controller and Internal power flow controller for application of these controllers



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Course Name:	Power System Reforms	Course Index:	C424
REGULATION:	R13	YEAR-SEM:	IV-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C424.1	Elucidate importance of power system deregulation and restructuring
C424.2	Compute the Available Transfer Capability
C424.3	Illustrate transmission congestion management
C424.4	Determine electricity pricing in deregulated environment
C424.5	Explain power system operation in deregulated environment
C424.6	Relate importance of ancillary services



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Course Name:	PROJECT	Course Index:	C425
REGULATION:	R13	YEAR-SEM:	IV-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C425.1	Evaluate Real world problem identification
C425.2	Make use of Communication Skills
C425.3	Develop Presentation skills
C425.4	Improve Research Skills
C425.5	Interpret Learner Autonomy
C425.6	Develop Report writing skills

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Course Name:	UNIX and Shell Programming	Course Index:	C4211
REGULATION:	R13	YEAR-SEM:	IV-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C4211.1	Make use of UNIX shells and commands to create powerful data processing applications.
C4211.2	Build UNIX applications using the shell command interpreter and UNIX commands.
C4211.3	Make use of UNIX at the command line to manage data, files, and programs.
C4211.4	Make use of UNIX editors and tools to create and modify data files and documents
C4211.5	Illustrate Korn Shell Programming
C4211.6	Illustrate C Shell Programming



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Course Name:	AI Techniques	Course Index:	C4212
REGULATION:	R13	YEAR-SEM:	IV-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C4212.1	Explain various methods of AI
C4212.2	Illustrate the models and architecture of artificial neural networks.
C4212.3	Illustrate the ANN paradigms.
C4212.4	Explain the fuzzy sets and operations.
C4212.5	Illustrate the fuzzy logic systems.
C4212.6	Illustrate the applications of AI.



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Course Name:	Systems Engineering	Course Index:	C4213
REGULATION:	R13	YEAR-SEM:	IV-II

The student will be able to:

CO INDEX	COURSE OUTCOME
C4213.1	Appreciate and evaluate systems in general and apply to specific systems.
C4213.2	Illustrate & Engineer successful systems fit for intended purpose right from concept to development.
C4213.3	Develop the new systems developed successfully
C4213.4	Make use of the support systems for success of systems from womb to tomb.
C4213.5	Apply systems engineering in engineering product and services.
C4213.6	Relate systems engineering with project management and software engineering.