RAAJDHANI ENGINEERING COLLEGE
Course Outcome

Subject(Code):Mathematics-I(C101) **Year/Semester of Study:1st yr/1st sem**

COs	CO Statements
C101.1	Apply the concept of definite integral to evaluate length of curves, areas of surfaces and volumes of surfaces of revolution
C101.2	Understand indefinite integral, Gamma function and Beta function.
C101.3	Understand the Single-Variable calculus and Power series.
C101.4	Apply the multi-variable calculus and method of Lagrange multipliers.
C101.5	Understand the basic of Linear algebra such as Vector space and matrix to solve system of linear equation.
C101.6	Understand the matrix and it's characteristics.

Subject(Code): Physics(C102) **Year and Semester of Study:1st /1st sem**

COs	CO Statements
C102.1	The students will be able to understand the basic concepts of the oscillatory motion, their applications, and can use the concept to solve the problem.
C102.2	The students will be able to understand the fundamentals of wave motion, their applications, and can solve the numericals.
C102.3	The students will be able to analyze the principle of wave optics, and their use to real-world problems.
C102.4	The students will able to learn the fundamentals of electromagnetism and can use different mathematical tools to understand different laws
C102.5	The students will able to understand the importance of quantum physics, the structure and behaviour of matter at the microscopic level and can able to solve numericals.
C102.6	The students will able to understand the characteristics of LASER, working principle of LASER, and its applications.

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Course Outcome

Subject(Code): Basic Electrical Engineering (103) **Year/Semester of Study: 1st/1st**

COs	CO Statements
C103.1	Implement principles of DC network, theorems and transients.
C103.2	Analyze the concept of Single phase AC circuits.
C103.3	Analyze the concept of Three phase AC circuits.
C103.4	Analyze the concept of magnetic circuit and DC machines.
C103.5	Apply basic principles of AC machines and their working.
C103.6	Demonstrate basic principles of power system

Subject(Code): Programming in C and Data Structure(C104) Year/Semester of Study:1st/1st

COs	CO Statements
C104.1	Demonstrate a comprehensive understanding of C programming fundamentals,
C104.2	Design and implement functions, leveraging recursion, and demonstrate advanced manipulation skills
C104.3	Demonstrate proficiency in pointer manipulation, dynamic memory allocation, and related concepts in C programming
C104.4	Apply their understanding of pointer manipulation, dynamic memory allocation, and related concepts in C programming
C104.5	Evaluate the design and implementation of core data structures—linear linked lists, stacks, and queues
C104.6	Design and implement advanced data structures, including binary trees and binary search trees, and sorting algorithms

RAAJDHANI ENGINEERING COLLEGE
Course Outcome

Subject(Code): Basic Civil Engineering (105) **Year/Semester of Study: 1st/1st**

COs	CO Statements
C105.1	Analyse grasping the essentials of both construction and civil engineering
C105.2	Understand the forms and functions of several foundational systems and characteristics of soil
C105.3	Understand concise synopsis of the main aspects of construction materials and their properties
C105.4	Develop a basic understanding of planning and different modes of transportation
C105.5	Understand fundamental knowledge of water treatment plants and drinking water requirements.
C105.6	Describe basic understanding of irrigation network systems

Subject(Code): Universal Human Values(C106) **Year/Semester of Study:1st/1st**

COs	CO Statements
C106.1	Understand and analyse the essentials of human values and skills, self-exploration, happiness and prosperity.
C106.2	Evaluate coexistence of the "I" with the body.
C106.3	Identify and evaluate the role of harmony in family, society and universal order.
C106.4	Develop appropriate technologies and management patterns to create harmony in professional and personal lives.
C106.5	Understand and Associate the holistic perception of harmony at all tevls of existence
C106.6	Understand about awareness in professional ethics.

RAAJDHANI ENGINEERING COLLEGE
Course Outcome

Subject(Code): Physics Lab.(C107) Year/Semester of Study:1st /1st

COs	CO Statements
C107.1	Students will be able to express the idea of calculation of acceleration due to gravity at any place using the concept of oscillatory system and simple harmonic motion.
C107.2	Students will be able to understand the properties of light and principle of interference and diffraction also to develop skills in laboratory techniques, data analysis and error analysis.
C107.3	Students will be able to demonstrate the working and operational technique to calculate the mechanical properties of fluid and other materials.
C107.4	Student will be able to evaluate the voltage, current, power and characteristics behaviour of the electronic devices.
C107.5	Student will be able to understand the rigidity concept of solid materials.
C107.6	Students will be able to analyze the electrical and magnetic field measurements and their applications.

Subject(Code): Basic Electrical Engineering Lab (C108) Year/Semester of Study:1st/1st

COs	CO Statements
C108.1	Know the safety rules as per ISS and symbols of different electrical components and the use of various electrical instruments in the laboratory.
C108.2	Measure armature and field resistance of DC machines, earth resistance and insulation resistance and demonstrate the internal structure of different machines.
C108.3	Demonstrate the working and operational characteristics of dc motor and dc generator.
C108.4	Evaluate the voltage, current, power and power factor of choke coil and study BH curve of a ferromagnetic core.
C108.5	Analyze the connection and calibration of single phase energy meter
C108.6	Apply Thevenin and Norton’s theorem to dc circuits

RAAJDHANI ENGINEERING COLLEGE
Course Outcome

Subject(Code): Programming Lab.(C109) **Year/Semester of Study: 1st/1st**

COs	CO Statements
C109.1	Apply programming fundamentals through practical exercises,
C109.2	Apply programming logic and problem-solving skills, as evidenced by their ability to develop programs
C109.3	Demonstrate proficiency in programming logic and problem-solving by designing programs in C.
C109.4	Demonstrate their competence by utilizing programming concepts such as functions, recursion, and structures in practical programming scenarios.
C109.5	Demonstrate proficiency in pointer usage, dynamic memory allocation, and linked lists.
C109.6	Apply data structures and algorithms, implementing stack, queue, sorting, and search operations in C.

Subject(Code): Engineering Graphic and Design Lab (C110) **Year/Semester of Study: 1st/1st**

COs	CO Statements
C110.1	The students will be able to understand the basics of AutoCAD and perform simple drawing using commands.
C110.2	The students will be able to perform free hand sketching of basic geometrical constructions and multiple views of objects using the various types of scales.
C110.3	The students will be able to different geometrical figures and engineering curves using physical instruments and Autocad.
C110.4	The students will be able draw the projections of points, straight lines and plane surfaces in given quadrant.
C110.5	The students will be able to draw projections and solids and can develop geometrical surfaces.
C110.6	The students will be able prepare isometric and perspective sections of simple solids.

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Course Outcome

Subject(Code): Mathematics (II) (C111) **Year/Semester of Study: 1st/2nd**

COs	CO Statements
C111.1	Apply the knowledge of matrix algebra for solving system of linear equations and compute the inverse of matrices.
C111.2	Develop the essential tool of matrices to compute Eigen values and Eigen vectors required for matrix diagonalization process.
C111.3	Illustrate the concept of vector differential calculus to understand the solenoidal and irrotational vectors.
C111.4	Understand the concept of vector integral calculus and exhibit the inter dependence of line integral and double integral (Green's theorem) and apply it to solve engineering problems.
C111.5	Apply the knowledge of surface and volume integrals (Gauss divergence and Stoke's theorem) to solve engineering problems.
C111.6	Know the use of periodic functions and Fourier series, Fourier intergral, Fourier transform to analyze circuit and system communication.

Subject(Code): Chemistry(C112) **Year/Semester of Study: 1st/2nd**

COs	CO Statements
C112.1	Demonstrate and realise the trend in various periodic properties associated with different elements present in different groups and periods of modern periodic table.
C112.2	Acquire the knowledge of free energy concept for the thermodynamics associated with chemical reactions and equilibriums.
C112.3	Analyze and implement the concepts of spectroscopic techniques for identification of various organic and inorganic compounds.
C112.4	Evaluate and visualize the concept of configurations and conformations of various organic compounds
C112.5	Able to assess the generation, reaction and identification of intermediates involved during organic reactions.
C112.6	Able to understand and generalise various organic reactions like addition, substitution and elimination reaction.

Subject(Code): Basic Electronics (C113) **Year/Semester of Study: 1st/2nd**

COs	CO Statements
C113.1	Understand the operation and application of semiconductor devices.
C113.2	Understand, construction and characteristics of FETs. & MOSFET
C113.3	Apply the Feedback Amplifiers and Operational Amplifiers.
C113.4	Analyse about the fundamentals of integrated circuits.
C113.5	Remember the fundamentals of different digital arithmetic operations.
C113.6	Understand about the electronics instruments, CRO and DSO.

Subject(Code): Engineering Mechanics(C114) **Year/Semester of Study: 1st/2nd**

COs	CO Statements
C114.1	Understand the basics of objects in static equilibrium including the determination of reactions, force systems and moments and analysis of trusses.
C114.2	Apply the fundamental concept of friction, virtual work and the analytical skills to solve the problems
C114.3	Evaluate the centroid and second moment of area of sections and their engineering applications.
C114.4	Apply the Principle of dynamics in a particle for rectilinear translation for solving realistic (/Practical) engineering problems.
C114.5	Analyse the different types of impact, coefficient of restituition and principle of conservation of momentum.
C114.6	Apply the concepts of D Alembert's principle in curvilinear motion and analysis of projectile motion.

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Course Outcome

Subject(Code): Basic Mechanical Engineering(C115) **Year/Semester of Study: 1st/2nd**

COs	CO Statements
C115.1	Understand the fundamental concept of thermodynamics system.
C115.2	Analyse the application of thermodynamics in IC engine refrigerator and heat pump.
C115.3	Understand the concept of fluid mechanics and Heat transfer
C115.4	Understand the types of engineering materials and its properties.
C115.5	Understand the different manufacturing process and techniques.
C115.6	Understand the fundamental power transfer mechanisms and aware of the fundamental robotics system.

Subject(Code):Communicative English(C116) **Year/Semester of Study: 1st/2nd**

COs	CO Statements
C116.1	Analyse awareness about the complexity of the communication process.
C116.2	Understand learning environment to practice listening, speaking, reading and writing skills.
C116.3	Analyse the tasks and activities through guided instructions and materials.
C116.4	Understand effective writing skills so as enable students to write in a clear, concise, persuasive manner
C116.5	Analyse variety of forms of writing in professional world.
C116.6	Analyse English language learning with employability skills and training.

RAAJDHANI ENGINEERING COLLEGE
Course Outcome

Subject(Code):Chemistry Laboratory(117) **Year/Semester of Study: 1st/ 2nd**

COs	CO Statements
C117.1	Analyze the alkalinity and hardness value of the water sample.
C117.2	Analyze the concentration of chlorine and ferrous iron .
C117.3	Analyse kinetics of the reactions and they'll get knowledge on dissolve oxygen and find conc of Ca in lime stone
C117.4	Understand and analyze the concept of standardization.
C117.5	Analyze viscosity and flash point of lubricating oils.
C117.6	Concentration of a given potassium permanganate solution and know the synthesis of paracetamol and aspirin.

Subject(Code): Basic Electronics Lab (C118) **Year/Semester of Study: 1st/2nd**

COs	CO Statements
C118.1	Acquire basic knowledge on electronic devices and components
C118.2	Design different electronics circuits using semiconductor diodes.
C118.3	Analyze and develop the characteristics of BJT , FET & MOSFET Circuits
C118.4	Implement Operational amplifier circuits.
C118.5	Acquire knowledge on basic digital logic gates.
C118.6	Analyze and develop the input and output waveform of different rectifier circuits.

RAAJDHANI ENGINEERING COLLEGE
Course Outcome

Subject(Code):Communicative English Lab(C119) Year/Semester of Study:1st/2nd

COs	CO Statements
C119.1	To acquire strategic competence to use both spoken and written language in range a wide communication strategies.
C119.2	Enrich fundamental concept offriction and demonstrate the analytical skills to solve the problems involving friction.
C119.3	Assimilating the knowledge for determination of centroid and second moment of area of sectionsand their engineering applications.
C119.4	To analyze the work done by forces, the energy transferred from one object to other. and apply principle of work and energy conservation for realistic (/Practical) engineering problems.
C119.5	To apply principle of work and energy conservation for realistic (/Practical) engineering problems.
C119.6	Identify the various parameters in projectile motion. Apply the principle of dynamics to analyze the curvilinear motion of rigid bodies.

Subject(Code): Workshop & Digital Manufacturing Lab Year/Semester of Study: 1st/2nd

COs	CO Statements
C120.1	Design the Preparation of job in fitting section and Study of lathe and turning operation
C120.2	Construct the Preparation of job in black smith section/ Study of milling machine and milling operation
C120.3	Students will be able to design the Preparation of job in carpentry section/milling operation on CNC milling machine
C120.4	Students will be able to implement the Study of CNC lathe machine and turning on CNC lathe.
C120.5	Students will be able to learn the Study of Robot (Pick and place and palletizing operation).
C120.6	Students will be able to analysis the Study of additive manufacturing using 3D printer and product development

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Course Outcome

Subject(Code): Mathematics-III (C201) **Year/Semester of Study: 2nd/3rd**

COs	CO Statements
C201.1	Select appropriate numerical methods to apply to various types of problems in engineering and science in consideration of the mathematical operations involved, accuracy requirements and available computational re-sources.
C201.2	Compare different numerical methods with respect to accuracy, efficiency and convergence properties of the algorithm.
C201.3	Measure a recorded observation and understand the concepts of random variables. Demonstrate knowledge of probability distribution function.
C201.4	Have a fundamental knowledge of the concepts of probability theory and translate real world problems into probability models.
C201.5	Perform correlation & regression analysis, construct confidence interval estimates for population parameters, for single & multiple population, based on sample data.
C201.6	Apply theory of estimation in various engineering problems and to do conduct hypothesis tests concerning population parameters, for single & multiple population, based on sample data.

Subject(Code): OOPS Using JAVA (C202) **Year \ Semester of Study: 2nd\3rd**

COs	CO Statements
C202.1	Understand programming concepts, Object-Oriented Programming benefits, and Java fundamentals.
C202.2	Understand oops concepts in Java string manipulation, type conversion, enabling them to design and implement sophisticated software systems.
C202.3	Examine the sophisticated ideas of data abstraction, abstract classes, interfaces, package management, and exception handling. .
C202.4	Demonstrate a comprehensive understanding of multithreading, syncs chaos, conquers deadlocks, masters advanced techniques - concurrency awaits!
C202.5	Analyze I/O operations, collections, GUIs, interactivity, and problem-solve like a champ
C202.6	Create using Java GUI development by mastering both Swing and Java FX frameworks.

RAAJDHANI ENGINEERING COLLEGE
Course Outcome

Subject(Code):Organisational behaviour (C203) **Year/Semester of Study: 2nd/3rd**

COs	CO Statements
C203.1	The students can understand and appreciate individuals, interpersonal, and group process for increased effectiveness both within and outside of organizations.
C203.2	The Students will be able to analyse the behavior of individuals and groups inside organizations.
C203.3	The students will be able to apply theoretical and practical insights and problem-solving capabilities for effectively managing the organizational processes.
C203.4	Students will be able to apply different motivational theories and methods to increase the productivity and job satisfaction of employees.
C203.5	The students can evaluate outline significant curriculum and assessment theories, models and research in the higher-education sector.
C203.6	The students will be able to analyze and compare different models used to explain individual behavior related to motivation and rewards.

Subject(Code): Analog Electronics Circuit (C204) **Year/Semester of Study: 2nd/3rd**

COs	CO Statements
C204.1	Students will be able to Learn about BJTs and MOSFETs
C204.2	Students will be able to Design the biasing circuits of BJTs and MOSFETs
C204.3	Students will be able to Design and construct BJT and FET amplifiers
C204.4	Students will be able to Study high frequency response of all amplifiers
C204.5	Students will be able to Construct feedback amplifiers and Oscillator circuits
C204.6	Students will be able to design different Op-Amp amplifier circuits.

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Course Outcome

Subject(Code): Network Theory(C205) **Year/Semester of Study: 2nd/3rd**

COs	CO Statements
C205.1	Apply the knowledge of basic circuit laws to simplify the networks using network theorems.
C205.2	Understand transient and steady state response of electrical circuit.
C205.3	Analyze the condition for resonating behaviour of circuits.
C205.4	Analyze electrical circuit(Single phase & Three phase) under sinusoidal steady state condition
C205.5	Analyze electrical circuit using Laplace transformation
C205.6	Understand Two port network behaviour to calculate various parameters of two port networks.

Subject(Code): Environmental Science(206) , Year/Semester of Study: 2nd Yr/3rd

COs	CO Statements
C206.1	Introduced about water management and waste management.
C206.2	Aware of Slogan and poster making event.
C206.3	Know about Cycle rally and Lectures from experts.
C206.4	Know about plantation and full tree growth.
C206.5	Know about Cleanliness and segregation of waste.
C206.6	Aware of varieties of plants and saving electricity .

RAAJDHANI ENGINEERING COLLEGE
Course Outcome

Subject(Code): Analog Electronics Circuit Lab(C207) **Year/Semester of Study: 2nd/3rd**

COs	CO Statements
C207.1	To investigate various biasing methods for BJT and FET circuits.
C207.2	To learn the design and study of DC and AC performance of BJT, FET and MOSFET.
C207.3	To plot and study the frequency response of BJT, FET & OP-AMP.
C207.4	To study the darlington connections and current mirror circuits.
C207.5	To study about the different circuit using Op-Amp and square wave testing.
C207.6	Examine the output from various semiconductor devices in various operational modes.

Subject(Code):Network Theory Lab(C208) **Year/Semester of Study: 2nd/3rd**

COs	CO Statements
C208.1	Understand circuit theorems and concepts in engineering applications.
C208.2	Analyze the response of DC and AC transients.
C208.3	Analyze the characteristics of Electrical circuits.
C208.4	Analyze the frequency response of different filters.
C208.5	Understand self and mutual inductance of two winding single phase transformer.
C208.6	Analyze resonance of series and parallel circuit.

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Course Outcome

Subject(Code):OOP Using JAVA Lab (C209), **Year / Semester of Study: 2nd/3rd**

COs	CO Statements
C209.1	Understand the basic syntax and structure of Java programs.
C209.2	Design Java programs using loop control structures.
C209.3	Create classes and objects in Java.
C209.4	Understand of data abstraction, data hiding, inheritance, and polymorphism.
C209.5	Understand thread-based programming, exception handling, and creating web-based applets.
C209.6	Apply knowledge to create and implement interfaces, inner classes, and wrapper classes in Java.

Subject(Code):Evaluation of Internship-I (C210) **Year/Semester of Study: 2nd/3rd**

COs	CO Statements
C210.1	Develop an understanding of real time problems/challenges in contemporary areas of power sector.
C210.2	Understand and analyse real-time challenges in Renewable Energy industry, green energy projects, energy efficiency, energy audit & management and policy & regulations.
C210.3	Explain the impact of engineering solutions, developed in a project, in a global, economic, environmental, and societal context.
C210.4	Realize Standard Operating Procedure of industry for specific project domain.
C210.5	Effectively communicate the learning through project report and oral presentation.
C210.6	Use new tools and technologies.

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Course Outcome

Subject(Code): Digital Electronics (C211) **Year/Semester of Study: 2nd/4th**

COs	CO Statements
C211.1	Remember the various types of digital logic system also became familiar with the digital signal, positive and negative logic, Boolean algebra etc.
C211.2	Understand the working of logic families, characteristics of digital IC, interfacing CMOS, TTL and tristate logic.
C211.3	Apply mechanism, design and implement of the combinational logic circuit and their role in the digital system design.
C211.4	Analyze various types of sequential logic circuit and apply for real time digital systems.
C211.5	Know various types of components- ADC and DAC and also to evaluate the design of ADC and DAC.
C211.6	Use PLDs to implement the given logic problem and known about different types of memory elements.

Subject(Code): Electrical Mechanics-I(C212) **Year and Semester of Study: 2nd/4th**

COs	CO Statements
C212.1	Analyse the concept of magnetic circuit.
C212.2	Explain the concept of electromechanical conversion.
C212.3	Understand the construction, different windings, effect of armature reaction and its assessment of dc machines.
C212.4	Analyze D.C generator and motor characteristics, various losses and their efficacy.
C212.5	Analyse constructional details of transformers.
C212.6	Understand different types three phase transformer connection.

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Course Outcome

Subject(Code): Engineering Economics (C213) Year/Semester of Study: 2nd/4th

COs	CO Statements
C213.1	Understand the different forms of market mechanisms.
C213.2	Understand the pattern of production and cost output relationship in different scale.
C213.3	Understand the difference between different market situations along with their profit maximization strategies.
C213.4	Understand the concept of interest and its equivalence to economy.
C213.5	Understand the different project estimation methods in business as well as social prospective along with depreciation and management of capital stock.
C213.6	Understand the role of financial institution & National income accounting in different sectors of the economy. Also able to understand the inflation and its remedies.

Subject(Code): Power Electronics(C214) Year/Semester of Study: 2nd/4th

COs	CO Statements
C214.1	Students will be able to correlate the different types of power semiconductor devices and their switching and applications in various electronic circuits.
C214.2	Students will be able to structure characteristics and performance parameters of controlled rectifiers with different types of load.
C214.3	Students will be able to acquire the knowledge on operation, switching techniques and basics topologies of DC-DC buck converter
C214.4	Students will be able to acquire the knowledge on operation, switching techniques and basics topologies of DC-DC boost converter
C214.5	Students will be able to acquire the knowledge on operation of single phase voltage source inverter and various configurations
C214.6	Students will be able to acquire the knowledge on operation of three phase voltage source inverter and various switching states.

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Course Outcome

Subject(Code): Electrical and Electronics Measurement (C215) **Year/Semester of Study: 2nd/4th**

COs	CO Statements
C215.1	Analyse fundamentals of Measurement and their errors and classify various measuring instruments
C215.2	Analyze the bridges for the measurement of resistance, inductance and capacitance.
C215.3	Understand the galvanometers for the measurement of voltage and current.
C215.4	Understand the potentiometers to measure AC and DC values of unknown voltage.
C215.5	Analyse high values of current and voltage by using instrumentation transformer
C215.6	Understand principle of oscilloscope to measure frequency, phase angle and time delay.

Subject(Code): Digital Signal, Processing(C216) **Year/Semester of Study:2nd/4th**

COs	CO Statements
C216.1	Students will be able to know the basic elements of a Digital signal processing system and its advantages over analog signal processing. Students should familiar with the classification of the signals and its system
C216.2	Understand the details of discrete time signal and system described by difference equation method and its implementation Correlation of discrete time signal.
C216.3	Implement z-transform and its application of LTI system
C216.4	Analyze the DFT and its property, application.
C216.5	Evaluate the structure for FIR and IIR system and design of FIR filters
C216.6	Design of IIR filter from analog filter by impulse invariance and bilinear transformation method.

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Course Outcome

Subject(Code): Constitution of India(C217) **Year/Semester of Study: 2nd/4th**

COs	CO Statements
C217.1	Know the importance of Constitution and Government.
C217.2	Become Good Citizens and know their fundamental rights, duties and principles.
C217.3	Learn about the role of PM, President, Council of Ministers and Local Administration.
C217.4	Understand the importance of Election Commission.
C217.5	Understand the importance and role of Local Self Government and Emergency Provisions.
C217.6	Know about Secularism, Federalism, Democracy, Liberty, Freedom of Expression, Special Status of States etc.

Subject(Code):Digital Electronics Lab(C218) **Year/Semester of Study: 2nd/4th**

COs	CO Statements
C218.1	Acquire the basic practical knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
C218.2	Know about the design of combinational circuit and design of various gates using NAND and NOR gate.
C218.3	Design of multiplexer and de-multiplexer and design various digital logic gates.
C218.4	Understand about gate level minimization and various types of flip-flop using VHDL code.
C218.5	Know about various type of shift register using VHDL code.
C218.6	Design with Multiplexer and De-multiplexer using VHDL code.

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Course Outcome

Subject(Code):Electrical Machines Lab(C219) **Year/Semester of Study: 2nd/4th**

COs	CO Statements
C219.1	Calculate efficiency and voltage regulation of a single phase transformer by open circuit and short circuit test.
C219.2	Identify and separate different losses of transformer.
C219.3	Understand application of VFD in speed control of 3-ph induction motor.
C219.4	Calculate efficiency and voltage regulation of a three phase induction motor by blocked rotor and break test.
C219.5	Understand the performance characteristics of grid connected induction generator.
C219.6	Know basics of single phase induction motor.

Subject(Code):Power Electronics Lab(C220) **Year/Semester of Study: 2nd/4th**

COs	CO Statements
C220.1	Students will be able to correlating the different types of power semiconductor devices and their characteristic.
C220.2	Students will be able to structuring different triggering circuits.
C220.3	Students will able to understand different controlled rectifier and their operations.
C220.4	Students will be able to Ability to acquire the knowledge on operation, switching techniques and basics topologies of DC-DC buck converter and boost converter
C220.5	Students will be able to Ability to acquire the knowledge on operation of single phase voltage source inverter and various configurations
C220.6	Students will be able to Ability to acquire the knowledge on operation of three phase voltage source inverter and various switching states

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Course Outcome

Subject(Code):Electric Power Transmission & Distribution (C301) Year/Semester of Study: 3rd/5th

COs+A407:C413	CO Statements
C301.1	Students will able to explain the different types of power generation systems
C301.2	Learn electrical characteristics of transmission line parameters , their calculation also effects on transmission line
C301.3	analyse the short ,medium and long transmission line and effect of corona
C301.4	analyse the methods of components, evaluate line insulators and transformers
C301.5	learn mechanical design along with the types of insulators
C301.6	describe types of substations, earthling schemes and bus-bar schemes

Subject(Code): Control System(C302) Year/Semester of Study: 3rd/5th

COs	CO Statements
C302.1	Implement the mathematical model of the physical systems.
C302.2	Analyze the time domain response of the closed and open loop systems.
C302.3	Analysis nature of stability of the system by RH criteria & Root Locus technique.
C302.4	Analysis in frequency domain to explain the nature of stability of the system.
C302.5	Design the various kinds of compensator.
C302.6	Analyze and develop state space models.

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Course Outcome

Subject(Code):Electrical Mechines -II (C303) **Year/Semester of Study: 3rd/5th**

COs	CO Statements
C303.1	Analyse the physical arrangement of windings in the stator and cylindrical rotor.
C303.2	Demonstrate knowledge of the magnetic field produced in winding under various conditions.
C303.3	Integrate knowledge of construction, performance characteristics, and parameter variations to design efficient induction motor systems.
C303.4	Discuss the fundamental control practices speed control strategies for different applications
C303.5	Analyze the double revolving, cross field theory for working of the single phase induction motor.
C303.6	Apply to use different methods for the computation of voltage regulation of an alternator under various loading conditions

Subject(Code): Electrical mechine Design (C304) **Year/Semester of Study: 3rd/5th**

COs	CO Statements
C304.1	Analyse design of transformer to estimate the performance characteristics
C304.2	Understand the concepts to design Electrical Machine
C304.3	Understand the Concept of Armature Windings.
C304.4	Analyze design of stator core & stator winding of an Induction motor
C304.5	Understand the design of rotor core & rotor winding of an induction motor to calculate load current & other performance
C304.6	Analyse the design of overall dimensions of synchronous machine to analyze role of various factors like: saliency, shape of pole shoe, SCR, air gap length etc.

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Course Outcome

Subject(Code):Renewable Power Generationg System (C305) **Year/Semester of Study: 3rd/5th**

COs	CO Statements
C305.1	Analyze the properties of solar energy resource, PV systems and Distributed Generation Systems.
C305.2	Design of PV systems for domestic, commercial and industrial application.
C305.3	Analyse the wind energy resource and its types, principles of conversion technologies.
C305.4	Understand the operation and constraints of wind turbine generators and wind power plant,
C305.5	Judge operating principles of biomass operation, biomass classification conversion and applications.
C305.6	Design different types of hybrid systems, such as Diesel-PV, wind-PV, micro hydel-PV, biomass-diesel hybrid system and hybrid electric vehicles.

Subject(Code):Universal Human Values **Year/Semester of Study: 3rd/5th**

COs	CO Statements
C306.1	Understand self, preconditioning and natural acceptance
C306.2	Understand self-exploration and its application for self-evaluation and development.
C306.3	Analyze the concept of co-existence & evaluate the program to ensure self regulation.
C306.4	Understand the role of harmony in family, society and universal order.
C306.5	Understand the holistic perception of harmony at all levels of existence.
C306.6	Apply professional ethics in their future profession to contribute for making a value based society.

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Subject(Code): EPTD (C307) **Year/Semester of Study:3rd/5th**

COs	CO Statements
C307.1	Analyse Ferranti effect in short medium and long transmission lines
C307.2	Determine string efficiency, ABCD parameters in transmission lines
C307.3	Analyse earth resistance and Compute series and shunt capacitance in transmission line
C307.4	understand and analyse the transformer oil testing
C307.5	Analyse the various types and applications of lightning arrester
C307.6	Understand the concept of power factor improvement in distribution systems and corona discharge in transmission lines

Subject(Code):Control Instrumentation Lab(308) **Year/Semester of Study: 3rd/5th**

COs	CO Statements
C308.1	Demonstrate the use of DC position control system.
C308.2	Study the frequency response of a different types of compensators.
C308.3	Evaluate transform function of network by using transfer function analyser.
C308.4	Classify and demonstrate different types of transducers.
C308.5	Analyze the bridges for the measurement resistance, inductance and capacitance.
C308.6	Validate the Energy meter for the measurement of electrical energy

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Course Outcome

Subject(Code): Electrical Machines Lab-II(C309) **Year/Semester of Study: 3rd/5th**

COs	CO Statements
C309.1	Predict the performance of alternator using standard equivalent circuit models.
C309.2	Understand and analyze synchronous Motor.
C309.3	Understand parameter of synchronous machines.
C309.4	Understand the performance of grid connected induction motor
C309.5	Understand the characteristic of induction motor.
C309.6	Understand the characteristic of 3-phase induction motor.

Subject(Code): Evaluation of Summer Internship (C310) **Year/Semester of Study: 3rd/5th**

COs	CO Statements
C310.1	Develop an understanding of real time problems/challenges in contemporary areas of power sector.
C310.2	Understand and analyse real-time challenges in Renewable Energy industry, green energy projects, energy efficiency, energy audit & management and policy & regulations
C310.3	Explain the impact of engineering solutions, developed in a project, in a global, economic, environmental, and societal context
C310.4	Realize Standard Operating Procedure of industry for specific project domain
C310.5	Effectively communicate the learning through project report and oral presentation
C310.6	Use new tools and technologies

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Course Outcome

Subject(Code): Power System Operation and Control(C311) **Year/Semester of Study: 3rd/6th**

COs	CO Statements
C311.1	Analyze power flows in power systems and understand the formation of the bus admittance matrix.
C311.2	Develop load flow programs.
C311.3	Apply optimization techniques to determine the optimal operating point on generator cost curves, considering factors such as fuel cost and operating constraints
C311.4	Incorporate the automatic frequency and voltage control strategies for single and two area case and analyze the effects, knowing the necessity of generation control.
C311.5	Derive power angle equation & swing equations.
C311.6	Analyze the dynamics of power system giving emphasis on stability study using equal area criteria and point by point method.

Subject(Code): Microprocessor and Micro Controller (C312) **Year/Semester of Study: 3rd/6th**

COs	CO Statements
C312.1	Understand the Intel 8085/8086 architecture with explanation of internal organization.
C312.2	Know the programming proficiency using the various addressing modes and data transfer instructions of the 8086 microprocessor.
C312.3	Know the interfacing of peripheral device with 8bit and 16 bit microprocessor.
C312.4	Solve different logical problems based on instructions of microprocessor.
C312.5	Understand 8051 microcontroller architecture with internal organization.
C312.6	Differentiate the advanced microprocessor and its operation with 8086 and 8051.

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Course Outcome

Subject(Code):Optimization Engineering(C313) Year/Semester of Study:3rd Year/6th Sem

COs	CO Statements
C313.1	Formulate optimization problems as mathematical programming problems.
C313.2	Apply classical optimization techniques to solve linear programming problems.
C313.3	Apply classical optimization techniques to solve linear programming problems (Transportation problems, Assignment problems, IPP)
C313.4	Apply classical optimization techniques to solve nonlinear optimization problems.
C313.5	Apply Evolutionary algorithms to find global optimum of nonlinear optimization problems.
C313.6	Model and Optimize Queuing Theory.

Subject(Code): Electric Power System Protection(C314)	**Year/Semester of Study:3rd/6th**
COs	**CO Statements**
C314.1	Analyze the principles and operation of Electrical Protection Systems & different faults in power system.
C314.2	Analyse the operating principles and design different types of Relays.
C314.3	Analyze the principles of Differential Relays, Static Relays and Comparator circuits.
C314.4	Analyze and understand the concepts of Apparatus Protection Schemes such as Transformer, generator and motor protection.
C314.5	Analyze and understand the concepts of Bus bar Protection Schemes and Numerical Relays.
C314.6	Analyse and understand operating principles of switchgears and different types of circuit breakers.

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Course Outcome

Subject(Code): Artificial Intelligence and Machine Learning (C315) Year/Semester of Study: 3rd/6th

COs	CO Statements
C315.1	Understand the foundations of AI, intelligent agents, and problem-solving strategies.
C315.2	Understand adversarial search, logical agents, and reasoning patterns
C315.3	**A**pply knowledge of First-Order Logic syntax, semantics, solve complex logical problems using unification, lifting, and forward/backward chaining algorithms,
C315.4	Analyze uncertainty adeptly, probability axioms, synthesize inference techniques , independence, and Bayes' Rule to solve complex problems .
C315.5	Evaluate probabilistic reasoning, synthesize Bayesian network representation, conditional distribution efficiency and fostering advanced modelling
C315.6	Synthesize advanced mastery across diverse learning methods, incorporating statistical learning, hidden variable learning, and rote learning,

Subject(Code):Essence of Indian Knowledge Tradition(C316) Year/Semester of Study: 3rd/6th

COs	CO Statements
C316.1	Identify the concept of Traditional knowledge and its importance.
C316.2	Identify the differences between Indigenous Tradition and Western Tradition.
C316.3	Explain the need and importance of protecting traditional knowledge.
C316.4	Illustrate the various enactments related to the protection of traditional knowledge.
C316.5	Interpret the concepts of Intellectual property to protect the traditional knowledge.
C316.6	Explain the importance of Traditional knowledge in Agriculture and Medicine.

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Course Outcome

Subject(Code):Power System Operation and Control Lab(C317)	**Year/Semester of Study: 3rd/6th**
COs	**CO Statements**
C317.1	Analyze and model alternator behaviour, particularly focusing on synchronous reactance, short-circuit conditions, fault currents & Negative and zero sequence reactance.
C317.2	Analyze and model the transient behaviour of 3-phase salient pole alternators, focusing on sub-transient direct axis and quadrature axis synchronous reactances.
C317.3	Understand various protective relays, including IDMT over-current relays, biased relays, MHO distance relays,
C317.4	Analyse the power system to obtain the power flow solution using numerical iterative methods.
C317.5	Develop a suitable program for determining the transmission line parameters and its performance evaluation.
C317.6	Perform fault analysis for a given power system under symmetrical and unsymmetrical fault.

Subject(Code): Microprocessor and Micro Controller Lab(C318) Year/Semester of Study: 3rd/6th

COs	**CO Statements**
C318.1	Analyse the architecture and the instruction set of an Intel microprocessor.
C318.2	Understand language programming will be studied as well as the design of various types of digital and analog interfaces.
C318.3	Understand the operation of peripheral devices with different microprocessor.
C318.4	Describe the architecture and instruction set of 8251.
C318.5	Design Memory Interfacing circuits.
C318.6	Design and implement 8051 microcontroller based systems.

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Course Outcome

Subject(Code): Future-ready Contributor Program(C319) **Year/Semester of Study: 3rd/6th**

COs	CO Statements
C319.1	Develop self-efficacy and inner strength.
C319.2	Discover how to achieve sustainable or lasting success, by making effective career choices.
C319.3	Understand solution and value creating individuals.
C319.4	Analyse collaboratively and as good citizens of the organization and country.
C319.5	Apply contributor thinking through effective project work.
C319.6	Develop new models of thinking and capacities.

Subject(Code): Seminar -I (C320) **Year/Semester of Study: 3rd/6th**

COs	CO Statements
C320.1	Analyse topics on modern technology; prepare slides for power point presentation.
C320.2	Able to gain deep knowledge on modern technology by referring the journals/ magazines.
C320.3	Present before a huge audience or any topic without fear and with a voice clarity, good gate up and proper body language.
C320.4	Develop their communication skill.
C320.5	Write a detail report on any topic related to modern technology in the prescribed format.
C320.6	Attend any National or International Seminar.

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Course Outcome

Subject(Code): Entrepreneurship Development (C401) **Year/Semester of Study: 4th/7th**

COs	CO Statements
C401.1	Understand about different concepts and functions of entrepreneurship and intrapreneurship with their types of Entrepreneur and importance.
C401.2	Analyze different Entrepreneurial Environment and Identify their Opportunities and also they can analyze how to Convert Business Opportunities into reality and know about Start-ups and business incubation .
C401.3	Apply their knowledge to solve the Issues relating to location and Environmental Problems with Industrial Policies and Regulations.
C401.4	Learn and will be able to remember about the Need of Accounting and Working capital Management.
C401.5	Analyze Labour Laws and Organizational support services –Central and State Government.
C401.6	Understand about Sickness of Small-Scale Industries with their Causes and symptoms of sickness their cures and about the Role of Banks and Governments in reviving industries.

Subject(Code):High Voltage System and DC Transmission (C402) **Year/Semester of Study: 4th/7th**

COs	CO Statements
C402.1	Understand theory of breakdown and withstand phenomena of all types of dielectric materials.
C402.2	Understand the techniques of generation of AC, DC and Impulse voltages and be able to apply knowledge for measurement of high voltage and high current AC, DC and Impulse.
C402.3	Describe testing high voltage electrical equipment with various testing devices
C402.4	Develop the knowledge of HVDC transmission and HVDC converters and the applicability
C402.5	Develop the knowledge of advantage of HVDC transmission over conventional AC transmission.
C402.6	Analyse harmonics and design of filters.

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Course Outcome

Subject(Code):Smart Grid(C303) **Year/Semester of Study:4th/7th**

COs	CO Statements
C403.1	Understand the fundamental knowledge of smart grid.
C403.2	Undestand various automation techniques in smart grid, their applications and protection schemes
C403.3	Analyse control of micro grids and different issues inter connection
C403.4	Anlyse and understand different energy storage techniques in micro grid
C403.5	Understand and analyse integration of renewables and concept of distributed generation in micro grids
C403.6	Analyse and understand different power quality issues of grid tied micro grids.

Subject(Code):Digital VLSI Design (C404) **Year/Semester of Study: 4th/7th**

COs	CO Statements
C404.1	Gain the knowledge about various CMOS fabrication process and its modelling.
C404.2	Comprehend about the second order effects of MOS transistor characteristics.
C404.3	Analyze and implement various CMOS static logic circuits.
C404.4	Learn the design of various CMOS dynamic logic circuits.
C404.5	To foster ability of handling and designing different types of techniques.
C404.6	Learn the basics of Fabrication and Layout of CMOS Integrated Circuits.

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Course Outcome

Subject(Code): Intellectual Property Right(405) **Year/Semester of Study: 4th/7th**

COs	CO Statements
C405.1	Understand about different types of intellectual property rights and their importance.
C405.2	Analyse functions of intellectual property rights.
C405.3	Evaluate practical problem related to intellectual property rights and know about the fundamental of copy rights.
C405.4	Apply the knowledge of intellectual property rights and know about copy right ownership issues.
C405.5	Solve problems intellectual property rights and can evaluate New development of intellectual property.
C405.6	Evaluate international patent law, Create different types developments in trade secret at international level.

Subject(Code): Bigdata Analytics (C406) **Year / Semester of Study: 3rd/7th Sem**

COs	CO Statements
C406.1	Understand fundamental concepts of Big Data and its technologies.
C406.2	Apply concepts of Map Reduce framework for optimization.
C406.3	Evaluate the performance and scalability implications of Mongo DB databases for various use cases.
C406.4	Evaluate the effectiveness of their integrated Big Data tools in solving real-world problems.
C406.5	Understand data analytics solutions using Hadoop ecosystems.
C406.6	Develop the basic principles of connecting to Mongo DB, Cassandra and machine learning algorithms.

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Course Outcome

Subject(Code):Essence of Indian Knowledge Tradition(C407) **Year/Semester of Study: 4th/7th**

COs	CO Statements
C407.1	Identify the concept of Traditional knowledge and its importance.
C407.2	Explain the need and importance of protecting traditional knowledge.
C407.3	Illustrate the various enactments related to the protection of traditional knowledge.
C407.4	Interpret the concepts of Intellectual property to protect the traditional knowledge.
C407.5	Interpret the concepts of patents to protect the traditional knowledge.
C407.6	Explain the importance of Traditional knowledge in Agriculture and Medicine.

Subject(Code):Minor Project (C408) **Year/Semester of Study: 4th/7th**

COs	CO Statements
C408.1	Identify & undertake projects, which is feasible, cost effective, eco-friendly and safety.
C408.2	Measure the relation of the project to the literature and how much the project is applicable to the society. (i.e. lab to land).
C408.3	Plan properly to complete the project within the schedule time.
C408.4	Conduct all relevant testing after execution of the project and analyse the test results for future research.
C408.5	Execute any project with proper methodology and in a team spirit.
C408.6	Write thesis / project report as per standard norm.

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Course Outcome

Subject(Code):Seminar -II (C409) **Year/Semester of Study: 4th/7th**

COs	CO Statements
C409.1	Select topics on modern technology; prepare slides for power point presentation.
C409.2	Able to gain deep knowledge on modern technology by referring the journals/ magazines.
C409.3	Present before a huge audience or any topic without fear and with a voice clarity, good gate up and proper body language.
C409.4	Develop their communication skill.
C409.5	Write a detail report on any topic related to modern technology in the prescribed format.
C409.6	Able to attend or deliver in any National or International Seminar.

Subject(Code):Comprehensive Viva (C410) **Year/Semester of Study: 4th/7th**

COs	CO Statements
C410.1	Acquire knowledge and skills to face the interview panel.
C410.2	Analyse and respond effectively to impromptu questions by the panel members.
C410.3	Present the technical knowledge, skills and problems in the most efficient way.
C410.4	Demonstrate the application of technical knowledge acquired in the four years to solve the problems of the various forms of organisations/ instituions.
C410.5	Understand the practical difficulties in applying the various forms of solutions to find the feasible solution.
C410.6	Solve the real life problems and assess the implications of various forms of solutions.

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Course Outcome

Subject(Code):Major Project(C411) **Year/Semester of Study:4th/8th**

COs	CO Statements
C411.1	Apply the fundamental knowledge and skills, which are acquired within the technical area to a given problem as well as summarize list of literature review, analyze previous researcher's work and relate them to the project.
C411.2	Measure the relation of the project to the literature and how much the project is applicable to the society. (i.e. lab to land).
C411.3	Design engineering solutions to complex problems and conduct experiments, as well as analyze and interpret the data.
C411.4	Utilize technology tools for communication, collaboration, decision support and also demonstrate the knowledge, skills and attitudes of a professional engineer.
C411.5	Interact with team members in a professional manner, respecting differences, to ensure a collaborative project environment and also demonstrate a strong working knowledge of ethics.
C411.6	Write thesis / project report as per standard norm.