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ODD SEM
I-I DR-23

Linear Algebra & Calculus

- Develop matrix algebra techniques that are needed by engineers for practical applications.
- To find the eigen values and eigen vectors and solve the problems transformation
- Learn important tools of calculus in higher dimensions.
- Familiarize with functions of several variables which is useful in optimization.
- by using linear
- Familiarize with double and triple integrals of functions of several variables in two and three dimensions.

Chemistry

- Compare the materials of construction for battery and electrochemical sensors.
- Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.
- Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.
- Apply the principle of Band diagrams in the application of conductors and semiconductors.
- Summarize the concepts of Instrumental methods.

Introduction To C Programming

- Illustrate the Fundamental concepts of Computers and basics of computer programming and problem-solving approach
- Understand the Control Structures, branching and looping statements
- Use of Arrays and Pointers in solving complex problems.
- Develop Modular program aspects and Strings fundamentals.
- Demonstrate the ideas of User Defined Data types, files. Solve real world problems using the concept of Structures, Unions and File operations.

Engineering Graphics

- Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.

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- Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
- Understand and draw projection of solids in various positions in first quadrant.
- Explain principles behind development of surfaces.
- Prepare isometric and perspective sections of simple solids.

Basic Electrical & Electronics Engineering

- Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments.
- Understand the problem solving concepts associated to AC and DC circuits, construction and operation of AC and DC machines, measuring instruments; different power generation mechanisms, Electricity billing concept and important safety measures related to electrical operations.
- Apply mathematical tools and fundamental concepts to derive various equations related to machines, circuits and measuring instruments; electricity bill calculations and layout representation of electrical power systems.
- Analyze different electrical circuits, performance of machines and measuring instruments.
- Evaluate different circuit configurations, Machine performance and Power systems operation.

Chemistry Lab

- Determine the cell constant and conductance of solutions.
- Prepare advanced polymer Bakelite materials.
- Measure the strength of an acid present in secondary batteries.
- Analyse the IR spectra of some organic compounds.
- Calculate strength of acid in Pb-Acid battery.

Computer Programming Lab

- Read, understand, and trace the execution of programs written in C language.
- Select the right control structure for solving the problem.
- Develop C programs which utilize memory efficiently using programming constructs like pointers.

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- Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

Electrical & Electronics Engineering Workshop

- Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.
- Apply the theoretical concepts and operating principles to derive mathematical models for
- circuits, Electrical machines and resistance, power and power factor measuring instruments; calculations for the measurement of
- Apply the theoretical concepts to obtain calculations for the measurement of resistance,power and power factor.
- Analyse various characteristics of electrical circuits, electrical machines instruments and measuring
- Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.

II-I

Mathematics– IV
- Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)
- Find the differentiation and integration of complex functions used in engineering problems (L5)
- Make use of the Cauchy residue theorem to evaluate certain integrals (L3)
- Apply discrete and continuous probability distributions (L3)
- Design the components of a classical hypothesis test (L6)
- Infer the statistical inferential methods based on small and large sampling tests (L4)

Electronic Devices and Circuits
- Understand the basic concepts of semiconductor physics.
- Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
- Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.

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- Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
- Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
- Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

Electrical Circuit Analysis
- Understand the concepts of balanced and unbalanced three-phase circuits.
- Know the transient behavior of electrical networks with DC excitations.
- Learn the transient behavior of electrical networks with AC excitations.
- Estimate various parameters of a two port network.
- Understand the significance of filters in electrical networks.

DC Machines and Transformers
- Assimilate the concepts of electromechanical energy conversion.
- Mitigate the ill-effects of armature reaction and improve commutation in dc machines.
- Understand the torque production mechanism and control the speed of dc motors.
- Analyze the performance ofsingle phase transformers.
- Predetermine regulation, losses and efficiency ofsingle phase transformers.
- Parallel transformers, control voltages with tap changing methods and achieve
- three-phase to two-phase transformation.

Electro Magnetic Fields
- Compute electric fields and potentials using Gauss law or solve Laplace's or Poisson's equations for various electric charge distributions.
- Calculate the capacitance and energy stored in dielectrics.
- Calculate the magnetic field intensity due to current carrying conductor and understanding the application of Ampere's law, Maxwell's second and third law.
- Estimate self and mutual inductances and the energy stored in the magnetic field.
- Understand the concepts of displacement current and Poynting theorem and Poynting vector

Electrical Circuits Lab
- Apply various theorems
- Determination ofself and mutual inductances

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- Two port parameters of a given electric circuits
- Draw locus diagrams
- Draw Waveforms and phasor diagrams for lagging and leading networks

DC Machines and Transformers Lab
- Determine and predetermine the performance of DC machines and Transformers.
- Control the speed of the DC motor.
- Obtain three phase to two phase transformation.

Electronic Devices and Circuits lab
- Analyze the characteristics of diodes, transistors and other devices
- Design and implement the rectifier circuits, SCR and UJT in the hardware circuits.
- Design the biasing and amplifiers of BJT and FET amplifiers
- Measure electrical quantities using CRO in the experimentation.

Skill oriented course -Design of Electrical Circuits
- Write the MATLAB programs to simulate the electrical circuit problems
- Simulate various circuits for electrical parameters
- Simulate various waveform for determination of wave form parameters
- Simulate RLC series and parallel resonance circuits for resonant parameters
- Simulate magnetic circuits for determination of self and mutual inductances

III-I

Power Systems-II
- Calculate parameters of transmission lines for different circuit configurations.
- Determine the performance of short, medium and long transmission lines.
- Analyze the effect of traveling waves on transmission lines.
- Analyze the various voltage control methods and effect of corona.
- Calculate sag/tension of transmission lines and performance of line insulators.

Power Electronics
- Illustrate the static and dynamic characteristics of SCR, Power-MOSFET and Power-IGBT.
- Analyze the operation of phase-controlled rectifiers.
- Analyze the operation of three-phase full–wave converters, AC Voltage Controllers and
- Cycloconverters.

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- Examine the operation and design of different types of DC-DC converters.
- Analyze the operation of PWM inverters for voltage control and harmonic mitigation

Control Systems
- Derive the transfer function of physical systems and determination of overall transfer function
- using block diagram algebra and signal flow graphs.
- Determine time response specifications of second order systems and absolute and relative stability
- of LTI systems using Routh's stability criterion and root locus method.
- Analyze the stability of LTI systems using frequency response methods.
- Design Lag, Lead, Lag-Lead compensators to improve system performance using Bode diagrams.
- Represent physical systems as state models and determine the response. Understand the concepts
- of controllability and observability

Utilization Of Electrical Energy
- Identify various illumination methods produced by different illuminating sources.
- Identify a suitable motor for electric drives and industrial applications
- Identify most appropriate heating and welding techniques for suitable applications.
- Distinguish various traction system and determine the tractive effort and specific energy consumption.
- Validate the necessity and usage of different energy storage schemes for different applications and comparisons.

Control Systems Lab
- Analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchros.
- Design P,PI,PD and PID controllers
- Design lag, lead and lag–lead compensators
- Evaluate temperature control of an oven using PID controller
- Determine the transfer function of D.C Motor
- Analyze the performance of D.C and A.C Servo Motor.
- Test the controllability and observability.
- Judge the stability in time and frequency domain.

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- To examine different logic gates and Boolean expressions using PLC.

Power Electronics Lab
- Analyse characteristics of various power electronic devices and design firing circuits for SCR.
- Analyse the performance of single–phase dual, three–phase full–wave bridge converters and dual converters with both resistive and inductive loads.
- Examine the operation of Single-phase AC voltage regulator and Cycloconverter with resistive and inductive loads.
- Differentiate the working and control of Buck converter and Boost converter.
- Differentiate the working & control of Square wave inverter and PWM inverter.

Soft Skill Course:Employability Skills
- Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems
- Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
- Analyze, summarize and present information in quantitative forms including table, graphs and formulas
- Understand the core competencies to succeed in professional and personal life
- Learn and demonstrate a set of practical skills such as time management, self-management,handling conflicts, team leadership, etc

IV-I
FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS
- Know the concepts of facts controller and power flow control in transmission line.
- Demonstrate operation and control of voltage source converter and know the concepts of current source converter.
- Analyse compensation by using different compensators to improve stability and reduce power oscillations in the transmission lines.
- Know the concepts and methods of compensations using series compensators.
- Analyse operation of Unified Power Flow Controller (UPFC) and Interline power flow controller (IPFC)

HYBRID ELECTRIC VEHICLES

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- Know the concept of electric vehicles and hybrid electric vehicles.
- Familiar with different configurations of hybrid electric vehicles.
- Choose an effective motor for EV and HEV application
- Understand the power converters used in hybrid electric vehicles
- Know different batteries and other energy storage systems

POWER SYSTEM OPERATION AND CONTROL

- Compute optimal load scheduling of Generators.
- Formulate hydrothermal scheduling and unit commitment problem..
- Analyse effect of Load Frequency Control for single area systems
- Analyse effect of Load Frequency Control for two area systems
- Describe the effect of reactive power control for transmission lines.

MACHINE LEARNING WITH PYTHON LAB

- Implement procedures for the machine learning algorithms
- Design and Develop Python programs for various Learning algorithms
- Apply appropriate data sets to the Machine Learning algorithms
- Develop Machine Learning algorithms to solve real world problems

EVEN SEM
I-II

Differential Equations & Vector Calculus

- Solve the differential equations related to various engineering fields.
- Model engineering problems as higher order differential equations and solve analytically.
- Identify solution methods for partial differential equations that model physical processes.
- Interpret the physical meaning of different operators such as gradient, curl and divergence.
- Estimate the work done against a field, circulation and flux using vector calculus.

Engineering Physics

- Analyze the intensity variation of light due to polarization, interference and diffraction. Familiarize with the basics of crystals and their structures.
- Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
- Summarize various types of polarization of dielectrics and classify the magneticmaterials.
- Explain the basic concepts of Quantum Mechanics and the band theory of solids.

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- Identify the type of semiconductor using the Hall effect**.**

Communicative English

- By the end of the course the students will have Learned how to understand the context, topic, and specific information from social or transactional dialogues.
- Remedially learn applying grammatical structures to formulate sentence sand words and correct word forms.use appropriate
- Using discourse markers to speak clearly on a specific topic in formal as well as informal discussions.(not required)
- Improved communicative competence in formal and informal contexts and academic purposes.for social and
- Critically comprehending and appreciating ding /listening texts and to write summaries based on global comprehension of these texts.
- Writing coherent paragraphs, essays, letters/e-mails and resume.

Basic Civil & Mechanical Engineering

- Understand various subdivisions of Civil Engineering and to appreciate their role in ensuring better society.
- Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
- Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
- Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
- Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

Electrical Circuit Analysis -I
- Remembering the basic electrical elements and different fundamental laws.

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- Understand the network reduction techniques, transformations, concept of self-inductance and mutual inductance, phasor diagrams, resonance and network theorems.
- Apply the concepts to obtain various mathematical and graphical representations.
- Analyse nodal and mesh networks, series and parallel circuits, steady state response,
- different circuit topologies (with R, L and C components).
- Evaluation of Network theorems, electrical, magnetic and single-phase circuits.

Communicative English Lab
- Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit professionalism in participating in debates and group discussions.
- Create effective Course Objectives

II-II

Python Programming
- Develop essential programming skills in computer programming concepts like data types, containers
- Apply the basics of programming in the Python language Solve coding tasks related
- conditional execution, loops
- Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming

Digital Electronics
- Classify different number systems and apply to generate various codes.
- Use the concept of Boolean algebra in minimization of switching functions
- Design different types of combinational logic circuits.
- Apply knowledge of flip-flops in designing of Registers and counters
- The operation and design methodology for synchronous sequential circuits and
- algorithmic state machines.

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Power System-I

- Identify the different components of thermal power plants.
- Identify the different components of nuclear Power plants.
- Identify the different components of air and gas insulated substations.
- Identify single core and three core cables with different insulating materials.
- Analyse the different economic factors of power generation and tariffs

Induction and Synchronous Machines

- Explain the operation and performance of three phase induction motor.
- Analyze the torque-speed relation, performance of induction motor and induction
- generator.
- Implement the starting ofsingle phase induction motors.
- Develop winding design and predetermine the regulation ofsynchronous generators.
- Explain hunting phenomenon, implement methods of staring and correction of power
- factor with synchronous motor.

Managerial Economics & Financial Analysis

- The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
- The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
- The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
- The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making

Python Programming Lab

- Write, Test and Debug Python Programs
- Use Conditionals and Loops for Python Programs
- Use functions and represent Compound data using Lists, Tuples and
- Dictionaries Use various applications using python

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- Know the construction and working various bridges for the measurement resistance - inductance and capacitance
- Know the operational concepts of various transducers
- Know the construction and operation digital meters

Power System Analysis
- Draw an impedance diagram for a power system network and calculate per unit quantities.
- Apply the load flow solution to a power system using different methods.
- Form Z_{bus} for a power system network and analyse the effect of symmetrical faults.
- Find the sequence components for power system Components and analyse its effects of unsymmetrical faults.
- Analyse the stability concepts of a power system.

Electrical Drives
- Explain the fundamentals of electric drive and different electric braking methods.
- Analyze the operation of three-phase converter fed dc motors and four quadrant operations of dc motors using dual converters.
- Describe the DC-DC converter fed control of dc motors in various quadrants of operation
- Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters and differentiate the stator side control and rotor side control
- Learn the concepts of speed control of synchronous motor with different methods

Electrical Measurements and Instrumentation Lab
- To understand students how different types of meters work and their construction.
- To make the students understand how to measure resistance, inductance and capacitance by AC & DC bridges.
- To understand the testing of CT and PT.
- To Understand and the characteristics of Thermo couples, LVDT, Capacitive transducer, piezoelectric transducer.
- To understand the measurement of strain and choke coil parameters.
- To study the procedure for standardization and calibration of various methods

- **Power Systems and Simulation Lab**

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- Estimate the sequence impedances of 3-phase Transformer and Alternators
- Evaluate the performance of transmission lines
- Analyse and simulate power flow methods in power systems
- Analyse and simulate the performance of PI controller for load frequency control.
- Analyse and simulate stability studies of power systems

Microprocessors and Microcontrollers lab

- Write assembly language program using 8086 microprocessor based on arithmetic - logical -number systems and shift operations.
- Write assembly language programs for numeric operations and array handling problems.
- Write a assembly program on string operations.
- Interface 8086 with I/O and other devices.
- Do parallel and serial communication using 8051 & PIC 18 micro controllers.
- Program microprocessors and microcontrollers for real world applications.

Machine Learning with Python

- Illustrate and comprehend the basics of Machine Learning with Python
- Demonstrate the algorithms of Supervised Learning and be able to differentiate linear and logistic regressions
- Demonstrate the algorithms of Unsupervised Learning and be able to understand the clustering algorithms
- Evaluate the concepts of binning, pipeline Interfaces with examples
- Apply the sentiment analysis for various case studies

Research Methodology

- Understand objectives and characteristics of a research problem
- Analyze research related information and to follow research ethics.
- Understand the types of intellectual property rights.
- Learn about the scope of IPR.
- Understand the new developments in IPR.

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