B.Tech – Electrical & Electronics Engineering
II Year Course Structure And Syllabus (R20)
Applicable From 2020-21 Admitted Batch

II YEAR I SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2030003	Laplace Transforms Series Solutions And Complex Variables	BSC	3	1	0	4	30	70	100
2	2030204	Network Analysis	PCC	3	0	0	3	30	70	100
3	2030205	Electrical Machines-I	PCC	3	1	0	4	30	70	100
4	2030402	Analog Electronics	PCC	3	0	0	3	30	70	100
5	2030502	Data Structures	BSC	2	0	0	2	30	70	100
6	2030274	Network Analysis Lab	PCC	0	0	2	1	30	70	100
7	2030484	Analog Electronics Lab	PCC	0	0	2	1	30	70	100
8	2030572	Data Structures Lab	BSC	0	0	2	1	30	70	100
9	2030321	Environmental Science	*MC	2	0	0	0	-	-	-
Total Credits				**16**	**2**	**6**	**19**	**240**	**560**	**800**

II YEAR II SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2040206	Electro Magnetic Fields	PCC	3	1	0	4	30	70	100
2	2040207	Electrical Machines-II	PCC	3	0	0	3	30	70	100
3	2040407	Digital Electronics & IC Applications	PCC	3	0	0	3	30	70	100
4	2040412	Signals & Systems	PCC	3	0	0	3	30	70	100
5	2040509	Java Programming	ESC	2	0	0	2	30	70	100
6	2040275	Electrical Machines-I Lab	PCC	0	0	2	1	30	70	100
7	2040485	Digital Electronics & IC Applications Lab	PCC	0	0	2	1	30	70	100
8	2040484	Signals & Systems Lab	PCC	0	0	2	1	30	70	100
9	2040570	Java Programming Lab	ESC	0	0	2	1	30	70	100
10		NSS/NCC	*MC	2	0	0	0	-	-	-
Total Credits				**16**	**1**	**8**	**19**	**270**	**630**	**900**

II - I

2030003: LAPLACE TRANSFORMS, SERIES SOLUTIONS AND COMPLEX VARIABLES

II Year B.Tech. ECE I – Sem. **L T P C**

3 1 0 4

Course Objectives:

- To understand the basic theory of complex functions to express the power series
- To evaluate the contour integration using Cauchy residue theorem
- Solving ordinary differential equations using Laplace transforms techniques

Course Outcomes:

At the end of this course, students will be able to

- Use the Laplace transforms techniques for solving ODE's
- Evaluate Fourier series for discontinuous functions
- Apply the series solution for Ordinary Differential Equations
- Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
- Understand Taylor's and Laurent's series expansions of complex function

UNIT– I

Laplace Transforms: Laplace Transform of standard functions; first shifting theorem; Laplace transforms of functions when they are multiplied and divided by't'. Laplace transforms of derivatives and integrals of function; Evaluation of integrals by Laplace transforms; Laplace transforms of Special functions; Laplace transform of periodic functions. Inverse Laplace transform by different methods, convolution theorem (without Proof), solving ODEs by Laplace Transform method.

Learning Outcomes: At the end of this unit, the student will be able to

- Understand the concept of transformations.
- Analyze the Laplace transforms of various functions
- Explain the Laplace Transform of periodic functions.
- Evaluate the integrals by Laplace Transforms.
- Apply Laplace Transforms to solve the ordinary differential Equations.

UNIT – II

FOURIER SERIES: Introduction, Periodic functions, Fourier series of Periodic functions, Dirichlet's conditions, Even and Odd Functions, Change of interval, Half range Fourier sine and cosine series.

Learning Outcomes: At the end of this unit, the student will be able to

- Understand the concept of algebraic function into trigonometric series.
- Explain the concepts of Periodic functions.
- Apply Fourier series for change of interval.
- Analyse an Even and Odd functions.
- Evaluate the Discontinuity functions in a given period.

UNIT – III

SERIES SOLUTIONS OF ODE: Introduction, Ordinary and singular point of an Equation.Bessel's Differential equation: Bessel function, properties of Bessel function, Recurrence relations of Bessel function, Generating function and Orthogonality of Bessel function, Trigonometric expansions involving Bessel function.

Learning Outcomes: At the end of this unit, the student will be able to

- Understand Bessel's function
- Explain Properties of Bessel's function
- Apply Bessel's function in circuit analysis.
- Analyse the Orthogonality of Bessel function
- Evaluation Recurrence relations of Bessel function.

UNIT – IV

Complex Variables (Differentiation): Limit, Continuity and Differentiation of Complex functions, Analyticity, Cauchy-Riemann equations (without proof), finding harmonic conjugate; Milne-Thomson method for constructing analytic functions.

Learning Outcomes: At the end of this unit, the student will be able to

- Understand the basic theory of complex functions
- Explain the concepts of limit, continuity, differentiability, analyticity.
- Apply C-R equations to different complex functions
- Analyse the harmonic functions
- Evaluate the Bilinear Transformation.

UNIT – V

ComplexVariables(Integration): Line integral, Cauchy's theorem, Cauchy's Integral formula, Zeros of analytic functions, Singularities, Taylor's series, Laurent's series; Residues, Cauchy Residue theorem, Conformal mappings, Mobius transformations and their properties.(All theorems are without proof)

Learning Outcomes: At the end of this unit, the student will be able to

- Understand the concept of complex integration.
- Explain the Cauchy's integral theorem
- Apply Complex integration over the stream flow functions
- Analyse the contour Integration.
- Evaluation of a line integral along a path.

TEXT BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons Publishers, 10th Edition, 2014.
2. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 42nd Edition, 2012.

REFERENCE BOOKS:

1. Churchill, R.V. and Brown, J.W, "Complex Variables and Applications", Tata Mc Graw-Hill, 8th Edition, 2012.
2. A. K. Kapoor, "Complex Variables Principles and Problem Sessions", World Scientific Publishers, 1st Edition, 2011.
3. Murray Spiegel, John Schiller, "Probability and Statistics", Schaum‟s Outline Series, 3rd Edition,2010.

II Year B.Tech. EEE I-Sem **L T P C**

3 0 0 3

(2030204) NETWORK ANALYSIS

Course Prerequisite: Mathematics - II (Ordinary Differential Equations and Multivariable Calculus) & Basic Electrical Engineering

Course Objectives:

- To understand Magnetic Circuits, Network Topology and Three phase circuits.
- To analyze transients in Electrical systems.
- To evaluate Network parameters of given Electrical network
- To design basic filter configurations

Course Outcomes: At the end of this course, students will demonstrate the ability to

- Apply network theorems for the analysis of electrical circuits.
- Obtain the transient and steady-state response of electrical circuits.
- Analyze circuits in the sinusoidal steady-state (single-phase and three-phase).
- Analyze two port circuit behaviour.

UNIT - I

Network Theorems: Node and Mesh Analysis, Maximum power transfer theorem, Reciprocity theorem, Milliman's theorem,Tellegen's theorem,Compensation theorem. Analysis with dependent current and voltage sources. Concept of duality and dual networks.

Learning Outcomes:

At the end of this unit, the student will be able to

- Determine the currents and voltages in a circuit using the mesh current and node voltage method.
- Apply network theorems to find the response of a network.
- Analyze the concept of dependent sources in networks theorems.

UNIT - II

Solution of First and Second order Networks: Solution of first and second order differential equations for Series and parallel R-L, R-C, RL-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response for DC Excitation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Evaluate the response of first and second order circuit.
- Illustrate the transient and steady state response of electrical circuits.

UNIT - III

Steady State Analysis: Series, Parallel RLC circuit analysis, series and parallel Resonance, Locus Diagrams, Three-phase circuits balanced and unbalanced circuits. Mutual coupled circuits, Dot Convention in coupled circuits, Ideal Transformer.

Learning Outcomes:

At the end of this unit, the student will be able to

- Analyze AC circuits using phasor concept, Resonance.
- Illustrate average and complex power.
- Understand magnetic circuit.

UNIT - IV

Network Analysis Using Laplace Transforms: Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, inverse Laplacetransform,and transformed network with initial conditions. Transfer function representation. Poles andZeros.Frequency response (magnitude and phase plots).

Learning Outcomes:

At the end of this unit, the student will be able to

- Find the response using Laplace transform method.
- Analyze poles and zeros concept of network functions.
- Evaluate time domain response from pole-zero plot.

UNIT - V

Two Port Network and Network Functions: Two Port Networks, terminal pairs, relationship of twoport variables, impedance parameters, admittance parameters, transmission parameters and hybridparameters, interconnections of two port networks.

Learning Outcomes:

At the end of this unit, the student will be able to

- Analyze two port network behaviours.
- Evaluate the different parameters of the circuit.

TEXT BOOKS:

1. M. E. Van Valkenburg, “Network Analysis”, Prentice Hall, 2006.
2. D. Roy Choudhury, “Networks and Systems”, New Age International Publications, 1998.
3. Chakrabarthy, Circuit theory, 4th Edition, DhanpatRai& Sons Publications.
4. Network analysis by Sudhakarshyammohan S Palli.

REFERENCE BOOKS:

1. W. H. Hayt and J. E. Kemmerly, “Engineering Circuit Analysis”, McGraw Hill Education, 2013.
2. C. K. Alexander and M. N. O. Sadiku, “Electric Circuits”, McGraw Hill Education, 2004.

(2030205) ELECTRICAL MACHINES - I

II Year B.Tech.EEEI-Sem **L T P C**

3 1 0 4

Prerequisite: Basic Electrical Engineering

Course Objectives:

- To study and understand different types of DC generators, Motors and Transformers, their construction, operation andapplications.
- To analyze performance aspects of various testingmethods.

Course Outcomes: At the end of this course, students will demonstrate the ability to

- Identify different parts of a DC machine & understand itsoperation
- Carry out different testing methods to predetermine the efficiency of DCmachines
- Understand different excitation and starting methods of DCmachines
- Control the voltage and speed of a DCmachines
- Analyze single phase and three phase transformers circuits.

UNIT - I

D.C. Generators: Principle of operation – Action of commutator – constructional features – armature windings – lap and wave windings -E.M. F Equation. Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation. Methods of Excitation – separately excited and self-excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self-excite and remedial measures. Load characteristics of shunt, series and compoundgenerators.

Learning Outcomes:

At the end of this unit, student will able to

- Analyze the concepts of D.C. Generator.
- Select the different types of armature winding depending on the requirement and need.
- Recognize the importance of Commutator, Compensation winding and building Emf.

UNIT – II

DC Motors: Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation. Speed control of D.C. Motors - Armature voltage and field flux control methods. Motor starters (3-point and 4-point starters), numerical problems,Testing of D.C. machines - Losses – Types of losses – calculation of efficiency – condition for maximumefficiency.

Learning Outcomes:

At the end of this unit, student will able to

- Illustrate the effect of Armature Reaction on Dc-Machine.
- Demonstrate different Speed Control Methods of Dc-Machine.
- Identify different types of losses occurring in a Dc-machine.

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UNIT - III

Testing of DC Machines: Methods of testing – direct, indirect, and regenerative testing – Brake test - Swinburne's test – Hopkinson's test – Field's test - separation of stray losses in a d.c. motortest.

Learning Outcomes:

At the end of this unit, student will able to

- Understand different types of tests that are conducted on a Dc-machine.
- Analyze the types of Motor necessary for a specific application by knowing its characteristics.
- Distinguish the difference between Direct and In-Direct test.

UNIT - IV

Single Phase Transformers: Types - constructional details-minimization of hysteresis and eddy current losses- EMF equation - operation on no load and on load - phasor diagrams

Equivalent circuit - losses and efficiency – regulation - All day efficiency - effect of variations of frequency & supply voltage on iron losses- Effect of nonlinear B-H curve of magnetic core material.

Learning Outcomes:

At the end of this unit, student will able to

- Understand the concept of transformer construction and principle.
- Analyze the different types of losses in a transformer.
- Distinguish the importance of Equivalent circuit with its phasor diagrams.

UNIT - V

Testing of Transformers and Poly-Phase Transformers: OC and SC tests - Sumpner's test - predetermination of efficiency and regulation-separation of losses test-parallel operation with equal and unequal voltage ratios - auto transformers-equivalent circuit - comparison with two winding transformers. Poly-phase transformers –cooling of transformers- Poly-phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and openΔ

Learning Outcomes:

At the end of this unit, student will able to

- Pre determine the performance of transformer by conducting suitable tests.
- Outline the necessary & satisfactory conditions for parallel operation.
- Identify the Importance of Poly Phase Connections of3-phase transformers and Auto Transformers.

TEXT BOOKS:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. Principles of Electric Machines and Power Electronics P C SEN Second Edition.
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.

REFERENCE BOOKS:

1. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
2. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

2030402: ANALOG ELECTRONICS

(For EEE)

II Year B.Tech. EEEI -Sem. **L T P C**

3 0 0 3

Course Objectives:

- To introduce components such as diodes, BJTs and FETs their switching characteristics, applications
- Learn the concepts of high frequency analysis of transistors
- To give understanding of various types of basic and feedback amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers
- To design the basic linear integrated circuits
- To understand the concepts of waveform generation and introduce some special function ICs

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Know the characteristics, utilization of various components.
- Understand the biasing techniques
- Design and analyze various rectifiers, small signal amplifier circuits.
- Design sinusoidal and non-sinusoidal oscillators.
- Understand the functioning of OP-AMP, designs OP-AMP based circuits with linear integrated circuits.

UNIT - I

Diode Circuits: P-N junction diode, I-V characteristics of a diode; Half-wave and Full-wave rectifiers, Cclamping and Clipping circuits. Input output characteristics of BJT in CB, CE, CC configurations, biasing circuits, Load line analysis, Common-emitter, Common-base and Common collector amplifiers; Small signal equivalent circuits.

Learning Outcomes: At the end of the unit, the student will be able to

- Understand construction of P-N junction diode
- Under the lamping and clipping circuits
- Draw the Input output characteristics of BJT in CB, CE, CC configurations

UNIT - II

MOSFET Circuits: MOSFET structure and V-I characteristics. MOSFET as a switch. small signal equivalent circuits - gain, input and output impedances, small-signal model and common-source, common-gate and common-drain amplifiers, trans conductance, high frequency equivalent circuit.

Learning Outcomes: At the end of the unit, the student will be able to

- Understand structure and Plot the I-V characteristics MOSFET
- Know the common-source, common-gate and common-drain amplifiers
- Draw the high frequency equivalent circuit

UNIT - III

Multi-Stage and Power Amplifiers: Direct coupled and RC Coupled multi-stage amplifiers; Differential Amplifiers, Power amplifiers - Class A, Class B, Class C.

Learning Outcomes: At the end of the unit, the student will be able to

- Know the Different types of Amplifiers
- Draw the Characteristics of different types of amplifiers
- Understand the Class A, Class B, Class C amplifiers

UNIT - IV

Feedback Amplifiers: Concepts of feedback – Classification of feedback amplifiers – General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems.

Oscillators: Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators - Applications.

Learning Outcomes: At the end of the unit, the student will be able to

- Understand the Concepts and Classification of feedback amplifiers
- Draw the Characteristics of different types of feedback amplifiers
- Know the Different types Oscillators and their Characteristics

UNIT - V

Operational Amplifiers: Ideal op-amp, output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product, Inverting and non-inverting amplifier, Differentiator, integrator, Square-wave and triangular-wave generators.

Learning Outcomes: At the end of the unit, the student will be able to

- Understand the concept of op-amps
- Classify the different types of op-amps
- Know the Square-wave and triangular-wave generators.

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias, "Integrated Electronics," McGraw Hill Education, 2nd Edition 2010.
2. Ramakanth A. Gayakwad, "Op-Amps & Linear ICs," 3rdEdition,PHI, 2003.

REFERENCE BOOKS:

1. Thomas L. Floyd, "Electronic Devices," 1stEdition, 2015, Pearson.
2. J. Millman and A. Grabel, "Microelectronics", McGraw Hill Education, 4thEdition, 1988.
3. P. Horowitz and W. Hill, "The Art of Electronics," Cambridge University Press, 3rdEdition, 1989.

2030502: DATA STRUCTURES

B.TECH II YearISem. **L T P C**
3 0 0 3

Prerequisites

A course on "Programming for Problem Solving "

Objectives

- Exploring basic data structures such as linked list, stacks and queues.
- Describes searching and sorting techniques.
- Introduces trees and graphs.

Outcomes

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for searching and sorting.
- Design programs using a variety of data structures- lists, stacks, queues, trees and graphs.

UNIT - I Introduction to Data Structures, Linear list – singly linked list, Doubly linked list, Circular linked list - operations and its applications

UNIT-II

Stacks- Introduction, Operations, array and linked representations of stacks, stack applications (Infix to postfix conversion and postfix evaluation), Queues-Introduction, operations, array and linked representations of queues and its applications.

UNIT - III

Searching: Linear Search and Binary Search and its applications.
Sorting: Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort and its applications.

UNIT-IV

Trees - Introduction, Types of trees, Binary tree, recursive and non- recursive Traversals of Binary Tree, Binary search tree- Operations and its applications.

UNIT - V

Graphs: Introduction, Types of graphs, Representation of graphs, Graph Traversal Methods, comparison between trees and graphs and its applications.

Text Books

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.
2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

References

1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning. 2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON.

II Year B.Tech. EEE I-Sem **L TP C**
0 021

(2030274) NETWORK ANALYSIS LAB

Prerequisite: Basic Electrical Engineering, Network Analysis

Course Objectives:

- To design electrical systems
- To analyze a given network by applying various Network Theorems
- To measure three phase Active and Reactive power.
- To understand the locus diagrams

Course Outcomes: After Completion of this lab the student is able to

- Analyze complex DC and AC linear circuits
- Apply concepts of electrical circuits across engineering
- Evaluate response in a given network by using theorems

The following experiments are required to be conducted as compulsory experiments

1. Verification of Reciprocity and Maximum Power Transfer theorems
2. Verification of compensation, Tellegen's&Milliman's theorems
3. Locus Diagrams of RL and RC Series Circuits
4. Series and Parallel Resonance
5. Time response of first order RC / RL network for periodic non – sinusoidal inputs – Timeconstant.
6. Two port network parameters – Z – Y parameters, Analytical verification.
7. Two port network parameters – A, B, C, D & Hybrid parameters, Analytical verification
8. Determination of Self and Mutual inductance in a Coupled Circuit, Co-efficient of Coupling.
9. Determination of form factor for non-sinusoidal waveform
10. Measurement of Active Power for Star and Delta connected balanced loads
11. Measurement of Reactive Power for Star and Delta connected balanced loads

TEXT BOOKS:

1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
2. D. Roy Choudhury, "Networks and Systems", New Age International Publications, 1998.

REFERENCES:

1. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
2. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.
3. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999.

2030484: ANALOG ELECTRONICSLABORATORY

(For EEE)

II Year B.Tech. EEEI -Sem. **L T P C**

0 0 2 1

Pre-requisite: Analog Electronics

Course Objectives:

- To introduce components such as diodes, BJTs and FETs their switching characteristics, applications
- Learn the concepts of high frequency analysis of transistors
- To give understanding of various types of basic and feedback amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers
- To introduce the basic building blocks of linear integrated circuits
- To introduce the concepts of waveform generation and introduce some special function ICs

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Know the characteristics, utilization of various components.
- Understand the biasing techniques
- Design and analyze various rectifiers, small signal amplifier circuits.
- Design sinusoidal and non-sinusoidal oscillators.
- Understanding the functioning of OP-AMP, designs OP-AMP based circuits with linear integrated circuits.

List of Experiments:

Experiments have to be designed, simulated and verify in hardware laboratory.

1. PN Junction diode characteristics: Forward and Reverse bias.
2. Full Wave Rectifier with & without filters.
3. Common Emitter amplifier characteristics.
4. Common Base amplifier characteristics.
5. Common Source amplifier characteristics.
6. Measurement of h-parameters of transistor in CB, CE, CC configurations.
7. Inverting and Non-inverting Amplifiers using Op-Amp.
8. Adder and Subtractor using Op-Amp.
9. Integrator Circuit using IC 741.
10. Differentiator circuit using Op-Amp.
11. Current Shunt Feedback amplifier.
12. RC Phase shift Oscillator.
13. Hartley and Colpitt's Oscillators.
14. Class A power amplifier.

NOTE: Minimum of 12 experiments to be conducted.

2030572: DATA STRUCTURES LAB

B.Tech. I YearIISem. **L T/P/D C**
0 0/2/0 1

Prerequisites:
A Course on "Programming for problem solving"

Objectives

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Outcomes

- Ability to develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

List of Experiments

1. Write a program that uses functions to perform the following operations on singly linked list.: i) Creation ii) Insertion iii) Deletion iv) Traversal

2. Write a program that uses functions to perform the following operations on doubly linked list.: i) Creation ii) Insertion iii) Deletion

3. Write a program that uses functions to perform the following operations on circular linked list: i) Creation ii) Insertion iii) Deletion

4. Write a program that implement stack operations using i) Arrays ii) Pointers

5. Write a c program to implement infix to postfix conversion using stack.

6. Write a c program to implement postfix evaluation.

7 Write a program that implement Queue operations using i) Arrays ii) Pointers

8. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort

9. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Merge sort ii) Quick sort

10. Write a program that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search

11. Write a program to implement the tree traversal methods using both recursive and non-recursive.
12. Write a program to implement the graph traversal methods.

Text Books

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.
2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

References

1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning.
2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON.

2020021 - ENVIRONMENTAL SCIENCE

B.Tech. I Year II Sem

L	T	P	C
3	0	0	0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon lifestyle.

TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt.Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

II - II

(2030204) ELECTROMAGNETIC FIELDS

II Year B.Tech EEE – IISem.	L	T	P	C
	3	1	0	4

Course Prerequisites: Mathematics-II (Differentiation and Integration)& Applied Physics.

Course Objectives:

- Inculcate the knowledge of different basic laws in static electric field for various applications.
- Impart the applications of static electric field such as boundary conditions across different media.
- Understand the laws in magnetic field at static conditions and its application.
- Concept of various Maxwell's equations in different forms and different media.
- Understand the concept of Electromagnetic waves and its application in Power transmission lines.

UNIT-I

Static Electric Field: Review of conversion of a vector from one coordinate system to another coordinate system, Coulomb's law, Electric field intensity, Electrical field due to point charges. Line, Surface and Volume charge distributions. Gauss law and its applications. Absolute Electric potential, potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density

Learning Outcomes:

At the end of this unit, the student will be able to

- Illustrate the application of vector analysis.(L4)
- Recognise the importance of electric field intensity in electrostatics. (L5)
- Demonstrate the use of Gauss Law and its application. (L4)

UNIT-II

Conductors, Dielectrics and Capacitance: Current and current density, Ohms Law in Point form, Continuity equation, Boundary conditions of conductors and dielectric materials. Capacitance, Capacitance of a two-wire line, Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Outline the necessary and essential boundary conditions in electrostatic field for dielectrics and conductors. (L6)

- Judge the importance of capacitance in electrostatics. (L1)
- Demonstrate the use of Laplace and Poisson's Equation. (L5)

UNIT-III

Static Magnetic Fields and Magnetic Forces: Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors. Force on a moving charge, Force on a differential current element, Force between differential current elements, Magnetic boundary conditions, Magnetic circuits, Self- inductances and mutual inductances.

Learning Outcomes:

At the end of this unit, the student will be able to

- Compute magnetic field intensity by using Bio-Savart's law and Amperes law. (L4)
- Evaluate the force in magneto statics and current configurations. (L1)
- Interpret the equations for self and mutual inductance due to magneto statics. (L4)

UNIT-IV

Time Varying Fields and Maxwell's Equations: Faraday's law for Electromagnetic induction, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations, Motional Electromotive forces.

Learning Outcomes:

At the end of this unit, the student will be able to

- Classify the Maxwell's equations for time varying fields. (L5)
- Select the Maxwell's equations for different applications. (L6)
- Judge the importance of displacement current in time varying fields. (L1)

UNIT-V

Electromagnetic Waves: Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Wave equation in Phasor form, Plane wave in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors. Poyntingtheorem.

Learning Outcomes:

At the end of this unit, the student will be able to

- Evaluate the Wave equations in different forms. (L1)
- Compute the Maxwell's equation in phasor form. (L4)
- Illustrate the plane waves in lossy dielectrics and pointing theorem. (L4)

TEXT BOOKS:

1. M. N. O. Sadiku, “Elements of Electromagnetics”, Oxford University Publication, 2014.
2. W. Hayt, “Engineering Electromagnetics”, McGraw Hill Education, 2012.

REFERENCE BOOKS:

1. A. Pramanik, “Electromagnetism-Problems with solution”, Prentice Hall India, 2012.
2. G. W. Carter, “The electromagnetic field in its engineering aspects”, Longmans, 1954.
3. W. J. Duffin, “Electricity and Magnetism”, McGraw Hill Publication, 1980.
4. W. J. Duffin, “Advanced Electricity and Magnetism”, McGraw Hill, 1968.
5. E. G. Cullwick, “The Fundamentals of Electromagnetism”, Cambridge University Press, 1966.
6. B. D. Popovic, “Introductory Engineering Electromagnetics”, Addison-Wesley Educational Publishers, International Edition, 1971.
7. A. Pramanik, “Electromagnetism - Theory and applications”, PHI Learning Pvt. Ltd, New Delhi, 2009.

Course Outcomes:

After completion of this course the student is able to

- Demonstrate the concept of electrostatic field intensity and electric potential.
- Illustrate polarization of dielectrics and the behavior of conductors and dielectrics in an electric field.
- Understand the concept of field intensity and flux density in magnetic fields.
- Discuss forces in magnetic fields and laws of electromagnetic induction.
- Evaluate the Maxwell’s equation in different forms and different media.

II Year B. Tech EEE – II Sem. **L T P C**

3 0 0 3

(2040207) ELECTRICAL MACHINES – II

Prerequisite: Basic Electrical Engineering**,** Electrical Machines-I

Course Objectives:

- To deal with the detailed analysis of poly-phase induction motors & Alternators
- To understand operation, construction and types of single phase motors and their applicationsin house hold appliances and control systems.
- To introduce the concept of parallel operation of alternators
- To introduce the concept of regulation and its calculations.

Course Outcomes: At the end of this course, students will demonstrate the ability to

- Understand the concepts of rotating magnetic fields.
- Understand the operation of ac machines.
- Analyze performance characteristics of ac machines.

UNIT - I

Poly-Phase Induction Machines: Constructional details of cage and wound rotor machinesproductionof a rotating magnetic field - principle of operation - rotor EMF and rotor frequency – rotorreactance, rotor current and Power factor at standstill and during operation.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the construction and operation of different types of Induction motors. (L4)
- Calculate emf value along with the calculations of losses. (L3)
- Obtain the performance characteristics of different induction motors. (L2)
- Identify the effects of loading of induction motors. (L1)

UNIT - II

Characteristics of Induction Machines: Rotor power input, rotor copper loss and mechanical powerdeveloped and their inter relation-torque equation-deduction from torque equation - expressions formaximum torque and starting torque - torque slip characteristic - equivalent circuit - phasor diagram -crawling and cogging -No-load Test and Blocked rotor test –Predetermination of performance-Methods of starting and starting current and Torque calculations.

Speed Control Methods: Change of voltage, change of frequency, voltage/frequency, injection of anEMF into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

Learning Outcomes:

At the end of the unit, the student will be able to

- Predetermine the performance of Polyphase Induction Motor Understandability of starting and stopping techniques of Induction motor. (L5)
- Control the speed of Induction Motor Understandability of working of an induction generator. (L3)

UNIT - III

Synchronous Generator: Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings– distribution, pitch and winding factors – E.M.F Equation. Harmonics in generated e.m.f. – suppression of harmonics – armature reaction - leakage reactance – synchronous reactance andimpedance – experimental determination - phasor diagram – load characteristics. Regulation bysynchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient polealternators – two reaction analysis – experimental determination of Xd and Xq (Slip test) Phasordiagrams – Regulation of salient pole alternators.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the construction and operation ofSynchronous motor. (L4)
- Understand the effect of harmonics in Synchronous machines. (L3)
- Analysis of Regulation methods of Synchronous machines. (L2)

UNIT - IV

Parallel Operation of Synchronous Generator: Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation andmechanical power input. Analysis of short circuit current wave form – determination of sub-transient,transient and steady state reactance's.

Synchronous Motors: Theory of operation – phasor diagram – Variation of current and power factorwith excitation – synchronous condenser – Mathematical analysis for power developed- hunting andits suppression – Methods of starting – synchronous induction motor.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the excitation of mechanical power input in alternators. (L4)
- Determination of sub-transient,transient and steady state reactance's. (L3)

- Obtain the methods for prevent hunting Synchronous motors. (L2)

UNIT – V:

Single Phase &Special Machines: Single phase induction motor – Capacitor start Induction motor- Capacitor and capacitor run induction motor - Constructional features-Doublerevolving field theory – split-phase motors – shaded pole motor- Reluctance motor- stepper motor- universal motor.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the construction and operation single phase motors. (L4)
- Obtain the performance of shaded pole motor.(L2)
- Analysis of different special machines. (L3)

TEXT BOOKS:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.

REFERENCE BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
3. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.
4. P. C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 2007.

2040407: DIGITAL ELECTRONICS & IC APPLICATIONS
(For EEE)

II Year B.Tech. EEEII -Sem. **L T P C**

3 0 0 3

Pre-requisite: Analog Electronics

Course Objectives:

- To learn about Number System and Boolean Algebra and Switching Functions
- To Learn the concepts of Design of Combinational Circuits
- To understand the various types of Registers and Counters
- To know the concepts of ADC and DAC converters
- To introduce the concepts Filters & IC-555 and its applications

Course Outcomes:

At the end of the laboratory work, students will be able to

- Understand of Number System and Boolean algebra
- Design of Combinational Circuits
- Acquire the knowledge about the Data converters
- Design theSequential Logic Circuits
- Know theFilters & IC-555 Applications

UNIT – I

Number System and Boolean Algebra and Switching Functions: Review of number systems, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Distance Codes, Error Detecting and Correcting Codes.

Boolean Algebra: Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

Learning Outcomes: At the end of the unit, the student will be able to

- Understand the concept of Number System and Boolean algebra
- Understand the properties of Binary Codes, Binary Coded Decimal Code
- Know the different types of Logic Gates

UNIT - II

Minimization and Design of Combinational Circuits: Introduction, The Minimization of switching function using theorem, The Karnaugh Map Method-Up to Five Variable Maps, Don't Care Map Entries, Tabular Method, Design of Combinational Logic: Adders, Subtractors, comparators, Multiplexers, De-multiplexers.

Learning Outcomes: At the end of the unit, the student will be able to

- Understand the concepts related to Combinational Circuits.
- Develop the Karnaugh Map Method-Up to Five Variable Maps
- Know the Design of Combinational Logic circuits.

UNIT - III

Sequential Logic Circuits: Introduction: Basic Architectural Distinctions between Combinational and Sequential circuits, Latches, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops, Timing and Triggering Consideration, Conversion from one type of Flip-Flop to another.

Registers and Counters: Shift Registers, Operation of Shift Registers, Shift Register Configuration, Bidirectional Shift Registers, Applications of Shift Registers, Design and Operation of Ring and Twisted Ring Counter, Operation Of Asynchronous And Synchronous Counters.

Learning Outcomes: At the end of the unit, the student will be able to

- Understand the concept of Sequential Logic Circuits.
- Know the Classification of Flip Flops.
- Understand the Registers and Counters.

UNIT - IV

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

Learning Outcomes: At the end of the unit, the student will be able to

- Acquire the knowledge on Data converters
- Understand the Different Types of Analog to Digital converters
- Know the DAC and ADC Specifications

UNIT – V

Filters & IC-555 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, Waveform Generators – Triangular, Sawtooth, Square Wave, IC555 Timer – Functional Diagram, Monostable, and Astable Multivibrators – Operations and its Applications.

Learning Outcomes: At the end of the unit, the student will be able to

- Understand the concept and classification of Filters
- Know the Waveform Generators – Triangular, Sawtooth, Square Wave
- Understand the concept IC555 Timer and its Functional Diagram

TEXT BOOKS:

1. William Gothmann H, "Digital Electronics: An Introduction to Theory and Practice," PHI,1982.
2. John Morris, "Digital Electronics," Pearson Education Limited, 2013

REFERENCE BOOKS:

1. D. Roy Chowdhury, "Linear Integrated Circuits," New Age International (p) Ltd, 2nd Ed., 2003.
2. RP Jain, Modern Digital Electronics," 4th Edition TMH, 2010.
3. Floyd and Jain, "Digital Fundamentals," Pearson Education, 8th Edition, 2005.

2040412: SIGNALS& SYSTEMS
(For EEE)

II Year B.Tech. EEEII -Sem.

L	T	P	C
3	0	0	3

Pre-requisites: Basics of Mathematics, and Electrical Engineering.

Course Objectives:

- Acquire the knowledge of signals and systems
- Understand the behavior of signals in time and frequency domain
- Analyze the characteristics of LTI systems
- Study the concepts of Signals and Systems and its analysis using different Transform techniques
- Obtain the relation between two same signals and two different signals

Course Outcomes:

At the end of this course, students will be able to

- Differentiate various signal functions
- Represent any arbitrary signal in time domain and frequency domain
- Understand the characteristics of linear time invariant systems
- Analyze the signals with different Transform techniques
- Design a system for sampling a signal

UNIT – I

Signal Analysis: Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Classification of signals and systems, operations on signals, Exponential and sinusoidal signals, Concepts of impulse function, Unit step function, Signum function.

Learning Outcomes: At the end of this unit, the students will be able to

- Discuss the similarity between vectors and signals
- Describe different types of signals
- Perform different operations on signals

UNIT – II

Fourier Series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier series and exponential Fourier series, Complex Fourier spectrum.

Fourier Transforms: Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signals, Fourier Transform of standard signals, Fourier Transform of periodic signals, Properties of Fourier Transform, Fourier Transforms involving impulse function and signum function, Introduction to Hilbert Transform.

Learning Outcomes: At the end of this unit, the students will be able to

- Illustrate Fourier series and properties of Fourier series
- Demonstrate dirichlet's conditions of Fourier series and Fourier Transform
- Compute Fourier Transform from Fourier series and Transform of different signals.

UNIT – III

Signal Transmission through Linear Systems: Linear system, Impulse response, Response of a linear system, Linear time invariant(LTI) system, Transfer function of a LTI system, Filter characteristicsof linear system, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF, and BPF characteristics, Causality and paley-wiener criterion for physical realization, Relationship between bandwidth and rise time, Convolution and correlation of signals, Concept of convolution in time domain and frequency domain, Graphical representation ofconvolution

Learning Outcomes: At the end of this unit, the students will be able to

- Analyze the response of a linear system
- Compute transfer function of a LTI system
- Discuss filter characteristics of linear systems

UNIT – IV

Laplace Transforms: Laplace Transforms (L.T), Inverse Laplace Transform, Concept of region of convergence (ROC) for Laplace Transforms, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis, and it's Applications.

Z–Transforms: Concept of Z-Transform of a discrete sequence, Distinction betweenLaplace, Fourier and Z Transforms, Region of convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-Transform, Properties of Z-Transforms, and it's Applications.

Learning Outcomes: At the end of this unit, the students will be able to

- Describe Laplace Transform andinverse Laplace Transform with the concept ofregion of convergence (ROC)
- Examine the constraints on ROC for various classes of signals
- Describe the properties of L.T's, Z.T's and relation between F.T, L.T, and Z.T of a signal

UNIT – V

Sampling Theorem: Graphical and analytical proof for band limited signals, Impulse sampling, Natural and flat top sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to band pass sampling.

Correlation: Cross correlation and auto correlation of functions, Properties of correlation functions, Energy density spectrum, Parsevalstheorem, Power density spectrum, Relation between autocorrelation function and energy/power spectral density function, Relation between convolution and correlation, Detection of periodic signals in the presence of noise

by correlation, Extraction of signal from noise byfiltering.

Learning Outcomes: At the end of this unit, the students will be able to

- Illustrate sampling theorem and types of sampling
- Reconstruct the signal from its samples and effect of under sampling
- Demonstrate auto correlation and cross correlation of functions and its properties

TEXT BOOKS:

1. B.P. Lathi, "Signals, Systems & Communications," BSP, 2nd Edition 2001.
2. A.V. Oppenheim, A.S. Willskyand S.H. Nawabi, "Signals and Systems," Pearson India 2nd Edition, 1996.

REFERENCES:

1. Simon Haykin and Van Veen,"Signals and Systems,"John Wiley 2nd Edition, 2007.
2. A. Anand Kumar,"Signals and Systems," PHI, 3rd Edition, 2013.
3. Michel J. Robert, "Fundamentals of Signals and Systems," MGH International, 2nd Edition, 2008.

2040509: JAVA PROGRAMMING

II Year B.Tech. EEEII -Sem. **L T P C**
2 0 0 2

Prerequisites: A course on programming for problem solving

Course Objectives:

- To introduce the object-oriented programming concepts.
- To understand object-oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes.
- To introduce the implementation of packages and interfaces.
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

UNIT-I:

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program,

Functions, Recursion, Enumeration. concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT II:

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism-method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT III:
Exception handling and Multithreading—Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling, Exploringjava.util. Differences between multi threading and multitasking, thread life cycle,creating threads, thread priorities, synchronizing threads, interthread communication, thread groups,daemon threads.

UNIT IV:
Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT V :
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- Japplet, Jframe and Jcomponent, Icons and Labels, text fields, buttons – The Jbutton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables

TEXT BOOKS:
1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS:
1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

II Year B. Tech EEE – II Sem. **L T P C**
0 0 2 1

(2040275) ELECTRICAL MACHINES LAB – I

LAB EXPERIMENTS

The following experiments are required to be conducted compulsory experiments:

1. Magnetization characteristics of DC shunt generator (Determination of critical field resistance and critical speed)
2. Load test on DC shunt generator (Determination of characteristics)
3. Load test on DC series generator (Determination of characteristics)
4. Load test on DC compound generator (Determination of characteristics.
5. Hopkinson's test on DC shunt machines (Predetermination of efficiency)
6. Fields test on DC series machines (Determination of efficiency)
7. Swinburne's test and speed control of DC shunt motor (Predetermination of efficiencies)
8. Brake test on DC compound motor (Determination of performance curves).
9. Speed control of DC Shunt Motor.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

1. Brake test on DC shunt motor (Determination of performance curves)
2. Retardation test on DC shunt motor (Determination of losses at rated speed)
3. Separation of losses in DC shunt motor.

2040485: DIGITAL ELECTRONICS & IC APPLICATIONS LABORATORY
(For EEE)

II Year B.Tech. EEEII -Sem.

L	T	P	C
0	0	2	1

Pre-requisite: Digital Electronics, Analog Electronics

Course Objectives:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand working of logic families and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- Be able to use PLDs to implement the given logical problem.
- Understand working of truth table and excitation table.

List of Experiments:

1. Realization of Boolean Expressions using Gates
2. Design and realization logic gates using universal gates
3. Generation of clock using NAND / NOR gates
4. Design a 4 – bit Adder / Subtractor
5. Design and realization a 4 – bit gray to Binary and Binary to Gray Converter
6. Design and realization of a 4 bit pseudo random sequence generator using logic gates.
7. Design and realization of an 8 bit parallel load and serial out shift register using flip-flops.
8. Design and realization a Synchronous and Asynchronous counter using flip-flops
9. Design and realization of Asynchronous counters using flip-flops
10. Design and realization 8x1 using 2x1 mux
11. Design and realization 2 bit comparator
12. Verification of truth tables and excitation tables
13. Realization of logic gates using DTL, TTL, ECL, etc.,
14. Design Finite state machines.

NOTE: Minimum of 12 experiments to be conducted.

2040484: SIGNALS & SYSTEMS LABORATORY

(For EEE)

II Year B.Tech. EEEII -Sem. **L T P C**

0 0 2 1

Pre-requisites: Nil

Course Objectives:

- To develop ability to analyze linear systems and signals
- To develop critical understanding of mathematical methods to analyze linear systems and signals
- To know the various transform techniques
- To analyze sampling principles
- To analyze Fourier series, transformation techniques.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand the concepts of continuous time and discrete time systems.
- Analyze systems in complex frequency domain.
- Understand sampling theorem and its implications.
- Understand Fourier transformation techniques.
- Analyze magnitude and phase plots.

List of Experiments:

All the signals & systems Lab experiments are to be simulated using MATLAB/SCI LAB or equivalentsoftware.

1. Frequency spectrum of continuous signal
2. Frequency spectrum of impulse signals (time bounded signals)
3. Frequency response analysis using any software
4. Frequency response analysis for any transfer function (Preferably transformer)
5. Write a program to generate the discrete sequences: Unit step, Unit impulse, Ramp and Periodic sinusoidal sequences. (Plot all the sequences).
6. Find the Fourier transform of a square pulse. (Plot its amplitude and phase spectrum).
7. Write a program to convolve two discrete time sequences. (Plot all the sequences). Verify the result by analytical calculation.
8. WriteaprogramtofindthetrigonometricFourierseriescoefficientsofarectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings.
9. Write a program to find the trigonometric and exponential Fourier series coefficients of a periodic rectangular signal. Plot the discrete spectrum of the signal.
10. Generateadiscretetimesequencebysamplingacontinuoustimesignal.Showthat with sampling rates less than nyquist rate, aliasing occurs while reconstructing the signal.
11. Write a program to find the magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.
12. Write a program to find the response of a low pass filter and high pass filter, when a speech signal is passed through these filters.

2030570: JAVA PROGRAMMING LABORATORY

II Year B.Tech. ECE I – Sem. **L T P C**

0 0 2 1

Course Objectives:

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

Course Outcomes:

- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

1. a) Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
   b) Write a java program that prints all real solutions to the quadratic equation ax2 +bx+c=0. Read in a, b, c and use the quadratic formula.
   c) Write a java program to implement Fibonacci series.

2. a) Write a java program to implement method overloading and constructors overloading.
   b).Write a java program to implement method overriding.

3. a) Write a java program to check whether a given string is palindrome.
   b) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

4. a) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

b) Write a java program to create user defined exception class and test this class.

5. a) Write a Java program to list all the files in a directory including the files present in all its subdirectories.

b) Write a java program that displays the number of characters, lines and words in a text file.

6. a) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

b) Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.

7. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
8. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
9. a)Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

b) Write a java program to demonstrate the key event handlers.

10. a) Develop an applet in Java that displays a simple message.

b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.

11. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
12. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.
13. Develop Swing application which uses JList, JTree, JTable, JTabbedPane and JScrollPane.
14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order

15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.