

R-22
COURSE STRUCTURE
&
DETAILED SYLLABUS

COLLEGE CODE: C4

ELECTRICAL & ELECTRONICS ENGINEERING

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2022-23)



JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(An Autonomous & Accredited Institution)

Narsampet, Warangal – 506 332
Telangana State, India



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
COURSE STRUCTURE

(Applicable for the batches admitted from the Academic Year 2022-23)

I Year

I- Semester

S.No	Course Code	Course Name	Periods / Week			Credits
			L	T	P	C
1	J2210001	Matrices & Calculus	3	1	0	4
2	J2210004	Engineering Chemistry	3	1	0	4
3	J2210506	C Programming and Data Structures	3	0	0	3
4	J2210201	Electric Circuit Analysis - I	3	0	0	3
5	J2210302	Computer Aided Engineering Graphics	1	0	4	3
6	J2210202	Elements of Electrical and Electronics Engineering	0	0	2	1
7	J2210005	Engineering Chemistry Lab	0	0	2	1
8	J2210507	C Programming and Data Structures Lab	0	0	2	1
9	---	Induction Program	-	-	-	-
Total			13	02	10	20

I Year

II -Semester

S.No	Course Code	Course Name	Periods / Week			Credits
			L	T	P	C
1	J2220008	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	J2220002	Applied Physics	3	1	0	4
3	J2220301	Engineering Workshop	0	1	3	2.5
4	J2220006	English for Skill Enhancement	2	0	0	2
5	J2220203	Electric Circuit Analysis - II	2	0	0	2
6	J2220003	Applied Physics Laboratory	0	0	3	1.5
7	J2220007	English Language and Communication Skills Laboratory	0	0	2	1
8	J2220511	Applied Python Programming Laboratory	0	1	2	2
9	J2220204	Electric Circuit Analysis Laboratory	0	0	2	1
Total			10	4	12	20



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(Applicable for the batches admitted from the Academic Year 2022-23)

II Year

I- Semester

S.No	Course Code	Course Name	Periods / Week			Credits
			L	T	P	C
1	J2230012	Numerical Methods and Complex variables	3	1	0	4
2	J2230321	Solid Mechanics & Hydraulic Machines	3	0	0	3
3	J2230404	Analog Electronic Circuits	3	0	0	3
4	J2230210	Electrical Machines-I	3	1	0	4
5	J2230212	Electro Magnetic Fields	3	0	0	3
6	J2230211	Electrical Machines Laboratory-I	0	0	2	1
7	J2230420	Analog Electronic Circuits Laboratory	0	0	2	1
8	J2230213	Electrical Simulation tools Laboratory	0	0	2	1
9	J223MC03	Gender Sensitization Laboratory	0	0	2	0
Total			15	2	8	20

II Year

II –Semester

S.No	Course Code	Course Name	Periods / Week			Credits
			L	T	P	C
1	J2240214	Power System-I	2	1	0	3
2	J2240215	Measurements and Instrumentation	3	0	0	3
3	J2240217	Electrical Machines–II	3	0	0	3
4	J2230406	Digital Electronics	2	0	0	2
5	J2240219	Control Systems	3	1	0	4
6	J2240422	Digital Electronics Laboratory	0	0	2	1
7	J2240216	Measurements and Instrumentation Laboratory	0	0	2	1
8	J2240218	Electrical Machines Laboratory-II	0	0	2	1
9	J2240PR1	Real-time Research Project/ Field Based Project	0	0	4	2
	J224MC02	Environmental Science	3	0	0	0
Total			13	2	10	20

B.TECH

I YEAR

I & II SEMESTER

SYLLABUS



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(J2210001) MATRICES & CALCULUS

B.Tech. I Year I SEM: Common to all branches

L/T/P/C

3/1/0/4

Pre-requisites: Mathematical Knowledge at pre-university level Course

Objectives: To learn

- Concept to rank of matrix and apply to know the consistency of system of linear equations.
- To determine Eigen values, Eigen vectors of matrices.
- Geometrical approach to the mean value theorem and their applications.
- To find extreme value of function of two and three variables.
- Evaluation of multiple integrations and their applications

COURSE OUTCOMES: On successful completion of this course, students will be able to

1. **Understand** the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.
2. **Determine** Eigen values, Eigen vectors of matrices.
3. **Evaluate** limits of single-variable functions graphically and computationally. Analyse improper integrals using Beta and Gamma functions.
4. **Calculate** Partial derivatives, extreme of functions of multiple variables
5. **Evaluate** the multiple integrals in various coordinate systems

UNIT-I

Matrices

Types of Matrices: Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, orthogonal, Unitary matrices, Rank of a matrix by Echelon form and Normal form, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations.

UNIT-II

Eigen Values and Eigenvectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem.

UNIT-III

Calculus

Mean value theorems (without proof): Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-IV

Multivariable calculus (Partial Differentiation and applications)

Definitions of Limit and continuity. Partial Differentiation; Total derivative; Jacobian; Functional dependence and independence, Maxima and Minima of functions of two and three variables using method of Lagrange's method of undetermined multipliers.

UNIT-V

Multivariable Calculus:

Evaluation of Double Integrals (Cartesian and polar co ordinates), Change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian and polar) for double. Applications: Area (by double) and volumes (by double and triple integrals).

TEXTBOOKS:

1. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.
2. Erwinkreyszig, Advanced Engineering Mathematics, 9th Edition, John wiley & Sons, 2006.
3. T.K.V.Iyengar, Engineering Mathematics-I,S.Chand, 2018.

REFERENCEBOOKS:

1. G.B.Thomas and R.L.Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. .P.Baliand ManishGoyal,A text book of Engineering Mathematics, Laxmi Publications, Reprint,2008.
3. Ramana B.V.,Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint,2010.

N



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(J2210004) ENGINEERING CHEMISTRY

B.Tech. I Year I-Sem.

L	T	P	C
3	1	0	4

Course Objectives:

- To achieve the knowledge about various kinds of orbital's and splitting patterns.
- To know about water quality and its parameters, learning the knowledge in the assessment of water quality and purifications.
- To achieve the knowledge about various kinds of Electro chemical cells, batteries and corrosion phenomenon.
- To acquire required knowledge about engineering materials like cement, smart materials and lubricants.

Course Outcomes:

1. Students will acquire the basic knowledge of MOT and CFT.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. The students are able to gain knowledge electrochemical procedures related to corrosion and its control.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs

UNIT-I: Molecular structure and theories of Bonding:

Atomic and Molecular orbital's. Linear combination of Atomic Orbital's (LCAO), molecular orbital's of diatomic molecules, molecular orbital energy level diagrams of N₂, O₂ and F₂ molecules.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d-orbital's in Tetrahedral, Octahedral and square planar geometries.

CFSCE, spectral and magnetic properties. factors affecting the magnitude of splitting

- a) Magnetic properties
- b) Spectral properties

Bond structure of solids and effect of doping on conduction n –doping and p-doping in semiconductors.

UNIT - II: Water and its treatment:

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination.

Boiler troubles: Sludge's, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

UNIT – III Electrochemistry and Batteries

Introduction – Electro chemical cells electrode potential, standard electrode potential types of

electrodes- calomel, quinhydrone and glass electrode. Nernst equation determination of PH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems potentiometric titrations .Batteries-primary battery(Dry cell) and secondary battery (lead acid storage battery) Fuel Cell- Construction and applications of Hydrogen-Oxygen fuel. Comparisons of primary secondary and fuel cells.

UNIT- IV Corrosion and It's control:

Introduction, Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods. Surface coatings(anodic and cathodic), methods of applications of metal coatings-Hot dipping and Electroplating.

UNIT- V Engineering Materials:

Cement: Portland cement, its composition, setting and hardening

Smart materials and their engineering applications

Shape memory materials- poly-lactic acid. Thermoresponse materials- polyacryl amides, poly vinyl amides.

Lubricants: Classifications of lubricants with examples -characteristics of good lubricants- mechanism of lubrication (thin film and extreme pressure) – properties of lubricants: Viscosity, cloud point , pour point, flash point and fire point.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K.Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi(2011)



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(J2210506) C PROGRAMMING AND DATA STRUCTURES

B.Tech. I Year I Sem.

L T P C

3 0 0 3

Course Objectives:

- Introduce the importance of programming
- C language constructs
- Program development
- Data structures, searching and sorting.

Course Outcomes:

1. Understand the various steps in Program development.
2. Explore the basic concepts in C Programming Language.
3. Develop modular and readable C Programs
4. Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Datastructures.
5. Apply data structures such as stacks, queues in problem solving
6. To understand and analyze various searching and sorting algorithms.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development

Introduction to C Language – Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output

Structure of a C Program – Operators, Bit-wise operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements.

UNIT - II

Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples,

other statements related to looping – break, continue, go to, Recursion.

Designing Structured Programs- Functions, basics, user defined functions, inter function communication, standard functions.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two –dimensional arrays, multidimensional arrays.

UNIT - III

Pointers – Introduction, Pointers for inter function communication, pointers to pointers, compatibility, **Pointer Applications** – Passing an array to a function, Memory allocation functions, array of pointers **Strings** – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion.

UNIT - IV

Derived types – The Typedef, enumerated types, Structures – Declaration, definition and initialization of structures, accessing structures, operations on structures, complex structures. Unions – Referencing unions, initializers, unions and structures.

Input and Output – Text vs Binary streams, standard library functions for files, converting file types, File programs – copy, merge files.

UNIT – V

Sorting- selection sort, bubble sort, insertion sort

Searching-linear and binary search methods.

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, CengageLearning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition,Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie,PHI/PearsonEducation

REFERENCE BOOKS:

1. C & Data structures – P. Padmanabham, 3rd Edition, B.S. Publications.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
- 3 Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
4. C for Engineers and Scientists, H. Cheng, McGraw-Hill International Edition
5. Data Structures using C – A. M. Tanenbaum, Y. Langsam, and M.J. Augenstein, PearsonEducation / PHI
6. C Programming & Data Structures, E. Balagurusamy, TMH.
7. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
8. C & Data structures – E V Prasad and N B Venkateswarlu, S. Chand & Co.



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(J2210201) ELECTRICAL CIRCUIT ANALYSIS –I

B.Tech. I Year I -Semester

L T P C
3 0 0 3

Prerequisites: Matrices and Calculus

Course Objectives:

- To gain knowledge in circuits and to understand the fundamentals of derived circuit laws
- To Understand the concept of different sources, Network theorems and coupled circuits
- To draw the different locus diagrams and calculate the series and parallel circuits impedance and admittance.
- To analyze the balanced and unbalanced 3-phase circuits in different connections.
- To draw the network Graph, tree and find the incident matrix

Course Outcomes: After learning the contents of this paper the student must be able to

1. Gain knowledge in circuits and understand the fundamentals of derived circuit laws
2. Understand the concept of different sources, Network theorems and coupled circuits
3. Draw the different locus diagrams and calculate the series and parallel circuits impedance and admittance.
4. Analyze the balanced and unbalanced 3-phase circuits in different connections.
5. Draw the network Graph, tree and find the incident matrix

UNIT-I:

Energy Sources & Network Elements : Active elements, Independent and dependent sources. Passive elements

— R, L and C, Energy stored in inductance and capacitance, Kirchhoff's laws, Source transformations, Star-delta transformations, Node voltage method, Mesh current method including super node and super mesh analysis.

UNIT-II:

Single-Phase Circuits: RMS and average values of periodic sinusoidal and non-sinusoidal waveforms, Phasor representation, Steady-state response of series, parallel and series-parallel circuits. Impedance, Admittance, Current locus diagrams of RL and RC series and parallel circuits with variation of various parameters. Resonance: Series and parallel circuits, Bandwidth and Q-factor.

UNIT-III:

Network theorems: Superposition theorem, Thevenin's theorem, Norton's theorems, Maximum power transfer theorem, Tellegen's theorem, Compensation theorem, Milliman's theorem and Reciprocity theorem. (AC & DC).

UNIT-IV:

Poly-phase Circuits: Analysis of balanced and unbalanced 3-phase circuits, Star and delta connections, Measurement of three-phase power for balanced and unbalanced loads.

UNIT-V:

Coupled circuits: Concept of self and mutual inductance, Dot convention, Coefficient of coupling Analysis of circuits with mutual inductance.

Topological Description of Networks: Graph, tree, chord, cut-set, incident matrix, circuit matrix and cut-set matrix,

TEXTBOOKS:

1. Electrical Circuit Analysis N.C Jagan , C Lakshrninarayana,B.S. Publications
2. Van Valkenburg M.E, "Network Analysis", Prentice Hall of India, 3rd Edition, 2000.
3. Ravish R Singh, "Network Analysis and Synthesis", McGrawHill, 2nd Edition, 2019.

REFERENCE BOOKS:

1. B. Subramanyam, "Electric Circuit Analysis", Dreamtech Press & Wiley, 2021.
2. James W.Nilsson, Susan A.Riedel, "Electric Circuits", Pearson, 11th Edition, 2020.
3. A Sudhakar, Shyammohan S Palli, "Circuits and Networks: Analysis and Synthesis", McGrawHill,5thEdition, 2017.
4. William Hayt H, Kimmerly Jack E. and Steven Durbin M, "Engineering Circuit Analysis", McGrawHill, 6th Edition, 2002.
5. Chakravarthy A., "Circuit Theory", Dhanpat Rai & Co., First Edition, 1999.



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(J2210302) COMPUTER AIDED ENGINEERING GRAPHICS
(Common to CSE, EEE, Data Science)

B.Tech. I Year I Sem.

L T P C
1 0 4 3

Course Objectives:

- To develop the ability of visualization of different objects through technical drawings
- To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products

Course Outcomes: At the end of the course, the student will be able to:

1. Apply computer aided drafting tools to create 2D and 3D objects
2. sketch conics and different types of solids
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpret engineering drawings
5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

UNIT – I:

Introduction to Engineering Graphics: Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Introduction to Computer aided drafting – views, commands and conics

UNIT- II:

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections – points, lines and planes

UNIT – III:

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views, Computer aided projections of solids – sectional views

UNIT – IV:

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Development of surfaces using computer aided drafting

UNIT – V:

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non-isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions. Conversion of orthographic projection into isometric view using computer aided drafting.

TEXT BOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapooan, Vikas: S.Chand and company Ltd.

REFERENCE BOOKS:

1. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill
2. Engineering Graphics and Design, WILEY, Edition 2020
3. Engineering Drawing, M. B. Shah, B.C. Rane / Pearson.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford
5. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

Note: - External examination is conducted in conventional mode and internal evaluation to be done byboth conventional as well as using computer aided drafting.



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(J2210202) ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

B.Tech. I Year I Sem.

L T P C

0 0 2 1

Prerequisites: Electrical circuit analysis-I

Course Objectives:

- To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
- To study the transient response of various R, L and C circuits using different excitations.
- To determine the performance of different types of DC machines and Transformers.
- To Evaluate the Performance calculations of three phase circuits.
- To draw the maximum power transfer characteristic for variable load.

Course Outcomes: After learning the contents of this paper the student must be able to

1. Measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
2. Study the transient response of various R, L and C circuits using different excitations.
3. Determine the performance of different types of DC machines and Transformers.
4. Evaluate the Performance calculations of three phase circuits.
5. Draw the maximum power transfer characteristic for variable load.

List of experiments/demonstrations:

PART-A (compulsory)

1. Verification Ohm's Law
2. Verification of KVL and KCL
3. Verification of Thevenin's and Norton's theorem
4. Verification of Superposition theorem
5. Verification of Series and Parallel Resonance.
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
7. Determination of self and mutual inductances and Coefficient of coupling in a Coupled circuits.
8. Measurement of Active and Reactive Power in a balanced Three-phase circuit

PART-B (any two experiments from the given list)

1. Measurement of line voltage, current and phase voltage, current in a Three-phase Star and delta circuit
2. Verification of Reciprocity and Milliman's Theorem.
3. Verification of Maximum Power Transfer Theorem.

4. Determination of form factor for non-sinusoidal waveform
5. Transient Response of Series RL and RC circuits for DC excitation

TEXTBOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCE BOOKS:

1. P.Ramana, M.Suryakalavathi, G.T.Chandrasheker, "Basic Electrical Engineering", S.Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M.S.Sukhija, T.K.Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthy, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.



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(J2210005) ENGINEERING CHEMISTRY LAB

B.Tech. I Year I Sem.

L T P C
0 0 2 1

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry methods.
- Students will learn to prepare in the laboratory.
- Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

Course Outcomes: The experiments will make the student gain skills on:

1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
2. Able to perform methods such as conductometry, potentiometry in order to find out the concentrations or equivalence points of acids and bases.
3. Students are able to prepare Drugs like aspirin and paracetamol.
4. Estimations saponification value, surface tension and viscosity of lubricant oils.

List of Experiments:

1. Estimation of Hardness of water by EDTA Complexometry method
2. Estimation of the concentration of strong acid by Conductometric titrations.
3. Estimation of the concentration of weak acid by Conductometric titrations.
4. Estimation of the concentration of strong acid by Potentiometric titrations.
5. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
6. Synthesis of Aspirin and Paracetamol.
7. Thin layer chromatography calculation of R_f values.eg: ortho and para nitro phenols.
8. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal.
9. Determination of Viscosity of castor oil and ground nut oil by using Ostwald's Viscometer.
10. Determination of surface tension of a give liquid using stalagmometer.

Note: Any 8 experiments are to be performed.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).



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(J2210507) C PROGRAMMING AND DATA STRUCTURES LAB

B.Tech. I Year I Sem.

L T P C

0 0 2 1

Course Objectives: Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

Course Outcomes:

1. Develop modular and readable C Programs
2. Solve problems using strings, functions
3. Handle data in files
4. Implement stacks, queues using arrays, linked lists.
5. To understand and analyze various searching and sorting algorithms

List of Experiments:

1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a quadratic equation.
5. Write a C program to find the factorial of a given integer.
6. Write a C program to find the GCD (greatest common divisor) of two given integers.
7. Write a C program to solve Towers of Hanoi problem.
8. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)
9. Write a C program to find both the largest and smallest number in a list of integers.
10. Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices
11. Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string into a given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
12. Write a C program to determine if the given string is a palindrome or not
13. Write a C program that displays the position or index in the string S where the string T begins, or - 1 if S doesn't contain T.

14. Write a C program to count the lines, words and characters in a given text.
15. Write a C program to generate Pascal's triangle.
16. Write a C program to construct a pyramid of numbers.

17. Write a C program that uses functions to perform the following operations:
 - i) Reading a complex number
 - ii) Writing a complex number
 - iii) Addition of two complex numbers
 - iv) Multiplication of two complex numbers
 (Note: represent complex number using a structure.)
18.
 - i. Write a C program which copies one file to another.
 - ii. Write a C program to reverse the first n characters in a file.(Note: The file name and n are specified on the command line.)
19.
 - i. Write a C program to display the contents of a file.
 - ii. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)
20. Write a C program that uses functions to perform the following operations on singly linkedlist.:
 - i) Creation
 - ii) Insertion
 - iii) Deletion
 - iv) Traversal
21. Write C programs that implement stack (its operations) using
 - i) Arrays
 - ii) Pointers
22. Write C programs that implement Queue (its operations) using
 - i) Arrays
 - ii) Pointers
23. Write a C 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
24. Write C programs 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

TEXT BOOKS:

1. C Programming & Data Structures, B.A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Let us C, Yeswanth Kanitkar
3. C Programming, Balaguruswamy.



**(J2220008) ORDINARY DIFFERENTIAL EQUATIONS AND
VECTOR CALCULUS**

B.Tech. I Year II SEM: Common to all branches

L/T/P/C

3/1/0/4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- Methods of solving the applications of differential equations.
- To solve initial value problems using differential equations.
- Solving ordinary differential equations using Laplace transforms techniques
- The physical quantity involved in Engineering field related to vector field.
- To apply fundamental theorems of vectors integrations in their applications.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

1. **Identify** whether the given differential equation of first order is exact or not
2. **Find** the complete solution of a non homogeneous differential equations and applying its concepts in Engineering problems.
3. **Solving** ODE's by using Laplace transforms techniques.
4. **Apply** the concepts of gradient, divergence and curl to formulate Engineering problems.
5. **Analyze** line, surface and volume integrals using fundamental theorems.

UNIT-I: Ordinary Differential Equations of First Order:

Exact, Non-Exact differential equations, linear and Bernoulli's differential equations, Applications: Newton's law of cooling, Law of Natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order:

Second order linear differential equations with constant coefficients, Non-Homogeneous terms of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, Method of variation of parameters.

UNIT-III: Laplace transforms

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second 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 transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT-IV: Vector Differentiation:

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration:

Line Integrals, Surface Integrals and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Editions, 2012.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. T.K.V. Iyengar, Engineering Mathematics-II, S. Chand, 2018.

REFERENCE BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishers
3. S.L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.



JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

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(J2220002) APPLIED PHYSICS

B.Tech. I Year II Sem.

L	T	P	C
3	1	0	4

Pre-requisites: 10 + 2 Physics

Course Objectives: The objectives of this course for the student are to:

- Understand the basic principles of quantum physics and band theory of solids.
- Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
- Study the fundamental concepts related to the dielectric, magnetic and energy materials.
- Identify the importance of nano scale, quantum confinement and various fabrications techniques.
- Study the characteristics of lasers and optical fibres.

Course Outcomes: At the end of the course the student will be able to

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of Nano materials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect - Davisson and Germer experiment –Heisenberg uncertainty principle – time independent Schrodinger wave equation - particle in one dimensional potential box.

Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) - Fermi-Dirac distribution, Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT - II: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT - III: DIELECTRIC AND MAGNETIC MATERIALS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications

Magnetic Materials: Classification of magnetic materials Hysteresis-soft and hard magnetic materials Magnetostriction, Magneto resistance - applications - bubble memory devices, magnetic field sensors and multiferroics.

UNIT - IV: NANOTECHNOLOGY

Nano scale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods –top-down fabrication: ball milling - physical vapor deposition (PVD) – chemical vapor deposition (CVD) - characterization techniques - XRD, SEM & TEM - applications of nano materials.

UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations- lasing action - pumping methods- ruby laser, He-Ne laser, CO₂ laser, - semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection- construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers- losses in optical fiber - optical fiber for communication system - applications.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy” A Text book of Engineering Physics”-S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication, 2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4th Edition, 2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition, 2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley & Sons, 11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid-State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhyaya - Nano Materials, New Age International, 1st Edition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group Energy Materials Taylor & Francis Group, 1st Edition, 2022.
7. Introduction to Nano science & Nano Technology, P.Venugopal Reddy, M.Laxmi, B.S.Publication, 2022.



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(J2220301)ENGINEERING WORKSHOP

B.Tech. I Year II Sem.

L T P C

0 1 3 2.5

Pre-requisites: Practical skill

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

- i. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
- ii. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
- iii. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
- iv. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
- v. Welding Practice – (Arc Welding & Gas Welding)
- vi. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
- vii. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Power tools in construction and Wood Working.

TEXT BOOKS:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP



(J2220006) ENGLISH FOR SKILL ENHANCEMENT

B.Tech. I Year II Sem.

L T P C
2 0 0 2

Course Objectives: This course will enable the students to:

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Develop study skills and communication skills in various professional situations.
- Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes: Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT - I

Chapter entitled '*Toasted English*' by **R. K. Narayan** from "*English: Language, Context and Culture*" published by Orient Black Swan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives -framing sentences with Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions

Reading: Reading and Its Importance- Techniques for Effective Reading

Writing: Sentence Structures -Types and Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- techniques for writing precisely-paragraph writing - types, structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled '*Appro JRD*' by **Sudha Murthy** from "*English: Language, Context and Culture*" published by Orient Black Swan, Hyderabad.

Vocabulary: Spelling- Rules of spelling-Words Often Mis-spelt - Homophones, Homonyms and Homographs- Words Often Confused - Words from Foreign Languages and their Use in English

Grammar: Types of Pronouns-Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Practice. Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice.

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events
– Classifying- Providing Examples or Evidence.

UNIT - III

Chapter entitled ‘Lessons from Online Learning’ by F. Haider Alvi, Deborah Hurst et al from

“*English: Language, Context and Culture*” published by Orient Black Swan, Hyderabad. **Vocabulary:** Idioms, Proverbs, Phrasal verbs-Their Usage.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers, and Tenses- Usage in Written Communication- Question Tags

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume-Blog Writing

UNIT - IV

Chapter entitled ‘Art and Literature’ by Abdul Kalam from “*English: Language, Context and Culture*” published by Orient Black Swan, Hyderabad.

Vocabulary: Standard Abbreviations and Acronyms in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT - V

Chapter entitled ‘Go, Kiss the World’ by Subroto Bagchi from “*English: Language, Context and Culture*” published by Orient Black Swan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage in sentences.

Grammar: Common Errors in English- Voice, Reported Speech, and
(Covering all the other aspects of grammar which were *not covered* in the previous units)

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports.

Note: Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.

- **Note: 1.** As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is Open-ended*, besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.
- **Note: 2.** Based on the recommendations of NEP-2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents. They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:

1. “English: Language, Context and Culture” by Orient Black Swan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2nd Ed.,). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.



(J2220203) ELECTRICAL CIRCUIT ANALYSIS – II

B.Tech. I Year II Sem.

L T P C
2 0 0 2

Prerequisites: Electrical circuit analysis – I

Course Objectives:

- To study the transient analysis of various R, L and C circuits for different inputs.
- To understand the Fourier series and Laplace transformation.
- To learn about two-port networks and concept of filters.
- To Apply the Fourier series and Laplace transformation techniques for complicated input functions.
- To design different types of Filters.

Course Outcomes: After learning the contents of this paper the student must be able to

1. Observe the transient response of various R, L and C circuits for different excitations.
2. Examine the behavior of circuits using Fourier, Laplace transforms and transfer function of single port network.
3. Obtain two port network parameters and applications and design of various filters.
4. Apply the Fourier series and Laplace transformation techniques for complicated input functions.
5. Design different types of Filters.

UNIT-I:

Transient analysis: Transient response of R, L & C circuits, Formulation of integral differential equations, Initial conditions, Transient Response of RL, RC and RLC (series and parallel) networks subjected to internal energy, Response to impulse, step, and ramp, exponential and sinusoidal excitations.

UNIT-II:

Fourier Series analysis: Fourier series representation of periodic functions, Symmetry conditions, Exponential Fourier series, Discrete spectrum, Fourier integral and its properties, Continuous spectrum, Application to simple networks

UNIT-III:

Two port network parameters: Open circuit impedance, short-circuit admittance, Transmission, Hybrid parameters & inter-relationships, Series, parallel and cascade connection of two port networks, System function, and Impedance and admittance functions.

UNIT-IV:

Electrical circuit Analysis using Laplace Transforms: Application of Laplace Transforms to RL, RC and RLC (series and parallel) Networks for impulse, step, and ramp, exponential and sinusoidal excitations

UNIT-V:

Filters: Classification of filters – Low pass, High pass, Band pass, Band Elimination and Butter worth filter, Constant-k and M-derived filters-Low pass and High pass Filters and Band pass and Band elimination filters (Elementary treatment only)

TEXTBOOKS:

1. Van Valkenburg M.E, “Network Analysis”, Prentice Hall of India, 3rd Edition, 2000.
2. Ravish R Singh, “Network Analysis and Synthesis”, McGrawHill, 2nd Edition, 2019.

REFERENCE BOOKS:

1. B. Subramanyam, “Electric Circuit Analysis”, Dreamtech Press & Wiley, 2021.
2. James W. Nilsson, Susan A.Riedel, “Electric Circuits”, Pearson, 11th Edition, 2020.
3. A Sudhakar, Shyammohan S Palli, “Circuits and Networks: Analysis and Synthesis”, McGrawHill, 5th Edition, 2017.
4. Jagan N.C, Lakshrninarayana C., “Network Analysis”, B.S. Publications, 3rd Edition, 2014.
5. William Hayt H, Kimmerly Jack E. and Steven Durbin M, “Engineering Circuit Analysis”, McGrawHill, 6th Edition, 2002.
6. Chakravarthy A., “Circuit Theory”, Dhanpat Rai & Co., First Edition, 1999.



(J2220003) APPLIED PHYSICS LABORATORY

B.Tech. I Year II Sem.

L T P C
0 0 3 1.5

Course Objectives: The objectives of this course for the student to

- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory
- To learn the usage of electrical and optical systems for various measurements
- Understand the characteristics of various devices such as PN junction diode, LED, lasers and optical fiber and measurement of energy gap of semiconductor materials.
- Able to measure the characteristics of LED, analysis of CR circuit and it's applications
- Apply the analytical techniques and graphical analysis to the experimental data

Course Outcomes: The students will be able to:

1. **Understand** the optical phenomenon of interference and diffraction .
2. Know the **determination** of the energy gap of semiconductor materials.
3. **Gain** the knowledge of applications of fiber optics in communication.
4. **Appreciate** quantum physics in semiconductor devices and optoelectronics
5. **Apply** the various procedures, mathematical concepts and techniques for the experiments to obtain quantitative results

LIST OF EXPERIMENTS:

1. Determination of Energy gap of semiconductor material of p-n junction diode.
2. Determination of frequency of electrical vibrator by using Melde's experiment.
3. Determination of wavelength of LASER by using diffraction grating.
4. Determination of rigidity modulus of a given wire by using Torsional pendulum.
5. R-C circuit analysis.
6. Determination of Numerical aperture of a given optical fiber.
7. Determination of the radius of curvature of plano-convex lens by forming Newton's rings
8. LED-characteristics
9. Study the V-I characteristics of a p-n junction diode and Zener diode
10. Study the V-I Characteristics of solar cell

Note: Any 8 experiments are to be performed.

REFERENCE BOOK:

1. Laboratory Manual of Engineering Physics By Dr. Y.Aparna And Dr K. Venkateswara Rao (V.G.S Publishers).
2. Practical Engineering Chemistry by K. Mukkanti, etal' B'S' Publications, Hyderabad.



(J222007) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

B.Tech. I Year II Sem.

L	T	P	C
0	0	2	1

The **English Language and Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize the impact of dialects.
- To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes: Students will be able to:

1. Understand the nuances of English language through audio- visual experience and group activities
2. Understand and respond to their speakers.
3. Neutralize their accent for intelligibility
4. Speak with clarity and confidence which in turn enhances their employability skills
5. Make presentations with proper communicative and body language.

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

- a. Computer Assisted Language Learning (CALL) Lab**
- b. Interactive Communication Skills (ICS) Lab**

Listening Skills:

Objectives

1. To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To involve students in speaking activities in various contexts
 2. To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice
 - Describing objects/situations/people
 - Role play – Individual/Group activities
 - Just A Minute (JAM) Sessions

The following course content is prescribed for the **English Language and Communication Skills Lab.**

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise II CALL Lab:

Understand: Syllabification-Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - *Testing Exercises*

ICS Lab:

Understand: Features of Good Conversation- Verbal Non Verbal Communication Skills – Strategies for Effective Communication.

Practice: Situational Dialogues-Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise III CALL Lab:

Understand: Errors in Pronunciation-Neutralizing Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -*Testing Exercises*

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines.

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise IV CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - *Testing Exercises*

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise V CALL lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -*Testing Exercises*

ICS Lab:

Understand: Group Discussion-Introduction to Interview

Practice: Group Discussion-Mock Interview

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 30 students with 30 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 30 systems with multimedia) with the following specifications:

- i) Computers with Suitable Configuration
- ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio- visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- *Exercises in Spoken English. Part 1,2,3.* CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:

(2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.

1. Shobha, KN&Rayen, J. Lourdes. (2019). *Communicative English – A workbook*. Cambridge University Press
2. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook*. Oxford University Press
3. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities*. Orient Black Swan Pvt. Ltd.
4. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach*. Cambridge University Press



(J2220511) APPLIED PYTHON PROGRAMMING LABORATORY

I Year B.Tech. II Sem

L T P C
0 1 2 2

Course Outcomes: Upon completing this course, the students will be able to

1. Build basic programs using fundamental programming constructs
2. Write and execute python codes for different applications
3. Capable to implement on hardware boards

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	1	1	1	-	-	1	-	1	1
CO2	2	3	2	1	1	2	-	-	1	-	1	1
CO3	2	3	2	1	1	2	-	-	1	-	1	1

LIST OF EXPERIMENTS:

Cycle - 1

1. Downloading and Installing Python and Modules
 - a) Python 3 on Linux

Follow the instructions given in the URL <https://docs.python-guide.org/starting/install3/linux/>

- b) Python 3 on Windows

Follow the instructions given in the URL <https://docs.python.org/3/using/windows.html> (Please remember that Windows installation of Python is harder!)

- c) pip3 on Windows and Linux

Install the Python package installer by following the instructions given in the URL

<https://www.activestate.com/resources/quick-reads/how-to-install-and-use-pip3/>

- d) Installing numpy and scipy

You can install any python3 package using the command `pip3 install <packagename>`

- e) Installing jupyterlab

Install from pip using the command `pip install jupyterlab`

2. Introduction to Python3
 - a) Printing your biodata on the screen
 - b) Printing all the primes less than a given number
 - c) Finding all the factors of a number and show whether it is a *perfect* number, i.e., the sum of all its factors (excluding the number itself) is equal to the number itself
3. Defining and Using Functions
 - a) Write a function to read data from a file and display it on the screen
 - b) Define a boolean function *is palindrome*(<input>)
 - c) Write a function *collatz*(*x*) which does the following: if *x* is odd, $x = 3x + 1$; if *x* is even, then $x = x/2$. Return the number of steps it takes for $x = 1$
 - d) Write a function $N(m, s) = \exp(-(x-m)^2/(2s^2))/\sqrt{2\pi}s$ that computes the Normal distribution
4. The package numpy
 - a) Creating a matrix of given order $m \times n$ containing *random numbers* in the range 1 to 99999
 - b) Write a program that adds, subtracts and multiplies two matrices. Provide an interface such that, based on the prompt, the function (addition, subtraction, multiplication) should be performed
 - c) Write a program to solve a system of n linear equations in n variables using matrix inverse

5. The package `scipy` and `pyplot`
 - a) Finding if two sets of data have the same *mean* value
 - b) Plotting data read from a file
 - c) Fitting a function through a set a data points using *polyfit* function
 - d) Plotting a histogram of a given data set
6. The `strings` package
 - a) Read text from a file and print the number of lines, words and characters
 - b) Read text from a file and return a list of all *n* letter words beginning with a vowel
 - c) Finding a secret message hidden in a paragraph of text
 - d) Plot a histogram of words according to their length from text read from a file

Cycle -2

7. Installing OS on Raspberry Pi
 - a) Installation using PiImager
 - b) Installation using image file
 - Downloading an Image
 - Writing the image to an SD card
 - using Linux
 - using Windows
 - Booting up

Follow the instructions given in the URL <https://www.raspberrypi.com/documentation/computers/getting-started.html>

8. Accessing GPIO pins using Python
 - a) Installing GPIO Zero library.

First, update your repositories list:

```
sudo apt update
```

Then install the package for Python 3:

```
sudo apt install python3-gpiozero
```

- b) Blinking an LED connected to one of the GPIO pin
 - c) Adjusting the brightness of an LED
 - d) Adjust the brightness of an LED (0 to 100, where 100 means maximum brightness) using the in-built PWM wavelength.
9. Collecting Sensor Data
 - a) DHT Sensor interface
 - Connect the terminals of DHT GPIO pins of Raspberry Pi.
 - Import the DHT library using `import Adafruit_DHT`
 - Read sensor data and display it on screen.



(J2220204) ELECTRICAL CIRCUIT ANALYSIS LABORATORY

B.Tech. I Year II Sem.

L T P C
0 0 2 1

Prerequisites: Electrical circuit analysis-II

Course Objectives:

- To remember and understand the locus diagrams and concept of resonance.
- To design electrical systems and analyze them by applying various Network Theorems
- To measure three phase Active and Reactive power.
- To determine the two port network parameters
- To draw the locus Diagrams of different series circuits

Course Outcomes: After learning the contents of this paper the student must be able to

1. Remember and understand the locus diagrams and concept of resonance.
2. Design Electrical systems and analyze them by applying various Network Theorems
3. Measure Three phase Active and Reactive power.
4. Determine the two port network parameters
5. Draw the locus Diagrams of different series circuits

The following experiments are required to be conducted as compulsory

1. To draw the locus Diagrams of RL (R-Varying) and RC (R-Varying) Series Circuits.
2. Verification of Series and Parallel Resonance.
3. Determination of Time response of first order RL and RC circuit for periodic non – sinusoidal inputs – Time Constant and Steady state error.
4. Determination of Two port network parameters – Z parameters.
5. Determination of Two port network parameters – A, B, C, D parameters.
6. Determination of Two port network parameters – Y parameters.
7. Frequency domain analysis of Low-pass filter.
8. Determination of Two port network parameters -Hybrid parameters.

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

1. Frequency domain analysis of Band-pass filter.
2. Measurement of Active Power for Star and Delta connected balanced loads.
3. Measurement of Reactive Power for Star and Delta connected balanced loads.
4. Frequency domain analysis of High-pass filter.
5. To draw the locus Diagrams of RL (L-Varying) and RC (C-Varying) Series Circuits.
6. Determination of Time response of first order RLC circuit for periodic non– sinusoidal inputs – Time Constant and Steady state error.

TEXTBOOKS:

1. Van Valkenburg M.E, “Network Analysis”, Prentice Hall of India, 3rd Edition, 2000.
2. Ravish R Singh, “Network Analysis and Synthesis”, McGrawHill, 2nd Edition, 2019.

REFERENCE BOOKS:

1. B. Subramanyam, "Electric Circuit Analysis", Dreamtech Press & Wiley, 2021.
2. James W. Nilsson, Susan A. Riedel, "Electric Circuits", Pearson, 11th Edition, 2020.
3. A Sudhakar, Shyammohan S Palli, "Circuits and Networks: Analysis and Synthesis", McGraw Hill, 5th Edition, 2017.
4. Jagan N.C, Lakshrninarayana C., "Network Analysis", B.S. Publications, 3rd Edition, 2014.
5. William Hayt H, Kimmerly Jack E. and Steven Durbin M, "Engineering Circuit Analysis", McGrawHill, 6th Edition, 2002.
6. Chakravarthy A., "Circuit Theory", Dhanpat Rai & Co., First Edition, 1999.

B.TECH

II YEAR

I & II SEMESTER

SYLLABUS



JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

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(J2230012) NUMERICAL METHODS AND COMPLEX VARIABLES

B.Tech. II Year I Sem (EEE), II Year II Sem (ECE)

Subject code: J2230012 / J2240012

L T P C

3 0 0 3

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn

- Expressing periodic function by Fourier series and a non-periodic function by Fourier transforms
- Various numerical methods to find roots of polynomial and transcendental equations.
- Concept of finite differences and to estimate the value for the given data using interpolation.
- Evaluation of integrals using numerical techniques
- Solving ordinary differential equations of first order using numerical techniques.
- Differentiation and integration of complex valued functions.
- Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.
- Expansion of complex functions using Taylor's and Laurent's series.

Course outcomes: After learning the contents of this paper the student must be able to

- Express any periodic function in terms of sine and cosine
- Find the root of a given polynomial and transcendental equations.
- Estimate the value for the given data using interpolation
- Find the numerical solutions for a given first order ODE's
- Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
- Taylor's and Laurent's series expansions in complex function

UNIT-I: Fourier Series & Fourier Transforms:

8 L

Fourier series - Dirichlet's Conditions - Half-range Fourier series - Fourier Transforms: Fourier Sine and cosine transforms- Inverse Fourier transforms.

UNIT-II: Numerical Methods-I

10 L

Solution of polynomial and transcendental equations: Bisection method, Iteration Method, Newton- Raphson method and Regula-Falsi method.

Finite differences: forward differences, backward differences, central differences, symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae.

UNIT-III: Numerical Methods-II**10 L**

Numerical integration: Trapezoidal rule and Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rules.

Ordinary differential equations: Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order for first order ODE.

UNIT-IV: Complex Differentiation**10 L**

Limit, Continuity and Differentiation of Complex functions. Cauchy-Riemann equations (without proof), Milne- Thomson methods, analytic functions, harmonic functions, finding harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithm) and their properties. (All theorems without Proofs), Conformal mappings, Mobius transformations.

UNIT-V: Complex Integration:**10 L**

Line integrals, Cauchy's theorem, Cauchy's Integral formula, zeros of analytic functions, singularities, Taylor's series, Laurent's series, Residues, Cauchy Residue theorem and their properties. (All theorems without Proofs)

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.

REFERENCE BOOKS:

1. M. K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical methods for Scientific and Engineering Computations, New Age International publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Edition, Mc-GrawHill, 2004.



JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

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(J22303021) SOLID MECHANICS AND HYDRAULIC MACHINES

B.Tech. II Year I Sem.

L T P C

3 1 0 4

Course Objectives:

- To identify an appropriate structural system and work comfortably with basic engineering mechanics and types of loading & support conditions that act on structural systems.
- To Understand the meaning of centers of gravity, centroids, moments of Inertia and rigidbody dynamics.
- To Study the characteristics of hydroelectric power plant and Design of hydraulic machinery.

Course Outcomes: After learning the contents of this paper the student must be able to

- Solve problems dealing with forces, beam and cable problems and understand distributed force systems.
- Solve friction problems and determine moments of Inertia and centroid of practical shapes.
- Apply knowledge of mechanics in addressing problems in hydraulic machinery and its principles that will be utilized in Hydropower development and for other practical usages.

UNIT-I:

INTRODUCTION OF ENGINEERING MECHANICS: Basic concepts of System of Forces-Coplanar Forces-Components in Space-Resultant- Moment of Forces and its Application – Couples and Resultant of Force System-Equilibrium of System of Forces-Free body diagrams-Direction of Force Equations of Equilibrium of Coplanar Systems and Spatial Systems – Vector cross product- Support reactions different beams for different types of loading – concentrated, uniformly distributed and uniformly varying loading. Types of friction – Limiting friction – Laws of Friction – static and Dynamic Frictions – Angle of Friction –Cone of limiting friction

UNIT-II:

CENTROID AND CENTER OF GRAVITY: Centroids – Theorem of Pappus- Centroids of Composite figures – Centre of Gravity of Bodies – Area moment of Inertia:-polar Moment of Inertia-Transfer- Theorems - Moments of Inertia of Composite Figures.

SIMPLE STRESSES AND STRAINS ANALYSIS: Concept of stress and strain- St. Venant's Principle-Stress and Strain Diagram - Elasticity and plasticity – Types of stresses and strains- Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Pure shear and Complementary shear - Elastic moduli, Elastic constants and the relationship between them

UNIT-III:

KINEMATICS & KINETICS: Introduction – Rectilinear motion – Motion with uniform and variable acceleration–Curvilinear motion– Components of motion– Circular motion Kinetics of a particle – D’Alembert’s principle – Motion in a curved path – work, energy and power. Principle of conservation of energy – Kinetics of a rigid body in translation, rotation – work done – Principle of work-energy – Impulse-momentum.

UNIT-IV:

BASICS OF HYDRAULIC MACHINERY: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency Elements of a typical Hydropower installation – Heads and efficiencies

UNIT-V:

TURBINES & PUMPS: Classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine –working, working proportions, velocity diagram, work done and efficiency, hydraulic design. Draft tube
– Classification, functions and efficiency. Governing of turbines, Performance of turbines Pump installation details – classification – work done – Manometric head – minimum starting speed –losses and efficiencies – specific speed. Multistage pumps – pumps in parallel

TEXT BOOKS:

1. M.V. Seshagiri Rao and Durgai, “Engineering Mechanics”, University Press.
2. P.N Modi and Seth, “Fluid Mechanics and Hydraulic Machinery”, standard Book House

REFERENCE BOOKS:

1. B. Bhattacharya, “Engineering Mechanics”, Oxford University Publications.
2. Hibbler, “Engineering Mechanics (Statics and Dynamics)”, Pearson Education.
3. Ferdinand L. Singer, “Engineering Mechanics” Harper Collings Publishers.
4. A.K.Tayal, “Engineering Mechanics”, Umesh Publication.
5. Domkundwar & Domkundwar, “Fluid mechanics & Hydraulic Machines”, Dhanpat Rai & C
6. R.C.Hibbeler, “Fluid Mechanics”, Pearson India Education Services Pvt. Ltd
7. D.S.Kumar, “Fluid Mechanics & Fluid Power Engineering”, Kataria & Sons Publications Pvt. Ltd.
8. Banga & Sharma, “Hydraulic Machines” Khanna Publishers.



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(J2240419) ANALOG ELECTRONIC CIRCUITS

B.Tech. II Year I Sem. EEE

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 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 be able 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.
- Designs OP-AMP based circuits with linear integrated circuits.

UNIT-I:

Diode and Bipolar Transistor Circuits: P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, clamping 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.

UNIT-II:

FET Circuits: FET Structure and VI Characteristics, MOSFET structure and I-V 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.

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

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.

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.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Electronic Devices Conventional and current version -Thomas L. Floyd 2015, pearson.
2. J. Millman and A. Grabel, “Microelectronics”, McGraw Hill Education, 1988.
3. P. Horowitz and W. Hill, “The Art of Electronics”, Cambridge University Press, 1989.
4. P. R. Gray, R. G. Meyer and S. Lewis, “Analysis and Design of Analog Integrated Circuits”, John Wiley & Sons, 2001.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Applicable for the batches admitted from the academic year 2022-23)

(J2230210) ELECTRICAL MACHINES - I

B.Tech. II Year I Sem.

L T P C
3 1 0 4

Prerequisites: Electrical Circuit Analysis-1 & Electrical Circuit Analysis-2

Course Objectives:

- To study and understand different types of DC machines and their performance evaluation through various testing methods.
- To understand the operation of single and ploy-phase Transformers
- To analyze the performance of transformers through various testing methods.

Course Outcomes: After learning the contents of this paper the student must be able to

- Identify different parts of a DC machines & understand their operation.
- Carry out different excitation, starting, speed control methods and testing of DC machines.
- Analyze single & three phase transformers and their performance through testing.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To study and understand different types of DC machines and their performance evaluation through various testing methods.	3	2	3	1	1	1	3	1	2	1	2	3
To understand the operation of single and ploy-phase Transformers	3	3	3	2	2	1	3	1	2	2	2	3
To analyse the performance of transformers through various testing methods	3	2	3	2	2	2	3	1	2	1	3	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Identify different parts of a DC machines & understand their operation	2	2	2	3	3	2	1	1	3	3	3	3
Carry out different excitation, starting, speed control methods and testing of DC machines	2	1	3	1	2	3	3	1	3	2	2	3
Analyse single & three phase transformers and their performance through testing	1	1	2	1	1	3	3	1	3	3	3	3

UNIT-I:

D.C. GENERATORS: Principle of operation – Action of commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated armature – 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-excited and remedial measures. Load characteristics and applications of shunt, series and compound generators.

UNIT-II:

D.C 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) Testing of D.C. machines - Losses – Constant & Variable losses – calculation of efficiency – condition for maximum efficiency.

UNIT-III:

TESTING OF DC MACHINES: Methods of Testing – direct, indirect, and regenerative testing – Braketest – Swinburne's test – Hopkinson's test – Field's test - separation of stray losses in a D.C. motor 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 and Applications.

Equivalent circuit - losses and efficiency – regulation - All day efficiency - effect of variations of frequency & supply voltage on iron losses.

UNIT-V:

TESTING OF TRANSFORMERS AND POLY-PHASE TRANSFORMERS: Open Circuit and Short Circuit 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 – Poly-phase connections - Y/Y, Y/ Δ , Δ /Y, Δ / Δ and open Δ , Scott connection and Applications.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
(Applicable for the batches admitted from the academic year 2022-23)

(J2230212) ELECTROMAGNETIC FIELDS

B.Tech. II Year I Sem.

L T P C
3 0 0 3

Prerequisites: Mathematics & Applied Physics

Course Objectives:

- To introduce the concepts of electric field and magnetic field.
- To know Applications of electric and magnetic fields in the development of the theory for power transmission lines and electrical machines.
- To study about electromagnetic waves.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand the basic laws of electromagnetism and their applications.
- Analyze time varying electric and magnetic fields.
- Understand the propagation of EM waves.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To introduce the concepts of electric field and magnetic field	3	1	1	1	3	3	3	1	1	1	0	3
To know Applications of electric and magnetic fields in the development of the theory for power transmission lines and electrical machines.	3	3	2	2	2	3	0	1	1	1	0	2
To study about electromagnetic waves	3	3	1	2	2	2	0	1	1	1	1	2

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the basic laws of electromagnetism and their applications	3	3	3	3	3	3	3	3	1	1	1	2
Analyze time varying electric and magnetic fields.	3	3	3	1	1	3	2	3	1	1	3	0
Understand the propagation of EM waves	3	2	2	2	3	3	3	2	1	3	3	1

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.

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.

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.

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.

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. Poynting theorem.

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.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
 (Applicable for the batches admitted from the academic year 2022-23)
(J2230211) ELECTRICAL MACHINES LABORATORY – I

B.Tech. II Year I Sem.

L T P C
0 0 2 1

Prerequisites: Electrical Machines- I

Course Objectives:

- To expose the students to the operation of DC Generators.
- To know the operation of various types of DC Motors.
- To examine the performance of Single and Three Phase Transformers.

Course Outcomes: After learning the contents of this paper the student must be able to

- Start and control the Different DC Machines.
- Assess the performance of different machines using different testing methods
- Evaluate the performance of different Transformers using different testing methods

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To expose the students to the operation of DC Generators	3	3	3	3	3	3	1	1	2	2	1	3
To know the operation of various types of DC Motors.	3	2	3	2	3	3	2	2	2	3	2	3
To examine the performance of Single and Three Phase Transformers	3	2	3	1	3	3	1	1	2	2	2	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Start and control the Different DC Machines	3	3	3	3	3	3	3	1	2	1	1	2
Assess the performance of different machines using different testing methods	3	3	3	3	3	3	3	3	3	3	2	3
Evaluate the performance of different Transformers using different testing methods	3	2	2	2	3	3	3	2	1	3	3	2

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. Hopkinson's test on DC shunt machines (Predetermination of efficiency)
5. Swinburne's test and speed control of DC shunt motor (Predetermination of efficiencies)
6. Brake test on DC compound motor (Determination of performance curves)
7. OC and SC Test on Single Phase Transformer

8. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)

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. Load test on DC compound generator (Determination of characteristics.)
3. Fields test on DC series machines (Determination of efficiency)
4. Retardation test on DC shunt motor (Determination of losses at rated speed)
5. Separation of losses in DC shunt motor.
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.



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(J2240420) ANALOG ELECTRONIC CIRCUITS LABORATORY

B.Tech. II Year I Sem. EEE

L T P C

0 0 2 1

Prerequisites: Analog Electronic Circuits

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.
- Design OP-AMP based circuits with linear integrated circuits.

List of Experiments:

1. Draw the VI Characteristics of given PN Junction diode. Determine the Static and Dynamic resistance of the Diode.
2. Determine the Ripple factor, %Regulation PIV and TUF of the given Rectifier with & without filter.
3. Obtain the I/O Characteristics of CE configurations of BJT. Calculate h-parameters from the Characteristics.
4. Obtain the I/O Characteristics of CB configurations of BJT. Calculate h-parameters from the Characteristics.
5. Obtain the I/O Characteristics of CC configurations of BJT. Calculate h-parameters from the Characteristics.
6. Obtain the Drain and Transfer characteristics of CD,CS configuration of JFET. Calculate gm, rd from the Characteristics Adder and Subtractor using Op Amp.
7. Inverting and Non-inverting Amplifiers using Op Amps
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. Design an RC phase shift oscillator circuit and derive the gain condition for oscillations practically for given frequency.
13. Design a Colpitts oscillator circuit for the given frequency and draw the output waveform.
14. Design transformer coupled class A power amplifier and draw the input and output



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
 (Applicable for the batches admitted from the academic year 2022-23)
(J2230213)ELECTRICAL SIMULATION TOOLS LABORATORY

B.Tech. II Year I Sem.

L T P C
0 0 2 1

Course Objectives:

- To understand basic block sets of different simulation platform used in electrical/electronic circuit design.
- To understand use and coding in different software tools used in electrical/ electronic circuit design.
- To understand the simulation of electric machines/circuits for performance analysis.

Course Outcomes: After learning the contents of this paper the student must be able to

- Develop knowledge of software packages to model and program electrical and electronics systems.
- Model different electrical and electronic systems and analyze the results.
- Articulate importance of software packages used for simulation in laboratory experimentation by analyzing the simulation results.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To understand basic block sets of different simulation platform used in electrical/electronic circuit design	3	3	3	3	3	3	2	2	1	2	2	1
To understand use and coding in different software tools used in electrical/ electronic circuit design	3	3	3	1	1	3	1	2	1	2	2	1
To understand the simulation of electric machines/circuits for performance analysis	3	3	2	1	2	3	2	1	2	1	2	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Develop knowledge of software packages to model and program electrical and electronics systems	3	3	1	3	2	3	2	3	1	2	2	3
Model different electrical and electronic systems and analyse the results	3	2	2	1	2	1	2	1	2	2	2	3
Articulate importance of software packages used for simulation in laboratory experimentation by analysing the simulation results	3	2	0	0	2	0	1	0	2	0	2	3

Students should be encouraged to use open-source software's such as **SCILAB, ORCAD, LTSPICE, Ngspice, Octave, Solve Elec, Simulide, CircuitLab, QElectroTech, Circuit Sims, DcAcLab, Every Circuit, DoCircuitsetc.** for carrying out the lab simulation listed below.

Use of Professional Licensed versions of softwares like **MATLAB, LabVIEW, NI Multisim, PSpice, PowerSim, TINA** etc. is also allowed.

Use of **'Python'** platform for simulating components/ circuit behaviour.

Suggested List of Laboratory Experiments:

The following experiments need to be performed from various subject domains.

1. Introduction to basic block sets of simulation platforms. Basic matrix operations, Generation of standard test signals
2. Solving the linear and nonlinear differential equations
3. Measurement of Voltage, Current and Power in DC circuits.
4. Verification of different network theorems with dependent and independent sources using suitable simulation tools.
5. Verification of performance characteristics of basic Electronic Devices using suitable simulation tools.
6. Analysis of series and parallel resonance circuits using suitable simulation tools
7. Obtaining the response of electrical network for standard test signals using suitable simulation tools.
8. Modeling and Analysis of Low pass and High pass Filters using suitable simulation tools
9. Performance analysis of DC motor using suitable simulation tools
10. Modeling and analysis of Equivalent circuit of transformer using suitable simulation tools.
11. Analysis of single-phase bridge rectifier with and without filter using suitable Simulation tools.
12. Modeling and Verification of Voltage Regulator using suitable simulation tools.
13. Modeling of transmission line using simulation tools.
14. Performance analysis of Solar PV model using suitable simulation tools



(J223MC03) GENDER SENSITIZATION LAB

B.Tech. EEE II Year I Sem.

L T P C

Subject Code: J223MC03

0 0 2 0

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit-I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Unit – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- “My Mother doesn’t Work.” “Share the Load.”-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.

Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

Unit – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! - Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “*Chupulu*”.

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. RebuildingLives. Thinking about Sexual Violence Blaming the Victim- “I Fought for my Life...”

Unit – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

- **Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on “Gender”.**

📖 **ESSENTIAL READING:** The Textbook, “*Towards a World of Equals: A Bilingual Textbook on Gender*” written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 5



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Applicable for the batches admitted from the academic year 2022-23)

(J2240214)POWER SYSTEM - I

B.Tech. II Year II Sem.

L T P C
2 1 0 3

Prerequisites: Electrical Circuit Analysis-1 & Electrical Circuit Analysis-2
 Electrical Machines-I & Electrical Machines-II

Course Objectives:

- To understand the power generation through conventional and non-conventional sources.
- To illustrate the economic aspects of power generation and tariff methods.
- To know about overhead line insulators, substations and AC & DC distribution systems.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand the operation of conventional and renewable electrical power generating stations.
- Evaluate the power tariff methods and Economics associated with power generation.
- Analyze the operations of AIS & GIS, Insulators and Distribution systems.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To understand the power generation through conventional and non-conventional sources	3	3	3	1	1	3	2	3	1	1	2	2
To illustrate the economic aspects of power generation and tariff methods	3	3	2	1	1	3	2	2	1	1	2	1
To know about overhead line insulators, substations and AC & DC distribution systems	3	3	2	1	1	3	2	3	1	1	1	1

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the operation of conventional and renewable electrical power generating stations	3	3	2	1	1	3	2	2	2	1	2	1
Evaluate the power tariff methods and Economics associated with power generation	3	3	2	1	1	3	2	3	2	1	2	1
Analyse the operations of AIS & GIS, Insulators and Distribution systems	3	3	3	3	1	2	2	2	1	1	1	1

UNIT-I:

GENERATION OF ELECTRIC POWER:

Conventional Sources (Qualitative): Hydro station, Steam Power Plant, Nuclear Power Plant and GasTurbine Plant.

Non-Conventional Sources (Elementary Treatment):

Solar Energy, Wind Energy, Fuel Cells, Ocean Energy, Tidal Energy, Wave Energy, Cogeneration, Energy conservation and storage.

UNIT-II:

ECONOMICS OF POWER GENERATION: Introduction, definitions of connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants. Cost of electrical energy-fixed cost, running cost, Tariff on charge to customer.

UNIT-III:

OVER HEAD TRANSMISSION LINES: Line conductors, inductance and capacitance of single phase and three phase lines with symmetrical and unsymmetrical spacing, Composite conductors- transposition, bundled conductors, and effect of earth on capacitance, skin and proximity effects.

OVERHEAD LINE INSULATORS: Introduction, types of insulators, Potential distribution over a string of suspension insulators, Methods of equalizing the potential, testing of insulators, Sag and tension calculations.

UNIT-IV:**SUBSTATIONS:**

AIR INSULATED SUBSTATIONS (AIS): Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

GAS INSULATED SUBSTATIONS (GIS): Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, bus bar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gasinsulated substations.

UNIT-V:

DC DISTRIBUTION: Classification of Distribution Systems. - Comparison of DC vs. AC and Under- Ground vs. Over- Head Distribution Systems. - Requirements and Design features of Distribution Systems. -Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

A.C. DISTRIBUTION: Introduction, AC distribution, Single phase, 3-phase, 3 phase 4 wire system, bus bar arrangement, Selection of site for substation. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

TEXT BOOKS:

1. C.L. Wadhwa, "Generation, Distribution and Utilization of Electrical Energy", 2nd Edition, New Age International, 2009.
2. V.K Mehta and Rohit Mehta, "Principles of Power Systems", S. Chand & Company Ltd, New Delhi, 2004.

REFERENCE BOOKS:

1. A. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, "A Text book on Power System Engineering", Dhanpat Rai Publishing Company (P) Ltd, 2008.
2. C.L. Wadhwa, "Electrical Power Systems", 5th Edition, New Age International, 2009.
3. M.V. Deshpande, "Elements of Electrical Power Station Design", 3rd Edition, Wheeler Pub. 1998.
4. H. Cotton & H. Barber, "The Transmission and Distribution of Electrical Energy", 3rd Edition, 1970.
5. W.D. Stevenson, "Elements of Power System Analysis", 4th Edition, McGraw Hill, 1984.



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
(Applicable for the batches admitted from the academic year 2022-23)
(J2240215) MEASUREMENTS AND INSTRUMENTATION

B.Tech. II Year II Sem.

L T P C
3 0 0 3

Prerequisites: Electrical Circuit Analysis-1 & Electrical Circuit Analysis-2, Analog Electronics
Electro Magnetic Fields.

Course Objectives:

- To introduce the basic principles of all measuring instruments.
- To deal with the measurement of voltage, current, Power factor, power, energy and magnetic measurements.
- To understand the basic concepts of smart and digital metering.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand different types of measuring instruments, their construction, operation and characteristics and identify the instruments suitable for typical measurements.
- Apply the knowledge about transducers and instrument transformers to use them effectively.
- Apply the knowledge of smart and digital metering for industrial applications.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To introduce the basic principles of all measuring instruments	3	3	3	3	3	3	1	1	2	2	1	3
To deal with the measurement of voltage, current, Power factor, power, energy and magnetic measurements.	2	1	2	2	2	2	2	1	1	1	2	3
To understand the basic concepts of smart and digital metering	2	1	2	2	2	2	2	1	1	1	2	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand different types of measuring instruments, their construction, operation and characteristics and identify the instruments suitable for typical measurements	2	1	2	2	2	2	2	1	2	1	2	3
Apply the knowledge about transducers and instrument transformers to use them effectively	2	1	2	2	2	2	2	1	2	1	2	3
Apply the knowledge of smart and digital metering for industrial applications	2	1	2	2	2	2	2	1	2	1	2	3

UNIT - I:

INTRODUCTION TO MEASURING INSTRUMENTS: Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting

torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – extension of range of E.S. Voltmeters.

UNIT-II:

POTENTIOMETERS & INSTRUMENT TRANSFORMERS: Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors

UNIT-III:

MEASUREMENT OF POWER & ENERGY: Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems. Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter, maximum demand meters.

UNIT-IV:

DC & AC BRIDGES: Method of measuring low, medium and high resistance – sensitivity of Wheatstone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method. Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge - Owen's bridge. Measurement of capacitance and loss angle – DeSauty's Bridge - Wien's bridge – Schering Bridge.

UNIT-V:

TRANSDUCERS: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, and photo diodes.

INTRODUCTION TO SMART AND DIGITAL METERING: Digital Multi-meter, True RMS meters, Clamp-on meters, Digital Energy Meter, Cathode Ray Oscilloscope, Digital Storage Oscilloscope.

TEXTBOOKS:

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications, 2005.
2. Dr. Rajendra Prasad, "Electrical Measurements & Measuring Instruments", Khanna Publishers 1989.

REFERENCE BOOKS:

1. G. K. Banerjee, "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016.
2. R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007.
3. S. C. Bhargava, "Electrical Measuring Instruments and Measurements", BS Publications, 2012.
4. Buckingham and Price, "Electrical Measurements", Prentice – Hall, 1988.
5. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
6. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
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(J2240217) ELECTRICAL MACHINES – II

B.Tech. II Year II Sem.

L T P C
3 0 0 3

Prerequisites: Electrical Circuit Analysis-1 & Electrical Circuit Analysis-2 & 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 applications in household appliances and control systems.
- To introduce the concept of parallel operation of alternators.

Course Outcomes: After learning the contents of this paper the student must be able to

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

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To deal with the detailed analysis of poly-phase induction motors & Alternators	2	1	2	1	1	2	2	1	1	1	2	3
To understand operation, construction and types of single-phase motors and their applications in household appliances and control systems	2	1	2	1	1	2	2	1	2	1	2	3
To introduce the concept of parallel operation of alternators	2	1	2	1	1	3	2	1	2	2	3	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the concepts of rotating magnetic fields	2	1	1	2	1	1	1	1	1	1	1	3
Examine the operation of ac machines	2	1	1	2	2	1	1	1	1	1	2	3
Analyse performance characteristics of ac machines	2	1	2	1	3	3	3	1	1	1	3	3

UNIT-I:

POLY-PHASE INDUCTION MACHINES: Constructional details of cage and wound rotor machines- production of a rotating magnetic field - principle of operation - rotor EMF and rotor frequency - rotor reactance, rotor current and Power factor at standstill and during operation. Rotor power input, rotor copper loss and mechanical power developed and their inter relation.

UNIT-II:

CHARACTERISTICS OF INDUCTION MACHINES: Torque equation-expressions for maximum 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, Applications.

SPEED CONTROL METHODS: Change of voltage, change of frequency, voltage/frequency, injection of an

EMF into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

UNIT-III:

SYNCHRONOUS MACHINES: 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 and impedance – experimental determination - phasor diagram – load characteristics.

Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two reaction analysis – experimental determination of X_d and X_q (Slip test) Phasor diagrams – Regulation of salient pole alternators.

UNIT-IV:

PARALLEL OPERATION OF SYNCHRONOUS MACHINES: Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing -Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactance's and Applications.

SYNCHRONOUS MOTORS: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed. - Hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT-V:

SINGLE PHASE MACHINES: Single phase induction motor – Constructional Features-Double revolving field theory – split-phase motors – AC series motor- Universal Motor- -Shadedpole motor and Applications.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.



JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

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Narsampet, Warangal 506 332



(J22040421) DIGITAL ELECTRONICS

B.Tech. II Year II Sem. EEE

L T P C

2 0 0 2

Prerequisites: Analog Electronics

Course Objectives:

- To learn fundamental concepts of digital system design and common forms of number representations and their conversions.
- To implement and design logical operations using combinational logic circuits and sequential logic circuits.
- To understand the semiconductor memories and programmable logic devices.

Course Outcomes:

After learning the contents of this paper the student must be able to

- Understand the working of logic families and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Implement the given logical problems using programmable logic devices.

UNIT-I:

Fundamentals of Digital Systems and Logic Families: Digital signals, Digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, Examples of IC gates, Number systems-binary, Signed binary, Octal hexadecimal number, Binary arithmetic, One's and Two's complements arithmetic.

UNIT-II:

Combinational Circuits-I: Standard representation for logic functions, K-map representation and simplification of logic functions using K- map, Minimization of logical functions, Don't care conditions, Multiplexer, De-Multiplexer

UNIT-III:

Combinational Circuits-II: Adders, Subtractors, Carry look ahead adder, Digital comparator, Parity checker/generator, Code converters, Priority encoders, Decoders/Drivers for display devices, Q-M method of function realization.

UNIT-IV: Sequential Circuits: Introduction to flip-flops, SR, JK, T and D type's flip-flops, Shift registers, Conversion of flip-flops, Ring counter, Ripple (Asynchronous) counters, Synchronous counters.

UNIT-V: Semiconductor Memories and Programmable Logic Devices: Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read-only memory (ROM), ROM types, Read and write memory (RAM) types, Programmable logic array, Programmable array logic, Field Programmable Gate Array (FPGA).

TEXT BOOKS:

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

REFERENCE BOOKS:

1. R.S. Sedha, "A Textbook of Digital Electronics", S.Chand, 2005
2. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
 (Applicable for the batches admitted from the academic year 2022-23)
(J2240219) CONTROL SYSTEMS

B.Tech. II Year II-Sem:EEE

L T P C
3 1 0 4

Pre- Requisites: To learn this course students should have the concepts on the following subjects: Electrical Circuits-I, Electrical Circuits-II, Electrical Machines

Course Objective:

1. To introduce concept of controls systems, block diagram reduction techniques & transfer function of mechanical systems
2. To Determine the transfer function & Stability of the system using S-domain and Frequency Domain
3. To Analyse the transfer function and State space analysis of continuous systems

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand the concepts of open loop and closed control systems.
- Determine the transfer function & Stability of the system using S-domain and Frequency Domain.
- Analyse the transfer function and State space analysis of continuous systems

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To introduce concept of controls systems, block diagram reduction techniques & transfer function	2	1	2	1	1	2	2	1	1	1	2	3
To Determine the transfer function & Stability of the system using S-domain and Frequency Domain	2	2	2	2	1	2	2	1	2	1	3	3
To Analyse the transfer function and State space analysis of continuous systems	2	1	2	1	1	3	2	1	2	2	3	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the concepts of open loop and closed control systems	3	1	1	2	1	1	1	1	1	1	1	3
Determine the transfer function & Stability of the system using S-domain and Frequency Domain	3	1	1	3	3	1	1	1	1	1	3	3
Analyse the transfer function and State space analysis of continuous systems	3	1	2	1	3	3	3	1	1	1	3	3

UNIT – I

INTRODUCTION:

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems.

TRANSFER FUNCTION REPRESENTATION:

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT-II

TIME RESPONSE ANALYSIS:

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT –III

STABILITY ANALYSIS:

The concept of stability – Routh- Hurwitz stability criterion – Absolute stability and conditional stability.**Root Locus**

Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to $G(s)H(s)$ on the root loci.

UNIT-IV

STABILITY ANALYSIS IN FREQUENCY DOMAIN:

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability –Effects of adding poles and zeros to $G(s)H(s)$ on the shape of the Nyquist diagrams.

UNIT –V

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization - Solving the Time invariant state Equations- State Transition Matrix and its Properties. Concepts on Controllability and Observability

TEXT BOOKS:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and sons.
3. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

REFERENCE BOOKS:

1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. Control Systems Engg. by NISE 3rd Edition – John wiley
3. Control Systems by S.Kesavan, Hitech Publications.
4. “Modeling & Control of Dynamic Systems” by Narciso F. Macia George J. Thaler, Thomson Publishers.
5. Solutions and Problems of Control Systems by A.K.Jairath, CBS Publications, 1992.



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(J2240422)DIGITAL ELECTRONICS LAB



B.Tech. II Year II Sem.

L T P C

0 0 2 1

Prerequisites: Analog Electronics & Digital Electronics

Course Objectives:

- To learn basic techniques for the design of digital circuits and number conversion systems.
- To implement simple logical operations using combinational logic circuits.
- To design combinational logic circuits, sequential logic circuits.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand the working of logic families and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Analyze different types of semiconductor memories.

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the working of logic families and logic gates	2	2	2	3	3	2	1	1	3	3	3	3
Design and implement Combinational and Sequential logic circuits.	2	1	3	1	2	3	3	1	3	2	2	3
Analyse different types of semiconductor memories	1	1	2	1	1	3	3	1	3	3	3	3

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 Asynchronous and Synchronous counters using flip-flops
9. Design and realization 8x1 using 2x1 mux
10. Design and realization 2-bit comparator
11. Verification of truth tables and excitation tables
12. Realization of logic gates using DTL, TTL, ECL, etc.,

TEXT BOOKS:

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

REFERENCE BOOKS:

1. R.S. Sedha, "A Textbook of Digital Electronics", S.Chand, 2005
2. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
 (Applicable for the batches admitted from the academic year 2022-23)
(J2240216) MEASUREMENTS AND INSTRUMENTATION LABORATORY

B.Tech. II Year II Sem.

L T P C
0 0 2 1

Prerequisites: Measurements and Instrumentation

Course Objectives:

- To calibrate Watt, Energy and PF Meter and determination of three phase active & reactive powers.
- To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges & A. C Bridges.
- To determine the ratio and phase angle errors of Instrument transformers.

Course Outcomes: After learning the contents of this paper the student must be able to

- Choose and test any measuring instruments.
- Find the accuracy of any instrument by performing experiments.
- Calculate the various parameters using different types of measuring instruments.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To calibrate Watt, Energy and PF Meter and determination of three phase active & reactive powers.	3	3	3	3	3	3	1	1	2	2	1	3
To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges & A. C Bridges.	3	2	3	2	3	3	2	2	2	3	2	3
To determine the ratio and phase angle errors of Instrument transformers	3	2	3	1	3	3	1	1	2	2	2	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Choose and test any measuring instruments	3	3	3	3	3	3	3	1	2	1	1	2
Find the accuracy of any instrument by performing experiments	3	3	3	3	3	3	3	3	3	3	2	3
Calculate the various parameters using different types of measuring instruments	3	2	2	2	3	3	3	2	1	3	3	2

The following experiments are required to be conducted as compulsory experiments:

1. Calibration and Testing of single-phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
5. Dielectric oil testing using H.T. testing Kit.
6. Schering Bridge & Anderson Bridge.
7. Measurement of 3 - Phase reactive power with single-phase wattmeter.

8. Measurement of displacement with the help of LVDT.

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

1. Calibration LPF wattmeter – by Phantom testing.
2. Measurement of 3-phase power with single watt meter and two CTs.
3. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given CT by Null method.
4. PT testing by comparison – V. G. as Null detector – Measurement of % ratio error and phase angle of the given PT
5. Resistance strain gauge – strain measurements and Calibration.
6. Transformer turns ratio measurement using AC bridges.
7. Measurement of % ratio error and phase angle of given CT by comparison.

TEXT BOOKS:

1. A. K. Sawhney, “Electrical & Electronic Measurement & Instruments”, Dhanpat Rai & Co. Publications, 2005.
2. Dr. Rajendra Prasad, “Electrical Measurements & Measuring Instruments”, Khanna Publishers 1989.

REFERENCE BOOKS:

1. G. K. Banerjee, “Electrical and Electronic Measurements”, PHI Learning Pvt. Ltd., 2nd Edition, 2016.
2. R. K. Rajput, “Electrical & Electronic Measurement & Instrumentation”, S. Chand and Company Ltd., 2007.
3. S. C. Bhargava, “Electrical Measuring Instruments and Measurements”, BS Publications, 2012.
4. Buckingham and Price, “Electrical Measurements”, Prentice – Hall, 1988.
5. Reissland, M. U, “Electrical Measurements: Fundamentals, Concepts, Applications”, New Age International (P) Limited Publishers, 1st Edition 2010.
6. E.W. Golding and F. C. Widdis, “Electrical Measurements and measuring Instruments”, fifth Edition, Wheeler Publishing, 2011.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Applicable for the batches admitted from the academic year 2022-23)

(J2240218) ELECTRICAL MACHINES LABORATORY – II

B. Tech. II Year II Sem.

L T P C
0 0 2 1

Prerequisites: Electrical Machines-I & Electrical Machines-II

Course Objectives:

- To understand the operation of Induction, Synchronous machines and Transformers.
- To study the performance analysis of Induction and Synchronous Machines through various testing methods.
- To analyze the performance of single and 3-phase transformer with experiments.

Course Outcomes: After learning the contents of this paper the student must be able to

- Assess the performance of different types of AC machines using different testing methods.
- Analyze the suitability of AC machines and Transformers for real word applications.
- Design the machine models based on the application requirements.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To understand the operation of Induction, Synchronous machines and Transformers	3	3	3	1	1	3	2	3	2	1	3	1
To study the performance analysis of Induction and Synchronous Machines through various testing methods	3	3	3	1	1	3	2	3	1	2	3	1
To analyse the performance of single and 3-phase transformer with experiments	3	3	3	2	1	2	1	3	1	1	3	1

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Assess the performance of different types of AC machines using different testing methods	3	3	3	2	1	3	2	1	1	1	3	2
Analyse the suitability of AC machines and Transformers for real word applications	3	3	3	1	3	2	2	2	1	1	1	3
Design the machine models based on the application requirements	3	3	3	2	1	3	2	2	1	2	1	3

The following experiments are required to be conducted as compulsory experiments:

1. Sumpner's test on a pair of single-phase transformers
2. No-load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three-phase alternator by synchronous impedance & m.m.f. methods
4. 'V' and 'Inverted V' curves of a three-phase synchronous motor.
5. Equivalent Circuit of a single-phase induction motor
6. Determination of X_d and X_q of a salient pole synchronous machine
7. Load test on three phase Induction Motor
8. Regulation of three-phase alternator by Z.P.F. and A.S.A methods

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

1. Separation of core losses of a single-phase transformer
2. Efficiency of a three-phase alternator
3. Parallel operation of Single-phase Transformers
4. Heat run test on a bank of 3 Nos. of single-phase Delta connected transformers
5. Measurement of sequence impedance of a three-phase alternator.
6. Vector grouping of Three Transformer
7. Scott Connection of transformer

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.



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(J224MC02) ENVIRONMENTAL SCIENCE

(Common to all Branches)

B.Tech. II Year II SEM:

L	T	P	C
2	0	0	0

Course Objectives: The objectives of this course are to

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

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:** Climate 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 life style.

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.

Course Outcomes: On completion of this course, students will be able to

1. Understanding of Ecosystem
2. Natural resources, Depletion of natural resources and prevention methods
3. Biodiversity, Protection, sharing of the biodiversity.
4. Environmental pollution- Understanding of water, soil, noise and air pollution and their control measures.
5. Students can understand about global environmental problems and they are aware of global efforts.