Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
Scheme of Instruction and Examination
(Choice Based Credit System)
Applicable for the batches admitted from Academic Year 2022-23

I SEMESTER

S.No.	Course Code	Course Title	Instruction			Examination			Credits
			Hours per week			Max. Marks		Duration of SEE in Hours	
			L	T	P/D	CIE	SEE		
1	MA101BS	Matrices and Calculus	3	1	0	40	60	3	4
2	PH101BS	Applied Physics	3	1	0	40	60	3	4
3	CS102ES	C Programming and Data Structures	3	0	0	40	60	3	3
4	EE101PC	Electrical Circuit Analysis - I	3	0	0	40	60	3	3
5	PH151BS	Applied Physics Laboratory	0	0	3	40	60	3	1.5
6	CS152ES	C Programming and Data Structures Laboratory	0	0	2	40	60	3	1
7	EE151PC	Elements of Electrical and Electronics Engineering	0	0	2	50	-	-	1
8	ME151ES	Engineering Workshop	0	1	3	40	60	3	2.5
9	-	Induction Programme	-	-	-	-	-	-	-
		Total	**12**	**3**	**10**	**330**	**420**	**-**	**20**

II SEMESTER

S.No.	Course Code	Course Title	Instruction			Examination			Credits
			Hours per week			Max. Marks		Duration of SEE in Hours	
			L	T	P/D	CIE	SEE		
1	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	40	60	3	4
2	CH201BS	Engineering Chemistry	3	1	0	40	60	3	4
3	ME201ES	Engineering Graphics	1	0	4	40	60	3	3
4	EE201PC	Electrical Circuit Analysis -II	2	0	0	40	60	3	2
5	EN201HS	English for Skill Enhancement	2	0	0	40	60	3	2
6	CH251BS	Engineering Chemistry Laboratory	0	0	2	40	60	3	1
7	CS251ES	Python Programming Laboratory	0	1	2	40	60	3	2
8	EE251PC	Electrical Circuit Analysis Laboratory	0	0	2	40	60	3	1
9	EN251HS	English Language and Communication Skills Laboratory	0	0	2	40	60	3	1
10	MC201BS	Environmental Science	3	0	0	40	60	3	0
		Total	**14**	**3**	**12**	**400**	**600**	**-**	**20**

L: Lecture T: Tutorial D: Drawing P: Practical CIE - Continuous Internal Evaluation
SEE - Semester End Examination

Mahatma Gandhi Institute of Technology (A)
B.Tech. in Electrical and Electronics Engineering
Scheme of Instruction and Examination
(Choice Based Credit System)
Applicable for the batches admitted from Academic Year 2022-23

III SEMESTER

S.No.	Course Code	Course Title	Instruction Hours per week			Examination Max. Marks		Examination Duration of SEE in Hours	Credits
			L	T	P	CIE	SEE		
1	MA301BS	Numerical Methods and Complex variables	3	1	0	40	60	3	4
2	EE301PC	Electrical Machines - I	3	1	0	40	60	3	4
3	EC333PC	Analog Electronic Circuits	3	0	0	40	60	3	3
4	EE302PC	Power Systems - I	3	0	0	40	60	3	3
5	EE303PC	Electro Magnetic Fields	3	0	0	40	60	3	3
6	EE351PC	Electrical Machines Laboratory - I	0	0	2	40	60	3	1
7	EE352PC	Electrical Simulation Tools Laboratory	0	0	2	40	60	3	1
8	EC363PC	Analog Electronic Circuits Laboratory	0	0	2	40	60	3	1
9	MC351HS	Gender Sensitization Laboratory	0	0	2	50	50	3	0
		Total	**15**	**2**	**8**	**370**	**530**		**20**

IV SEMESTER

S.No.	Course Code	Course Title	Instruction Hours per week			Examination Max. Marks		Examination Duration of SEE in Hours	Credits
			L	T	P	CIE	SEE		
1	ME431PC	Fluid Mechanics and Hydraulic Machines	3	0	0	40	60	3	3
2	EE401PC	Measurements and Instrumentation	3	0	0	40	60	3	3
3	EE402PC	Electrical Machines - II	3	0	0	40	60	3	3
4	EC431PC	Digital Electronics	2	0	0	40	60	3	2
5	EE403PC	Power Systems - II	3	0	0	40	60	3	3
6	EE451PC	Measurements and Instrumentation Laboratory	0	0	2	40	60	3	1
7	EE452PC	Electrical and Electronics Design Laboratory	0	0	2	40	60	3	1
8	EC461PC	Digital Electronics Laboratory	0	0	2	40	60	3	1
9	ME461PC	Fluid Mechanics and Hydraulic Machines Laboratory	0	0	2	40	60	3	1
10	MC401HS	Constitution of India	3	0	0	40	60	3	0
11	EE453PC	Real-time Research Project / Field Based Project	0	0	4	50	-	-	2
		Total	**17**	**0**	**12**	**450**	**600**		**20**

L: Lecture T: Tutorial D: Drawing P: Practical CIE - Continuous Internal Evaluation
SEE - Semester End Examination

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
I Semester Syllabus
MA101BS: MATRICES AND CALCULUS
(Common to all Branches)

L	T	P	C
3	1	0	4

Course Objectives:

1. Types of matrices and their properties, concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
2. Concept of eigen values and eigen vectors and to reduce the quadratic form to canonical form.
3. Geometrical approach to the mean value theorems and their application to the mathematical problems, evaluation of improper integrals using Beta and Gamma functions.
4. Partial differentiation, concept of total derivative, finding maxima and minima of function of two and three variables.
5. Evaluation of multiple integrals and their applications.

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

1. Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
2. Find the Eigen values and Eigen vectors, reduce the quadratic form to canonical form using orthogonal transformations.
3. Solve the applications on the mean value theorems, evaluate the improper integrals using Beta and Gamma functions.
4. Find the extreme values of functions of two variables with and without constraints.
5. Evaluate the multiple integrals and apply the concept to find areas, volumes.

UNIT-I: MATRICES

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss- Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations, LU Decomposition method, Gauss elimination method and Gauss Seidel Iteration Method.

UNIT-II: EIGEN VALUES AND EIGEN VECTORS

Linear Transformation and Orthogonal Transformation: Eigen values, Eigen vectors, properties of Symmetric, Skew Symmetric, Orthogonal, Unitary, Hermitian and Skew Hermitian matrices with reference to Eigen values and Eigen vectors Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: CALCULUS

Mean value theorems: 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: Euler's Theorem, Total derivative, Jacobian, Functional dependence and independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: MULTIVARIABLE CALCULUS (INTEGRATION)

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

Suggested Readings:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

Reference Books:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9^{th} Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9^{th}Edition, Pearson, Reprint,2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
I/II Semester syllabus
PH101BS/PH201BS: APPLIED PHYSICS
(Common to all branches)

L	T	P	C
3	1	0	4

Course Objectives:

The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric and magnetic materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrication techniques.
5. 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 and magnetic materials for their applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT - I: QUANTUM PHYSICS

Blackbody radiation – Planck's radiation law - Wein's law, Rayleigh-Jean's law - Photoelectric effect – de Broglie's Hypothesis, Davisson and Germer's experiment – Heisenberg uncertainty principle with an illustration - Non-existence of electrons in nucleus - Time independent Schrodinger wave equation - Born interpretation of the wave function - Particle in one dimensional potential box.

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: structure, materials, working principle and characteristics.

UNIT - III: DIELECTRIC AND MAGNETIC MATERIALS

Dielectric Materials: Types of polarizations – Electronic & Ionic polarizabilities - Internal field in Dielectircs and Clausius – Mossotti Relation - Ferroelectric - Piezoelectric and Pyroelectric materials – Applications: liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Origin of magnetic moment - Classification of Magnetic materials - Weiss theory of ferromagnetism – Hysteresis curve – Soft and Hard magnetic materials – Applications: Bubble memory devices, magnetic field sensors.

UNIT - IV: NANOTECHNOLOGY

Nanoscale - Properties of Nanomaterials - Surface to volume ratio - Quantum confinement - Top-down fabrication: ball milling - Bottom-up fabrication: sol-gel, Physical Vapor Deposition (PVD) and Chemical Vapor Deposition (CVD) - Characterization techniques: XRD, SEM & TEM - Applications of nanomaterials.

UNIT - V: LASERS AND FIBER OPTICS

Lasers: Characteristics - Spontaneous and Stimulated emissions - Einstein coefficients - Population Inversion - Pumping mechanisms - Ruby laser, Nd:YAG laser, He-Ne laser, CO_2 laser, Semiconductor laser - Applications of lasers.

Fiber Optics: Introduction to optical fibers - Advantages of optical Fibers over conventional communications – Principle of light transmission through optical fiber - Structure of optical fiber - Acceptance angle and Numerical aperture - Classification of optical fibers: Step index and Graded index fibers – Attenuation mechanism in optical fibers – Block diagram of optical fiber communication system - applications.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & T. V. S. 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. Bhandhopadhya – Nano Materials, New Age International, 1st Edition, 2007.

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
I Semester Syllabus
CS102ES: C PROGRAMMING AND DATA STRUCTURES
(CIVIL, ECE, EEE, MCT, MECH, MME)

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 Data structures.
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 Associatively, 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, Cengage Learning.
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/Pearson Education

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, Pearson Education / 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.

Mahatma Gandhi Institute of Technology (Autonomous)

B.Tech. in Electrical and Electronics Engineering

I Semester Syllabus

EE101PC: ELECTRICAL CIRCUIT ANALYSIS – I

L	T	P	C
3	0	0	3

Prerequisites: Mathematics

Course Objectives:

1. It helps the engineers to find out the behaviour of each element in the circuit and figuring out voltages and currents in each element with essential laws.
2. To understand the electrical quantities, relationships, Theorems using DC and AC sources.
3. To learn 3-phase circuits
4. To develop a clear understanding the magnetic circuits
5. To Understand the concept of graphical solution to electrical network

Course Outcomes:

After completion of this course, the students will be able to

1. Apply the knowledge of various circuit analysis techniques such as mesh analysis, nodal analysis and network theorems to investigate the given network.
2. To understand the fundamental behaviour of AC Circuits and solve AC circuit problems.
3. Apply the knowledge gained to explain the behaviour of the Circuit at series and parallel resonance of circuit and effect of resonance
4. Evaluate the power using 3-phase circuits and analyze the concepts of coupled circuits
5. Able to solve the networks using graphical approach

UNIT- I: NETWORK ELEMENTS AND LAWS

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 Supermesh 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, Thevinin'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 AND TOPOLOGICAL DESCRIPTION OF NETWORKS

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.

Suggested Readings:

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.

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
I/II Semester Syllabus
PH151BS/PH251BS: APPLIED PHYSICS LABORATORY
(Common to all branches)

L	T	P	C
0	0	3	1.5

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

1. Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the time constant of RC circuits.
4. Study the variation of magnetic field along the axis of current carrying coil.
5. Understanding the method of least squares fitting.

Course Outcomes: The students will be able to:

1. Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of RC circuits.
4. Understand the effect of magnetic field in different current carrying coils.
5. Carried out data analysis.

LIST OF EXPERIMENTS:

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode.
5. V-I and P-I characteristics of light emitting diode (LED)
6. V-I Characteristics of solar cell.
7. Determination of Energy gap of a semiconductor.
8. Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
9. V-I characteristics of Laser diode.
10. Understanding the method of least squares – torsional pendulum as an example.
11. Determination of time constant using RC circuits.
12. Determination of magnetic field of induction using Steewart-Gee's apparatus.

Note: *Any 8 experiments are to be performed.*

REFERENCE BOOK:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

Mahatma Gandhi Institute of Technology (Autonomous)

B.Tech. in Electrical and Electronics Engineering

CS152ES: C PROGRAMMING AND DATA STRUCTURES LABORATORY

(CIVIL, ECE, EEE, MCT, MECH, MME)

I Semester Syllabus

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 in to 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 linked list:
    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.

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
I Semester Syllabus

EE151PC: ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING

L	T	P	C
0	0	2	1

Prerequisites: Elements of Electrical Engineering

Course Objectives:

1. To understand the fundamentals of derived circuit laws
2. To understand the concept of resonance
3. To measure the electrical parameters for different types of circuits using theorems
4. To measure the three-phase power
5. To understand the concepts of coupled circuits

Course Outcomes:

After completion of this course, the student will be able to

1. Verify basic laws through different experiments
2. Verify the network theorems by conducting experiments
3. Analyse the resonance and measure different powers for AC circuits
4. Analyse various polyphase circuits
5. Compute the self and mutual inductance of coupled circuits

List of experiments/demonstrations:

PART-A (compulsory)

1. Verification of Ohm's Law
2. Verification of KVL and KCL
3. Verification of Series and Parallel Resonance.
4. Verification of Superposition theorem
5. Verification of Thevenin's and Norton's theorem
6. Verification of Maximum Power Transfer Theorem.
7. Measurement of Active Power for Star and Delta connected balanced loads.
8. Determination of Co-efficient of Coupling and Separation of Self and Mutual inductance in Coupled Circuits.

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

1. Calculation and Verification of Impedance and Current in RL, RC and RLC series circuits
2. Determination of form factor for non-sinusoidal waveform
3. Verification of Reciprocity and Milliman's Theorem
4. Verification of Tellegen's Theorem

5. Measurement of Reactive Power for Star and Delta connected balanced loads.

Suggested Readings:

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

Reference Books:

1. P. Ramana, M. Suryakalavathi, G. T. Chandrasheker" Basic Electrical Engineering", S. Chand, 2ndEdition, 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 Chakrabarthi, 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.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
I Semester Syllabus
ME151ES: ENGINEERING WORKSHOP

L	T	P	C
0	1	3	2.5

Pre-requisites: Practical skill

Course Objectives: At the end of this course students are expected to

1. Study of different hand operated power tools, uses and their demonstration.
2. Gain a good basic working knowledge required for the production of various engineering products.
3. Provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field.
4. Study commonly used Engineering trades like carpentry, fitting, tin smithy, foundry, house wiring, plumbing & black smithy and practical exposure to these trades.
5. Study of various machining operations.

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

1. Practice on various workshop trades including plumbing, fitting, carpentry, foundry, house wiring, tin smithy, black smithy and welding by using different tools.
2. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring and chiseling.
3. Apply basic electrical engineering knowledge for house wiring practice.
4. Implement the knowledge of basic workshop processes under safety norms.
5. Understand different metal joining techniques using arc welding process.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry - (Bridle Joint, Half - Lap Joint, Mortise & Tenon Joint).
II. Fitting - (L- fit, V-Fit & Dovetail Fit).
III. Tin-Smithy - (Square Tin, Rectangular scoop & Rectangular tray).
IV. Foundry - (Preparation of Green Sand Mould using Single Piece and Split Pattern).
V. Welding Practice – (Arc Welding- Lap Joint, Butt Joint & T Joint).
VI. House - wiring – (Parallel & Series, Two-way Switch and Tube Light).
VII. Black Smithy – (Oval shape, S – Hook & Fan Hook).

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools used in construction and Wood Working operations.

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.

Mahatma Gandhi Institute of Technology (Autonomous)
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II Semester Syllabus

MA201BS: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to all Branches)

L	T	P	C
3	1	0	4

Course Objectives:

1. Methods of solving the differential equations of first order.
2. Methods of solving the differential equations of higher order.
3. Concept, properties of Laplace transforms, solving ordinary differential equations using Laplace transforms techniques.
4. The physical quantities involved in engineering field related to vector valued functions.
5. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

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

1. Identify whether the given differential equation of first order is exact or not.
2. Solve higher differential equation and apply the concept of differential equation to real world problems.
3. Use the Laplace transforms techniques for solving ordinary differential equations.
4. To analyse the physical quantities involved in engineering field related to vector valued functions.
5. Evaluate the line, surface and volume integrals and converting them from one to another.

UNIT-I: FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates). 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 $e^{ax}, sinax, cosax, polynomial\ in\ x,\ e^{ax}.v(x)\ and\ x.v(x)$, method of variation of parameters, Equations reducible to linear ordinary differential equations with constant coefficients: Legendre's equation, Cauchy-Euler equation. Applications: Electric Circuits.

UNIT-III: LAPLACE TRANSFORMS

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, 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, Vector Identities, Scalar potential functions, Solenoidal and Irrotational vectors.

UNIT-V: VECTOR INTEGRATION

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

Suggested Readings:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

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I/II Semester Syllabus

CH101BS/CH201BS: ENGINEERING CHEMISTRY

(Common to all Branches)

L	T	P	C
3	1	0	4

Course Objectives:

1. To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
2. To understand water quality for industrial and domestic usage, softening methods and related problems.
3. To acquire the knowledge of Battery technology, corrosion and corrosion controlling techniques which are essential for the Engineers and applications in industries.
4. To understand the preparation, properties and applications of polymeric materials.
5. To get exposed to qualitative and quantitative parameters of fuels and to develop understanding of the combustion process.
6. To understand the application of smart materials, lubricants, refractories and cement.

Course Outcomes:

After completing the course , the student will be able to acquire:

1. Knowledge on the disadvantages of hard water for domestic and industrial purposes. The techniques of softening of hard water and treatment of potable water.
2. Knowledge on storage of electrical energy in batteries, construction of batteries and fuel cells.
3. Mechanism of corrosion of metals and alloys and corrosion control methods.
4. Knowledge on the Preparation, properties and application of polymeric materials.
5. Knowledge about the fuels, techniques of analysis for quality parameters of fuels, their combustion process and applications.
6. Knowledge pertaining to the applications of smart materials, lubricants, refractories and cement.

UNIT - I: WATER AND ITS TREATMENT [8]

Introduction to hardness of water – Expression of hardness, Units 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, Scale, Boiler corrosion 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 – II: BATTERY CHEMISTRY AND CORROSION [8]

Introduction - Classification of batteries - primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of Zn-air and Lithium ion battery, Applications of Li-ion battery. Fuel Cells - Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: 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. Application of Metallic coatings – Electroplating.

UNIT - III: POLYMERIC MATERIALS [8]

Definition – Classification of polymers with examples – Types of polymerization – Addition and condensation polymerization with examples.

Plastics: Definition and characteristics - Thermoplastic and thermosetting plastics, Preparation, Properties and Engineering applications of PVC, Teflon and Bakelite.

Fibers: Preparation, Properties and Engineering applications of Nylon 6:6, and Terylene

Elastomers: Characteristics – Preparation – Properties and Applications of Buna-S, Butyl and Thiokolrubber.

Conducting polymers: Characteristics and Classification with examples - Mechanism of conduction in trans-polyacetylene and Applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and Polyvinyl alcohol and their applications.

UNIT - IV: ENERGY SOURCES [8]

Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula. Classification - solid fuels: Coal – Analysis of coal – Proximate and ultimate analysis and their significance. Liquid fuels – Petroleum and its refining, Cracking types – Moving bed catalytic cracking. Knocking – Octane and Cetane rating. Synthetic petrol - Fischer-Tropsch's process. Gaseous fuels – Composition and uses of Natural gas, LPG and CNG. Biodiesel – Transesterification, advantages.

UNIT - V: ENGINEERING MATERIALS [8]

Smart materials and their engineering applications

Shape memory materials - Poly L- Lactic acid. Thermoresponse materials - Polyacryl amides, Poly vinylamides.

Lubricants: Classification of lubricants with examples - Characteristics of a good lubricant.

Properties of lubricants: Viscosity, Cloud point,Pour point, Flash point and Fire point.

Refractories: Definition, Classification, Characteristics of a good refractory. Application of refractories.

Cement: Portland cement - its composition, Setting and hardening

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 textbook 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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II SEMESTER
ME201ES: ENGINEERING GRAPHICS

L	T	P	C
1	0	4	3

Course Objectives:

1. Recognize the standards of engineering graphics, learn to generate Geometric Constructions, Conic Sections and construct Engineering Scales.
2. Understand the procedure to develop Orthographic projections of points, lines and planes.
3. Learn the procedure to develop projection of solids and objects.
4. Understand the procedure to generate the Sections and developments of Solids.
5. Learn the procedure to develop Isometric projections, convert Orthographic views to Isometric views and vice versa using Graphics Instruments and AutoCAD.

Course Outcomes:

1. Apply the fundamental principles of Engineering Graphics to create engineering drawings of various geometric constructions, conic sections and engineering scales adhering to BIS Standards.
2. Generate Orthographic projections; Front View, top view and side views of points and lines.
3. Draw the Orthographic projections of planes and solids
4. Understand the Sections of solids and developments of surfaces.
5. Develop Isometric projection convert orthographic views to isometric views and vice versa for practical engineering problems using AutoCAD.

UNIT – I:

Introduction to Engineering Graphics: Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections-ellipse, parabola, hyperbola and Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid. Introduction to AutoCAD software – Commands.

UNIT- II:

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.

UNIT – III:

Projections of Regular Solids inclined to one plane, Sections and Sectional views of Right Regular Solids –Prism, Cylinder, Pyramid, and Cone

UNIT – IV:

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone. Intersection of solids – cylinder vs cylinder.

UNIT – V:

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions –Isometric Projection of solids. Conversion of Isometric Views to Orthographic Views and Vice-versa –Conventions.

Free hands Sketches of 2D, creation of 2D sketches. conversion of Isometric views to orthographic views using AutoCAD.

TEXT BOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar.
2. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill.
3. Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S. Chand and company Ltd.

REFERENCE BOOKS:

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

Note: Internal and external examinations are conducted in conventional mode.

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II Semester Syllabus

EE201PC: ELECTRICAL CIRCUIT ANALYSIS – II

L	T	P	C
2	0	0	2

Prerequisites: Mathematics

Course Objectives:

1. To analyze the behaviour of the circuits response in time domain.
2. To introduce the students with the basic knowledge of Laplace transform, Fourier Transform and Fourier series and to analyze the network using suitable technique.
3. To prepare the students to analyze the two - port networks with different types of connections.
4. To introduce the Fourier Series representation of periodic function and it's applications.
5. To analyze various types of filters.

Course Outcomes:

After completion of this course, the students will be able to

1. Understanding the concept of transient and steady state response of electrical circuits
2. Analyze the given network by transforming from time domain to S domain
3. Design and analyze two – port networks
4. Express the periodic sources using Fourier series.
5. Design and analyze 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, ramp, exponential and sinusoidal excitations.

UNIT- II: ELECTRICAL CIRCUIT ANALYSIS USING LAPLACE TRANSFORMS

Application of Laplace Transforms to RL, RC and RLC (Series and Parallel) Networks for impulse, step, ramp, exponential and sinusoidal excitations.

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: Fourier Series and Integral

Fourier series representation of Periodic functions, Symmetry conditions, Exponential Fourier series, Discrete spectrum, Fourier integral and it's properties, Continuous Spectrum, Application to simple networks

UNIT-V: Filters

Classification of filters – Low Pass, High Pass, Band Pass and Band Elimination, Constant-K and M-derived filters-Low Pass and High Pass Filters and Band Pass and Band Elimination Filters (Elementary treatment only)

Suggested Readings:

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.

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EN201HS: ENGLISH FOR SKILL ENHANCEMENT

(Common to CSE, CSE (DS), CSE (AI&ML), IT, CSBS & EEE)

L	T	P	C
2	0	0	2

Course Objectives: This course will enable the students to:

1. Improve the language proficiency in English with an emphasis on Vocabulary and improve their functional grammar.
2. Enhance their Reading and Writing skills.
3. Develop study skills and communication skills in various professional situations.
4. Train in effective reading techniques for better comprehension of texts of various domains.
5. Equip them 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. Choose appropriate vocabulary and sentence structures for their oral and written communication.
2. Demonstrate their understanding of the rules of functional grammar.
3. Develop comprehension skills from the known and unknown passages.
4. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
5. Acquire basic proficiency in reading and writing modules of English.

UNIT-I ***Toasted English*** **by R. K. Narayan** from **"English: Language, Context and Culture"** published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - 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 -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 ***Appro JRD*** **by Sudha Murthy** from **"English: Language, Context and Culture"** published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs.

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

Reading: 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 ***Lessons from Online Learning*** **by F. Haider Alvi, Deborah Hurst et al** from **"English: Language, Context and Culture"** published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

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

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

UNIT-IV ***Art and Literature*** **by Abdul Kalam** from **"English: Language, Context and Culture"** published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English – Idioms and Phrases

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Effective Steps to 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 ***Go, Kiss the World*** **by Subroto Bagchi** from **"English: Language, Context and Culture"** published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (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 - Writing a Report.

Note: Listening and Speaking Skills given under Unit-6 in the 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 NEP2020, 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.

Textbook:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

Reference Books:

1. Liss and Davis (2010) Effective Academic Writing, Oxford University Press.
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. Wiley (2019). Technical Communication. Wiley India Pvt. Ltd, Rupa Publications.
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
8. Green, David (2015). Contemporary English Grammar Structure And Composition, Trinity Press (Imprint of Laxmi Publication Pvt Ltd).

Mahatma Gandhi Institute of Technology (Autonomous)
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I/II Semester Syllabus

CH151BS/CH251BS: ENGINEERING CHEMISTRY LABORATORY
(Common to all branches)

L	T	P	C
0	0	2	1

Course Objectives:

The course consists of experiments related to the principles of chemistry required for an Engineering student and the student will learn the following:

1. Estimation of hardness of water to check its suitability for industrial and drinking purpose and estimation procedures through volumetric analysis.
2. Estimation procedures using conductometry and potentiometry.
3. Preparation of polymers such as Bakelite and Polystyrene in the laboratory.
4. Understand the lubricant properties such as saponification value and viscosity of oils.
5. Understand the corrosion of metals in a corrosive medium.

Course Outcomes:

After completing the course, the student will gain practical knowledge on:

1. Determination of parameters like hardness of water and estimations through volumetric analysis.
2. Performance of experiments of conductometry and potentiometry and estimation procedures using them.
3. Preparation of polymers like Bakelite and Polystyrene.
4. Performing experiments related to estimation of saponification value and viscosity of lubricating oils.
5. Performing experiments to know rate of corrosion of mild steel in various conditions.

List of Experiments:

I. Volumetric Analysis: Estimation of hardness of water by EDTA - Complexometry method.

II. Volumetric Analysis: Estimation of Fe^{+2} by Dichrometry.

III. Conductometry: Estimation of the concentration of an acid by Conductometry.

IV. Potentiometry: Estimation of the amount of Fe^{+2} by Potentiometry.

V. Potentiometry: Determination of an acid concentration using Potentiometer.

VI. Preparations:

1. Preparation of Bakelite.
2. Preparation Polystyrene

VII. Lubricants:

1. Estimation of acid value of given lubricating oil.
2. Estimation of viscosity of lubricating oil using Ostwald's Viscometer.

VIII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of Inhibitor.

IX. Virtual lab experiments

a. Construction of Fuel cell and its working.
b. Smart materials for Biomedical applications
c. Batteries for Electrical vehicles.
d. Functioning of Solar cell and its applications.

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).

Mahatma Gandhi Institute of Technology (Autonomous)
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II Semester Syllabus
CS251ES: PYTHON PROGRAMMING LABORATORY

L	T	P	C
0	1	2	2

Course Objectives:

1. To install and run the Python interpreter.
2. To learn control structures.
3. To Understand Lists, Dictionaries in python.
4. To Handle Strings and Files in Python.

Course Outcomes: After completion of the course, the student should be able to

1. Develop the application specific codes using python.
2. Understand Strings, Lists, Tuples and Dictionaries in Python.
3. Verify programs using modular approach, file I/O, Python standard library.
4. Implement Digital Systems using Python.

Note: The lab experiments will be like the following experiment examples.

Week -1:

1. i) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   ii) Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.
3. i) Write a program to calculate compound interest when principal, rate and number of periods are given.
   ii) Given coordinates (x1, y1), (x2, y2) find the distance between two points.
4. Read name, address, email and phone number of a person through keyboard and print the details.

Week - 2:

1. Print the below triangle using for loop.

   5
   4 4
   3 3 3
   2 2 2 2
   1 1 1 1 1

2. Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character (use 'if-else-if' ladder).
3. Python Program to Print the Fibonacci sequence using while loop.
4. Python program to print all prime numbers in a given interval (use break).

Week - 3:

1. Write a program to convert a list and tuple into arrays.
2. Write a program to find common values between two arrays.
3. Write a function called gcd that takes parameters a and b and returns their greatest common divisor.
4. Write a function called palindrome that takes a string argument and returns True if it is a palindrome and False otherwise. Remember that you can use the built-in function len to check the length of a string.

Week - 4:

1. Write a function called is_sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise.
2. Write a function called has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.

   i) Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.

   ii) The wordlist I provided, words.txt, doesn't contain single letter words. So you might want to add "I", "a", and the empty string.

   iii) Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.
3. i) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'.

   ii) Remove the given word in all the places in a string.

   iii) Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function.
4. Writes a recursive function that generates all binary strings of n-bit length.

Week - 5:

1. i) Write a python program that defines a matrix and prints.

   ii) Write a python program to perform addition of two square matrices.

   iii) Write a python program to perform multiplication of two square matrices.
2. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.
3. Use the structure of exception handling all general purpose exceptions.

Week-6:

1. i) Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.

   ii) Add an attribute named color to your Rectangle objects and modify draw_rectangle so that it uses the color attribute as the fill color.

   iii) Write a function called draw_point that takes a Canvas and a Point as arguments and draws a representation of the Point on the Canvas.

   iv) Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.

2. Write a Python program to demonstrate the usage of Method Resolution Order (MRO) in multiple levels of Inheritances.
3. Write a python code to read a phone number and email-id from the user and validate it for correctness.

Week- 7:

1. Write a Python code to merge two given file contents into a third file.
2. Write a Python code to open a given file and construct a function to check for given words present in it and display on found.
3. Write a Python code to Read text from a text file, find the word with most number of occurrences
4. Write a function that reads a file *file1* and displays the number of words, number of vowels, blank spaces, lower case letters and uppercase letters.

Week - 8:

1. Import numpy, Plotpy and Scipy and explore their functionalities.
2. Install NumPy package with pip and explore it.
3. Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR.
4. Write a program to implement Half Adder, Full Adder, and Parallel Adder.
5. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

TEXT BOOKS:

1. Supercharged Python: Take your code to the next level, Overland.
2. Learning Python, Mark Lutz, O'reilly.

REFERENCE BOOKS:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
2. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson.
3. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition.
4. Think Python, Allen Downey, Green Tea Press.
5. Core Python Programming, W. Chun, Pearson.
6. Introduction to Python, Kenneth A. Lambert, Cengage.

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
II Semester Syllabus

EE251PC: ELECTRICAL CIRCUIT ANALYSIS LABORATORY

L	T	P	C
0	0	2	1

Prerequisites: Elements of Electrical Engineering and Electrical Circuit Analysis

Course Objectives:

1. To understand the locus diagrams.
2. To study the transient response of various R, L and C circuits using different excitations.
3. To learn about two-port networks.
4. To understand the Fourier series representation of periodic functions.
5. To learn the concept of filters.

Course Outcomes:

After completion of this course, the students will be able to

1. Plot the Locus diagrams for RL and RC circuits.
2. Analyse the transient response of various R, L and C circuits.
3. Design different two port networks for various electrical applications.
4. Represent the periodic functions as Fourier series.
5. Perform various analyses on various filter 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. Determination of Time response of first order RL and RC circuit for periodic non - sinusoidal inputs - Time Constant and Steady state error.
3. Transient Response of Series RL and RC circuits for DC excitation.
4. Determination of Two port network parameters – Z & Y parameters.
5. Determination of Two port network parameters – A, B, C, D parameters.
6. Harmonic Analysis of non-sinusoidal waveform signals using Harmonic Analyzer and plotting frequency spectrum.
7. Frequency domain analysis of Low-pass filter.
8. Frequency domain analysis of Band-pass filter.

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

1. To draw the locus Diagrams of RL (L-Varying) and RC (C-Varying) Series Circuits.
2. Determination of Time response of first order RLC circuit for periodic non – sinusoidal inputs – Time Constant and Steady state error.
3. Determination of Two port network parameters - Hybrid parameters.
4. Frequency domain analysis of High-pass filter.

Suggested Readings:

1. Van Valkenburg M.E, "Network Analysis", Prentice Hall of India, 3rd Edition, 2000.
2. Ravish R Singh, "Network Analysis and Synthesis", McGraw Hill, 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", McGraw Hill, 6th Edition, 2002.
6. Chakravarthy A., "Circuit Theory", Dhanpat Rai & Co., First Edition, 1999.

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
II Semester Syllabus
EN251HS: English Language and Communication Skills Laboratory
(Common to CSE, CSE (DS), CSE (AI&ML), IT, CSBS & EEE)

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: This course will enable the students to:

1. Facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. Sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. Bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. Improve the fluency of students in spoken English and neutralize mother tongue interference
5. 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. Demonstrate their understanding of exact pronunciation of speech sounds.
3. Acquire fluency in their language and neutralize their accent for intelligibility without Mother Tongue Interference (MTI).
4. Speak with clarity and confidence which in turn enhances their employability skills.
5. Develop their ability in presenting, arguing, summarizing and leading various communicative activities.

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 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: 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 – 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-Neutralising 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 – Blog Writing

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 Skills

Practice: Group Discussion – Mock Interviews

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 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 40 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 audiovisual 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:

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

Reference Books:

1. Kumar, Rajesh (2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). Communication Skills: A Workbook. Oxford University Press.
4. Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). English Language Skills: A Practical Approach. Cambridge University Press.
6. Central Institute of English (2005). Exercises in Spoken English Vol. 1, 2 & 3, Oxford India, Hyderabad.

Mahatma Gandhi Institute of Technology (Autonomous)
B.Tech. in Electrical and Electronics Engineering
I/II Semester Syllabus
MC101BS/MC201BS: ENVIRONMENTAL SCIENCE
(Common to all branches)

L	T	P	C
3	0	0	0

Course Objectives

1. To understand the importance of ecosystem and ecological balance.
2. To understand the natural resources and their conservation.
3. To understand the importance of biodiversity and its values.
4. To gain knowledge about environmental pollution, effects and controlling measures.
5. To study about global environmental problems and global issues.
6. To understand the environmental policies, regulations and sustainable development.

Course Outcomes

After completing the course, the student will be able to:

1. Get the information about ecosystem and their usage and conservation.
2. Learn different types of natural resources and take up the measures to protect the resources.
3. Get the information about biodiversity and their usage and conservation.
4. Get the information about the types of pollution, understand their effects and controlling measures.
5. Gain the knowledge about current global environmental issues and initiations to be taken to protect the environment.
6. Gain the knowledge about environmental acts, EIA, sustainable development and follow the rules 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** and **Forest resources**. **Energy resources:** Growing energy needs, renewable and non-renewable energy resources, use of alternate energy resources. Case studies.

UNIT - III

Biodiversity and Biotic Resources: Introduction, definition, genetic, species and ecosystem diversity. Values 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. **Soil pollution:** Sources and types, impacts of modern agriculture, degradation of soil. **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 and EIA: Environmental Protection Act, legal aspects Air Act- 1981, Water Act, biomedical waste management and handling rules, hazardous waste management and handling rules.

EIA: EIA structure, methods of baseline data acquisition. Concepts of environmental management plan (EMP).

Towards Sustainable Future: Concept of sustainable development goals, population and its explosion. Crazy consumerism, Environmental education, Human health, Environmental ethics. Concept of green building, Principles of green chemistry, Ecological footprint, 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.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
III Semester Syllabus

MA301BS: NUMERICAL METHODS AND COMPLEX VARIABLES

(EEE & ECE)

L	T	P	C
3	1	0	4

Course Objectives:

1. 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.
2. Evaluation of integrals using numerical techniques. Solving ordinary differential equations of first order using numerical techniques.
3. Differentiation of complex valued functions.
4. Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem. Expansion of complex functions using Taylor's and Laurent's series.
5. Expressing periodic function by Fourier series

Course Outcomes:

After completion of the course, the students will be able to:

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-

UNIT-I: NUMERICAL METHODS-I

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

Interpolation: Finite differences, Forward differences, backward differences, central differences - Interpolation using Newton's forward and backward difference formulae – Central difference interpolation: Gauss's forward and backward formulae - Lagrange's

method of interpolation.

UNIT-II: NUMERICAL METHODS-II

Numerical integration: General quadrature formula, Trapezoidal rule and Simpson's $\frac{1}{3}$ and $\frac{3}{8}$ 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-III: COMPLEX DIFFERENTIATION

Limit, Continuity and Differentiation of Complex functions - Cauchy-Riemann equations in Cartesian and Polar co-ordinates (without proof), Milne- Thomson methods - analytic functions, harmonic functions, finding harmonic conjugate, Mobius transformation.

UNIT-IV: COMPLEX INTEGRATION

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

UNIT-V: FOURIER SERIES

Periodic Function, Dirichlet's Conditions, Determination of Fourier Coefficients (without proof) - Fourier expansion of periodic function in a given interval of length 2π - Fourier series in an arbitrary interval - Fourier series of even and odd functions - Half-range Fourier sine and cosine series.

Suggested Readings:

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-Graw Hill, 2004.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
III Semester Syllabus
EE301PC: ELECTRICAL MACHINES - I

L	T	P	C
3	1	0	4

Prerequisite: Principles of Magnetism**,** Electrical Circuit Analysis-I and Electrical Circuit Analysis-II.

Course Objectives:

1. To study and understand different types of DC Generators - their construction, operation, and applications.
2. To study the effect of Armature Reaction, Commutation process and methods of improving commutation.
3. To study and understand load characteristics of different types of DC Generators and Parallel Operation of DC Generators.
4. To study and understand different types of DC Motors, construction, applications and speed control of DC motors.
5. To understand different types of losses, testing of DC Machines to determine efficiency.

Course Outcomes:

After completion of the course, students will be able to:

1. Identify different parts of a DC Generators & understand it's operation.
2. Understand the effect of armature reaction and methods of improving commutation.
3. Able to analyze different types of DC generators and their characteristics.
4. Able to explain operational characteristics of DC motor and speed control methods of DC motor.
5. Able to calculate various losses in DC machines and calculation of efficiency by various testing methods.

Course Objectives	**Program Outcomes**											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To study and understand different types of DC Generators - their construction, operation, and applications	2	1	2	-	2	-	-	-	-	-	-	-
To study the effect of Armature Reaction, Commutation process and methods of improving commutation	3	3	2	2	3	-	-	-	-	-	-	-
To study and understand load characteristics of different types of DC Generators and Parallel Operation of DC Generators	2	3	3	2	2	-	-	-	-	-	-	-

To study and understand different types of DC Motors, construction, applications and speed control of DC motors	3	3	2	2	2	2	-	-	-	-	-	-
To understand different types of losses, testing of DC Machines to determine efficiency	3	2	2	3	2	-	-	-	-	-	-	-

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Identify different parts of a DC Generators & understand it's operation	2	1	2	-	2	-	-	-	-	-	-	-
Understand the effect of armature reaction and methods of improving commutation	3	3	2	2	3	-	-	-	-	-	-	-
Able to analyze different types of DC generators and their characteristics	2	3	3	2	2	-	-	-	-	-	-	-
Able to explain operational characteristics of DC motor and speed control methods of DC motor	3	3	2	2	2	2	-	-	-	-	-	-
Able to calculate various losses in DC machines and calculation of efficiency by various testing methods	3	2	2	3	2	-	-	-	-	-	-	-

UNIT-I: DC GENERATORS

Introduction to DC Machines, Principle of operation, constructional Details and features, Action of commutator, Armature winding terms, Types of armature windings – lap and wave windings, simplex and multiplex windings, Progressive and Retrogressive Winding, use of laminated armature, E.M.F Equation. Problems.

UNIT-II: ARMATURE REACTION IN DC GENERATORS

Introduction, effect of Armature Reaction, Cross magnetizing and de-magnetizing Conductors, Calculation of Cross magnetizing and de-magnetizing AT/pole, compensating winding, commutation, Ideal Commutation, reactance voltage, methods of improving commutation – Resistance Commutation, EMF Commutation, Problems.

UNIT-III: TYPES OF DC GENERATORS & LOAD CHARACTERISTICS

Methods of Excitation, separately excited and self-excited generators, build-up of E.M.F, critical field resistance and critical speed, causes for failure to self-excite and remedial measures. Load characteristics of shunt, series and compound generators, applications of DC generators, Necessity of Parallel operation of DC Generators, Conditions for Parallel operation of Generators, parallel operation of DC shunt, series and Compound Generators, Problems.

UNIT-IV: DC MOTORS AND SPEED CONTROL METHODS

Introduction, Principle of operation, Back e.m.f, Speed Equation, Torque equation, Types of DC Motors, Characteristics and applications of Shunt, Series and Compound motors, Armature reaction in DC motor, Problems.

Speed control of DC Motors: Necessity of starter for starting DC Motor, Principle of 3-point and 4-point starters, Construction, Protective Devices. Armature voltage and flux control methods, Ward-Leonard system, Problems.

UNIT-V: TESTING OF DC MACHINES

Losses in DC Machines, Power stages in DC Machines, Calculation of Efficiency, Condition for maximum Efficiency, Methods of Testing – direct, indirect, and regenerative testing, Brake test, Swinburnes test, Hopkinson's test, Series Field's test, separation of stray losses in a DC motor test, Retardation Test, Problems.

Suggested Readings:

1. J. B. Gupta, "Theory and Performance of Electrical Machines", S. K. Kataria and Sons.
2. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
3. V. K. Mehta, Rohit Mehta, "Principles of Electrical Machines", S. Chand Publishing.
4. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

Reference Books:

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

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
III Semester Syllabus
EC333PC: ANALOG ELECTRONIC CIRCUITS

L	T	P	C
3	0	0	3

Course Objectives:

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

Course Outcomes:

1. Know the characteristics, utilization of various components.
2. Understand the biasing techniques.
3. Design and analyze various rectifiers, small signal amplifier circuits.
4. Design sinusoidal and non-sinusoidal oscillators.
5. Designs OP-AMP based circuits with linear integrated circuits.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2	-	1	-	-	-	-	-	1	1	1
CO2	3	2	3	2	-	1	-	-	-	-	-	1	1	1
CO3	3	2	3	2	-	1	-	-	-	-	-	1	2	2
CO4	3	2	3	2	-	1	-	-	-	-	-	1	2	2
CO5	3	2	3	2	-	1	-	-	-	-	-	1	2	2

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.

Suggested Readings:

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.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
III Semester Syllabus
EE302PC: POWER SYSTEMS - I

L	T	P	C
3	0	0	3

Prerequisite: Electrical Circuit Analysis-I, Electrical Circuit Analysis-II and Electrical Machines-I.

Course Objectives:

1. To understand the power generation through coal and gas.
2. To understand the power generation through water and nuclear fuels.
3. To illustrate the economic aspects of power generation and tariff methods.
4. To know about air insulated and gas insulated substations.
5. To know about AC and DC distribution systems.

Course Outcomes:

After completion of the course, students will be able to:

1. Understand the operation of thermal and gas electrical power generating stations.
2. Understand the operation of hydro and nuclear electrical power generating stations.
3. Evaluate the Economics associated with power generation and power tariff methods.
4. Analyze the operations of air insulated and gas insulated substations.
5. Analyze the operations of AC and DC distribution systems.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To understand the power generation through coal and gas	2	1	3	1	1	1	2	2	1	1	-	1
To understand the power generation through water and nuclear fuels	2	1	3	1	1	3	2	2	1	1	-	1
To illustrate the economic aspects of power generation and tariff methods	3	3	1	2	2	3	2	2	1	1	1	-
To know about air insulated and gas insulated substations	3	3	1	3	1	2	1	3	1	2	1	-
To know about AC and DC 1distribution systems	2	1	3	1	1	2	1	2	1	2	1	1

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the operation of thermal and gas electrical power generating stations	2	1	3	1	1	1	2	2	1	1	0	1

Understand the operation of hydro and nuclear electrical power generating stations	2	1	3	1	1	3	2	2	1	1	0	1
Evaluate the Economics associated with power generation and power tariff methods	3	3	1	2	2	3	2	2	1	1	1	0
Analyze the operations of air insulated and gas insulated substations	3	3	1	3	1	2	1	3	1	2	1	0
Analyze the operations of AC and DC distribution systems	2	1	3	1	1	2	1	2	1	2	1	1

UNIT-I: THERMAL AND GAS POWER STATIONS

Thermal Power Stations: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gases. Brief description of TPS components: Coal and Ash handling plant, Steam generating plant - Boilers, Super heaters – Economizers - Air Preheaters, Turbine, Condensers, Alternator, Feed water circuit and Cooling water circuit.

Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only)

UNIT-II: HYDRO AND NUCLEAR POWER STATIONS

Hydro Electric Power Stations: Layout of storage type Hydro station and its Elements – Reservoir, Dam, Spill ways, Intake, Forebay, Penstock, Surge Tank, Prime mover, Power house and Draft tube.

Nuclear Power Stations: Schematic Arrangement of Nuclear Power Station, Principle of operation of Nuclear reactor and its Components: Core, Moderators, Reflectors, Control rods, Coolants and Shielding.

UNIT-III: ECONOMICS OF POWER GENERATION

Introduction, definitions of connected load, maximum demand, demand factor, load curve, load factor, diversity factor, coincidence factor, load duration curve, integrated load duration curve, plant factor, utilization factor, plant use factor - Numerical Problems. Cost of electrical energy - fixed cost and running cost. Tariff, Desirable Characteristics of Tariff, Tariff Methods: Flat Rate, Block - Rate, Two - Part, Three - Part and Power Factor Tariff Methods and Numerical Problems.

UNIT-IV:ELECTRICAL SUBSTATIONS

AIR INSULATED SUBSTATIONS (AIS): Selection of site for substation, 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, Comparison of Air insulated substations and Gas insulated substations.

UNIT-V: DC AND AC DISTRIBUTION:

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, Voltage Drop Calculations (Numerical Problems) in AC Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

Suggested Readings:

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.
3. J.B.Gupta, A Course in Power Systems" Katson Books, 11th Edition, 2016.

Reference Books:

1. 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. M.V. Deshpande, "Elements of Electrical Power Station Design", 3rd Edition, Wheeler Pub. 1998.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
III Semester Syllabus
EE303PC: ELECTROMAGNETIC FIELDS

L	T	P	C
3	0	0	3

Prerequisites: Mathematics and Applied Physics

Course Objectives:

1. To introduce the concepts of electric field and magnetic field
2. To know the applications of electric fields in the development of the theory for power transmission lines and electrical machines
3. To study the applications of magnetic fields in power systems and electrical machines
4. To acquire basic knowledge about force between conductors in uniform fields
5. To study about Maxwell's equations for time varying fields

Course Outcomes:

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

1. Understand the basic laws of electromagnetism
2. Obtain the electric fields for simple configurations under static conditions
3. Analyze the static magnetic fields for simple configurations
4. Describe the behavior of magnetic materials and interpret the force between conductors
5. Analyze time varying electric and magnetic fields

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 the applications of electric 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 the applications of magnetic fields in power systems and electrical machines	3	3	2	2	2	3	0	1	1	1	0	2
To acquire basic knowledge about force between conductors in uniform fields	3	3	2	2	2	3	0	1	1	1	0	2
To study about Maxwell's equations for time varying fields	3	3	3	2	2	3	0	1	1	1	0	2

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the basic laws of electromagnetism	3	3	3	3	3	3	3	3	1	1	1	2
Obtain the electric fields for simple configurations under static conditions	3	3	2	2	2	3	2	2	1	1	1	2
Analyze the static magnetic fields for simple configurations	3	3	2	2	2	3	2	2	1	1	1	2
Describe the behavior of magnetic materials and interpret the force between conductors	3	3	2	2	1	3	2	2	1	1	1	2
Analyze time varying electric and magnetic fields	3	3	3	3	3	3	3	3	1	1	1	2

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, potential gradient, Electric dipole, Dipole moment, Polarization, Potential due to an Electric Dipole.

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, Electrostatic Energy and Energy density in a static electric field. Conduction current density and Convection current density. Poisson's and Laplace's equation, Solution of Laplace equation.

UNIT-III: STATIC FIELDS

Biot-Savart Law, Ampere's Circuital Law and it's applications. Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors.

UNIT-IV: MAGNETIC FORCES

Lorentz force equation. Force on a moving charge, Force on a differential current element, Force between differential current elements, Magnetic boundary conditions. Behavior of magnetic materials, magnetic energy, magnetic forces in uniform magnetic fields.

UNIT-V: TIME VARYING FIELDS AND MAXWELL'S EQUATIONS

Self and Mutual inductance. Determination of self-inductance of a solenoid and toroid. Faraday's law of Electromagnetic induction, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations, Motional Electromotive force, Maxwell's equation in Phasor form, Poynting theorem.

Suggested Readings:

1. K. A. Gangadhar, “Electromagnetic Field Theory”, Khanna Publishers
2. M. N. O. Sadiku, “Elements of Electromagnetics”, Oxford University Publication, 2014.

Reference Books:

1. W. Hayt, “Engineering Electromagnetics”, McGraw Hill Education, 2012.
2. A. Pramanik, “Electromagnetism-Problems with solution”, Prentice Hall India, 2012.
3. A. Pramanik, “Electromagnetism - Theory and applications”, PHI Learning Pvt. Ltd, New Delhi, 2009.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
III Semester Syllabus
EE351PC: ELECTRICAL MACHINES LABORATORY- I

L	T	P	C
0	0	2	1

Prerequisite: Electrical Machines-I

Course Objectives:

1. To conduct load test on DC machines.
2. To conduct brake test on DC machines.
3. To determine the efficiency of DC machines using different methods.
4. To determine the losses of DC machines using different methods.
5. To determine critical field resistance and critical speed of DC machines.

Course Outcomes:

After completion of the course, students will be able to:

1. Conduct load test on DC machines.
2. Conduct brake test on DC machines.
3. Determine the efficiency of DC machines using different methods.
4. Determine the losses of DC machines using different methods.
5. Determine critical field resistance and critical speed of DC machines.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To conduct load test on DC machines	3	3	3	3	3	3	1	1	1	1	-	3
To conduct brake test on DC machines	3	3	3	3	3	3	1	1	1	1	-	3
To determine the efficiency of DC machines using different methods	3	2	3	2	3	3	1	1	1	1	-	3
To determine the losses of DC machines using different methods	3	2	3	2	3	3	1	1	1	1	-	3
To determine critical field resistance and critical speed of DC machines	3	2	3	1	3	3	1	1	1	1	-	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Conduct load test on DC machines	3	3	3	3	3	3	1	1	1	1	-	3
Conduct brake test on DC machines	3	3	3	3	3	3	1	1	1	1	-	3

Determine the efficiency of DC machines using different methods	3	2	3	2	3	3	1	1	1	1	-	3
Determine the losses of DC machines using different methods	3	2	3	2	3	3	1	1	1	1	-	3
Determine critical field resistance and critical speed of DC machines	3	2	3	1	3	3	1	1	1	1	-	3

The following experiments are required to be conducted as 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. Swinburne's test and speed control of DC shunt motor (Predetermination of efficiencies).
5. Load test on DC compound generator (Determination of characteristics).
6. Fields test on DC series machines (Determination of efficiency).
7. Brake test on DC compound motor (Determination of performance curves).
8. Hopkinson's test on DC shunt machines (Predetermination of efficiency).

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

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

Suggested Readings:

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

Reference Books:

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

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
III Semester Syllabus
EE352PC: ELECTRICAL SIMULATION TOOLS LABORATORY

L	T	P	C
0	0	2	1

Prerequisites: Elements of Electrical Engineering

Course Objectives:

1. To understand basic block sets of different simulation platform used in electrical/electronic circuit design.
2. To understand use and coding in different software tools used in electrical circuit design.
3. To understand use and coding in different software tools used in electronic circuit design.
4. To understand the simulation of electric circuits for performance analysis.
5. To understand the simulation of electric machines and Solar PV model for performance analysis.

Course Outcomes:

After completion of the course, students will be able to:

1. Develop knowledge of software packages to model electrical and electronics systems.
2. Develop knowledge of software packages to program electrical and electronics systems.
3. Model different electrical and analyze the results.
4. Model different electronic systems and analyze the results.
5. 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 circuit design	3	3	3	1	1	3	1	2	1	2	2	1
To understand use and coding in different software tools used in electronic circuit design	3	3	3	1	1	3	1	2	1	2	2	1
To understand the simulation of electric circuits for performance analysis	3	3	2	1	2	3	2	1	2	1	2	3
To understand the simulation of electric machines and Solar PV model for performance analysis	3	2	-	-	2	-	1	-	2	-	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 electrical and electronics systems	3	3	1	3	2	3	2	3	1	2	2	3
Develop knowledge of software packages to program electrical and electronics systems	3	3	2	1	2	3	2	1	2	1	2	3
Model different electrical and analyze the results	3	2	2	1	2	1	2	1	2	2	2	3
Model different electronic systems and analyze 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 analyzing the simulation results	3	2	-	-	2	-	1	-	2	-	2	3

LIST OF EXPERIMENTS/DEMONSTRATIONS:

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. Simulation of Voltage Regulator using suitable simulation tools.
13. Simulation of transmission line using simulation tools.
14. Simulation of Solar PV model using suitable simulation tools

Any Ten Experiments are to be conducted using open-source software like ORCAD, Circuitlab, SCILAB, Ngspice, Octave, Simulid etc OR any Licensed simulation tools software like ORCAD PSPICE, MATLAB, NI Multisim, PowerSim, TINA, Python etc.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
III Semester Syllabus
EC363PC: ANALOG ELECTRONIC CIRCUITS LABORATORY

L	T	P	C
0	0	2	1

Course Objectives:

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

Course Outcomes:

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	1	-	-	-	-	-	1	1	1
CO2	3	2	2	-	-	1	-	-	-	-	-	1	1	1
CO3	3	2	2	3	1	1	-	-	-	-	-	1	2	2
CO4	3	2	3	3	1	1	-	-	-	-	-	1	2	2
CO5	3	2	3	3	1	1	-	-	-	-	-	1	2	2

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 CS configuration of JFET. Calculate gm, rd from the Characteristics.
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 wave forms, find its efficiency.
    - Experiments related to MOSFET may be included

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)

B. Tech. in Electrical and Electronics Engineering

III Semester Syllabus

MC351HS: GENDER SENSITIZATION LABORATORY

(EEE, CSE, IT, CSD & CSB)

L	T	P	C
0	0	2	0

Course Objectives:

This course aims:

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

Course Outcomes:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. 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.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. 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.

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.

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.

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 Out -Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. 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".

Suggested Readings:

- The Textbook, "Towards a World of Equals: A Bilingual Text Book 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: 50%.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
IV Semester Syllabus
ME431PC: FLUID MECHANICS AND HYDRAULIC MACHINES

L	T	P	C
3	0	0	3

Course Objectives:

1. Study the properties of fluids and classification of fluids.
2. Identify different types of flows and analysis of various equations of fluid flow.
3. Understand the concepts of losses in flow and analysis of impact of jet on vanes.
4. Analyze the performance of various Turbines.
5. Analyze the performance of various Pumps.

Course Outcomes:

After the completion of the course student should be able to

1. Understand the basic properties of fluid flow and the concepts of pressure.
2. Understand classifications of fluid flow and apply the broad principles of kinematics and dynamics.
3. Understand the various minor and major losses in pipe flow and to analyze the impact of jet on various vanes.
4. Acquire knowledge on different types of turbines and its principles that will be utilized for practical usages.
5. Acquire knowledge on Centrifugal pumps and its principles that will be utilized for practical usages.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To Study the properties of Fluids and classification of fluids	2	1	2	-	-	-	-	-	-	-	-	-
To identify different types of flows and analysis of various equations of fluid flow	3	3	2	2	3	-	-	-	-	-	-	-
To understand the concepts of losses in flow and analysis of impact of jet on vanes	2	3	3	2	2	-	-	-	-	-	-	-
To analyze the performance of various Turbines	3	3	2	2	2	-	-	-	-	-	-	-
To analyze the performance of various Turbines	3	2	2	3	2	-	-	-	-	-	-	-

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the basic properties of fluid flow and the concepts of pressure	2	1	2	-	2	-	-	-	-	-	-	-
Understand classifications of fluid flow and apply the broad principles of kinematics and dynamics	3	3	2	2	3	-	-	-	-	-	-	-
To understand the various minor and major losses in pipe flow and to analyze the impact of jet on various vanes	2	3	3	2	2	-	-	-	-	-	-	-
Acquire knowledge on different types of Turbines and its principles that will be utilized for practical usages	3	3	2	2	2	2	-	-	-	-	-	-
Acquire knowledge on Centrifugal pumps and its principles that will be utilized for practical usages	3	2	2	3	2	-	-	-	-	-	-	-

UNIT I - PROPERTIES OF FLUIDS

Dimensions and units: physical properties of fluids –density, specific weight, specific gravity, viscosity - vapour pressure - atmospheric gauge and vacuum pressure - measurement of pressure – manometers – Piezometer, U-tube & Differential Manometers.

UNIT II - FLUID KINEMATICS

Basic definition of stream line, path line and streak lines and classification of flows, steady unsteady, uniform, non-uniform, laminar, turbulent, rotational, and irrotational flows - equation of continuity for 1- dimensional flow.

Fluid dynamics: Surface and body forces - Euler's and Bernoulli's equations for flow along a stream line, Measurement of flow: Venturimeter, Orifice meter. Notches and its types

UNIT III - CLOSED CONDUIT FLOW

Darcy Weisbach equation-Minor losses in pipes – Pipes in series and in parallel - total energy line - hydraulic gradient line. Momentum Equation.

Basics of Turbo Machinery: Hydro dynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams and work done.

UNIT IV - HYDRAULIC TURBINES

Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine – working proportions, work done and efficiencies, function of draft tube.

Performance of Hydraulic Turbines: Definitions of Unit Quantities and Specific speed, Characteristic Curves, Cavitation, Water Hammer.

UNIT V - CENTRIFUGAL PUMPS:

Centrifugal pump: Definition and classification, components, work done, manometric head,

various losses and efficiencies, minimum starting speed, specific speed. Multistage pumps-pumps in series and parallel, performance of pumps, NPSH.

Reciprocating Pumps: Classification, working principles of single acting Reciprocating pump.

Suggested Readings:

1. Modi P.N. and Seth S.M., Hydraulics and Fluid Mechanics including Hydraulic Machines, Standard Book House, 2009.
2. Bansal R. K, Fluid Mechanics and Hydraulic Machines, Laxmi Publication Pvt. Ltd, 2010
3. Rajput R.K., Fluid Mechanics and Hydraulic machines, S.Chand & Company, 2010.

Reference Books:

1. Jain A. K., Fluid Mechanics including Hydraulic Machines, Khanna Publishers , 2004.
2. Subramanya K., Fluid Mechanics and Hydraulic Machines problems and solutions, McGraw Hill Education Pvt.Ltd,2014

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)

B.Tech. in Electrical and Electronics Engineering

IV Semester Syllabus

EE401PC: MEASUREMENTS AND INSTRUMENTATION

L	T	P	C
3	0	0	3

Prerequisites: Electrical Circuit Analysis-I, Electrical Circuit Analysis-II, Analog Electronics and Electromagnetic Fields.

Course Objectives:

1. To introduce the basic principles of all measuring instruments.
2. To deal with the measurement of voltage, current, power factor, power, and energy.
3. To deal measurements with the measurement of RLC parameters using the bridges.
4. To understand the operation of different types of transducers and their applications.
5. To understand the basic concepts of smart and digital metering.

Course Outcomes:

After completion of this course, the students will be able to

1. Understand different types of measuring instruments, their construction, operation, and characteristics.
2. Identify the instruments suitable for typical measurements.
3. Understand the resistance measurement through DC Bridge, capacitance and inductance through AC bridges.
4. Apply the knowledge about transducers and instrument transformers to use them effectively.
5. 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 and energy measurements	2	1	2	2	2	2	2	1	1	1	2	3
To deal with the measurement of RLC parameters using the bridges	2	1	2	2	2	2	2	1	1	1	2	3
To understand the operation of different types of transducers and their applications	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	2	1	2	2	2	2	2	1	2	1	2	3
Identify the instruments suitable for typical measurements	2	1	2	2	2	2	2	1	2	1	2	3
Understand the resistance measurement through DC Bridge, capacitance and inductance through AC bridges	2	1	2	2	2	2	2	1	2	1	2	3
Apply the knowledge about transducers and instrument transformers to use themeffectively	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 AND INSTRUMENT TRANSFORMERS

Principle and operation of D.C. Crompton's potentiometer, standardization - Measurement of unknown resistance, current, voltage, A.C Potentiometers: polar and coordinate types, standardization, applications.

Instrument transformers: CT and PT, Ratio and phase angle errors, CT testing using mutual inductor method by null technique.

UNIT- III: MEASUREMENT OF POWER AND 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 indicator.

UNIT- IV: DC AND AC BRIDGES

Method of measuring low, medium and high resistance - Sensitivity of Wheat-stone's bridge, Carey

Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance using loss of charge method.

Measurement of inductance - Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge, Mmeasurement of capacitance and loss angle - Desauty's Bridge, Wien's bridge, Schering bridge.

UNIT-V: TRANSDUCERS AND DIGITAL METERING

Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle of 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, Prepaid meter, Net metering, bi-directional meter, Cathode Ray Oscilloscope, Digital Storage Oscilloscope.

Suggested Readings:

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.
7. C.T. Baldwin, "Fundamentals of Electrical Measurements", Kalyani Publications, 2001.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
IV Semester Syllabus
EE402PC: ELECTRICAL MACHINES - II

L	T	P	C
3	0	0	3

Prerequisite: Electrical Machines-I

Course Objectives:

1. To study and understand 1-phase transformer - their construction, operation, and applications.
2. To analyze the performance of transformers through various testing methods.
3. To study and understand auto and poly-phase transformers - their winding connections, operation, and applications.
4. To deal with the detailed analysis of poly-phase induction motors.
5. To study and understand concepts of circle diagram and speed control of three phase Induction motors.

Course Outcomes:

After completion of the course, students will be able to:

1. Understand the concepts and constructional aspects of 1-phase transformer.
2. Carry out different testing methods to determine the efficiency of single-phase transformer.
3. Understand the concepts and winding connections of auto and poly-phase transformers.
4. Identify different parts of a poly-phase induction motor and understand it's operation.
5. Understand the concepts of circle diagram through testing and carry out different speed control methods of 3-phase induction motor.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To study and understand 1-phase Transformer - their construction, operation, and applications	3	2	3	-	3	3	-	-	-	-	-	-
To analyze the performance of transformers through various testing methods	3	3	2	2	3	3	-	-	-	-	-	-
To study and understand auto and poly-phase transformers - their winding connections, operation, and applications	2	3	3	2	3	3	-	-	-	-	-	-
To deal with the detailed analysis of poly-phase induction motors	3	3	2	2	2	2	-	-	-	-	-	-
To study and understand concepts of circle diagram and speed control of three phase induction motors	3	2	2	3	2	2	-	-	-	-	-	-

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand the concepts and constructional aspects of 1-phase transformer	2	2	3	-	2	2	-	-	-	-	-	-
Carry out different testing methods to determine the efficiency of single-phase transformer	3	3	3	2	3	2	-	-	-	-	-	-
Understand the concepts and winding connections of auto and poly-phase transformers	2	3	3	2	2	2	-	-	-	-	-	-
Identify different parts of a poly-phase induction motor and understand it's operation	3	3	3	2	2	2	-	-	-	-	-	-
Understand the concepts of circle diagram through testing and carry out different speed control methods of 3-phase induction motor	3	2	3	3	2	2	-	-	-	-	-	-

UNIT-I: SINGLE PHASE TRANSFORMERS

Single phase transformers-types - constructional details-minimization of hysteresis and eddy current losses- EMF equation - operation on no load and on load - phasor diagrams. Equivalent circuit - losses and efficiency-regulation. All-day efficiency - effect of variations of frequency & supply voltage on iron losses.

UNIT-II: TESTING OF TRANSFORMERS

Testing of 1-phase transformers: OC and SC tests - Sumpner's test - predetermination of efficiency and regulation-separation of losses test-parallel operation with equal and unequal voltage ratios.

UNIT-III: AUTO AND POLY-PHASE TRANSFORMERS

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, Third harmonics in phase voltages-three winding transformers-tertiary windings-determination of Zp, Zs and Zt transients in switching - off load and on load tap changing; Scott connection.

UNIT-IV: POLY-PHASE INDUCTION MOTORS

Poly-phase induction motors-construction 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 pf at standstill and during operation. Rotor power input, rotor copper loss and mechanical power developed and their inter relation- torque equation-deduction from torque equation - expressions for maximum torque and starting torque - torque slip characteristic - double cage and deep bar rotors - equivalent circuit - phasor diagram - crawling and cogging.

UNIT-V: CIRCLE DIAGRAM AND SPEED CONTROL OF INDUCTION MOTORS

Circle diagram-no load and blocked rotor tests-predetermination of performance-methods of starting and starting current and torque calculations.

Speed control: change of frequency; change of poles and methods of consequent poles; cascade connection. Injection of an EMF into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

Suggested Readings:

1. Electrical Machines, P.S. Bimbra, Khanna Publishers.
2. Principles of Electrical Machines, V. K. Mehta, Rohit Mehta, S. Chand Publishing.

Reference Books:

1. Electric Machines, I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers.
2. Electric Machines, Mulukutla S. Sarma, Mukesh K. Pathak, Cengage Learning.
3. Fundamentals of Electric Machines, B. R. Gupta, Vandana Singhal, New Age International Publishers.
4. Electrical Machines, M. V. Deshpande, PHI Learning Private Limited.
5. Electrical Machines, R. K. Srivastava, Cengage Learning.
6. Performance and Design of AC Machines, MG.Say, BPB Publishers.
7. Theory of Alternating Current Machinery, Langsdorf, Tata McGraw- Hill Companies.
8. Electric machinery, A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
IV Semester Syllabus
EC431PC: DIGITAL ELECTRONICS

L	T	P	C
2	0	0	2

Course Objectives:

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

Course Outcomes:

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

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	3	1	2	3	3	1	1	1	1	1	1
CO2	2	2	1	2	3	1	2	2	2	1	1	1	1	1
CO3	3	2	2	2	2	2	2	1	1	1	1	1	1	1

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).

Suggested Readings:

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.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
IV Semester Syllabus
EE403PC: POWER SYSTEMS - II

L	T	P	C
3	0	0	3

Prerequisite: Power Systems - I and Electromagnetic Fields

Course Objectives:

1. To evaluate the transmission line parameters.
2. To study the performance of transmission lines.
3. To study the travelling waves.
4. To understand the overhead line insulators and concept of corona.
5. To evaluate the sag and tension and study the underground cables.

Course Outcomes:

After completion of the course, students will be able to:

1. Determine the parameters of transmission lines.
2. Analyze performance of transmission lines.
3. Understand the travelling waves.
4. Understand the concept of corona and determine the voltage distribution across insulators.
5. Calculate sag of transmission line and analyze the underground cables.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To evaluate the transmission line parameters	3	3	3	3	3	2	-	-	-	-	1	-
To study the performance of transmission lines	3	3	3	3	3	2	1	-	-	-	-	-
To study the travelling waves	3	3	3	3	3	1	2	2	-	-	-	-
To understand the overhead line insulators and concept of corona	3	3	3	3	3	3	2	-	-	-	-	-
To evaluate the sag and tension and study the underground cables	3	3	3	2	2	1	2	1	-	-	-	-

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Determine the parameters of transmission lines	3	3	3	3	3	2	-	-	-	-	1	-
Analyze performance of transmission lines	3	3	3	3	3	2	1	-	-	-	-	-
Understand the travelling waves	3	3	3	3	3	1	2	2	-	-	-	-

Understand the concept of corona and determine the voltage distribution across insulators	3	3	3	3	3	3	2	-	-	-	-	-
Calculate sag of transmission line and analyze the underground cables	3	3	3	2	2	1	2	1	-	-	-	-

UNIT-I: TRANSMISSION LINE PARAMETERS

Types of conductors, Bare Aluminum conductors – AAC, ACSR, AAAC and ACAR.

Calculation of inductance for single phase and three phase, single and double circuit lines, Transposition of power lines, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems.

Calculation of capacitance for single phase and three phase, single and double circuit lines, symmetrical and asymmetrical conductor configuration, effect of ground on capacitance, Numerical Problems.

UNIT-II: PERFORMANCE OF SHORT, MEDIUM AND LONG LENGTH TRANSMISSION LINES

Classification of Transmission Lines - Short, medium and long lines, Mathematical solution to estimate regulation and efficiency of short and medium lines, Nominal-T, Nominal-Pie, Evaluation of A, B, C, D constants, Numerical Problems. Long Transmission Line-Rigorous Solution, evaluation of A, B, C, D constants, Interpretation of Long Line Equations, Incident, Reflected and Refracted Waves -Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models, Numerical Problems, Ferranti effect.

UNIT-III: POWER SYSTEM TRANSIENTS AND INSULATION COORDINATION

Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions, Numerical Problems, Introduction to Bewley's Lattice Diagrams, Insulation coordination, Volt-time curves.

Various Factors Governing the Performance of Transmission Line

Skin and Proximity effects – Description of the phenomenon, Corona - Description of the phenomenon, critical voltages and power loss, factors affecting corona, Bundle conductors.

UNIT-IV: OVERHEAD LINE INSULATORS AND CORONA

Types of Insulators-Pin, Suspension, Strain and Shackle, Voltage distribution across string, calculation of string efficiency, Capacitance grading and Static Shielding, Numerical Problems.

Skin and Proximity effects – Description of the phenomenon, Corona - Description of the phenomenon, critical voltages and power loss, factors affecting corona, Bundle conductors.

UNIT-V: SAG-TENSION CALCULATIONS AND UNDERGROUND CABLES

Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems.

Types of Cables, Construction of a 3-core cable, Electrostatic Stress in Single Core Cable, Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter-sheath grading, Calculations of Insulation resistance, Capacitance of Single and 3-Core belted cables, Numerical Problems.

Suggested Readings:

1. C.L. Wadhwa, "Electrical Power Systems", New Age International (P) Limited, Third Edition, 2001.
2. V.K Mehta and Rohit Mehta, "Principles of Power Systems", S. Chand & Company Ltd, New Delhi, 2004.

Reference Books:

1. J.B.Gupta, A Course in Power Systems" Katson Books, 11th Edition, 2016.
2. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, "A Text book on Power System Engineering", Dhanpat Rai Publishing Company (P) Ltd, 2008.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
IV Semester Syllabus
EE451PC: MEASUREMENTS AND INSTRUMENTATION LABORATORY

L	T	P	C
0	0	2	1

Prerequisites: Measurements and Instrumentation

Course Objectives:

1. To calibrate LPF Wattmeter, energy meter, PF meter using electrodynamometer type instrument as the standard instrument.
2. To determine unknown inductance, resistance, and capacitance by performing experiments on DC Bridges and AC Bridges.
3. To determine three phase active and reactive powers using single wattmeter method practically.
4. To determine the displacement and strain using transducers.

Course Outcomes:

After completion of this course, the students will be able to

1. To choose instruments.
2. Test any instrument.
3. Find the accuracy of any instrument by performing experiment.
4. Calibrate PMMC instrument using DC potentiometer.
5. Understand the measurement of displacement using LVDT and measurement of strainusing resistance strain gauge.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To calibrate LPF Wattmeter, energy meter, PF meter using electro dynamo meter type instrument as the standard instrument	3	3	3	3	3	3	1	1	2	2	1	3
To determine unknown inductance, resistance, capacitance by performing experiments on DC Bridges & AC Bridges	3	2	3	2	3	3	2	2	2	3	2	3
To determine three phase active & reactive powers using single wattmeter method practically	3	2	3	2	3	3	2	2	2	3	2	3
To determine the displacement and strain using transducers	3	2	3	2	3	3	2	2	2	3	2	3
To determine the ratio and phase angle errors of current transformer	3	2	3	1	3	3	1	1	2	2	2	3

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To choose instruments	3	3	3	3	3	3	3	1	2	1	1	2
Test any instrument	3	3	3	3	3	3	3	1	2	1	1	2
Find the accuracy of any instrument by performing experiment	3	3	3	3	3	3	3	3	3	3	2	3
Calibrate PMMC instrument using DC potentiometer	3	2	2	2	3	3	3	2	1	3	3	2
Understand the measurement of displacement using LVDT and measurement of strain using resistance strain gauge	3	2	2	2	3	3	3	2	1	3	3	2

Any Ten experiments are required to be conducted from the following list of experiments.

1. Calibration and Testing of single-phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Crompton DC 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.
9. Calibration of LPF wattmeter by Phantom testing.
10. C.T. testing using mutual Inductor - Measurement of % ratio error and phase angle of given CT by Null method.
11. Resistance strain gauge – strain measurements and Calibration.
12. Measurement of parameters of a choke coil using 3-voltmeter and 3-ammeter methods.

Suggested Readings:

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.
7. C.T. Baldwin, "Fundamentals of Electrical Measurements", Kalyani Publications, 2001.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
IV Semester Syllabus
EE452PC: ELECTRICAL AND ELECTRONICS DESIGN LABORATORY

L	T	P	C
0	0	2	1

Course Objectives:

1. To enhance practical knowledge related to different subjects.
2. To develop hardware skills such as soldering, winding etc.
3. To develop debugging skills.
4. To enhance employability of a student.
5. To prepare students for working on different hardware projects**.**

Course Outcomes:

After completion of the course, students will be able to:

1. Get practical knowledge related to electrical engineering
2. Fabricate basic electrical circuit elements/networks
3. Trouble shoot the electrical circuits
4. Get hardware skills such as wiring, etc.
5. Get debugging skills.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To enhance practical knowledge related to different subjects	3	3	3	3	1	3	-	-	-	-	-	3
To develop hardware skills such as soldering, winding etc	3	3	2	2	0	2	-	-	-	-	-	3
To develop debugging skills	3	3	3	3	0	3	-	-	-	-	-	3
To enhance employability of a student	3	3	2	3	1	3	-	-	-	-	-	3
To prepare students for working on different hardware projects	3	3	2	2	1	2	-	-	-	-	-	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Get practical knowledge related to electrical engineering	3	3	3	3	1	3	-	-	-	-	-	3
Fabricate basic electrical circuit elements/networks	3	3	2	2	0	2	-	-	-	-	-	3

Trouble shoot the electrical circuits	3	3	3	3	0	3	-	-	-	-	-	3
Get hardware skills such as wiring, etc	3	3	2	3	1	3	-	-	-	-	-	3
Get debugging skills	3	3	2	2	1	2	-	-	-	-	-	3

List of Experiments:

1. Design and fabrication of reactor/ electromagnet for different inductance values.
2. Design and fabrication of single phase Induction/three phase motor stator.
3. Start delta starter wiring for automatic and manual operation.
4. Wiring of distribution box with MCB, ELCB, RCCB and MCCB.
5. Wiring of 40 W tube, T-5, LED, Metal Halide lamps and available latest luminaries.
6. Assembly of various types of contactors with wiring.
7. Assembly of DOL and 3 point starter with NVC connections and overload operation.
8. Design and development of 5 V regulated power supply.
9. Microcontroller Interface circuit for temperature measurement.
10. Peak detector using op-amplifiers.
11. Design and development of precision rectifier.
12. Design and development of first order/ second order low pass/high pass filters with an application.

Any 10 experiments from the above list must be conducted.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)

B.Tech. in Electrical and Electronics Engineering

IV Semester Syllabus

EC461PC: DIGITAL ELECTRONICS LABORATORY

L	T	P	C
0	0	2	1

Course Objectives:

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

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

1. Understand the working of logic families and logic gates.
2. Define Postulates of Boolean algebra and to minimize combinational functions
3. Design and implement Combinational and Sequential logic circuits.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	2	1	-	-	1	-	-	2	2	2
CO2	3	2	2	1	2	1	-	-	1	-	-	2	2	2
CO3	2	3	3	2	2	1	-	-	1	-	-	1	2	2

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.,

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering
IV Semester Syllabus
ME461PC: FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY

L	T	P	C
0	0	2	1

Course Objectives:

1. Verify the Bernoulli's equation and to calculate pressure heads along pipe flow.
2. Determine the coefficient of discharge for venturi meter, orifice meter.
3. Find out the major losses in flow through pipes.
4. Study the characteristic of a centrifugal and reciprocating pump.
5. Evaluate the coefficient of impact of jet on different kinds of vanes and also to study the performance of hydraulic turbines.

Course Outcomes:

After successful completion of the course, student will:

1. Understand on calibration of venturi meter and orifice meter.
2. Understand about different coefficients of discharges for different flow devices.
3. Obtain the knowledge on design of turbines with the available heads and speeds.
4. To estimate performance parameters of a given centrifugal and reciprocating pump.
5. To analyze the losses of a fluid flow in pipes.

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To Verify the Bernoulli's equation and to calculate pressure heads along pipe flow	2	1	2	-	2	-	-	-	-	-	-	-
To determine the coefficient of discharge for Venturi meter, Orifice meter	3	3	2	2	3	-	-	-	-	-	-	-
To find out the major losses in flow through pipes	2	3	3	2	2	-	-	-	-	-	-	-
To study the characteristics of a centrifugal and reciprocating pump	3	3	2	2	2	2	-	-	-	-	-	-
Evaluate the coefficient of impact of jet on different kinds of vanes and also to study the performance of hydraulic turbines	3	2	2	3	2	-	-	-	-	-	-	-

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Understand on calibration of venturi meter and orifice meter	2	1	2	-	2	-	-	-	-	-	-	-
Understand about different coefficients of discharges for different flow devices	3	3	2	2	3	-	-	-	-	-	-	-
Obtain the knowledge on design of turbines with the available heads and speeds	2	3	3	2	2	-	-	-	-	-	-	-
To estimate performance parameters of a given centrifugal and reciprocating pump	3	3	2	2	2	2	-	-	-	-	-	-
To analyze the losses of a fluid flow in pipes	3	2	2	3	2	-	-	-	-	-	-	-

List of Experiments:

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Calibration of V- Notch and Rectangular Notch.
12. Verification of Bernoulli's Theorem.

Any Ten experiments are to be conducted.

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. in Electrical and Electronics Engineering

IV Semester Syllabus

MC401HS: CONSTITUTION OF INDIA

(EEE, CSE, IT, CSD & CSB)

L	T	P	C
3	0	0	0

Course Objectives:

1. To understand the history of making of Indian Constitution and the role of drafting committee.
2. To list the salient features of the Preamble to the Constitution of India.
3. To identify the importance of fundamental rights as well as fundamental duties.
4. To understand the powers and functions of parliament, President, Council of Ministers, Governor Judges, etc and their qualifications.
5. To have a thorough understanding of Local self government and its associated agencies.
6. To learn and realise the role and functioning of election commission and Institute and Bodies for the welfare of SC/ST/OBC and women.

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

1. Describe the history of making of Indian Constitution and the role of drafting committee
2. Explain the purpose of Preamble to the Constitution of India.
3. Outline the Fundamental Rights and Fundamental Duties of a citizen.
4. Acquire knowledge on functioning of Parliament, Executive and judiciary systems.
5. Comprehend and evaluate the role of Local self government and its associated agencies.
6. Assess and analyze the role and functioning of the Election Commission.

Unit - 1 History of Making of the Indian Constitution- History of Drafting Committee.
Unit - 2 Philosophy of the Indian Constitution- Preamble Salient Features.
Unit - 3 Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

Unit - 4 Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.

Unit - 5 Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal

Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

Unit - 6 Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.