



ACE ENGINEERING COLLEGE

Ankushapur(V), Ghatkesar(M), Medchal Dist – 501301

B.Tech. in ELECTRICAL AND ELECTRONICS ENGINEERING COURSE STRUCTURE & SYLLABUS (R22 Regulations)

Applicable from AY 2022-23 Batch

I year I Semester

S.No.	Subject Code	Course Title	Periods			Credits
			L	T	P	
1	MA101BS	Matrices and Calculus	3	1	0	4
2	CH102BS	Engineering Chemistry	3	1	0	4
3	EE103ES	C Programming and Data Structures	3	0	0	3
4	EE105ES	Electrical Circuit Analysis-I	3	0	0	3
5	ME105ES	Computer Aided Engineering Graphics	1	0	4	3
6	EE106ES	Electrical Circuit Analysis-I Laboratory	0	0	2	1
7	CH107BS	Engineering Chemistry Laboratory	0	0	2	1
8	CS109ES	C Programming and Data Structures Laboratory	0	0	2	1
9		Induction Program				
		Total Credits	13	2	10	20

I year II Semester

S.No.	Subject Code	Course Title	Periods per week			Credits
			L	T	P	
1	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	PH202BS	Applied Physics	3	1	0	4
3	ME203ES	Engineering Workshop	0	1	3	2.5
4	EN204HS	English for skill Enhancement	2	0	0	2
5	EE205ES	Electrical Circuit Analysis-II	2	0	0	2
6	CS206ES	Python programming Laboratory	0	1	2	2
7	PH207BS	Applied Physics Laboratory	0	0	3	1.5
8	EN208HS	English Language and communication skills laboratory	0	0	2	1
9	EE209ES	Electrical Circuit Analysis-II Laboratory	0	0	2	1
10	*MC210	Environmental Science	3	0	0	0
		Total Credits	13	4	12	20

II year I Semester

S.No.	Subject Code	Course Title	Periods per week			Credits
			L	T	P	
1	MA301BS	Numerical Methods and Complex Variables	3	1	0	4
2	ME302ES	Solid Mechanics & Hydraulic Machines	3	0	0	3
3	EC303ES	Analog Electronics	3	0	0	3
4	EE304PC	Electrical Machines-I	3	1	0	4
5	EE305PC	Electro Magnetic Fields	3	0	0	3
6	EE306PC	Electrical Machines-I Laboratory	0	0	2	1
7	EC307ES	Analog Electronics Laboratory	0	0	2	1
8	EE308PC	Electrical Simulation Laboratory	0	0	2	1
9	MC310	Gender Sensitization Laboratory	0	0	2	0
		Total Credits	15	2	8	20

II year II Semester

S.No.	Subject Code	Course Title	Periods per week			Credits
			L	T	P	
1	EE401PC	Power Systems-I	3	0	0	3
2	EE402PC	Measurements and Instrumentation	3	0	0	3
3	EE403PC	Electrical Machines-II	3	0	0	3
4	EC404ES	Digital Circuits	2	0	0	2
5	EE405PC	Control Systems	3	1	0	4
6	EC406ES	Digital Circuits Laboratory	0	0	2	1
7	EE407PC	Measurements and Instrumentation Laboratory	0	0	2	1
8	EE408PC	Electrical Machines -II Laboratory	0	0	2	1
9	EE409PC	Research Oriented Mini Project/ Field Based Project	0	0	4	2
10	MC409	Constitution of India	3	0	0	0
		Total Credits	17	1	10	20

MA101BS: MATRICES AND CALCULUS

(Offered in I B.Tech I Sem - CE, EEE, ME, ECE, CSE, IT, CSE (AIML), CSE (DS), CSE (IoT), AIML, AIDS)

B. Tech. I Year I Sem.

L T P C

3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

1. 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 eigenvectors and to reduce the quadratic form to canonical form
3. Geometrical approach to the mean value theorems and their application to the mathematical problems and Evaluation of improper integrals using Beta and Gamma functions.
4. Partial differentiation, concept of total derivative and finding maxima and minima of function of two and three variables.
5. Evaluation of multiple integrals and their applications

Course outcomes: After learning the contents of this paper the student must 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 and evaluate the improper integrals using Beta and Gamma functions
4. Find the extreme values of functions of two variables with/ without constraints.
5. Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT-I: Matrices

10 L

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 by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

10 L

Linear Transformation and Orthogonal Transformation: Eigen values, Eigenvectors and their properties, 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**10 L**

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.

Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-IV: Multivariable Calculus (Partial Differentiation and applications) 10 L

Definitions of Limit and continuity.

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

UNIT-V: Multivariable Calculus (Integration)**10L**

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) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

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. 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

CH102BS: ENGINEERING CHEMISTRY

B.Tech. I Year I Sem-CSE,IT,EEE,CSE(DS)

L T P C

B.Tech. I Year II Sem-CE,ME,ECE,CSE(IoT),CSE(AI&ML),AI&ML,AI&DS

3 1 0 4

Course Objectives:

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To know the importance of water and its treatment in domestic and industrial usage.
3. To acquire fundamental aspects of battery chemistry, significance of corrosion its control to protect the structures.
4. To gain knowledge in the preparation and engineering applications of materials like polymers, cement, smart materials, Lubricants etc.,
5. To acquire required knowledge the basic concepts of petroleum and its products.

Course Outcomes:

1. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
2. The students are able to understand the basic importance of water and its usage in domestic and industrial purposes.
3. Students will acquire the basic knowledge of battery technology and electrochemical procedures related to corrosion and its control.
4. They can learn the fundamentals and general properties of polymers and other engineering materials.
5. Students will be able to understand the mechanism of combustion for solving problems related to combustion.

UNIT - I: Water and its treatment: [10]

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of Fion by ion- selective electrode method.

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

UNIT – II Battery Chemistry & Corrosion [10]

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 to electrical vehicles. 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. Electroplating of Cu

UNIT - III: Polymeric materials: [10]

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP).

Rubbers: Natural rubber, Processing and its vulcanization.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

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 poly vinyl alcohol and their applications.

UNIT - IV: Energy Sources: [10]

Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula and Numericals
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 – Trans esterification, advantages. Combustion –Calculation of air quantities (Numericals).

UNIT - V: Engineering Materials: [8]

Cement: Portland cement, its composition, setting and hardening.

Smart materials and their engineering applications

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

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

EE103ES: C PROGRAMMING AND DATA STRUCTURES

B.Tech. I Year I Sem.

L	T	P	C
3	0	0	3

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

Course Outcomes:

1. Understand the various steps in Program development.
2. Explore the basic concepts in C Programming Language.
3. Develop modular and readable C Programs
4. Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear 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 Associativity, Expression Evaluation, Type conversions, Statements.

UNIT - II

Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Recursion.

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

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

UNIT - III

Pointers – Introduction, Pointers for inter function communication, pointers to pointers, compatibility,

Pointer Applications – Passing an array to a function, Memory allocation functions, array of pointers

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion.

UNIT - IV

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

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

UNIT – V

Sorting- selection sort, bubble sort, insertion sort,

Searching-linear and binary search methods.

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

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, 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.

EE105ES: ELECTRICAL CIRCUIT ANALYSIS-I

B.TECH. I YEAR I SEMESTER

L T P C

3 0 0 3

Prerequisite: Matrices and Calculus

Course Objectives:

1. To gain knowledge in electrical circuits.
2. To understand the fundamentals of derived circuit laws.
3. To learn steady state and transient analysis of single phase and 3-phase circuits.
4. To comprehend Network Theorems and concepts of coupled circuits.
5. To understand the concepts of Graph theory.

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

1. Understand network analysis techniques using mesh and node analysis.
2. Evaluate steady state and transient behavior of circuits for DC excitations.
3. Evaluate steady state and transient behavior of circuits for AC excitations.
4. Analyze the concept of poly phase circuits.
5. Analyze electric circuits using network theorems and concepts of coupled circuits.

UNIT: I NETWORK ELEMENTS & LAWS

10L

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

UNIT: II SINGLE-PHASE CIRCUITS

10L

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

10L

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

Unit: IV POLY-PHASE CIRCUITS

10L

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

10L

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

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

TEXTBOOKS:

1. Van Valkenburg M.E, “Network Analysis”, Prentice Hall of India, 3rd Edition, 2019.
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”, McGraw Hill, 6th Edition, 2002.
6. Chakravarthy A., “Circuit Theory”, Dhanpat Rai & Co., First Edition, 1999.

WEB REFERENCES:

1. <https://nptel.ac.in/courses/108102042>
2. <https://nptel.ac.in/courses/108104139>

ME105ES: COMPUTER AIDED ENGINEERING GRAPHICS

B.Tech. I Year I Sem

L	T	P	C
1	0	4	3

Course Objectives:

- To develop the ability of visualization of different objects through technical drawings.
- To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products.
- Apply the knowledge of interpretation of projection in different quadrants.
- Create intricate details of components through sections and develop its surfaces.
- Convert the pictorial views into orthographic view and vice versa.

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

- CO1: Apply computer aided drafting tools to create 2D and 3D objects
- CO2: Sketch conics and different types of solids
- CO2: Appreciate the need of Sectional views of solids and Development of surfaces of solids
- CO4: Read and interpret engineering drawings
- CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

UNIT – I:

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

UNIT- II:

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

UNIT – III:

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

UNIT – IV:

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

UNIT – V:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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

EE106ES: ELECTRICAL CIRCUIT ANALYSIS-I LABORATORY

B.TECH. I YEAR I SEMESTER

L T P C

0 0 2 1

Prerequisite: Knowledge of Intermediate level Physics & Mathematics

Course Objectives:

1. To measure the electrical parameters for different types of DC circuits using conventional approach.
2. To measure the RMS, Average values of Sinusoidal waveform
3. To Analyze the given circuits by using network theorems of AC & DC
4. To measure 3 phase power for balanced loads
5. To measure the coefficient of coupling for the given coupled circuit

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

1. Measure the electrical parameters for different types of DC circuits using conventional approach.
2. Measure the electrical parameters for different types of AC circuits using conventional and theorems approach
3. Apply the concepts of network theorems to AC & DC circuits
4. Analyze 3 phase power for balanced Circuits
5. Calculate the Self & Mutual Inductance of the given coupled circuits

List of experiments/demonstrations:

PART-A (compulsory)

1. Verification Ohm's Law
2. Verification of KVL and KCL
3. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
4. Verification of Series & Parallel Resonance
5. Verification of Thevenin's and Norton's theorem
6. Verification of Superposition 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 a Coupled Circuits.

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

1. Verification of Reciprocity and Milliman's Theorem.
2. Verification of Maximum Power Transfer Theorem.
3. Verification of Compensation Theorem
4. Determination of form factor for non-sinusoidal waveform
5. Measurement of Reactive Power for Star and Delta connected balanced loads

WEB REFERENCES:

1. <https://phet.colorado.edu/en/simulations/circuit-construction-kit-dc-virtual-lab>

CH107BS: ENGINEERING CHEMISTRY LABORATORY

B.Tech. I Year I Sem-CSE,IT,EEE,CSE(DS)

L T P C

B.Tech. I Year II Sem-CE,ME,ECE,CSE(IoT),CSE(AI&ML),AI&ML,AI&DS

0 0 2 1

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

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- Students will learn to prepare polymers such as Thiokol rubber and nylon-6 in the laboratory.
- Students will learn skills related to the lubricant properties such as viscosity of oils.
- Students will learn the extent of corrosion in metals like mild steel.

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

- Determination of parameters like hardness of water in various conditions.
- Able to know parameters of rate of corrosion of mild steel in various conditions.
- Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
- Students are able to prepare polymers like Thiokol rubber and nylon-6.
- Estimations viscosity of lubricant oils.

List of Experiments:

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

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

III. Potentiometry: Estimation of the amount of Fe⁺² by Potentiometry.

IV. pH Metry: Determination of an acid concentration using pH meter.

V. Preparations:

1. Preparation of Thiokol Rubber.
2. Preparation Nylon – 6,6.

VI. Lubricants:

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

VII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

VIII. Virtual lab experiments

1. Construction of Fuel cell and its working.
2. Smart materials for Bio medical applications
3. Batteries for electrical vehicles.
4. 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).

CS109ES: C PROGRAMMING AND DATA STRUCTURES LABORATORY

B.Tech. I Year I Sem.

L	T	P	C
0	0	2	1

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

Course Outcomes:

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

List of Experiments:

1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
3. Write a C program to generate the first n terms of the sequence.
4. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
5. Write a C program to find the roots of a quadratic equation.
6. Write a C program to find the factorial of a given integer.
7. Write a C program to find the GCD (greatest common divisor) of two given integers.
8. Write a C program to solve Towers of Hanoi problem.
9. 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)
10. Write a C program to find both the largest and smallest number in a list of integers.
11. Write a C program that uses functions to perform the following:
 - i. Addition of Two Matrices
 - ii. Multiplication of Two Matrices
12. 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.
13. Write a C program to determine if the given string is a palindrome or not
14. 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.
15. Write a C program to count the lines, words and characters in a given text.
16. Write a C program to generate Pascal's triangle.
17. Write a C program to construct a pyramid of numbers.
18. 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.)
19. 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.)
20. 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)

21. Write a C program that uses functions to perform the following operations on singly linked list.:
 - i) Creation ii) Insertion iii) Deletion iv) Traversal
22. Write C programs that implement stack (its operations) using
 - i) Arrays ii) Pointers
23. Write C programs that implement Queue (its operations) using
 - i) Arrays ii) Pointers
24. 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
25. 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.

**MA201BS: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR
CALCULUS**

(Offered in I B.Tech II Sem - CE, EEE, ME, ECE, CSE, IT, CSE (AIML), CSE (DS),
CSE (IoT), AIML, AIDS)

B. Tech. I Year II Sem.

L T P C

3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

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: After learning the contents of this paper the student must 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 ODE's.
4. Evaluate the line, surface and volume integrals.
5. Converting line, surface and volume integrals from one to another

UNIT-I: First Order ODE

8 L

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Applications: Orthogonal Trajectories (only in Cartesian Coordinates) Newton's law of cooling, Law of natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order

10 L

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$ and $x(x)$, method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation. Applications: Electric Circuits

UNIT-III: Laplace transforms

10 L

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**10 L**

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**10 L**

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

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 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.
N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008

PH202BS: APPLIED PHYSICS

B.Tech. I Year II Sem.

L T P C

Pre-requisites: 10 + 2 Physics

3 1 0 4

Course Objectives:

The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibers.

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 Quantummechanics and visualize the difference between conductor, semiconductor, and an insulator byclassification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for theirapplications.
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 AND SOLIDS

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

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

UNIT - II: SEMICONDUCTORS AND DEVICES

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

UNIT - III: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics.

Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

UNIT - IV: NANOTECHNOLOGY

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

UNIT -V: LASER AND FIBER OPTICS

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

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

Textbooks

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy”, A Textbook 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

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

ME203ES: ENGINEERING WORKSHOP

B.Tech. I Year II Sem.

L T P C

0 1 3 2.5

Pre-requisites: Practical skill

Course Objectives:

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

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

- CO1: Study and practice on machine tools and their operations
- CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, and foundry, house wiring and welding.
- CO3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- CO4: Apply basic electrical engineering knowledge for house wiring practice.
- CO5: Identify the different types of welding, moulding, metal cutting methods.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

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

2. TRADES FOR DEMONSTRATION & EXPOSURE:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Workshop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP
3. Dictionary of Mechanical Engineering – G.H.F. Naylor, Jaico Publishing House.

EN204HS: ENGLISH FOR SKILL ENHANCEMENT

(Offered in I B.Tech I Sem - CE, ME,ECE,CSE(AI&ML),CSE(IoT), AI&ML, AI&DS)

B.Tech. I Year II Sem

L T P C

2 0 0 2

Course Objectives: This course will enable the students to:

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

Course Outcomes: Students will be able to:

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

UNIT - I

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

Chapter entitled '*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

Chapter entitled ‘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.

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

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

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

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

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

UNIT - V

Chapter entitled ‘Go, Kiss the World’ by Subroto Bagchi from *“English: Language, Context and Culture”* published by Orient 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 which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.*

- **Note:** 1. As the syllabus of English given in AICTE Model Curriculum-2018 for B.Tech First Year is ***Open-ended***, besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.
- **Note:** 2. Based on the recommendations of 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.

TEXT BOOK:

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

REFERENCE BOOKS:

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

EE205ES: ELECTRICAL CIRCUIT ANALYSIS-II

B.TECH. I YEAR II SEMESTER

L	T	P	C
2	0	0	2

Prerequisite: Matrices and Calculus, Ordinary Differential Equations and Vector Calculus

Course Objectives:

1. To study the transient analysis of various R, L and C circuits for different inputs
2. To learn about two-port networks
3. To understand the Applications of Fourier Series
4. To understand the Applications of Laplace transformation.
5. To understand the concept of filters.

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

1. Observe the response of various R, L and C circuits for different excitations.
2. Obtain two port network parameters.
3. Examine the behavior of circuits using Fourier series
4. Examine the behavior of circuits using Laplace transforms
5. Analyze the applications and design of various filters

UNIT: I TRANSIENT ANALYSIS

10L

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

UNIT: II TWO PORT NETWORK PARAMETERS

10L

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: III FOURIER ANALYSIS

10L

Introduction, Exponential form of Fourier Series, Trigonometric form of Fourier Series, Symmetry in Fourier Series, Frequency Spectrum, Properties of Fourier Analysis, Average & RMS values of a Periodic Complex wave, Expression of Power with Non-Sinusoidal Voltage & Current, Shifting of a Function, Fourier Analysis Applications in Circuit Analysis

UNIT: IV ELECTRICAL CIRCUIT ANALYSIS USING LAPLACE TRANSFORMS

10L

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

UNIT: V FILTERS**10L**

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)

TEXTBOOKS:

1. Van Valkenburg M.E, “Network Analysis”, Prentice Hall of India, 3 rd Edition, 2000.
2. Ravish R Singh, “Network Analysis and Synthesis”, McGrawHill, 2 nd 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, 5 th Edition, 2017.
4. Jagan N.C, Lakshminarayana C., “Network Analysis”, B.S. Publications, 3 rd Edition, 2014.
5. William Hayt H, Kimmerly Jack E. and Steven Durbin M, “Engineering Circuit Analysis”, McGraw Hill, 6 th Edition, 2002.
6. Chakravarthy A., “Circuit Theory”, Dhanpat Rai & Co., First Edition, 1999.

WEB REFERENCES:

1. <https://nptel.ac.in/courses/108105159>
2. https://onlinecourses.nptel.ac.in/noc20_ee64/preview

CS206ES: PYTHON PROGRAMMING LABORATORY

B.Tech. I Year II Sem.

L	T	P	C
0	1	2	2

Course Objectives:

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

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

- Develop the application specific codes using python.
- Understand Strings, Lists, Tuples and Dictionaries in Python
- Verify programs using modular approach, file I/O, Python standard library
- 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. i) Write a program to convert a list and tuple into arrays.
ii) Write a program to find common values between two arrays.
2. Write a function called gcd that takes parameters a and b and returns their greatest common divisor.
3. 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.
 - a. 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.
 - b. Add an attribute named `color` to your Rectangle objects and modify `draw_rectangle` so that it uses the `color` attribute as the fill color.
 - c. 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.
 - d. 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. a) 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

PH207BS: APPLIED PHYSICS LABORATORY
(for all Branches)

B.Tech. I Year II Sem

L	T	P	C
0	0	3	1.5

Course Objectives:

The objectives of this course for the student to

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, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
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 dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
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. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)
b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method. 9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam
b) Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
12. Understanding the method of least squares – torsional pendulum as an example.

Note: Any 8 experiments are to be performed.

Reference book:

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

**EN208HS:ENGLISH LANGUAGE AND COMMUNICATION
SKILLS LABORATORY**

B.Tech. I Year II Sem.

L T P C

0 0 2 1

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

Course Objectives:

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

Course Outcomes: Students will be able to:

- ✓ Understand the nuances of English language through audio-visual experience and group activities
- ✓ Neutralise their accent for intelligibility
- ✓ Speak with clarity and confidence which in turn enhances their employability skills

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

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

Listening Skills:

Objectives

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

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

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

Speaking Skills:

Objectives

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

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

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. *Practice:* Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs-Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English. *Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: 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: Introduction to Group Discussion

Practice: Group Discussion

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 followingspecifications:

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

2. Interactive Communication Skills (ICS) Lab :

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

Source of Material (Master Copy):

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

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

Suggested Software:

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

REFERENCE BOOKS:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook*. CengageLearning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook*. CambridgeUniversity Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook*. Oxford UniversityPress
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*. CambridgeUniversity Press

**EE209ES : ELECTRICAL CIRCUIT ANALYSIS -II
LABORATORY**

B.TECH. I YEAR II SEMESTER

L	T	P	C
0	0	2	1

Prerequisite: Electrical Circuit Analysis – I&II

Course Objectives:

1. To study the transient analysis of various R, L and C circuits for different inputs
2. To learn about two-port networks
3. To understand the Harmonic Analysis of Non – Sinusoidal waveform
4. To understand the frequency domain analysis of Low pass filter and High pass filter
5. To understand the locus diagrams

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

1. Observe the response of various R, L and C circuits for DC excitation
2. Evaluate the two port network parameters
3. Observe the Harmonic Analysis of Non – Sinusoidal waveform
4. Analyze the frequency domain analysis of Low pass filter and High pass filter.
5. Draw the Locus diagram of Series RL & RC circuits

List of Experiments:

The following experiments are required to be conducted as compulsory

1. Determination of Time response of first order RL and RC circuit for periodic non – Sinusoidal inputs – Time Constant and Steady state error.
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 – Z & Y parameters.
4. Determination of Two port network parameters – A, B, C, D parameters
5. Harmonic Analysis of non-sinusoidal waveform signals using Harmonic Analyzer and plotting frequency spectrum
6. To draw the locus Diagrams of RL (R-Varying) and RC (R-Varying) Series Circuits.
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. Frequency domain analysis of High-pass filter
2. Determination of Two port network parameters -Hybrid parameters.
3. To draw the locus Diagrams of RL (L-Varying) Series Circuits.
4. To draw the locus Diagrams of RC (C-Varying) Series Circuits

WEB REFERENCES:

1. <https://phet.colorado.edu/en/simulations/circuit-construction-kit-dc-virtual-lab>

*MC210: ENVIRONMENTAL SCIENCE

B. Tech. I Year II Sem

L	T	P	C
3	0	0	0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Learn about water, mineral and energy resources. Environmental impacts associated with the natural resources.
- Understand the importance of biodiversity, levels of biodiversity and their values.
- Understanding the environmental policies and regulations.

Course Outcomes:

- Students will examine and learn how organisms modify their environments to sustain their needs.
- Students will be able to understand about renewable and non-renewable resources.
- Students will understand about the threats to biodiversity.
- Students will learn about types of pollution and their control technologies.
- Students will understand the environmental policies and regulations.

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

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

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

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water,

Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHILearning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHILearning 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, BSPublications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

MA301BS: NUMERICAL METHODS AND COMPLEX VARIABLES

(Offered in II B.Tech I Sem - EEE)

B. Tech. II Year I Sem.

L T P C

3 1 0 4

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

Course Objectives: To learn

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

And Expansion of complex functions using Taylor's and Laurent's series.

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

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

UNIT-I: Fourier Series & Fourier Transforms:

10 L

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

UNIT-II: Numerical Methods-I

10 L

Solution of polynomial and transcendental equations: Bisection method, Iteration Method, Newton- Raphson method and Regula-Falsi method. Jacobi and Gauss-Seidal iteration methods for solving linear systems of equations.

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

UNIT-III: Numerical Methods-II**8 L**

Numerical integration: Trapezoidal rule and Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rules.
Ordinary differential equations: Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order for first order ODE

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

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

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

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

ME302ES: SOLID MECHANICS AND HYDRAULIC MACHINES

B.Tech. II Year I Sem

L T P C

3 0 0 3

Course Objectives:

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

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

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

Course Objectives	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
To identify an appropriate structural system and work comfortably with basic engineering mechanics and types of loading & support conditions that act on structural systems.	3	3	3	3	3	3	1	1	2	2	1	3
To Understand the meaning of centers of gravity, centroids, moments of	3	2	3	2	3	3	2	2	2	3	2	3

Inertia and rigid body dynamics.												
To Study the characteristics of hydroelectric power plant and Design of hydraulic machinery.	3	2	3	1	3	3	1	1	2	2	2	3

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Solve problems dealing with forces, beam and cable problems And understand distributed force systems.	3	3	3	3	3	3	3	1	2	1	1	2
Solve friction problems and determine moments of Inertia and centroid of practical shapes.	3	3	3	3	3	3	3	3	3	3	2	3
Apply knowledge of mechanics in addressing problems in hydraulic machinery and its principles that will be utilized in Hydropower development and for other practical usages.	3	2	2	2	3	3	3	2	1	3	3	2

UNIT-I:

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

UNIT-II:

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

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

UNIT-III:

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

UNIT-IV:

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

UNIT-V:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

EC303ES: ANALOG ELECTRONICS

B. Tech. II Year I Sem.

L T P C

3 0 0 3

Course Objectives:

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

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

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

UNIT-I:

Diode and Bipolar Transistor Circuits: P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, clamping and clipping circuits. Input output characteristics of BJT in CB, CE, CC configurations, biasing circuits, Load line analysis, common-emitter, common-base and common collector amplifiers; Small signal equivalent circuits,

UNIT-II:

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

UNIT-III:

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

UNIT-IV:

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

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

UNIT-V:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

EE304PC: ELECTRICAL MACHINES-I

B.TECH. II YEAR I SEMESTER

L	T	P	C
3	1	0	4

Prerequisite: Electrical Circuit Analysis-I &II

Course Objectives:

1. To study different types of DC machines and their performance
2. To understand the performance evaluation of DC machines through various testing methods.
3. To understand the operation of single and poly-phase Transformers
4. To analyze the performance of transformers through various testing methods.
5. To Understand different connections of Poly phase transformers.

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

1. Explain the theory and principle of operation of DC generators.
2. Explain the theory and principle of operation of DC Motors.
3. Analyze the performance of DC machines through various testing methods.
4. Understand the operation of single and poly-phase Transformers
5. Analyze the performance of transformers through various testing methods.

UNIT: I D.C. GENERATORS

10L

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

UNIT: II D.C MOTORS

10L

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

UNIT: III TESTING OF DC MACHINES

10L

Methods of Testing – direct, indirect, and regenerative testing – Brake test – Swinburne's test – Hopkinson's test –Field's test - separation of stray losses in a D.C. motor test.

UNIT: IV SINGLE PHASE TRANSFORMERS**10L**

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

UNIT: V TESTING OF TRANSFORMERS AND POLY-PHASE TRANSFORMERS 10L

Open Circuit and Short Circuit tests - Sumpner's test - predetermination of efficiency and regulation- separation of losses test parallel operation with equal and unequal voltage ratios - auto transformers- equivalent circuit - comparison with two winding transformers. Poly-phase transformers – Poly-phase connections - Y/Y, Y/ Δ , Δ /Y, Δ / Δ and open Δ , Scott connection and Applications.

TEXTBOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 5th Edition, 2017.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
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. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002

WEB REFERENCES:

1. <https://nptel.ac.in/courses/108105155>
2. <https://nptel.ac.in/courses/108105017>

EE305PC: ELECTRO MAGNETIC FIELDS

B.TECH. II YEAR I SEMESTER

L T P C

3 0 0 3

Prerequisite: Ordinary Differential Equations and Vector Calculus & Applied Physics.

Course Objectives:

1. To introduce the concepts of electric field and magnetic field.
2. To know applications of electric fields in the development of the theory for power transmission lines and electrical machines.
3. To know applications of magnetic fields in the development of the theory for power transmission lines and electrical machines.
4. To study about electromagnetic waves.
5. To learn about Poynting Theorem

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

1. Analyze the basic laws of electromagnetism.
2. Obtain the electric and magnetic fields for simple configurations under static conditions.
3. Analyze time varying electric and magnetic fields.
4. Apply Maxwell's equation in different forms and different media.
5. Analyze the propagation of EM waves.

UNIT: I STATIC ELECTRIC FIELD

10L

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

UNIT: II CONDUCTORS, DIELECTRICS AND CAPACITANCE

10L

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

UNIT: III STATIC MAGNETIC FIELDS AND MAGNETIC FORCES

10L

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

Unit: IV TIME VARYING FIELDS AND MAXWELL'S EQUATIONS

10L

Faraday's law for Electromagnetic induction, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations, Motional Electromotive forces.

UNIT: V ELECTROMAGNETIC WAVES**10L**

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

TEXTBOOKS:

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

REFERENCE BOOKS:

1. W. J. Duffin, "Electricity and Magnetism", McGraw Hill Publication, 1980.
2. W. J. Duffin, "Advanced Electricity and Magnetism", McGraw Hill, 1968.
3. E. G. Cullwick, "The Fundamentals of Electromagnetism", Cambridge University Press, 1966.
4. D. Popovic, "Introductory Engineering Electromagnetics", Addison-Wesley Educational Publishers, International Edition, 1971.
5. A. Pramanik, "Electromagnetism - Theory and applications", PHI Learning Pvt. Ltd, New Delhi, 2009.

WEB REFERENCES:

1. <https://nptel.ac.in/courses/108104087>
2. <https://archive.nptel.ac.in/courses/108/106/108106073/>

EE306PC: ELECTRICAL MACHINES – I LABORATORY

B.TECH. II YEAR I SEMESTER

L	T	P	C
0	0	2	1

Prerequisite: Electrical Machines- I

Course Objectives:

1. To expose the students to the operation of DC Generators.
2. To know the operation of various types of DC Motors.
3. To examine the performance of Single-Phase Transformers.
4. To examine the performance of Three Phase Transformers.
5. To observe the different connections of three phase transformer.

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

1. Start and control the Different DC Machines.
2. Assess the performance of different machines using different testing methods
3. Identify different conditions required to be satisfied for self - excitation of DC Generators.
4. Separate iron losses of DC machines into different components
5. The student able to assess the performance of the transformer.

List of Experiments:

The following experiments are required to be conducted as compulsory

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. Predetermination of efficiency of DC shunt motor with suitable test and Speed Control of DC Shunt Motor
5. Brake test on DC compound motor (Determination of performance curves)
6. Hopkinson's test on DC shunt machines (Predetermination of efficiency)
7. Determination of Equivalent Circuit Parameters of a Single-Phase Transformer
8. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star Delta, Delta-Delta, Delta-star, Star-Star).

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

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

WEB REFERENCES:

1. <https://ems-iitr.vlabs.ac.in/>

EC307ES :ANALOG ELECTRONICS LABORATORY

B. Tech. II Year I Sem.

L T P C

0 0 2 1

Prerequisites: Analog Electronic Circuits

Course Objectives:

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

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

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

List of Experiments:

1. Draw the VI Characteristics of given PN Junction diode. Determine the Static and Dynamic resistance of the Diode.
2. Determine the Ripple factor, %Regulation PIV and TUF of the given Rectifier with & without filter.
3. Obtain the I/O Characteristics of CE configurations of BJT. Calculate h-parameters from the Characteristics.
4. Obtain the I/O Characteristics of CB configurations of BJT. Calculate h-parameters from the Characteristics.
5. Obtain the I/O Characteristics of CC configurations of BJT. Calculate h-parameters from the Characteristics.
6. Obtain the Drain and Transfer characteristics of CD,CS configuration of JFET. Calculate g_m , r_d from the Characteristics Adder and Subtractor using Op Amp.

7. Inverting and Non-inverting Amplifiers using Op Amps
8. Adder and Subtractor using Op Amp
9. Integrator Circuit using IC 741.
10. Differentiator circuit using Op Amp.
11. Current Shunt Feedback amplifier
12. Design an RC phase shift oscillator circuit and derive the gain condition for oscillations practically for given frequency.
13. Design a Colpitts oscillator circuit for the given frequency and draw the output waveform.
14. Design transformer coupled class A power amplifier and draw the input and output waveforms, find its efficiency

□ **Experiments related to MOSFET may be included**

EE308PC: ELECTRICAL SIMULATION LABORATORY

B.TECH. II YEAR I SEMESTER

L T P C

0 0 2 1

Prerequisite: Electrical Circuit Analysis I & II

Course Objectives:

1. To understand basic block sets of different simulation platform used in electrical/electronic circuit design.
2. To realize use and coding in different software tools used in electrical/ electronic circuit design.
3. To know about the simulation of electric machines/circuits for performance analysis.
4. To Model the Voltage Regulator using suitable simulation tool.
5. To comprehend the performance Solar of PV model using suitable simulation tool.

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

1. Develop knowledge of software packages to model and program electrical and electronics systems.
2. Model different electrical and electronic systems and analyze the results.
3. Articulate importance of software packages used for simulation in laboratory experimentation by analyzing the simulation results.
4. Analyze the performance of Solar PV model using suitable simulation tool.
5. Analyze the software tool for any engineering and real time applications.

List of Experiments:

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

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

Students should be encouraged to use open-source software's such as SCILAB, ORCAD, LTSPICE, Ngspice, Octave, Solve Elec, Simulide, CircuitLab, QElectroTech, Circuit Sims, DcAcLab, Every Circuit, DoCircuitsetc. for carrying out the lab simulation listed below. Use of Professional Licensed versions of softwares like MATLAB, LabVIEW, NI Multisim, PSpice, PowerSim, TINA etc. is also allowed.

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

MC310: GENDER SENSITIZATION LABORATORY

B.TECH II YEAR I SEMESTER

L	T	P	C
0	0	2	0

PREREQUISITES: No

COURSE OBJECTIVE:

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 and to expose students to more egalitarian interactions between men and women

COURSE OUTCOME: Upon completion of the course, students will be able to:

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 labor 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. Students will develop a sense of appreciation of women in all walks of life.

Unit-1 Understanding Gender

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

Unit-2 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 ConsequencesDeclining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Unit-3 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-4 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-5 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.

TEXT BOOK:

1. “Towards a World of Equals: A Bilingual Textbook on Gender” written by A.Suneetha, Uma Bhugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu published by Telugu Akademi, Telangana Government in 2015.

ASSESSMENT AND GRADING::

1. Discussion & Classroom Participation: 20%
2. Project/Assignment: 30%
3. End Term Exam: 50%

Note: 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”

EE401PC: POWER SYTEMS-I

B.TECH. II YEAR II SEMESTER

L	T	P	C
3	0	0	3

Prerequisite: Solid Mechanics & Hydraulic Machines, Electrical Machines-I &II

Course Objectives:

1. To understand the power generation through conventional and non-conventional sources.
2. To illustrate the economic aspects of power generation and tariff methods.
3. To know about overhead line insulators.
4. To distinguish different types of substations.
5. To understand the concepts of AC & DC distribution systems.

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

6. Understand the operation of conventional and renewable electrical power generating stations.
7. Evaluate the power tariff methods and Economics associated with power generation.
8. Analyze the operations of Overhead transmission lines.
9. Understand the operations AIS & GIS.
10. Analyze the operation of DC and AC Distribution systems.

UNIT: I GENERATION OF ELECTRIC POWER 10L

Conventional Sources (Qualitative): Hydro station, Steam Power Plant, Nuclear Power Plant and Gas Turbine Plant. Non-Conventional Sources (Elementary Treatment): Solar Energy, Wind Energy, Fuel Cells, Ocean Energy, Tidal Energy, Wave Energy, Cogeneration, Energy conservation and storage.

UNIT: II ECONOMICS OF POWER GENERATION 10L

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

UNIT: III OVER HEAD TRANSMISSION LINES 10L

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

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

UNIT: IV SUBSTATIONS 10L

AIR INSULATED SUBSTATIONS (AIS): Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams. GAS INSULATED SUBSTATIONS (GIS): Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, bus bar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations

UNIT: V DC AND AC DISTRIBUTION**10L**

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

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

TEXTBOOKS:

1. C.L. Wadhwa, "Generation, Distribution and Utilization of Electrical Energy", 3rd Edition, New Age International, 2015.
2. A. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, "A Textbook on Power System Engineering", Dhanpat Rai Publishing Company (P) Ltd, 2009.

REFERENCE BOOKS:

1. C.L. Wadhwa, "Electrical Power Systems", 8th Edition, New Age International, 2022.
2. M.V. Deshpande, "Elements of Electrical Power Station Design", 3rd Edition, Wheeler Pub.1998.
3. H. Cotton & H. Barber, "The Transmission and Distribution of Electrical Energy", 3rd Edition, 1970.

WEB REFERENCES:

1. <https://nptel.ac.in/courses/108105104>
2. <https://nptel.ac.in/courses/108105067>

EE402PC: MEASUREMENTS AND INSTRUMENTATION

B.TECH. II YEAR II SEMESTER

L	T	P	C
3	0	0	3

Prerequisite: Electrical Circuit Analysis-I & II, Analog Electronics, Electro Magnetic Fields

Course Objectives:

1. To introduce the basic principles of all measuring instruments
2. To understand the constructional details and principle of operation of basic analog and digital measuring instruments.
3. To deal with the measurement of voltage, current, Power factor, power, energy, and magnetic measurements.
4. To understand the basic concepts of smart and digital metering.
5. To know about the working of Cathode Ray Oscilloscope

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

1. Illustrate different types of measuring instruments, their construction, operation and characteristics
2. Identify the instruments suitable for typical measurements
3. Apply the knowledge about transducers and instrument transformers to use them effectively.
4. Analyze smart and digital metering for industrial applications.
5. Examine the operation of potentiometer for calibration of Instruments.

UNIT: I INTRODUCTION TO MEASURING INSTRUMENTS 10L

Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – extension of range of E.S. Voltmeters.

UNIT: II POTENTIOMETERS & INSTRUMENT TRANSFORMERS 10L

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

UNIT: III MEASUREMENT OF POWER & ENERGY 10L

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

UNIT: IV DC & AC BRIDGES**10L**

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

UNIT: V TRANSDUCERS**10L**

Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics, and choice of transducers; Principal operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, and photo diodes. INTRODUCTION TO SMART AND DIGITAL METERING: Digital Multi-meter, True RMS meters, Clamp- on meters, Digital Energy Meter, Cathode Ray Oscilloscope, Digital Storage Oscilloscope.

TEXTBOOKS:

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications, 2005.
2. William D. Cooper, Albert D. Helfrick, "Electronic Instrumentation and Measurement Techniques" Prentice Hall; 3rd edition, 1985

REFERENCE BOOKS:

1. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011
2. Dr. Rajendra Prasad, "Electrical Measurements & Measuring Instruments", Khanna Publishers 1989.
3. G. K. Banerjee, "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016.
4. R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007.
5. S. C. Bhargava, "Electrical Measuring Instruments and Measurements", BS Publications, 2012.
6. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.

WEB REFERENCES:

1. <https://nptel.ac.in/courses/108/105/108105153/>
2. <https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ee44/>
3. <https://www.classcentral.com/course/swayam-electrical-measurement-and-electronic-instruments-14032>

EE403PC: ELECTRICAL MACHINES – II

B.TECH. II YEAR II SEMESTER

L	T	P	C
3	0	0	3

Prerequisite: Electrical Circuit Analysis-I & II, Electrical Machines-I

Course Objectives:

1. To deal with the detailed analysis of poly-phase induction motors & Alternators.
2. To understand operation, construction, and types of single-phase motors and
3. To understand the applications of in household appliances and control systems.
4. To introduce the concept of parallel operation of alternators.
5. To Know about the working of BLDC motor & its applications.

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

1. Analyze the concept of rotating magnetic fields.
2. Calculate maximum and starting torque
3. Determine Regulation by synchronous impedance method, M.M.F. method
4. Analyze parallel operation and load sharing of synchronous motor
5. Apply concepts of Motors Step Motors.

UNIT: I POLY-PHASE INDUCTION MACHINES

10L

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

UNIT: II INDUCTION MACHINES

10L

Torque equation-expressions for maximum torque and starting torque - torque slip characteristic - equivalent circuit - phasor diagram - crawling and cogging, No-load Test and Blocked rotor test –Predetermination of performance-Methods of starting and starting current and Torque calculations, Applications. SPEED CONTROL METHODS: Change of voltage, change of frequency, voltage/frequency, injection of an EMF into rotor circuit (qualitative treatment only)-induction generator-principle of operation

UNIT: III SYNCHRONOUS MACHINES

10L

Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation. Harmonics in generated e.m.f. – suppression of harmonics – armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics. Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two

reaction analysis – experimental determination of X_d and X_q (Slip test) Phasor diagrams – Regulation of salient pole alternators.

UNIT-IV PARALLEL OPERATION OF SYNCHRONOUS MACHINES 10L

Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing -Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactance's and Applications. SYNCHRONOUS MOTORS: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed. - Hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT: V SINGLE PHASE MACHINES 10L

Single phase induction motor – Constructional Features-Double revolving field theory – split-phase motors – AC series motor- Universal Motor- -Shaded pole motor and Applications.

TEXTBOOKS:

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

REFERENCE BOOKS:

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

WEB REFERENCES:

1. <https://nptel.ac.in/courses/108102146>
2. https://onlinecourses.nptel.ac.in/noc22_ee06/preview

EC404ES: DIGITAL CIRCUITS

B. Tech. II Year II Sem.

L T P C

2 0 0 2

Prerequisites: Analog Electronics

Course Objectives:

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

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

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

UNIT-I:

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

UNIT-II:

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

UNIT-III:

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

UNIT-IV:

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

UNIT-V:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

EE405PC: CONTROL SYSTEMS

B.TECH. II YEAR II SEMESTER

L T P C

3 1 0 4

Prerequisite: : Matrices and Calculus, Ordinary Differential Equations and Vector Calculus, Numerical Methods and Complex variables

Course Objectives:

1. To understand the different ways of system representations such as Transfer function representation and statespace representations.
2. To study the characteristics of closed loop control system.
3. To evaluate the system performance using time domain analysis and methods for improving it
4. To assess the system performance using frequency domain analysis and techniques for improving theperformance.
5. To Understand the concepts of controllability and observability

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

1. Analyze closed-loop control systems for stability and steady-state performance.
2. Develop the modeling of linear-time-invariant systems using transfer function and state spaceRepresentations.
3. Evaluate transfer function for a given control system problems.
4. Formulate different types of analysis in frequency domain to explain the nature of the system.
5. Identify the needs of different types of controllers and compensators to ascertain the required dynamicresponse.

UNIT: I MODELLING OF PHYSICAL SYSTEMS

10L

Basic Components of a control Systems, Classification of control systems-Linear &Non-Linear, Time-Variant &Invariant, Continuous & Discrete, Dynamic &Static, andOpen-Loop &Closed-loop systems. Examples and Characteristics of Open Loop and closed Loop Control Systems. Mathematical models of physical systems- Transfer function -Electrical and Mechanical Systems. Block diagram representation and reduction techniques-Signal Flow Graphs.

UNIT: II TIME RESPONSE ANALYSIS

10L

Time response of first and second order systems for standard test inputs. Application of initial and final value theorem, Design specifications for second-order systems based on the time-response. Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems

UNIT: III STABILITY ANALYSIS**10L**

Concept of Stability. Routh-Hurwitz Criteria. Relative and Conditional stability analysis – limitations of Routh's stability. The root locus concept - construction of root loci-effects of adding poles and zeros to $G(s)$ $H(s)$ on the root loci.

UNIT: IV FREQUENCY RESPONSE ANALYSIS**10L**

Relationship between time and frequency response, Polar plots, Bode plots. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed loop frequency response

UNIT: V STATE VARIABLES ANALYSIS**10L**

State space model. Diagonalization of State Matrix. Solution of state equations. Eigen values and Stability Analysis. Concept of controllability and observability. Effect of Lag, lead and lag-lead compensation on frequency response-Design of Lag, lead and lag & lead compensator using bode plots

TEXTBOOKS:

1. M. Gopal, "Control Systems: Principles and Design", McGraw Hill Education, 1997.
2. B. C. Kuo, "Automatic Control System", Prentice Hall, 1995.

REFERENCE BOOKS:

1. K. Ogata, "Modern Control Engineering", Prentice Hall, 1991.
2. I. J. Nagrath and M. Gopal, "Control Systems Engineering", New Age International, 2009.

WEB REFERENCES:

1. https://en.wikibooks.org/wiki/Control_Systems/Resources

E TEXTBOOKS:

1. <https://www.pdfdrive.com/the-control-systems-handbook-control-system-advanced-methods-second-edition-electrical-engineering-handbook-d175616386.html>
2. <https://www.pdfdrive.com/linear-control-system-analysis-and-design-with-matlab-sixth-edition-automation-and-control-engineering-book-53-d187590194.html>

EC406ES: DIGITAL CIRCUITS LABORATORY

B. Tech. II Year II Sem.

L T P C

0 0 2 1

Prerequisites: Analog Electronics & Digital Electronics

Course Objectives:

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

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

- ☐ Understand the working of logic families and logic gates.
- ☐ Design and implement Combinational and Sequential logic circuits.

☐ **Analyze different types of semiconductor memories.**

List of Experiments:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

EE407PC: MEASUREMENTS AND INSTRUMENTATION LABORATORY

B.TECH. II YEAR II SEMESTER

L	T	P	C
0	0	2	1

Prerequisite: Measurements and Instrumentation

Course Objectives:

1. To calibrate LPF Watt Meter, energy meter, P. F Meter using electro dynamo meter type instrument as the standard instrument
2. To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges & A. C Bridges
3. To determine three phase powers using single wattmeter method practically
4. To determine the ratio and phase angle errors of current transformer and potential transformer.
5. To perform Dielectric oil testing using H.T. testing Kit

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

1. To select instruments.
2. Analyze any electrical instrument
3. Find the accuracy of any instrument by performing experiment.
4. Calibrate PMMC instrument using D.C potentiometer.
5. Estimate the Strength of Dielectric oil.

List of Experiments:

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

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

In addition to the above eight experiments, at least any two of the experiments from the following

list are required to be conducted:

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

WEB REFERENCES: 1. <http://vlabs.iitkgp.ernet.in/asnm/exp10/index.html>

EE408PC: ELECTRICAL MACHINES – II LABORATORY

B.TECH. II YEAR II SEMESTER

L	T	P	C
0	0	2	1

Prerequisite: Electrical Machines-I & Electrical Machines-II

Course Objectives:

1. To understand the operation of Induction, Synchronous machines and Transformers.
2. To learn the performance analysis of Induction Machines by various testing methods.
3. To study the performance analysis of Synchronous Machines through various testing methods.
4. To analyze the performance of single and 3-phase phase transformer.
5. To determine X_d and X_q parameters of a salient pole synchronous machine

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

1. Assess the performance of different types of AC machines using different testing methods.
2. Analyze the suitability of AC machines for real word applications.
3. Analyze the suitability of Transformers for real word applications.
4. Design the machine models based on the application requirements.
5. Evaluate the Efficiency of a three-phase alternator

List of Experiments:

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

1. No-load & Blocked rotor tests on three phase Induction motor
2. Brake test on three phase squirrel cage Induction Motor
3. Equivalent Circuit of a single-phase induction motor
4. Regulation of a three –phase alternator by synchronous impedance method.
5. Regulation of three-phase alternator by Z.P.F method
6. ‘V’ and ‘Inverted V’ curves of a three—phase synchronous motor.
7. Determination of X_d and X_q of a salient pole synchronous machine
8. Parallel Operation of Alternators

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

1. Efficiency of a three-phase alternator
2. Measurement of sequence impedance of a three-phase alternator.
3. Regulation of three-phase alternator by A.S.A method
4. Regulation of a three –phase alternator by m.m.f. method.

WEB REFERENCES:

1. <https://ems-iitr.vlabs.ac.in/>
2. http://vlabs.iitb.ac.in/vlabs-dev/vlab_bootcamp/bootcamp/Sadhya/index.php

EE409PC: Research Oriented Mini Project/Field Based Project

MC409: CONSTITUTION OF INDIA

B.TECH II YEAR II SEMESTER

L	T	P	C
3	0	0	0

PREREQUISITES: NIL

COURSE OBJECTIVE: Students will be able to:

1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.
4. To address the federal structure and distribution of legislative and financial powers between unions and states.
5. Understand the scheme of fundamental rights

COURSE OUTCOME: Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
4. Discuss the passage of the Hindu Code Bill of 1956.
5. Discuss the judicial activism and its historic contributions in the world

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.

TEXT BOOKS:

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.

REFERENCE BOOKS:

1. Rajeev Bhargava (ed), Ethics and Politics of the Indian Constitution, Oxford University Press, New Delhi, 2008.
2. Granville Austin, The Indian Constitution: Cornerstone of a Nation, Oxford University Press, Oxford, 1966.
3. Zoya Hassan, E. Sridharan and R. Sudarshan (eds), India's Living Constitution: Ideas, Practices, Controversies, Permanent Black, New Delhi, 2002.
4. Subhash C. Kashyap, Our Constitution, National Book Trust, New Delhi, 2011.

WEB REFERENCES:

1. Cec.Ugc. Reference Consortium for Educational Communication, New Delhi, India.
2. <https://legislative.gov.in/constitution-of-india>.
3. <https://www.refworld.org/docid/3ae6b5e20.html>.
4. http://164.100.47.193/Refinput/Research_notes/English/04122019_153433_1021204140.pdf.

TEXT BOOKS:

1. An Introduction to the Constitution of India : Author : M.V.Pylee, Vikas Publishing House (PVT) Limited.
2. The Constitution of India, Analysis and Interpretation. Author : Kall Pada Chakravarti, Prentice Halls.
3. Indian Constitution and Indian Polity. Author : S.G.Subramanian, Pearson Publication.