ACE
ENGINEERINGCOLLEGE
Ankushapur, Ghatkesar–501 301

B. Tech. in ELECTRICAL AND ELECTRONICS ENGINEERING
COURSE STRUCTURE & SYLLABUS (ACER22 Regulations)

Applicable from AY 2022-23Batch

I Year I Semester

S. No.	Course Code	Course Title	L	T	P	Credits
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.	Course Code	Course Title	L	T	P	Credits
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**

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 solvingthe 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 thesystem 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 Editon, 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, 9^{th}Edition, Pearson, Reprint,2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
    4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and CompanyLimited, 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 controlto 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- Dulongs 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 Associatively, Expression Evaluation, Type conversions, Statements.

UNIT - II
Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Recursion.
Designing Structured Programs- Functions, basics, user defined functions, inter function communication, standard functions.
Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays.

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

UNIT - IV
Derived types – The Typedef, enumerated types, Structures – Declaration, definition and initialization of structures, accessing structures, operations on structures, complex structures. Unions – Referencing unions, initializers, unions and structures.
Input and Output – Text vs Binary streams, standard library functions for files, converting file types, File programs – copy, merge files.

UNIT – V
Sorting- selection sort, bubble sort, insertion sort,
Searching-linear and binary search methods.
Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:

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

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

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 byusing 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, Developmentof 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 Potentiomentry.
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, YeswanthKanitkar
 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 andvolume 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 worldproblems.
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 , 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 theirapplications.

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 CompanyLimited, 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, CO_2 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, 2ndEdition,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. Bhandhopadhya - Nano Materials, New Age International, 1stEdition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion andStorage 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 engineeringproducts. 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 toprescribed 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 pluming,fitting, carpentry, and foundry, house wiring and welding.
- CO3: Identify and apply suitable tools for different trades of Engineering processes includingdrilling, 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 WoodWorking

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. Nayler, 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 ofProper 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 Agreementand 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 andEvents – 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 forPractice.

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

UNIT - IV
Chapter entitled **'Art and Literature' by Abdul Kalam** from *"English: Language,
Context andCulture"* 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 andCulture"* 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 notcovered 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 arecovered 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 EngineeringStudents. 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 returnsTrue 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 Apertureof 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 andindependent 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 ofEnglish by providing an opportunity for practice in speaking
- ✓ To improve the fluency of students in spoken English and neutralize the impact ofdialects.
- ✓ 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 groupactivities
- ✓ 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 theLSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speechof 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 professionalcontexts
- 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 SkillsLab**.

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 insentences – Intonation.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress patternin 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 Requestsand 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 AmericanPronunciation -*Testing Exercises*

ICS Lab:
Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing
Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions –
Thankingand 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: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, 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 forUniversity 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 PHLLearning 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.