



**B.Tech. in COMPUTER SCIENCE AND ENGINEERING (CSE),
CSE (Data Science), CSE (Cyber Security)
COURSE STRUCTURE & SYLLABUS (SR23 Regulation)**

Applicable for the Academic Year 2023-24

I Year I Semester

S. No.	Course Code	Course	L	T	P	Credits
1.	S23MA101BS	Matrices and Calculus	3	1	0	4
2.	S23CH102BS	Engineering Chemistry	3	1	0	4
3.	S23CS103ES	Programming for Problem Solving	3	0	0	3
4.	S23EE104ES	Basic Electrical Engineering	2	0	0	2
5.	S23ME105ES	Computer Aided Engineering Graphics	1	0	4	3
6.	S23CS106ES	Elements of Computer Science & Engineering	0	0	2	1
7.	S23CH107BS	Engineering Chemistry Laboratory	0	0	2	1
8.	S23CS108ES	Programming for Problem Solving Laboratory	0	0	2	1
9.	S23EE109ES	Basic Electrical Engineering Laboratory	0	0	2	1
		Induction Program				
		Total	12	2	12	20

I Year II Semester

S. No.	Course Code	Course	L	T	P	Credits
1.	S23MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	S23PH202BS	Applied Physics	3	1	0	4
3.	S23ME203ES	Engineering Workshop	0	1	3	2.5
4.	S23EN204HS	English for Skill Enhancement	2	0	0	2
5.	S23EC205ES	Electronic Devices and Circuits	2	0	0	2
6.	S23CS206ES	Python Programming Laboratory	0	1	2	2
7.	S23PH207BS	Applied Physics Laboratory	0	0	3	1.5
8.	S23EN208HS	English Language and Communication Skills Laboratory	0	0	2	1
9.	S23CS209ES	IT Workshop	0	0	2	1
10.	S23*MC210	Environmental Science	3	0	0	0
		Total	13	4	12	20



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
MATRICES AND CALCULUS
(S23MA101BS)

B.Tech. I Year I Sem.

L T P C

3 1 0 4

Course Objectives:

- To acquire knowledge over the rank of a matrix and apply this concept to solve a system of linear equations.
- To learn the evaluation of improper integrals using Beta and Gamma functions.
- To use the partial derivatives for finding maxima and minima of functions of two and three variables.

Course Outcomes:

After learning the contents of this course, the students will be able to

1. Represent a system of linear equations in the form of a matrix, analyze & obtain its solution.
2. Obtain the canonical form of any quadratic form by using the orthogonal transformation.
3. Evaluate improper integrals using Beta-Gamma functions and verify mean value theorems for given mathematical functions.
4. Locate the maxima and minima of functions of two variables with or without constraint.
5. Find out areas and volumes by using double and triple integrals.

UNIT - I: Matrices

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

UNIT - II: Eigen values and Eigen vectors

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

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)

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)

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

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. T. K. V. Iyengar and Krishna Gandhi, Engineering Mathematics-I, S. Chand, 20th Edition, 2023.

MOOCS References:

1. https://onlinecourses.nptel.ac.in/noc23_ma88/preview
2. https://onlinecourses.nptel.ac.in/noc23_ma33/preview



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
ENGINEERING CHEMISTRY
(S23CH102BS)

B.Tech. I Year I Sem.

L T P C
3 1 0 4

Course Objectives :

- To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
- To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
- To imbibe the basic concepts of petroleum and its products.
- To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes :

After learning the content of this course,

1. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
2. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. The students will gain the knowledge about different types of fuels, combustion and refining of petroleum.
5. Student will describe the different types of smart materials, cements, and Lubricants and their engineering applications.

UNIT - I: Water and its treatment

Introduction to hardness of water – Estimation of hardness of water by complex metric 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 F⁻ ion by ion- selective electrode method.

Boiler troubles: Sludges, 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

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

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.

UNIT - III: Polymeric materials

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- thermos plastic and thermos setting plastics, Preparation, Properties and engineering applications of PVC, Bakelite, Teflon, and

Rubbers: Natural rubber and its vulcanization.

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

Conducting polymers : 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

Thermal energy: Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula. Classification-**solid fuels:** coal – analysis of coal – proximate and ultimate analysis and their significance. **Liquid fuels** – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; **Gaseous fuels** – composition and uses of natural gas, LPG and CNG

UNIT - V: Engineering Materials:

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 -- 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

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)



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
PROGRAMMING FOR PROBLEM SOLVING
(S23CS103ES)

B.Tech. I Year I Sem.

L T P C
3 0 0 3

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of the C programming language.
- To learn the usage of structured programming approaches in solving problems.

Course Outcomes:

At the end of the course the student will be able to;

1. To write algorithms and to draw flow charts for solving problems and convert them into programs.
2. To code and test, a given logic in the C programming language using different programming constructs.
3. To decompose a problem into functions and to develop modular Reusable code.
4. To use arrays, pointers, strings and structures to write C programs.
5. To solve Searching and sorting problems

UNIT-I: Introduction to Programming

Compilers, compiling and executing a program.

Representation of Algorithm - Algorithms for finding roots of a quadratic equations, finding minimum and numbers of a given set, finding if a number is prime number Flowchart /Pseudo code with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression valuation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, go to, Iteration with for, while, do-while loops

I/O : Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr. Command line arguments

UNIT-II: Arrays, Strings, Structures and Pointers:

Arrays : one and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self-referential structures in linked list (no implementation) Enumeration data type

UNIT-III: Preprocessor and File handling in C:

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef

Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

UNIT-IV: Function and Dynamic Memory Allocation:

Functions : Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion : Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions. Dynamic memory allocation : Allocating and freeing memory, Allocating memory for arrays of different data types

UNIT-V: Searching and Sorting:

Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

Text Books:

1. Jeri R. Hanly and Elliot B. Koffman, Problem solving and Program Design in C 7th Edition, Pearson
2. B.A. Forouzan and R. F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

Reference Books:

1. Brian W. Kernighan and Dennis M .Ritchie, The C Programming Language, Prentice Hall of India
2. E. Balaguruswamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. YashavantKanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C : The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, Mc Graw-Hill



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
BASIC ELECTRICAL ENGINEERING
(S23EE104ES)

B.Tech. I Year I Sem.

L T P C
2 0 0 2

Course Objectives :

- To understand DC and Single & Three phase AC circuits
- To study and understand the different types of DC ,AC machines and Transformers.
- To import the knowledge of various electrical installations and the concept of power ,power factor and its improvement.

Course Outcomes :

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

1. Understand and analyze basic Electrical circuits
2. Study the working principles of Electrical Machines and Transformers
3. Introduce components of Low Voltage Electrical Installations.

UNIT-I:

D.C. Circuits :Electrical circuit elements (R,L and C),voltage and current sources, KVL & KCL ,analysis of simple circuits with dc excitation. Super position, The venin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II:

A.C. Circuits : Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor ,Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel),resonance in series R-L-C circuit .Three-phase balanced circuits ,voltage and current relations in star and delta connections.

UNIT-III:

Transformers : Idea land practical transformer ,equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV:

Electrical Machines : Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor Significance of torque –slip characteristics. Single-phase induction motor ,Construction and working. Construction and working of synchronous generator.

UNIT-V:

Electrical Installations : Components of LT Switchgear : Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries .Elementary calculations for energy consumption , power factor improvement and battery backup.

Text Books:

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

Reference Books:

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



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
 Applicable from AY 2023-24
COMPUTER AIDED ENGINEERING GRAPHICS
(S23ME105ES)

B.Tech. I Year I Sem.

L T P C
1 0 4 3

Course Objectives:

- To acquire visualization & computer drafting skill for ideas in engineering design.
- To apply drafting techniques using Auto CAD overall.
- To prepare the student to draw pictorial views of solids by Computer aided drafting.
- To enable the student for creation of 2D & 3D CAD Modelling of objects.
- To acquire the knowledge to plot conversion of isometric views to orthographic view by Computer aided drafting.

Course Outcomes:

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

1. Apply computer aided drafting tools to create 2D and 3D objects.
2. Sketch conics and different types of solids.
3. Design the Sectional views and Development of surfaces of solids.
4. Develop and interpret engineering drawings.
5. Prepare the 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, Epi-cycloid 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

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

Moocs:

<https://www.classcentral.com/course/swayam-engineering-graphics-5305>

<https://www.classcentral.com/course/swayam-engineering-drawing-and-computer-graphics-19856>

<https://www.classcentral.com/course/swayam-engineering-architectural-graphics-part-ii-isometric-and-axonometric-drawings-58454>



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING
(S23CS106ES)

B.Tech. I Year I Sem.

L T P C
0 0 2 1

Course Objectives :

- To provide an overview of the subjects of computer science and engineering

Course Outcomes :

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

1. Know the working principles of functional units of a basic Computer
2. Understand program development ,the use of data structures and algorithms in problem solving.
3. Know the need and types of operating system , database systems.
4. Understand the significance of net works, internet , WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence.

UNIT-I

Basics of a Computer – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software – systems software, application software, packages, frameworks, IDEs.

UNIT-II

Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development–steps in program development, flow charts, algorithms, data structures – definition, types of data structures

UNIT-III

Operating systems : Functions of operating systems, types of operating systems, Device & Resource management

Database Management Systems : Data models, RDBMS, SQL, Database Transactions, data centers, cloud services

UNIT-IV

Computer Networks: Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensor networks, vehicular networks, 5G communication.

World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Online social networks.

Security–information security, cyber security, cyber laws

UNIT-V

Autonomous Systems : IoT, Robotics, Drones, Artificial Intelligence–Learning, Game Development, natural language processing, image and video processing.

Cloud Basics

Text Book:

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Spring field.

Reference Books:

1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education ,Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata Mc Graw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage.



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
ENGINEERING CHEMISTRY LABORATORY
(S23CH107BS)

B.Tech. I Year I Sem.

L T P C
0 0 2 1

Course Objectives :

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

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
- Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

Course Outcomes :

The experiments will make the student gain skills on:

1. Determination of parameters like hardness of water
2. 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.
3. Students are able to prepare polymers like bakelite and Nylon-6.
4. Estimations saponification value and viscosity of lubricant oils.
5. Estimation of rate of corrosion of mild steel in various conditions in presence and absence of inhibitors.

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. P H Metry : Determination of an acid concentration using pH meter.

V. Preparations:

1. Preparation of Bakelite.
2. Preparation of Nylon-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 Biomedical 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.
- College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
PROGRAMMING FOR PROBLEM SOLVING LABORATORY
(S23CS108ES)

B.Tech. I Year I Sem.

L T P C
0 0 2 1

Course Objectives :

- To work with an IDE to create, edit, compile ,run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept.
- To create ,read from and write to text and binary files

Course Outcomes :

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

1. Formulate the algorithms for simple problems
2. Translate given algorithms to a working and correct program
3. Correct syntax errors as reported by the compilers
4. Identify and correct logical errors encountered during execution
5. Represent and manipulate data with arrays, strings and structures
6. Use pointers of different types
7. Create, read and write to and from simple text and binary files
8. Modularize the code with functions so that they can be reused.

Practice Sessions:

- a. Write a simple program that prints the results of all the operators available in C (including pre / post increment, bitwise and / or / not, etc.). Read required operand values from standard input.
- b. Write a simple program that converts one given data type to another using auto conversion and casting .Take the values from standard input.

Simple numeric problems:

- a. Write a program for finding the max and min from the three numbers.
- b. Write the program for the simple, compound interest.
- c. Write a program that declares Class awarded for a given percentage of marks, where mark <40% = Failed, 40% to < 60% = Second class, 60% to <70% = First class, >= 70% = Distinction. Read percentage from standard input.
- d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be :
- e. 5 X 1 = 5
- f. 5 X 2 =10

- g. $5 \times 3 = 15$
- h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

- a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula $s = ut + \frac{1}{2}at^2$ where u and a are the initial velocity in m/sec ($= 0$) and acceleration in m/sec^2 ($= 9.8m/s^2$)).
- b. 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)
- c. Write a program that finds if a given number is a prime number
- d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
- e. A Fibonacci sequence is defined as follows : the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- f. Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
- g. Write a C program to find the roots of a Quadratic equation.
- h. Write a C program to calculate the following, where x is a fractional value.
- i. $1 - \frac{x}{2} + \frac{x^2}{4} - \frac{x^3}{6}$
- j. Write a C program to read in two numbers, x and n , and then compute the sum of this geometric progression : $1 + x + x^2 + x^3 + \dots + x^n$. For example : if n is 3 and x is 5, then the program computes $1 + 5 + 25 + 125$.

Arrays, Pointers and Functions:

- a. Write a C program to find the minimum, maximum and average in an array of integers.
- b. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in a single dimension array.
- c. Write a C program that uses functions to perform the following:
- d. Addition of Two Matrices
- e. Multiplication of Two Matrices
- f. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be the same.
- g. Write C programs that use both recursive and non-recursive functions
- h. To find the factorial of a given integer.
- i. To find the GCD (greatest common divisor) of two given integers.
- j. To find x^n
- k. Write a program for reading elements using a pointer into an array and display the values using the array.
- l. Write a program for display values reverse order from an array using a pointer.
- m. Write a program through a pointer variable to sum of n elements from an array.

Files:

- a. Write a C program to display the contents of a file to standard output device.
- b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
- c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.

- d. Write a C program that does the following :
- It should first create a binary file and store 10 integers, where the filename and 10 values are given in the command line. (hint: convert the strings using atoi function)
- Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint :use fseek function)
- The program should then read all 10 values and print them back.
- e. 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).

Strings:

- Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
- Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
- Write a C program that uses functions to perform the following operations:
- To insert a sub-string into a given main string from a given position.
- To delete n Characters from a given position in a given string.
- Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
- Write a C program that displays the position of a character ch in the string S or -1 if S doesn't contain ch.
- Write a C program to count the lines, words and characters in a given text.

Miscellaneous:

- Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
- Write a C program to construct a pyramid of numbers as follows:

```

1           *           1           1           *
1 2        **          2 3         2 2         **
1 2 3      ***         4 5 6       3 3 3       ***
                                           4 4 4 4      **
                                           *

```

Sorting and Searching:

- Write a C program that uses non recursive function to search for a Key value in a given
- list of integers using linear search method.
- Write a C program that uses non recursive function to search for a Key value in a given
- Sorted list of integers using binary search method.
- Write a C program that implements the Bubble sort method to sort a given list of
- Integers in ascending order.
- Write a C program that sorts the given array of integers using selection sort in descending order
- Write a C program that sorts the given array of integers using insertion sort in ascending order
- Write a C program that sorts a given array of names

Text Books:

- Jeri R. Hanly and Elliot B. Koffman, Problem solving and Program Design in C 7th Edition, Pearson
- B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

Reference Books:

- Brian W.Kernighan and Dennis M.Ritchie, The C Programming Language, PHI

2. E.Balaguruswamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R. G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, McGraw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, Mc Graw-Hill



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
BASIC ELECTRICAL ENGINEERING LABORATORY
(S23EE109ES)

B.Tech. I Year I Sem.

L T P C
0 0 2 1

Course Objectives :

- To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
- To study the transient response of various R,L and C circuits using different excitations.
- To determine the performance of different types of DC , AC machines and Transformers

Course Outcomes :

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

1. Verify the basic Electrical circuits through different experiments.
2. Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
3. Analyze the transient responses of R, L and C circuits for different input conditions.

List of experiments / demonstrations:

PART- A(compulsory)

1. Verification of KVL and KCL
2. Verification of Thevenin's and Norton's theorem
3. Transient Response of Series R L and R C circuits for DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three- phase Induction Motor.

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

1. Verification of Super position theorem.
2. Three Phase Transformer: Verification of Relationship between Voltages and Currents(Star-Delta, Delta-Delta, Delta-star, Star-Star)
3. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
4. Measurement of Active and Reactive Power in a balanced Three-phase circuit
5. No-Load Characteristics of a Three-phase Alternator

Text Books:

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

Reference Books:

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



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(S23MA201BS)

B.Tech. I Year II Sem.

L T P C

3 1 0 4

Course Objectives :

- To solve first- and higher-order differential equations.
- To apply Laplace transforms for solving ordinary differential equations.
- To apply Green's, Gauss's and Stokes Theorems to line, surface, and volume integrals.

Course Outcomes :

After learning the contents of this course, students will be able to

1. Analyze and solve industrial problems using first-order differential equations.
2. Solve higher order linear differential equations with constant coefficients.
3. Apply the Laplace transform techniques for solving ordinary differential equations.
4. Find out the tangent planes and normal lines of any given surface.
5. Evaluate the line, surface, and volume integrals and establish the relationship among them.

UNIT-I: First Order ODE

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

UNIT-II: Ordinary Differential Equations of Higher Order

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

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT-IV: Vector Differentiation

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

UNIT-V: Vector Integration

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

Text Books:

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

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. T. K. V. Iyengar and Krishna Gandhi, Engineering Mathematics-II, S. Chand, 1st Edition, 2019.

MOOCS References:

1. https://onlinecourses.nptel.ac.in/noc23_ma88/preview
2. https://onlinecourses.nptel.ac.in/noc23_ma33/preview



**B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)**

Applicable from AY 2023-24

APPLIED PHYSICS

(S23PH202BS)

B.Tech. I Year II Sem.

L T P C

3 1 0 4

Course Objectives:

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

Course Outcomes:

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

1. Demonstrate the physical world from a fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Demonstrate the features, synthesis mechanisms and applications of Nanomaterials.
5. Apply the concepts of Lasers and Optical fiber 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 independent Schrodinger wave equation - particle in one dimensional potential box. Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) – Fermi-Dirac distribution - Bloch's theorem – Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT - II: Semiconductors and Devices

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photodiode (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.

Text Books:

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

Reference Books:

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

Web Resources:

1. <https://nptel.ac.in/courses/115102023> (Quantum Mechanics and Applications by Prof. Ajoy Ghatak, IIT Delhi Lecture 1 and 2).
2. https://onlinecourses.nptel.ac.in/noc22_ee13/preview (Fundamentals of Semiconductor devices by Prof. Digbijoy N. Nath, IISc Bangalore Week 1 to Week 5).
3. <https://www.coursera.org/learn/nanotechnology#syllabus> (Nanotechnology: A Maker's course by Coursera)
4. https://onlinecourses.nptel.ac.in/noc23_ph33/preview (Introduction to Laser by Prof. M. R. Shenoy, IIT Delhi Week 1, Week3, Week4, Week 11, Week 12)



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
ENGINEERING WORKSHOP
(S23ME203ES)

B.Tech. I Year II Sem.

L T P C
0 1 3 2.5

Course Objectives :

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

Course Outcomes :

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

1. Operate on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.
5. Create different models in Tin -Smithy and Prepare different moulds in Foundry.

1. Trades For Exercises :

At least two exercises from each trade:

- I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Ten on 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. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
 Applicable from AY 2023-24
ENGLISH FOR SKILL ENHANCEMENT
(S23EN204HS)

B.Tech. I Year II Sem.

L T P C
2 0 0 2

Course Objectives :

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

Course Outcomes :

After learning the content of this course, Students will be able to:

1. Understand the importance of reading and writing and acquire basic proficiency in reading and writing modules of English
2. Choose appropriate expressions and sentence structures for their oral and written communication.
3. Develop comprehension skills from the known and unknown passages.
4. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
5. Students would be able to create substantial base by the formation of strong professional vocabulary

UNIT-I

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

Vocabulary : The Concept of Word Formation -The Use of Prefixes and Suffixes – Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - 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 Black Swan, Hyderabad.

Vocabulary : Words Often Miss pelt - 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 Black Swan, 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 Black Swan, 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 Black Swan, 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 Black Swan Pvt. Ltd, Hyderabad. 2022. Print.

Reference Books:

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

NOTE : Based on the content and interest level of the students the order of the lessons was changed in the syllabus



**B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)**

Applicable from AY 2023-24

**ELECTRONIC DEVICES AND CIRCUITS
(S23EC205ES)**

B.Tech. I Year II Sem.

**L T P C
2 0 0 2**

Course Objectives :

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of devices.
- To know the switching characteristic of devices.

Course Outcomes :

Upon completion of the Course, the students will be able to:

1. Acquire the knowledge of various electronic devices and their use on real life.
2. Know the applications of various devices.
3. Acquire the knowledge about the role of special purpose devices and their applications.

UNIT-I

Diodes : Diode – Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances, V-I Characteristics, Diode as a switch-switching times.

UNIT-II

Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

UNIT-III

Bipolar Junction Transistor (BJT) : Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times,

UNIT-IV

Junction Field Effect Transistor (FET) : Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, FET as Voltage Variable Resistor, MOSFET, MOSTET as a capacitor.

UNIT-V

Special Purpose Devices : Zener Diode-Characteristics, Zener diode as Voltage Regulator, Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode.

Text Books:

1. Jacob Millman - Electronic Devices and Circuits, Mc Graw Hill Education
2. Robert L. Boylestead, Louis Nashelsky - Electronic Devices and Circuits theory, 11th Edition, 2009, Pearson.

Reference Books:

1. Horowitz-Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. Chinmoy Saha, Arindam Halder, Debaati Ganguly - Basic Electronics - Principles and Applications, Cambridge, 2018.



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
PYTHON PROGRAMMING LABORATORY
(S23CS206ES)

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 :

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

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

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.
 - 1) Write a program to calculate compound interest when principal ,rate and number of
 - 2) periods are given.
 - 3) Given coordinates(x1,y1),(x2,y2) find the distance between two points
4. Read name ,address ,email and phone number of a person through key board and print the details.

Week-2:

1. Print the below triangle using for loop.5
 4 4
 3 33
 2 222
 1 1111
2. Write a program to check whether the given input is digit or lower case character or upper case 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.
 - i). 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. 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 "l", "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.
2. 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 then stop the letters in the word by corresponding letters in lowercase without using a built-in function?
3. Write 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 for 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 Inheritance.
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 ,lowercase letters and uppercase letters.

Week-8:

1. Import numpy, matplotlib 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. Super charged Python :Take your code to the next level ,Overland
2. Learning Python ,MarkLutz,O'reilly

Reference Books:

1. Python for Data Science, Dr. Mohd. Abdul Hameed, Wiley Publications-1stEd.2021.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Python Programming A Modular Approach with Graphics ,Database ,Mobile ,and Web Applications ,Sheetal Taneja, Naveen Kumar, Pearson
4. Programming with Python ,A User's Book, Michael Dawson, Cengage Learning, India Edition
5. Think Python, Allen Downey, Green Tea Press
6. Core Python Programming ,W. Chun, Pearson
7. Introduction to Python, Kenneth A. Lambert, Cengage



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
APPLIED PHYSICS LABORATORY
(S23PH207BS)

B.Tech. I Year II Sem.

L T P C
0 0 3 1.5

Course Objectives :

- Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
- 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.
- Able to measure the characteristics of dielectric constant of a given material.
- Study the behavior of B-H curve of ferromagnetic materials.
- Understanding the method of least squares fitting.

Course Outcomes :

At the end of the course the student 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. Carry out data analysis.

List of Experiments:

2. Determination of work function and Planck's constant using photoelectric effect.
3. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
4. Characteristics of series and parallel LCR circuits.
5. V-I characteristics of a p-n junction diode and Zener diode.
6. Input and output characteristics of BJT (CE, CB & CC configurations)
 - 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 Text book of Practical Physics" - S Chand Publishers, 2017.



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB
(S23EN208HS)

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 :

This LAB will enable the students to:

- 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 :

After learning the content of this course, the students will be able to

1. Understand the nuances of English language through individual, pair, and group Activities.
2. Speak with clarity and confidence which in turn enhances their employability skills.
3. Develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
4. Speak fluently in various activities viz group discussion, interviews, presentations, and public speaking.
5. Express themselves fluently and appropriately in social and professional contexts

BASIC COMMUNICATION SKILLS

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 One self 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- Neutralizing Mother Tongue Interference(MTI).

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

ICS Lab:

Understand : Descriptions-Narrations-Giving Directions and Guidelines–Blog Writing

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

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests-*Testing Exercises*

ICS Lab:

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

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

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests-*Testing Exercises*

ICS Lab:

Understand : Group Discussion

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 following specifications :

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

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. Part1,2,3.* 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.
- OxfordAdvancedLearner'sCompass, 10th Edition.
- English in Mind(Series1-4),Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use(Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary , Intermediate ,Advanced)Cambridge University Press.
- TOEFL & GRE(KAPLAN ,AARCO & BARRONS, USA ,Cracking GRE by CLIFFS).
- Digital All
- Oral Digital Language Lab(Licensed Version)

Reference Books:

1. (2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). Communication Skills: A Workbook. Oxford University Press
4. Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). English Language Skills: A Practical Approach. Cambridge University Press.
6. Strengthen your communication skills, Maruthi publication 2021.Web Resources

https://youtu.be/UcEq_RsCyxY-Nptel video1 on Group discussion

<https://youtu.be/9STcKFIfx5s> -Nptel video2 on Group discussion

<https://youtu.be/z-ce7fcKe1E> - Nptel video on presentation skills



**B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)**

Applicable from AY 2023-24

IT WORKSHOP

(S23CS209ES)

B.Tech. I Year II Sem.

L T P C

0 0 2 1

Course Objectives :

The IT Workshop for engineers is a training lab courses period over 60hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, PowerPoint and Publisher.

Course Outcomes :

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

1. Perform Hardware troubleshooting
2. Understand Hardware components and inter dependencies
3. Safeguard computer systems from viruses/worms
4. Document/ Presentation preparation
5. Perform calculations using spreadsheets

PC Hardware

Task1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2 : Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1 : Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task2 : Web Browsers , Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for app lets should be configured.

Task 3: Search Engines & Netiquette : Students should know what search engines are and how to

use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet . They need to customize their browsers to block pop ups ,block active x downloads to avoid viruses and/ or worms.

LaTeX and WORD

Task1–Word Orientation :The mentor needs to give an over view of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word : Importance of LaTeX and MS office or equivalent (FOSS) tool Word a sword Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing tool bar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel–Accessing, over view of tool bars, saving excel files, Using help and resources.

Task1: Creating a Scheduler-Features to be covered : Gridlines, Format Cells, Summation, auto fill Formatting Text

Task 2 : Calculating GPA - Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

Power point

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power Point.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting–Background, textures, Design Templates Hidden slides.

Reference Books:

1. Comdex Information Technology course tool kit Vikas Gupta, *WILEY Dream tech*
2. The Complete Computer upgrade and repair book ,

3rd edition Cheryl A Schmidt, *WILEY Dreamtech*

3. Introduction to Information Technology, ITL Education Solutions limited, *Pearson Education*.
4. PC Hardware- A Hand book–Kate J. Chase *PHI*(Microsoft)
5. LaTeX Companion–Leslie Lamport, *PHI/Pearson*.
6. IT essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme.–*CISCO Press, Pearson Education*.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan–*CISCO Press, Pearson Education*.



B.Tech-CSE, CSE(DS), CSE(CS)
COURSE STRUCTURE & SYLLABUS (SR23 Regulations)
Applicable from AY 2023-24
ENVIRONMENTAL SCIENCE
(S23MC210)

B.Tech. I Year II Sem.

L T P C
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Course Objectives :

- To study about environment and ecosystems
- To study about different types of natural resource.
- To understand the concept of biodiversity and its conservation.
- To basic concept of causes, effect and control of different type of environmental pollution and its impact on natural resources.
- To understand the different policies & regulations of environmental aspects

Course Outcomes :

At the end of the course the student will be able to;

2. Gain knowledge about environment and ecosystems.
3. Learn about natural resource, its importance and environmental impacts of human activities on natural resources.
4. Gain knowledge about the conservation of biodiversity and its importance.
5. Aware about problems of environmental pollution, its impact on human and ecosystem and control measures.
6. Aware about rules & regulation acts of environment and its importance for sustainable development

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bio-accumulation, Bio-magnification, 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 ,Auto mobile and Industrial pollution, Ambient air quality standards .

Water pollution: Sources and types of pollution , drinking water quality standards.

Soil Pollution: Sources and types , Impacts of modern agriculture ,degradation of soil.

Noise Pollution :Sources and Health hazards ,standards,

Solid waste :Municipal Solid Waste management ,composition and characteristics of e-Waste and its management.

Pollution control technologies :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-Go Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA :Environmental Protection act, Legal aspects Air Act-1981,Water Act, Forest Act, Wildlife Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure ,methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan(EMP).

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

Text Books:

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

Reference Books:

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