MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

B.Tech- CSIT (R22) – I YEAR COURSE STRUCTURE AND SYALLABUS
Applicable From 2022-23 Admitted Batch

I YEAR I SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2210001	Matrix Algebra and Calculus	BS	3	1	0	4	40	60	100
2	2210009	Engineering Chemistry	BS	3	1	0	4	40	60	100
3	2210501	Programming for Problem Solving	ES	3	0	0	3	40	60	100
4	2210201	Basic Electrical Engineering	ES	2	0	0	2	40	60	100
5	2210371	Engineering Drawing Practice	ES	1	0	4	3	40	60	100
6	2210518	Elements of Computer Science and Engineering	ES	0	0	2	1	50	--	50
7	2210072	Engineering Chemistry Laboratory	BS	0	0	2	1	40	60	100
8	2210571	Programming for Problem Solving Laboratory	ES	0	0	2	1	40	60	100
9	2210271	Basic Electrical Engineering Laboratory	ES	0	0	2	1	40	60	100
		Induction Program	-	-	-	-	-	-	-	-
		Total Credits		**12**	**2**	**12**	**20**	**370**	**480**	**850**

I YEAR II SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2220002	Differential Equations and Vector Calculus	BS	3	1	0	4	40	60	100
2	2220008	Applied Physics	BS	3	1	0	4	40	60	100
3	2220372	Engineering Workshop	ES	0	1	3	2.5	40	60	100
4	2220010	English for Skill Enhancement	HSMC	2	0	0	2	40	60	100
5	2220401	Basics of Electronic Devices and Circuits	ES	2	0	0	2	40	60	100
6	2220572	Data Structures Laboratory	ES	0	1	2	2	40	60	100
7	2220071	Applied Physics Laboratory	BS	0	0	3	1.5	40	60	100
8	2220073	English Language and Communication Skills Laboratory	HSMC	0	0	2	1	40	60	100
9	2220575	IT Workshop	ES	0	0	2	1	40	60	100
10	2220021	Environmental Science	MC	3	0	0	0	-	-	-
		Total Credits		**13**	**4**	**12**	**20**	**360**	**540**	**900**

I-I

2210001: MATRIX ALGEBRA AND CALCULUS (Common to all)

B.Tech. I Year- I Semester   **L T P C**

                                                                          3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

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

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

CO1: Write the matrix representation of a set of linear equations and to analyses the
  solution of the System of equations.

CO2: Find the Eigen values and Eigen vectors and reduce the quadratic form to
  canonical form using orthogonal transformations.

CO3: Solve the applications on the mean value theorems, and evaluate the improper
  integrals using Beta and Gamma functions.

CO4: Find the extreme values of functions of two variables with/ without constraints.

CO5: 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**
Eigen values, Eigen vectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, 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 (without proofs). Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-IV: Multivariable Calculus (Partial Differentiation and applications)   10 L
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)   8 L
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 triple integrals (Cartesian to Spherical and Cylindrical polar coordinates).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, 5thEditon,2016.

REFERENCE BOOKS:
1. Erwin kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley & Sons,2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.
3. H. K. Dassand Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, NewDelhi.

2210009: ENGINEERING CHEMISTRY

B.Tech. I Year- I Semester　　　　　　　　　　　　　　　　　　　　**L T P C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　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 include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

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

UNIT - I: Water and its treatment: [8]
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 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 [8]
Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery 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.

UNIT - III: Polymeric materials: [8]
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 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: [8]
Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula. Classification- solid fuels: coal –
analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and
its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating,
synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas,
LPG and CNG, Biodiesel – Transesterification, advantages.

UNIT - V: Engineering Materials: [8]
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)

2210501: PROGRAMMING FOR PROBLEM SOLVING

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: The student will learn
- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in the C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

UNIT - I: Introduction to Programming
Compilers, compiling and executing a program.
Algorithm – Flowchart / Pseudocode 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 evaluation, 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, goto, 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) Enumerationdata 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 andrewind 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, (3rdEdition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia
2. E. Balagurusamy, 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, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

(2210201)BASIC ELECTRICAL ENGINEERING
(Common for ECE, CSE, CSC,CSD, CSM, CSIT & IT)

B.Tech. I Year- I Sem

L	T	P	C
2	0	0	2

Course Prerequisites: Nil

Course Objectives:
- To analyse and solve electric circuits.
- To provide an understanding of basics in Electrical circuits.
- To identify the types of electrical machines for a given application.
- To explain the working principles of Electrical Machines and single phase transformers.

Course Outcomes

After completion of this course the student is able to
- Analyse Electrical circuits to compute and measure the parameters of Electrical Energy.
- Comprehend the working principles of Electrical DC Machines.
- Identify and test various electrical switchgear, single phase transformers and assess the ratings needed in given application.
- Comprehend the working principles of electrical AC machines.

UNIT-IDC Circuits:

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin's and Norton's Theorems.

Learning Outcomes:

At the end of this unit, the student will be able to
- Explain the need of circuit elements. (L2)
- Analyse the resistive circuits with independent sources. (L4)
- Solve D.C. circuits by using KVL and KCL. (L3)
- Apply network theorems for solving D.C. circuit problems. (L3)

Unit-IIAC Circuits:

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

Learning Outcomes:

At the end of this unit, the student will be able to
- Develop an understanding of the fundamental laws and elements of A.C circuits. (L3)
- Learn the energy properties of electric elements and the techniques to measure voltage and current. (L2)
- Explain the concept of steady state. (L2)

UNIT-III Transformers:

Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Learning Outcomes:

At the end of this unit, the student will be able to

- Demonstrate knowledge of construction and operating principles of single-phase transformers. (L3)

- Determine losses, efficiency, and voltage regulation of a transformer under specific operating conditions. (L5)
- Identify the connections of a three phase transformer. (L3)
- Illustrate the performance characteristics of different induction motors. (L3)

UNIT-IV: Electrical Machines:

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dcmotor. Construction and working of synchronous generators.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain construction & working of induction motor - DC motor. (L2)
- Perform speed control of DC Motor. (L3)
- Explain principle and operation of DC Generator & Motor. (L2)

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.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand working principles of LT Switchgear components. (L2)
- Perform elementary calculations for energy consumption, power factor improvement and battery backup. (L3)

Text Books:

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshaiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.

Reference Books:

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin Pearson.

B.Tech. I Year – I Semester	**L**	**T**	**P**	**C**
	1	**0**	**4**	**3**

Pre-requisites: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

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COURSE OBJECTIVES
1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

COURSE OUTCOMES: After completion of the course the student is able to
1. Familiarize with BIS standards and conventions used in engineering graphics. (L3)
2. Draw various engineering curves e.g., ellipse, parabola, cycloids and involutes etc. andconstruct various reduced scales e.g., plain and diagonal scale. (L2)
3. Ability to draw orthographic projections and isometric projections of given engineering components. (L3)
4. Visualize different views like elevation and plan for a given line, plane figures or solid objects. (L2)
5. Develop the lateral surfaces of simple solids. (L5)
6. To know about isometric projection. (L2)

UNIT – 1	**CLASSES:12**

Introduction To Engineering Drawing
Principles of Engineering Graphics and their Significance-Drawing Instruments and their Uses-Conventions in Drawing-BIS -Lettering and Dimensioning.

Geometrical Constructions: Bisecting a Line, Arc. Dividing A Line into 'N' Equal Parts,Construction of Polygons, Division of Circle into Equal Parts (8 And 12)

Construction of Scales: Plain and Diagonal Scale.

Conic Sections: Ellipse, Parabola, Hyperbola and Rectangular Hyperbola- GeneralMethods only.

Engineering Curves: Cycloid, Epicycloid, Hypocycloid.

Involutes: For Circle, Triangle, Square, Pentagon and Hexagon.

LEARNING OUTCOME:
1. To understand the basic standards, conventions of engineering drawing and how to use the instruments in drawing. (L1)
2. Learn and draw the various types of curves used in engineering application. (L2)

UNIT – 2	**CLASSES:12**

Orthographic Projections
Principles- Assumptions- Different Angles of Projection.

Projections of Points- Located in all the quadrants

Projections of Lines- Parallel, Perpendicular, inclined to one plane and inclined to bothplanes.

Projections of Planes: Simple and auxiliary position of a plane.

LEARNING OUTCOME:
1. Knowledge in various planes of projections. (L1)
2. To draw the front view, top view and side views of the given geometrical elements. (L2)

UNIT – 3	**CLASSES :09**

Projections Of Solids
Classification of solids- simple and inclined to one plane position of Prisms, Pyramids, Cylinder and Cone

LEARNING OUTCOME:
1. To understand the various solid types. (L2)
2. To draw all the views of the given solid in all possible orientations. (L3)

UNIT – 4	**CLASSES :12**

Section Of Solids
Types of Section Planes, Sectioning of Prisms, Pyramids, Cylinders and Cones.
Development Of surfaces
Development of surfaces of right Regular Solids- Parallel Line Method, Radial Line Method.

LEARNING OUTCOME:
1. To identify the cut surfaces and represent the sectional views graphically when the solid is sectioned. (L4)
2. To develop the surfaces of solid using various methods. (L5)

UNIT – 5	CLASSES :09

Isometric Projections

Principles, Isometric Views of Planes, Solids- Box Method, Offset Method, Compound solids, Sectioned Solids. Conversion of Isometric to Multi view projection. And vice versa

LEARNING OUTCOME:
1. Knowledge in principles of isometric projection. (L2)
2. Conversion of isometric to orthographic and vice-versa. (L2)

TEXT BOOKS:
1. N.D.Bhatt, Elementary Engineering Drawing, Charotar Publishers,2012.
2. K.Veenugopal, –Engineering Drawing and Graphics + AutoCAD New Age International Pvt. Ltd, 2011.

REFERENCE BOOKS:
1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishers Engineering Drawing-Johle/Tata Macgraw Hill.
2. Basanth Agrawal and C M Agrawal –Engineering Drawing 2nd Edition -McGraw-Hill Education (India) Pvt.Ltd

2210518: ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

B.Tech. I Year - I Sem.   **L T P C**
                                                                                                     0 0 2 1

Course Objective: To provide an overview of the subjects of computer science and engineering.
Course Outcomes:
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 networks, 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.
An Introduction to Computer Science:
The Definition of Computer Science, Algorithms, the Importance of Algorithmic Problem Solving, A Brief History of Computing

UNIT – II
Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development.

UNIT – III
The Building Blocks: Binary Numbers, Boolean Logic, Introduction, The Binary Numbering System Binary Representation of Numeric and Textual Information, Binary Representation of Sound and Images. Computer Systems Organization: Introduction, Memory and Cache, Input/output and Mass Storage

UNIT – IV
Computer Networks, the Internet and the World Wide Web:
Introduction, Communication Links, Local Area Networks, Wide Area Networks, Overall Structure of the Internet, Communication Protocols.
A Brief History of the Internet and the World Wide Web: The Internet, The World Wide Web.
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, Springfield.
REFERENCE BOOKS:
1. Fundamentals of Computers, ReemaThareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage.

2210072: ENGINEERING CHEMISTRY LABARORARY

B.Tech. I Year – I Semester   **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:

- Determination of parameters like hardness of water and 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 bakelite and nylon-6.
- Estimations saponification value, surface tension and 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 Bakelite.
  2. Preparation Nylon – 6.
 II. **Lubricants:**
  1. Estimation of acid value of given lubricant oil.
  2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.
 III. **Corrosion:** Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.
 IV. **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.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

2210571: PROGRAMMING FOR PROBLEM SOLVING LABORATORY

B.Tech. I Year I – Semester.

L	T	P	C
0	0	2	1

[Note: The programs may be executed using any available Open Source/ Freely available IDESome of the Tools available are:
CodeLite: https://codelite.org/ Code: Blocks:
http://www.codeblocks.org/
DevCpp: http://www.bloodshed.net/evcpp.html
Eclipse: http://www.eclipse.org
This list is not exhaustive and is NOT in any order of preference]

Course Objectives: The students will learn the following:
- 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 create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:
- Formulate the algorithms for simple problems
- Able to develop programs based on condition checking
- Implement pyramid programs
- Able to perform matrix applications
- Modularize the code with functions so that they can be reused
- Create, read and write to and from simple text and binary files

Simple numeric problems:
a. Write a program for the simple, compound interest.
b. Write a program to implement bit-wise operators.
c. Write a program for converting Fahrenheit to Celsius.
d. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.
e. Writeasimpleprogramtofindlargestoftwoandthreenumbersusingconditionaloperator.
f. Writeaprogramforswappingtwonumberswithandwithoutusingthirdvariableandusingbitwiseo perators.

Condition branching and statements:
a. Write a program for finding larges of three numbers.
b. Write a program that declares Class awarded for a given percentage of marks, where marks<40%=Failed, 40% to<60% = Second class, 60% to<70%=First class, >=70%=Distinction. Read percentage from standard input.
c. Write a C program to find the roots of a Quadratic equation.
d. 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)

Condition branching and loops:
a. Write a program to find whether the given number is a prime or not.
b. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
c. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, number=5 and no. of rows = 3, the output should be:

$$5x1=5$$
$$5x2=10$$
$$5x3=15$$

d. Write a program that shows the binary equivalent of a given positive number between0to255.
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 calculate the following ,where x is a fractional value.$1-x/2+x^2/4-x^3/6$
h. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:$1+x+x^2+x^3+....+x^n$. For example: if n=3 and x=5, then the program compute$1+5+25+125$.
i. Write a C program to construct a pyramid of numbers as follows:

1	*	1	1	*
12	**	23	22	**
123	***	456	333	***
			4444	**
				*

j. Write a C program to find given number is Armstrong number or not.
k. Write a C program to find given number is Perfect number or not.

Arrays, Strings, Pointers and Structures:
a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a program to compute Mean, Variance, Standard Deviation, Sorting of n elements in single dimension array.
c. Write a C program that perform the following:
    i.   Addition of Two Matrices
    ii. Multiplication of Two Matrices
    iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
d. Write a C program that sorts a given array of names.
e. Write a C program that perform the following operations:
    i. To insert a sub-string into a given main string from a given position.
    ii. To delete n Characters from a given position in a given string.
f. Write a program for reading elements using pointer in to array and display the values using array.
g. Write a program for display values reverse order from array using pointer.
h. Write a program through pointer variable to sum of n elements from array.
i. Write a program to implement student information by using structure to function.
j. Write a program to sort student id or name using structures.

Functions:

a. Write a C program to find factorial of a given number using functions.

b. Write a C program to perform swapping using functions.

c. Write a C program to find LCM, GCD of two numbers using functions.

d. Write a C program to implement sorting using functions.

e. Write a C program to create and print two dimensional array using functions.

f. Write a C program to find factorial of a given number using recursion.

g. Write a C program to find Fibonacci series using recursion

h. Write a C program to implement Towers of Hanoi problem using recursion.

Files:

a. Write a C program to display the contents of a file to standard out put device.

b. Write a C program which copies one file to another, replacing all lower case characters with their upper case equivalents.

c. Write a C program to count the occurrence of a character in a text file. The file name and the character are supplied as command line arguments.

d. Write a C program to merge two files in to a third file (i.e. ,the contents of the first file followed by those of these cond are put in the third file).

CASE STUDY I: Develop Sample Student Data base

Create a structure to specify data on students given below: Roll number, Name, Department, Course, Year of joining

Assume that there are not more than 15 students in the collage.

(a) Write a function to print names of all students who joined in a particular year.

(b) Write a function to print the data of a student whose roll number is given.

CASE STUDY 2: Perform simple Bank Transactions

Create a structure to specify data of customers in a bank. The data to be stored is: Account number, Name, Balance in account. Assume maximum of 20 customers in the bank.

(a) Write a function to print the Account number and name of each customer with balance below Rs. 100.

(b) If a customer request for withdrawal or deposit, it is given in the form: Acct. no, amount, code (1 for deposit, 0 for withdrawal)

Write a program to give a message, "The balance is insufficient for the specified with drawal".

CASE STUDY 3: Provide Serial Numbers for Engine parts

An automobile company has serial number for engine parts starting from AA0 to FF9. The other characteristics of parts to be specified in a structure are: Year of manufacture, material and quantity manufactured.

(a) Specify a structure to store information corresponding to a part.

(b) Retrieve information on parts with serial numbers between BB1 and CC6.

Reference Books

1. Byron Gottfried, Schaum"s Outline of Programming with C, Mc Graw-Hill

2. Let us C by YashavantKanetkar BPB publications(16[th]Edition)

3. B.A.ForouzanandR.F.GilbergCProgrammingandDataStructures,CengageLearning,(3[rd]Edition)

4. BrianW.KernighanandDennisM.Ritchie,TheCProgrammingLanguage,PrenticeHallofIndia

5. R. G. Dromey, How to solve It by Computer, Pearson(16[th]Impression)

6. Programming in C, Stephen G.Kochan, Fourth Edition, and Pearson Education.

7. Herbert Schildt,   C:TheCompleteReference, McGrawHill,4[th]Edition.

(2210271)BASIC ELECTRICAL ENGINEERING LABORATOTY
(ECE, CSE, CSC, CSD, CSM, CSIT& IT)

B.Tech. I Year - I Semester   **L T P C**
                                                                                     0 0 2 1

Course Objectives:
To analyze a given network by applying various electrical laws and network theorems
- To know the response of electrical circuits for different excitations
- To calculate, measure and know the relation between basic electrical parameters.
- To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes:
- Get an exposure to basic electrical laws.
- Understand the response of different types of electrical circuits to different excitations.
- Understand the measurement, calculation and relation between the basic electrical parameters
- Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Verification of superposition theorem.
4. Verification of Thevenin's and Norton's theorem.
5. Resonance in series RLC circuit.
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer.
8. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
9. Torque-Speed Characteristics of a Three-phase Induction Motor.
   Any two experiments from the given list
10. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
11. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
12. Measurement of Active and Reactive Power in a balanced Three-phase circuit
13. 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 Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand, 2 nd Edition, 2019.

2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009

3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.

4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.

5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.

6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.

7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

I-II

2220002: DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS(Common to all)

B.Tech. I Year - II Semester   **L T P C**
                                                                    3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

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

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

CO1: Identify whether the given first order differential equation is exact or not.
CO2: Solve higher differential equation and apply the concept of differential equation
to real world problems.
CO3: Use the Laplace transforms techniques for solving ODE's.
CO4: Apply the Del operator to scalar and vector point functions.
CO5: Evaluate the line, surface and volume integrals and converting them from one to
another.

UNIT-I: First Order ODE   **8L**
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   **10 L**
Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin ax , cos ax, polynomials in x, $e^{ax} V(x)$ and x V(x), method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

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, Vector Identities, Scalar potential functions, Solenoidal and Irrotational vectors.

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

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

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

REFERENCE BOOKS:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. H. K. Dassand Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, NewDelhi.

B.Tech. I Year – II Semester   **L T P C**
                                                                                                        3 1 0 4

Prerequisites: 10 + 2 Physics

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 fibres.

Course Outcomes: At the end of the course the student will be able to:
1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of 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, Photoelectric effect, de-Broglie Hypothesis, Matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle, Born interpretation of the wave function, Time independent Schrodinger's wave equation, Particle in one dimensional potential box.
Solids: Free electron theory (Drude & Lorentz, Sommerfeld) (qualitative), Bloch's theorem -Kronig-Penney model, Effective mass of an 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.
Magnetic Materials: Domain theory of ferromagnetism, Soft and Hard magnetic materials, Magnetostriction, Magnetoresistance, Applications.
Energy Materials: Conductivity of liquid and solid electrolytes, Superionic conductors, Materials and electrolytes for super capacitors.

UNIT - IV: NANOTECHNOLOGY
Nanoscale, Quantum confinement, Surface to volume ratio, Bottom-up fabrication: Sol-gel, precipitation methods, Top-down fabrication: Ball milling, Physical vapor deposition (PVD), Characterization techniques: XRD, SEM and TEM, Applications of nano materials.

UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics, Three quantum processes, Einstein coefficients and their relations, Lasing action, Population inversion, Pumping methods, Ruby laser, He-Ne laser, Nd:YAG laser, Applications of laser.

Fiber Optics: Introduction to optical fibers, Total internal reflection, Construction of optical fiber, Classification of optical fibers, Acceptance angle - Numerical aperture, Losses in optical fibers, Optical fiber for communication system, Applications of optical fibers.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

2220372: ENGINEERING WORK SHOP

B.Tech. I Year - II Semester.   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, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, Equipment and machines

Course Outcomes:
- Explain the design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint. (L4)
- Demonstrate the design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit. (L4)
- Understand to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder. (L4)
- Demonstrate the design and model various basic prototypes in the trade of Welding. (L4)
- Explain to make various basic prototypes in the trade of Black smithy such as J shape, and S shape. (L4)
- Understand to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring. (L4)

UNIT I - CARPENTRY & FITTING
- **Carpentry** – Introduction, Carpentry tools, sequence of operations and applications (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
- **Fitting** – Introduction, fitting tools, sequence of operations and applications (V-Fit, Dovetail Fit & Semi-circular fit)

Learning Outcomes: Students should be able to,
- Understand the trade of carpentry and fitting. (L2)
- Explain the tools involved in manufacturing operations. (L3)
- Evaluate the applications of carpentry and fitting. (L4)

UNIT II - TIN SMITHY AND BLACKSMITHY
- **Tin-Smithy** – Introduction, Tin smithy tools, sequence of operations and applications (Square Tin, Rectangular Tray & Conical Funnel).
- **Blacksmithy**- Introduction, Blacksmithy tools, sequence of operations and applications (Round to Square, Fan Hook and S-Hook)

Learning Outcomes: Students should be able to,
- Understand the oldest manufacturing methods. (L2)
- Describe the sequence of operations involved. (L3)
- Explain the safety precautions and tools usage. (L4)

UNIT III - HOUSE WIRING AND WELDING

- **House-wiring** – Introduction, Electrical wiring tools, sequence of operations and applications (Parallel & Series, Two-way Switch and Tube Light)
- **Welding Practice** – Introduction, electrode, welding tools, and sequence of operations. Advantages and applications (Arc Welding)

Learning Outcomes:

- Students should be able to,
- Discuss the topic of Heat engines.(L3)
- Identify types of Heat engines cycles.(L5)
- Evaluate the Factors affecting routing procedure, Route Sheet.(L4)

Text Books:

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

References:

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

B.Tech. I Year - II Sem.   **L   T   P   C**
                                                                             2   0   0   2

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

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

UNIT - I

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

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

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

Reading: Reading and Its Importance- Techniques for Effective Reading.

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

UNIT - II

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

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

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

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

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

UNIT - III

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

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

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

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

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

UNIT - IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from *"English: Language, Context and Culture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English
Grammar: Redundancies and Clichés in Oral and Written Communication.
Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice
Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT - V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from *"English: Language, Context and Culture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage
Grammar: Common Errors in English (*Covering all the other aspects of grammar which were 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

2220401: BASICS OF ELECTRONIC DEVICES AND CIRCUITS
(Common to CSE, CSM, CSC, CSD, IT, CSIT)

B.Tech .I Year - II Semester   **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 characteristics of devices.
- To understand the various types of transistor configurations
- To study the special purpose devices

Course Outcomes:
   At the end of this course, students will demonstrate the ability to
- Understand the utilization of various semiconductor components
- Acquire the knowledge of various electronic devices and their use on real life.
- Understand the applications of various devices.
- Acquire the knowledge about the role of special purpose devices.
- Analyze different types of transistor characteristics

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
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, Christos C. Halkias, and Satyabrata Jit, "Electronic Devices and Circuits", 3rd Edition., Mc-Graw Hill Education, 2010.
2. Robert L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuits theory" 11th Edition, Pearson, 2013.

REFERENCES:

1. Donald Neamen, Dhrubes Biswas, "Semiconductor Physics and Devices" 4th Edition, McGraw Hill Education, 2017.

2. Steven T. Karris, "Electronic Devices and Amplifier Circuits with MATLAB Applications" Orchard Publications, 3rd Edition 2005.

3. Paul Horowitz, Winfield Hill, "The Art of Electronics" 3rd Edition Cambridge University Press, 1994.

2220572: DATA STRUCTURES LABORATORY

B.Tech. I Year - II Semester.　　　　　　　　　　　　　　　　　　　　**L T P C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　0 1 2 2

Prerequisites: A Course on "Programming for problem solving".
Course Objectives:
- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:
- Ability to develop C programs for computing and real life applications using basic
- elements like control statements, arrays, functions, pointers and strings, and data
- structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

List of Experiments
1. Write a program that uses functions to perform the following operations on singly linked list.: i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.: i) Creation ii) Insertion iii) Deletion
3. Write a program that uses functions to perform the following operations on circular linked list: i) Creation ii) Insertion iii) Deletion
4. Write a program that implement stack operations using i) Arrays ii) Pointers
5. Write a c program to implement infix to postfix conversion using stack.
6. Write a c program to implement postfix evaluation.
7. Write a program that implement Queue operations using i) Arrays ii) Pointers
8. Write a 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
9. Write a program that implements the following sorting methods to sort a given list of Integers in ascending order i) Merge sort ii) Quick sort
10. Write a program 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
11. Write a program to implement the tree traversal methods
12. Write a program to implement the graph traversal methods.

CASE STUDY-1 Balanced Brackets
A bracket is considered to be any one of the following characters: (,), {, }, [, or].
Two brackets are considered to be a *matched pair* if the an opening bracket (i.e., (, [, or {) occurs to the left of a closing bracket (i.e.,),], or }) *of the exact same type*. There are three types of matched pairs of brackets: [], {}, and ().
A matching pair of brackets is *not balanced* if the set of brackets it encloses are not matched. For example, {[(])} is not balanced because the contents in between { and } are not balanced. The pair of square brackets encloses a single, unbalanced opening bracket, (, and the pair of parentheses encloses a single, unbalanced closing square bracket,].
By this logic, we say a sequence of brackets is *balanced* if the following conditions are met:
- It contains no unmatched brackets.
- The subset of brackets enclosed within the confines of a matched pair of brackets is also a matched pair of brackets.

Given strings of brackets, determine whether each sequence of brackets is balanced. If a string is balanced, return YES. Otherwise, return NO.

CASE STUDY-2 Minimum Average Waiting Time

Mr. Raju owns a pizza restaurant and he manages it in his own way. While in a normal restaurant, a customer is served by following the first-come, first-served rule, Raju simply minimizes the average waiting time of his customers. So he gets to decide who is served first, regardless of how sooner or later a person comes.

Different kinds of pizzas take different amounts of time to cook. Also, once he starts cooking a pizza, he cannot cook another pizza until the first pizza is completely cooked. Let's say we have three customers who come at time t=0, t=1, & t=2 respectively, and the time needed to cook their pizzas is 3, 9, & 6 respectively. If Raju applies first-come, first-served rule, then the waiting time of three customers is 3, 11, & 16 respectively. The average waiting time in this case is (3 + 11 + 16) / 3 = 10. This is not an optimized solution. After serving the first customer at time t=3, Raju can choose to serve the third customer. In that case, the waiting time will be 3, 7, & 17 respectively. Hence the average waiting time is (3 + 7 + 17) / 3 = 9.

Help Raju achieve the minimum average waiting time. For the sake of simplicity, just find the integer part of the minimum average waiting time.

Note:

- The waiting time is calculated as the difference between the time a customer orders pizza (the time at which they enter the shop) and the time she is served.
- Cook does not know about the future orders.

TEXT BOOKS:
1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.
2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCES:
1. Data structures: A Pseudocode Approach with C, R.F.GilbergAndB.A.Forouzan, 2nd Edition, Cengage Learning.
2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON

22200071: APPLIED PHYSICS LABORATORY

B.Tech. I Year - II Semester   **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. V-I and L-I characteristics of light emitting diode (LED) and LASER.
7. V-I Characteristics of solar cell.
8. Determination of Energy gap of a semiconductor.
9. To determine the time constant of R-C circuit.
10. Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
11. Understanding the method of least squares – Torsional pendulum as an example.
12. Determination of magnetic field induction along the axis of a current carrying coil.

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

2220073: English Language and Communication Skills Laboratory

B.Tech. I Year - II Semester.

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 the students with the use of English in everyday situations both in formal and informal contexts.

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

Course Outcomes: Students will be able to:
- ✓ Understand the nuances of English language through audio- visual experience and group activities
- ✓ Neutralise their accent for intelligibility
- ✓ Speak with clarity and confidence which in turn enhances their employability skills

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:
a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

Listening Skills:
Objectives
1. To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the 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 professional contexts

• Oral practice
• Describing objects/situations/people
• Role play – Individual/Group activities
 • Just A Minute (JAM) Sessions

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

Exercise – ICALL 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 – IICALL 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 - IIICALL 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 – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IVCALL 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 – VCALL 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 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

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 course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, PowerPoint and Publisher.

Course Outcomes:
- Perform Hardware troubleshooting
- Understand Hardware components and inter dependencies
- Safeguard computer systems from viruses/worms
- Document/ Presentation preparation
- Perform calculations using spreadsheets

PC Hardware

Task 1: 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.

Task 3: 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.

Task 2: 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 applets 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

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX and MS office or equivalent (FOSS) tool Word as word 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 toolbar 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, overview of toolbars, saving excel files, Using help and resources.

Task 1: 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

Task 3: 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 PowerPoint.

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 Dreamtech*
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, *WILEYDreamtech*
3. Introduction to Information Technology, ITL Education Solutions limited, *Pearson Education.*
4. PC Hardware - A Handbook – 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 Anfinsonand 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.*

2220021: ENVIRONMENTAL SCIENCE

B.Tech. I Year – II Semester   **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.
- Understanding the environmental policies and regulations

Course Outcomes:
- Based on this course, the Engineering graduate will understand /evaluate / develop
  technologies on the basis of ecological principles and environmental regulations which in turn
  helps in 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, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

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

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

UNIT - IV
Environmental Pollution and Control Technologies: Environmental Pollution: Classification of
pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil.

Noise Pollution: Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental**

Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion
and Ozone depleting substances (ODS). Deforestation and desertification. International conventions /
Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V
Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water,R22 B.Tech. ECE Syllabus JNTU HYDERABAD biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

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

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

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