VIGNANA BHARATHI Institute of Technology
(A UGC Autonomous Institution, Approved by AICTE, Accredited by NBA & NAAC-A Grade, Affiliated to JNTUH)

Aushapur (V), Ghatkesar (M), Medchal – Dist. Telangana State – 501 301.

# DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (Cyber Security)

## (R22 B. TECH. CSC)

**ACADEMIC YEAR : 2023-24**

# I B.TECH (CSC) COURSE STRUCTURE & SYLLABUS

**B.TECH. COMPUTER SCIENCE & ENGINEERING**

**(Cyber Security)**

**EFFECTIVE FROM ACADEMIC YEAR 2023 - 24 ADMITTED BATCH**

# R22 COURSE STRUCTURE AND SYLLABUS

## I YEAR I – SEMESTER

| S.No. | Course Code | Course | Category | L | T | P | Credits |
|---|---|---|---|---|---|---|---|
| 1. | 22BS1111 | Matrices and Calculus | BS | 3 | 1 | 0 | 4 |
| 2. | 22BS1112 | Engineering Chemistry | BS | 3 | 1 | 0 | 4 |
| 3. | 22CS1113 | Programming for Problem Solving | ES | 3 | 0 | 0 | 3 |
| 4. | 22EE1114 | Basic Electrical Engineering | ES | 2 | 0 | 0 | 2 |
| 5. | 22ME1155 | Computer Aided Engineering Graphics | ES | 1 | 0 | 4 | 3 |
| 6. | 22CS1156 | Elements of Computer Science & Engineering | BS | 0 | 0 | 2 | 1 |
| 7. | 22BS1152 | Engineering Chemistry Laboratory | ES | 0 | 0 | 2 | 1 |
| 8. | 22CS1153 | Programming for Problem Solving Laboratory | ES | 0 | 0 | 2 | 1 |
| 9. | 22EE1154 | Basic Electrical Engineering Laboratory | ES | 0 | 0 | 2 | 1 |
| 10. | 22MC0001 | Induction Program | BS | | | | |
| | | **Total** | | **12** | **2** | **12** | **20** |

## I YEAR II – SEMESTER

| S.No. | Course Code | Course | Category | L | T | P | Credits |
|---|---|---|---|---|---|---|---|
| 1. | 22BS1211 | Ordinary Differential Equations and Vector Calculus | BS | 3 | 1 | 0 | 4 |
| 2. | 22BS1213 | Applied Physics | BS | 3 | 1 | 0 | 4 |
| 3. | 22ME1256 | Engineering Workshop | ES | 0 | 1 | 3 | 2.5 |
| 4. | 22HS1212 | English for Skill Enhancement | HS | 2 | 0 | 0 | 2 |
| 5. | 22EC1215 | Electronic Devices and Circuits | ES | 2 | 0 | 0 | 2 |
| 6. | 22BS1253 | Applied Physics Laboratory | BS | 0 | 0 | 3 | 1.5 |
| 7. | 22CS1251 | Python Programming Laboratory | ES | 0 | 1 | 2 | 2 |
| 8. | 22HS1252 | English Language and Communication Skills Laboratory | HS | 0 | 0 | 2 | 1 |
| 9. | 22IT1255 | IT Workshop | ES | 0 | 0 | 2 | 1 |
| 10. | 22MC0002 | Environmental Science | BS | 3 | 0 | 0 | 0 |
| | | **Total** | | **13** | **4** | **12** | **20** |

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# R22 B.Tech

# CSC

## 2023-2024

# I Year – I Semester

# 22BS1111-MATRICES AND CALCULUS

**I B Tech. I Semester**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Prerequisite(s):** Mathematical knowledge at Pre university level.

**Course Objectives:** Develop ability to learn the concept of

1. Rank of the matrix and apply the same to know the consistency for the linear system of equations.
2. Eigen values and Eigen vectors to reduce the quadratic form to canonical form.
3. Geometrical approach to the mean value theorems and their application to the mathematical problems, Evaluation of surface areas and volumes of revolutions of curves and evaluation of improper integrals using Beta and Gamma functions.
4. Partial differentiation and Finding maxima and minima of function of two and three variables.
5. Evaluation of multiple integrals and their applications.

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

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

## UNIT - I: MATRICES

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

## UNIT - II: EIGEN VALUES AND EIGEN VECTORS

Linear Transformation and Orthogonal Transformation: Eigenvalues, 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 (without proof). Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates for known curves (circle, parabola, ellipse), 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 for known curves (circle, parabola, ellipse), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

**TEXT BOOKS:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers,44th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

**REFERENCE BOOKS:**

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

## 22BS1112: ENGINEERING CHEMISTRY

**I B Tech. I Semester**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**Course Objectives:**

1. To acquire knowledge about desalination of brackish water and treatment of municipal water
2. To include the fundamental aspects of battery chemistry, significance of corrosion and it's control to protect the structures.
3. To gain the knowledge of conducting polymers, bio-degradable polymers and fiber reinforced plastics.
4. To understand the significance of green chemistry and green synthesis and to imbibe the green chemistry principles.
5. To acquire required knowledge about engineering materials like smart materials, lubricants, and biodiesel.

**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 Substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.
4. The student can use real examples to illustrate how the principles of *green chemistry* can be applied to chemical process in engineering
5. They can predict potential applications of engineering materials and practical utility in order become good engineers and entrepreneurs.

### UNIT - I: WATER AND ITS TREATMENT:

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

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:**

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 Thiokolrubber.

**Conducting polymers:** Characteristics and Classification with examples-mechanism of conduction intrans-polyacetylene and applications of conducting polymers.

**Biodegradable polymers:** Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

**UNIT - IV: GREEN CHEMISTRY AND ENGINEERING FOR SUSTAINABLE DEVELOPMENT:**

Definition and history of Green chemistry, Concept and principles (Prevention, Atom Economy, Less Hazardous Chemical Syntheses, Designing Safer Chemicals, Safer Solvents and Auxiliaries, Design for Energy Efficiency, Use of Renewable Feedstock, Reduce, Derivatives, Catalysis, Design for Degradation, Real-time Analysis for Pollution Prevention, Inherently Safer Chemistry for Accident Prevention) of Green Chemistry with suitable examples.

**UNIT - V: ENGINEERING MATERIALS:**

**Smart materials and their engineering applications**

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

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

**Bio Diesel:** Sources and applications of Biodiesel

**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. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.
4. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K.

Shashikala, Pearson Publications, 2021.
5. Engineering Chemistry by K Sesha Maheswaramma and Mridula Chugh, Pearson 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)

## 22CS1113: PROGRAMMING FOR PROBLEM SOLVING

**I B.Tech. I Semester**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Course Objectives:**

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of the C programming language.
4. To learn the usage of structured programming approaches in solving problems.
5. To learn the fundamentals of searching and sorting.

**Course Outcomes:** The student will learn

1. To write algorithms and to draw flowcharts for solving problems,To convert the algorithms/flowcharts to C programs.
2. To code and test a given logic in the C programming language.
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 implement 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 maximum numbers of a given set, finding if a number is prime number Flowchart/Pseudo code withexamples, 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:** Ternary operator, Bitwise operations: Bitwise AND, OR, XOR and NOT operators, expressions and precedence, Expression evaluation, type conversion.

**Conditional Branching and Loops:** Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, goto, Iteration with for, while, do- while loops

**I/O:** Simple input and output with scanf() and printf(), formatted I/O.

### UNIT - II: ARRAYS AND FUNCTIONS

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

**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.

**Storage class**es: auto, extern, static and register.

**Recursion:** Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Some C standard functions and libraries.

### UNIT - III: POINTERS, STRINGS &STRUCTURES.

**Pointers:** Idea of pointers, Defining pointers, usage of self-referential structures in linked list (no

implementation), passing pointers to functions, idea of call by reference.

**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 to Arrays and Structures, Use of Pointers in self-referential structures,
Enumerationdata type.

**UNIT - IV: FILE HANDLING IN C, PREPROCESSOR COMMANDS**

**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.

**Preprocessor Commands:** Commonly used Preprocessor commands like File inclusion, macros substitution, conditional compilation (include, define, undef, if, ifdef, ifndef )
Introduction to stdin, stdout and stderr.Command line arguments

**UNIT - V: SEARCHING AND SORTING TECHNIQUES:**

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).

**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 of India
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

## 22EE1114: BASIC ELECTRICAL ENGINEERING

**I B.Tech. I Semester**

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Prerequisites**: Mathematics

**Course Objectives:**

1. To study and understand DC circuits.
2. To study and understand Single& Three phase AC circuits.
3. To study and understand the Single Phase Transformers.
4. To study and understand the different types of DC and AC machines.
5. To have the knowledge of various electrical installations and the concept of power factor improvement.

**Course Outcomes:** After completion of this course, students will be able to

1. Analyze DC circuits using various techniques
2. Analyze Single& Three phase AC circuits
3. Discuss the working principles and estimate the performance of Single Phase Transformers
4. Discuss the Construction and working principle of different types of DC and AC machines.
5. Classify various components of Low Voltage Electrical Installations and identify the importance of power factor improvement

**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 (Series, Parallel, Series and Parallel circuits, Nodal Analysis and Mesh Analysis). Superposition, Thevenin's and Norton's 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 circuits only), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

**UNIT-III: SINGLE PHASE TRANSFORMERS**: Working Principle and construction of Transformer, Types, Ideal and practical transformer, EMF Equation, equivalent circuit, losses in transformers, regulation and efficiency.

**UNIT-IV: ELECTRICAL MACHINES**

**D. C. Generator:** Constructional details of D C Machine, Working Principle of D C Generator, EMF Equation, Types, Numerical Problems.

**D. C. Motor:** Working Principle of D C Motor, Types, Torque Equation, Numerical Problems Performance Characteristics of dc shunt motor.

**Three Phase Induction Motor**: Generation of rotating magnetic field, Construction and

working of a three-phase induction motor, Significance of torque-slip characteristics.

**Synchronous Generator:** 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. Elementary calculations for energy consumption, power factor improvement.

**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,2nd 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, 1stEdition, 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

## 22ME1155: COMPUTER AIDED ENGINEERING GRAPHICS

**I B.Tech. I Semester**

| L | T | P | C |
|---|---|---|---|
| 1 | 0 | 4 | 3 |

**Course Objectives:**

1. To develop the ability of visualization of different objects through technical drawings
2. To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products
3. To draw sectional views and pictorial views for various types of solids.
4. To develop the lateral surfaces of basic engineering objects
5. To impart knowledge about standard principles of orthographic projection and isometric views of different objects.

**Course Out comes:** 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. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpret engineering drawings
5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

**UNIT – I:**

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

**UNIT- II:**

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

**UNIT – III:**

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

**UNIT – IV:**

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

**UNIT – V:**

**ISOMETRIC PROJECTIONS:** Principles of Isometric Projection – Isometric Scale – Isometric

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

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

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

## 22CS1156: ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

**I B.Tech. I Semester**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 2 | 1 |

**Course Objective:**

1. To learn the fundamentals of computers.
2. To provide an overview of the subjects of computer science and engineering.
3. To learn the operating system, database management system, computer networks.
4. To understand the software development process.
5. To learn the various autonomous system

**Course Outcomes:**

1. Know the working principles of functional units of a basic Computer
2. Understandprogramdevelopment,theuseofdatastructuresandalgorithmsinproblemsolving.
3. Know the need and types of operating system, data base systems.
4. Understand the significance of networks, internet, WWW and cybersecurity.
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 –systemssoftware,applicationsoftware,packages,frameworks,IDEs.

**UNIT–II**

**SOFTWARE DEVELOPMENT** – waterfall model, Agile, Types of computer languages – Programming, markup, scripting, Program development steps, flowcharts, 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 communications.

WorldWideWeb–Basics, role of HTML, CSS, XML, Tools for web designing, social media, online social networks.

Security–information security, cyber security, cyber laws

**UNIT–V**

**AUTONOMOUSSYSTEMS:** IoT, Robotics, Drones, Artificial Intelligence–Learning, Game Development, natural language processing, image and video processing, Cloud Basics.

**TEXTBOOK:**

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.

**REFERENCEBOOKS:**

1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introductiontocomputers,PeterNorton,8thEdition,TataMcGrawHill.
3. ComputerFundamentals,AnitaGoel,PearsonEducationIndia,2010.
4. Elements of computer science, Cengage.

## 22BS1152: ENGINEERING CHEMISTRY LABORATORY

**I B.Tech. 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:

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

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

1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
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, surface tension and viscosity of lubricant oils.
5. Can perform the experiments making use of working models

**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.

**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.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

## 22CS1153: PROGRAMMING FOR PROBLEM SOLVING LAB

**I B.Tech. I Semester**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 2 | 1 |

**Course Objectives:**

1. To learn C-language Programs using the data types, input/ output statements and control statements.
2. Describe the importance of modular programing and arrays using C-Language Program.
3. Understand the concept and use of pointers for memory management techniques
4. Understand structure, union, and enumerated types.
5. Understand the basic characteristics of text, binary files and C implementation of file I/O using streams.

**Course Outcomes:**

1. Ability to design and test programs to solve mathematical and scientific problems.
2. Ability to write structured programs using control structures and functions.
3. Able to Implement C programs using arrays & pointers.
4. Able to Use the type definition, enumerated types, define and use structures, unions in programs using C language.
5. Able to execute programs that read and write text, binary files using the formatting and character I/O functions.

**EXPERIMENTS**

**WEEK-1:**

a. Write a C program to find simple interest and compound interest.
b. Write a C program to convert Celsius to Fahrenheit.
c. Write a C Program to swap two numbers.
d. Write a C program to perform all arithmetic operations (+, -, *, / , %).
e. 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.

**WEEK-2:**

a. Write a simple program that converts one given data type to another using auto Conversion and casting. Take the values from standard input.
b. Write a C program to check whether the given number is even or odd using Conditional Operator.
c. Write a C program to find the Largest of two numbers.
d. Write a C program to print ascending order of three given integers.

**WEEK-3:**

a. Write a C program to Check the given year is leap year or not.
b. Write a C program to find the roots of quadratic equation.
c. Write a C Program to implement arithmetic calculator using switch case.
d . Write a program that declares Class awarded for a given percentage of marks, where (use else if ladder and switch) <40%= Failed, 40% to <60% = Second class, 60% to

<70%=First class, >= 70% = Distinction.Read percentage from standard input.

**WEEK-4:**

a. 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:
   5 x 1 = 5
   5 x 2 = 10
   5 x 3 = 15
b. Write a program that shows the binary equivalent of a given positive number between 0 and 255.
c. Write a C program to find sum of individual digits of the given integer.
d. Write a C program to find factorial of a given number.

**WEEK-5:**

a. Write a program that finds if a given number is a prime number
b. Write a C program to check whether the given number is palindrome or not.
c. Write a C program to print Fibonacci series.
d. 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 is 3 and x is 5, then the program computes 1+5+25+125.

**WEEK-6:**

a Write a C program to calculate the following, where x is a fractional value.
   1-x/2 +x^2/4-x^3/6.

b. Write a C program to display the prime numbers from 1 to n(where n value is Given by user)

c. 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    * *
                                            *
```

d. Write a C program to construct the Pascal triangle

**WEEK-7:**

a. Write a C program to find largest, smallest numbers and average in a list of array elements.
b. Write a C program to find mean, variance, standard deviation for a given list of elements.
c. 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.

**WEEK-8:**

a. Write a C program to transpose a matrix.
b. Write a C program to perform the Addition of Two Matrices.
c. Write a C program to perform the Multiplication of Two Matrices.

**WEEK-9:**

Write programs using non recursive and recursive functions for the following

a. Find GCD.
b. Find the factorial of a given number.
c. Generate the Fibonacci series.
d. Find $x^n$

**WEEK-10:**

a. Write a C program to swap two integers using following methods.
   i. call by value ii. call by reference
b. Write a program for reading elements using a pointer into an array and display the Values using array.
c. Write a program for display values reverse order from an array using a pointer.
d. Write a program through a pointer variable to sum of n elements from an array.

**WEEK-11:**

a. Write a C program to insert a sub-string into a given main string from a given position.
b. Write a C program to delete n characters from a given position in a given string.
c. Write a C program to arrange given n strings in alphabetical order.
d. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.

**WEEK-12:**

a. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
b. 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.)
c. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn‘t contain ch.
d. Write a C program to count the lines, words and characters in a given text.

**WEEK-13:**

a. Write a C program to find total and average marks for five subjects of three students using structures.
b. Write a C program to demonstrate nested structures.
c. Write a C program to display the contents of a file to standard output device.
d. Write a C program which copies one file to another into another file.
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)

**WEEK-14:**

a. Write a C program to reverse the contents of a file.
b. Write a C program that does the following:
   It should first create a binary file and store 10 integers, where the file name 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.
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 uses non recursive function to search for a Key value in a Given list of integers using linear search method.
e. 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.

**WEEK-15:**

a. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
b. Write a C program that sorts the given array of integers using selection sort in
c. descending order Write a C program that sorts the given array of integers using insertion sort in ascending order

**TEXT BOOKS:**

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

# 22EE1154: BASIC ELECTRICAL ENGINEERING LABORATORY

**I B.Tech. I Semester**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 2 | 1 |

**Prerequisites**: Basic Electrical Engineering

**Course Objectives:**

1. To measure the electrical parameters for different types of DC circuits using conventional and theorems approach.
2. To measure the electrical parameters for different types of AC circuits
3. To study the transient response of various R, L and C circuits using different excitations.
4. To determine the performance of Single Phase Transformers.
5. To determine the performance of different types of DC and AC machines.

**Course Outcomes: After completion of this course, students will be able to**

1. Verify the basic conventional approach and theorems for Electrical circuits through different experiments.
2. Calculate the electrical parameters for different types of AC circuits
3. Analyze the transient responses of R, L and C circuits for different input conditions.
4. Evaluate the performance calculations of Single Phase Transformers through various testing methods.
5. Evaluate the performance calculations of DC and AC machines through various testing methods.

**List of experiments/demonstrations:**

**PART- A (compulsory)**

1. Verification of KVL and KCL
2. Verification of Thevenin's theorem
3. Verification of Norton's theorem
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 Superposition theorem
2. Transient Response of Series RL and RC circuits for DC excitation
3. Load Test on Single Phase Transformer (Calculate Efficiency)
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 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,2nd 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, 1stEdition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic ElectricalEngineering", 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.

**22MC0001: INDUCTION PROGRAM**

VIGNANA BHARATHI Institute of Technology

(A UGC Autonomous Institution, Approved by AICTE, Accredited by NBA & NAAC-A Grade, Affiliated to JNTUH)

# R22 B.Tech

# CSC

## 2023-2024

# I Year – II Semester

## 22BS1211- ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

**I B.Tech. II Semester**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Pre-requisites:** Mathematical Knowledge at pre-university level

**Course Objectives:** Develop ability to learn

1. Methods of solving the Ordinary Differential Equations of first order.
2. Methods of solving the higher order Ordinary Differential Equations.
3. Concept, properties of Laplace transforms & using the same to solve ordinary differential equations.
4. The physical quantities involved in engineering field related to vector valued functions
5. The basic properties of vector valued functions and their applications to vector integration.

**Course outcomes**: After successful completion of this course, student should be able to

1. Identify the type of first order Ordinary Differential Equation and solve them by appropriate method.
2. Apply the concept of higher order Ordinary Differential Equations to solve real world problems.
3. Solve ordinary differential equations by using Laplace transform techniques.
4. Calculate scalar potential for a vector and directional derivative of a scalar point function using vector differentiation.
5. Evaluate the line, surface and volume integrals and converting them from one to another.

**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 and higher order linear differential equations with constant coefficients: non-Homogeneous terms of the type $e^{ax}$, sin bx, cos *bx*, polynomials in $x^k$, $ve^{ax}$ and *x V(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 (without proof), 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. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition,
2. R.K. Jain and S.R.K. lyengar, Advanced Engineering Mathematics, Narosa Publications, Sth Edition, 2016.

**REFERENCE BOOKS:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9t' Edition, Pearson, Reprint, 2002.
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and CompanyLimited, New Delhi.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

# 22BS1213: APPLIED PHYSICS

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

## Course Objectives:

The objectives of this course for the student are to:

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

## Course Outcomes:

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

1. Understand physical world from fundamental point of view by the concepts of 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 and energy materials for their applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

**UNIT - I: QUANTUM PHYSICS AND SOLIDS**

**Quantum Mechanics:** Introduction to quantum physics, blackbody radiation, Wein's and Rayleigh-Jean's law, Planck's radiation law (Qualitative) - photoelectric effect de-Broglie hypothesis and matter waves- 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: Free electron theory (Drude & Lorentz, Sommerfeld) (Qualitative) Bloch's theorem - Kronig-Penney model (Qualitative) 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, AND MAGNETIC AND ENERGY MATERIALS**

**Dielectric Materials:** Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials.

**Magnetic Materials:** Basic definitions – classification of Magnetic materials – Domain theory of ferromagnetism in hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance.

**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, 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, $CO_2$ 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.
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, 4thEdition,2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2ndEdition,2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

**REFERENCE BOOKS:**

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.

## 22ME1256: ENGINEERING WORKSHOP

**I B.Tech. II Semester** **L T P C**
**0 1 3 2.5**

**Pre-requisites**: Practical skill

**Course Objectives:**

1. To Study about different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at workplace.
5. It explains the construction, function, use and application of different working tools, equipment and machines.

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

1. CO1:Study and practice on machine tools and their operations
2. CO2: Practice on manufacturing of components using work shop trades including pluming, fitting, carpentry, foundry, house wiring and welding.
3. CO3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. CO4: Apply basic electrical engineering knowledge for house wiring practice.
5. CO 5: Study and Practice of arc welding process

**1. TRADES FOR EXERCISES:**

**At least two exercises from each trade:**

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

**2. TRADES FOR DEMONSTRATION & EXPOSURE:**

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

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

## 22HS1212 : ENGLISH FOR SKILL ENHANCEMENT

**I B.Tech. II Semester**

| 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. Learn remedial and functional grammar related to various grammar items.
4. Prepare the students for examinations such as IELTS and TOEFL by sharpening their reading and writing skills
5. 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. Use a wide range of vocabulary and sentence structures and also acquire basic proficiency in reading and writing modules of English.
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.

**UNIT-I**

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

**Vocabulary**: TheConcept 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 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 Hurstetal** 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**f rom ***"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 (SQ3RMethod) – 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.

**TEXTBOOK:**

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

**REFERENCEBOOKS:**

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.

## 22EC1215: ELECTRONIC DEVICES AND CIRCUITS

**I B.Tech. II Semester**

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Course Objectives:**

1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of devices.
3. To know the switching characteristics of devices.
4. To know the special purpose devices such as SCR, UJT.
5. To know the MOSFET and its characteristics

**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.
4. Know the configurations of Transistors
5. Acquire the knowledge of various device 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**

**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, McGraw 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 – 5thEdition, Oxford.
2. ChinmoySaha, Arindam Halder, DebaatiGanguly - Basic Electronics-Principles and Applications, Cambridge, 2018.

# 22BS1253: APPLIED PHYSICS LABORATORY

**I B. Tech. 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. Understand the method of least square fitting
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Study the behavior of passive components.

## 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. Carried out data analysis
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Learn the characteristics of passive components like L, C and R and their applications.

**LIST OF EXPERIMENTS:**

1. Understanding the method of least squares – torsional pendulum as an example.
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)
7. a). V-I and L-I characteristics of light emitting diode (LED)

   b). V-I characteristics of a Laser diode
8. V-I Characteristics of solar cell
9. a). Determination of the beam divergence of the given LASER beam

   b). Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
10. Determination of Energy gap of a semiconductor.
11. Determination of time constant of RC Circuit.
12. Study B-H curve of a magnetic material.

***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.

## 22CS1251: PYTHON PROGRAMMING LABORATORY

**I B.Tech. II Semester**

| L | T | P | C |
|---|---|---|---|
| 0 | 1 | 2 | 2 |

**Course Objectives:**

1. To learn python programming language using the data types, input/ output statements.
2. To install and run the Python interpreter
3. To learn control structures.
4. To Understand Lists, Dictionaries in python
5. To Handle Strings and Files inPython

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

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

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

**Week -1:**

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

Week-2:

1. Read name, address, email and phone number of a person through keyboard and print the details.
2. Write a program to demonstrate different number data types in Python.
3. Write a program to perform different Arithmetic Operations on numbers in Python.

**Week - 3:**

1. Print the below triangle using for loop. 5
   4 4
   3 3 3
   2 2 2 2
   1 1 1 1 1
2. Write a program to check whether the given input is digit or lowercase character or

uppercase character or a special character (use 'if-else-if' ladder)

3. Python Program to Print the Fibonacci sequence using while loop

**Week-4:**

1. Python program to print all prime numbers in a given interval (use break)
2. Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017"
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.

**Week - 5:**

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 - 6:**

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

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

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

   iii). Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.

3. i) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
   ii) Remove the given word in all the places in a string?
   iii) Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?

**Week-7:**

1. Writes a recursive function that generates all binary strings of n-bit length
2. Write a program to define a lambda function(**rev_upper**) to convert a string to it's upper-case and reverse it.
3. Write a python program to find factorial of a number using Recursion.

**Week - 8:**

1. i) Write a python program that defines a matrix and prints
   ii) Write a python program to perform addition of two square matrices
   iii) Write a python program to perform multiplication of two square matrices

2. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.
3. Use the structure of exception handling all general purpose exceptions.

**Week - 9:**

1. Write a Python program to show how to use else clause with try and except clauses
2. Write a Python Module Program to implement Arithmetic operators, Bitwise operators, Logical operators in python as functions in one module.
3. Write a python program to specify scope and Lifetime of variables in python Functions.

**Week-10:**

1. a. Write a function called draw rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.
   b. Add an attribute named color to your Rectangle objects and modify draw rectangle so that it uses the color attribute as the fill color.
   c. Write a function called draw point that takes a Canvas and a Point as arguments and draws a representation of the Point on the Canvas.
   d. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw circle that draws circles on the canvas.
2. Write a Python program to demonstrate the usage of Method Resolution Order (MRO) in multiple levels of Inheritances.
3. Write a python code to read a phone number and email-id from the user and validate it for correctness.

**Week- 11**

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

**Week - 12:**

1. Import numpy, Plotpy and Scipy and explore their functionalities.
2. a) Install NumPy package with pip and explore it.
3. Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR

**Week - 13:**

1. Write a program to implement Half Adder, Full Adder, and Parallel Adder
2. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.
3. Write a function that reads a file *file1* and displays the number of words, number of vowels, blank spaces, lower case letters and uppercase letters.

**Week - 14:**

1. Write a script named **copyfile.py**. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.

2. Write a GUI program to create a window for calculator and implement basic arithmetic operations in that window.

3. Write a python program to perform addition of two matrices using NUMPY package

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1. Python for Data Science, Dr. Mohd. Abdul Hameed, Wiley Publications - 1st Ed. 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

## 22HS1252: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

**I B. Tech. 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 familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

***Course Objectives:***

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

**Course Outcomes:** Students will be able to:

1. Make use of various online and web resources for independent language learning.
2. Understand the nuances of English language through audio-visual experience and group activities.
3. Neutralize their accent for intelligibility for enabling them to communicate with a global audience.
4. Speak with clarity and confidence which in turn improves their academic performance in the other courses.
5. Face and interact with various stakeholders leading to the enhancement of their employability skills.

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

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

**Listening Skills:**

Objectives

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

*Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress*

*and recognize and use the right intonation in sentences.*

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

***Speaking Skills:***

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

- Oral practice
- Describing objects/situations/people
- Roleplay – Individual/Group activities
- Just A Mine (JAM) Sessions

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

***Exercise–I***

***CALL Lab****:*

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

***ICS Lab****:*

*Understand:* Spoken vs. Written language – Formal and Informal English.

*Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

***Exercise–II***

***CALL Lab****:*

*Understand:* Structure of Syllables–Word Stress–Weak Forms and Strong Forms– Stress pattern in sentences – Intonation.

*Practice:* Basic Rules of Word Accent – Stress Shift - Weak Forms and Strong Forms – Stress pattern in sentences – Intonation - *Testing Exercises*

***ICS Lab****:*

*Understand:* Features of Good Conversation – Strategies for Effective Communication.

*Practice:* Situational Dialogues – Role Play – Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

***Exercise-III***

***CALL Lab:***

*Understand:* Errors in Pronunciation – Neutralising Mother Tongue Interference (MTI).

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

***ICS Lab**:*
*Understand:* Descriptions – Narrations – Giving Directions and Guidelines – Blog Writing
*Practice:* Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

***Exercise–IV***
***CALL Lab**:*
*Understand:* Listening for General Details.
*Practice:* Listening Comprehension Tests - *Testing Exercises*
***ICS Lab**:*
*Understand:* PublicSpeaking – 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 ELCSLab:***

1. **Computer Assisted Language Learning (CALL) Lab:**

**The Computer Assisted Language Learning Lab** has to accommodate 40students with40 systems, with one Master Console, LAN facility and English language learning software for self-study by students.

***System Requirement (Hardwarecomponent):***
*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. 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.
- Oxford Advanced Learner's Compass, 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).
- DigitalAll
- Orell Digital Language Lab (Licensed Version)

**REFERENCEBOOKS:**

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.

## 22IT1255: IT WORKSHOP

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

**Course Objectives:** The IT Workshop for engineers is a training lab course spread over 60 hours.

1. The modules include training on PC Hardware, Internet & World Wide Web
2. To learn Hardware troubleshooting.
3. To understand the productivity tools including Word, Excel, PowerPoint and Publisher.
4. To learn the Safeguard computer systems from viruses/worms
5. To learn the LaTeX and Word.

**Course Outcomes:**

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**

**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, PGF(ref.9) Case study of Wayback Machine web robot for Cyberforensics for Secure Digital India

**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

**POWERPOINT**

**Task 1:** Students will be working on basic power point utilities and tools which help them create basic powerpoint 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. Prepare and demonstrate (.ppt file) for the "Call to the Nation" quotations under "Faith and Strength", "Education and Society", "Powers of the Mind", "Man: The Maker of his Own Destiny", "India: Our Motherland" from the sources
https://sites.google.com/view/chandraksekharaiah/call-to-the-nation-book
https://www.ramakrishnavivekananda.info/vivekananda/complete_works.htm

**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, *WILEY Dreamtech*
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 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.*
8. "Swami Vivekananda - Call to the Nation", ISBN: 978-81-7505-018-1.
   http://sites.google.com/view/pgovernanceforum

## 22MC0002: ENVIRONMENTAL SCIENCE

**I B.Tech. II Semester** **L T P C**
**3 0 0 0**

**Course Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

**Course Outcomes:**

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

**UNIT - V**

**ENVIRONMENTAL POLICY, LEGISLATION & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, 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. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.