



COURSE STRUCTURE & SYLLABUS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B TECH I YEAR- COURSE STRUCTURE (CSE, CSE-DS)

I Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0001	English for skill Enhancement	2	0	0	2	40	60
2	R24A0023	Linear Algebra and Ordinary Differential Equations	3	1	0	4	40	60
3	R24A0021	Applied Physics	3	1	0	4	40	60
4	R24A0301	Computer Aided Engineering Graphics	2	0	2	3	40	60
5	R24A0501	Programming for Problem Solving	3	0	0	3	40	60
6	R24A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R24A0082	Applied Physics Lab	-	0	3	1.5	40	60
8	R24A0581	Programming for Problem Solving Lab	-	0	3	1.5	40	60
9	R24A0004	Environmental Science	2	0	0	0	100	-
		Total	15	2	11	20	420	480

I Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0024	Numerical Methods and Vector Calculus	3	1	0	4	40	60
2	R24A0201	Principles of Electrical and Electronics Engineering	3	1	0	4	40	60
3	R24A0022	Engineering Chemistry	3	0	0	3	40	60
4	R24A0502	Data structures and Algorithms	3	0	0	3	40	60
5	R24A0083	Engineering Chemistry Lab	-	0	3	1.5	40	60
6	R24A0582	Data structures and Algorithms Lab	-	0	3	1.5	40	60
7	R24A0281	Principles of Electrical and Electronics Engineering	-	0	3	1.5	40	60
8	R24A0084	Engineering and Computing Hardware Workshop	-	0	3	1.5	40	60
9	R24A0003	Human Values and Professional Ethics	2	0	0	0	100	-
		Total	14	2	12	20	420	480

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B TECH I YEAR- COURSE STRUCTURE (CSE-AI&ML/CSE-CS/ECE/EEE/MEC/ANE)

I Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0023	Linear Algebra and Ordinary Differential Equations	3	1	0	4	40	60
2	R24A0201	Principles of Electrical and Electronics Engineering	3	1	0	4	40	60
3	R24A0022	Engineering Chemistry	3	0	0	3	40	60
4	R24A0501	Programming for Problem Solving	3	0	0	3	40	60
5	R24A0083	Engineering Chemistry Lab	-	0	3	1.5	40	60
6	R24A0582	Programming for Problem Solving Lab	-	0	3	1.5	40	60
7	R24A0281	Principles of Electrical and Electronics Engineering	-	0	3	1.5	40	60
8	R24A0084	Engineering and Computing Hardware Workshop	-	0	3	1.5	40	60
9	R24A0003	Human Values and Professional Ethics	2	0	0	0	100	-
		Total	14	2	12	20	420	480

I Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0001	English for skill Enhancement	2	0	0	2	40	60
2	R24A0024	Numerical Methods and Vector Calculus	3	1	0	4	40	60
3	R24A0021	Applied Physics	3	1	0	4	40	60
4	R24A0301	Computer Aided Engineering Graphics	2	0	2	3	40	60
5	R24A0502	Data structures and Algorithms	3	0	0	3	40	60
6	R24A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R24A0082	Applied Physics Lab	-	0	3	1.5	40	60
8	R24A0582	Data structures and Algorithms Lab	-	0	3	1.5	40	60
9	R24A0004	Environmental Science	2	0	0	0	100	-
		Total	15	2	11	20	420	480

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -I-SEM****L/T/P/ C
3/1/0/ 4****(R24A0023) LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS
(Common to All Branches)****Course Objectives: To learn**

1. The concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of linear equations.
2. The concept of Eigen values, Eigen vectors and Diagonalisation.
3. The maxima and minima of functions of several variables.
4. The Applications of first order ordinary differential equations.
5. The methods to solve higher order differential equations.

UNIT I: Matrices**[10 hours]**

Introduction, Types of matrices, Rank of a matrix - Echelon form and Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss elimination method and LU Decomposition method.

UNIT II: Eigen values and Eigen vectors**[12 hours]**

Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties(without proof), Diagonalisation 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: Multi Variable Calculus (Differentiation)**[10 hours]**

Functions of two variables-Limit, Continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobian-functional dependence and independence, Maxima and minima and saddle points, Method of Lagrange multipliers, Taylors theorem for two variables.

UNIT IV: First Order Ordinary Differential Equations**[12hours]**

Exact, Equations reducible to exact form, Applications of first order differential equations - Orthogonal Trajectories(Cartesian form),Newton's law of cooling, Law of natural growth and decay,.

UNIT V: Differential Equations of Higher Order**[11 hours]**

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type $f(x) = e^{ax}$, $\sin ax$, $\cos ax$, x^n , $e^{ax} V$ and $x^n V$ - Method of variation of parameters.

Text Books:

- i. Higher Engineering Mathematics by B V Ramana., Tata McGraw Hill.
- ii. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
- iii. Advanced Engineering Mathematics by Kreyszig ,John Wiley & Sons .

Reference Books :

- i. Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
- ii. Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
- iii. Engineering Mathematics by N.P Bali and Manish Goyal.

Course Outcomes: After learning the concepts of this paper the student will be able to

- 1) Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
- 2) Reduce the quadratic form to canonical form using orthogonal transformations.
- 3) Find the extreme values of functions of two variables with / without constraints.
- 4) Solve first order, first degree differential equations and their applications.
- 5) Solve higher order differential equations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -I-SEM****L/T/P/C
3/1/0/4****(R24A0201) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING****COURSE OBJECTIVES:**

1. To understand the basic concepts of electrical circuits and analyze Circuits using Network Theorems.
2. To get overview of single phase A.C. Circuits.
3. To introduce the concept of DC Machines and Single-Phase Transformers.
4. To study the concepts of p-n diodes, rectifiers and Zener diodes.
5. To study the concepts of BJTs, JFET and MOSFETs.

UNIT – I: INTRODUCTION TO ELECTRICAL CIRCUITS: Concept of Circuit and Network, R-L-C Parameters, Ohms law and its limitations, Kirchhoff's Laws-KVL, KCL.

NETWORK ANALYSIS(D. C EXCITATION): Series and parallel connections of Resistive Networks, voltage division and current division, Mesh analysis, Nodal analysis.

UNIT-II: NETWORK THEOREMS: Thevenin's Theorem, Norton's Theorem and Superposition Theorem (for independent sources).

SINGLE PHASE A.C. CIRCUITS: Average value, R.M.S. value, Form factor and Peak factor for sinusoidal wave form. Concept of phase, Phasor representation of sinusoidal quantities, Phase difference, Active power, Reactive power and Apparent power. Sinusoidal response of pure R, pure L and pure C.

UNIT-III: MACHINES:

DC GENERATOR: Principle of operation and working, constructional features, basic concept of Lap and wave windings, emf equation.

DC MOTOR: Principle of operation, Back emf and its significance, torque equation-Gross torque and Shaft torque.

SINGLE PHASE TRANSFORMER: Principle of operation, emf equation, transformation ratio, problems on emf equation.

UNIT-IV:

P-N JUNCTION DIODE: P-N junction diode, symbol and forward biased and reverse biased conditions, V-I characteristics of P-N junction diode, Half wave, Full wave-Centre tap and Bridge rectifiers. **ZENER DIODE:** Symbol, construction, principle of operation and its applications.

UNIT–V:

BIPOLAR JUNCTION TRANSISTOR: Symbols, types, Construction and Principle of Operation of N-P-N and P-N-P transistors, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

JFET: Symbol, Construction, Principle of operation, and its Characteristics, MOSFET (Enhancement and Depletion mode): Symbol, Construction, Principle of Operation and its Characteristics.

TEXTBOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc GrawHill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbira, Khanna Publishers.
4. “Electronic Devices & Circuits”, Special Edition–MRCET, McGrawHill Publications, 2017.
5. Integrated Electronics Analog Digital Circuits, Jacob Millman and D.Halkias, Mc GrawHill.
6. Electronic Devices and Circuits, S.Salivahanan, N.Sureshkumar, McGrawHill.

REFERENCEBOOKS

1. Network Analysis by M.E Van Valkenburg, PHI learning publications.
2. Network Analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.
5. Electronic Devices and Circuits, K.LalKishore, B.S Publications
6. Electronic Devices and Circuits, G.S.N.Raju, I.K.International Publications, New Delhi, 2006.

COURSEOUTCOMES:

After the course completion the students will be able to

1. Apply the basic RLC circuit elements and its concepts to networks and circuits.
2. Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
3. Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
4. Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5. To understand the concepts of p-n junction diode, rectifiers and Zener diode
6. To understand the concepts of BJTs, JFET and MOSFETs

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -I-SEM****L/T/P/C
3/0/0/3****(R24A0022) ENGINEERING CHEMISTRY****COURSE OBJECTIVES:** The students will be able

1. To analyze water for its various parameters for sustainable living and interpret different problems involved in industrial utilization of water.
2. To acquire the knowledge on fundamental aspects of battery chemistry, significance of corrosion and its control to protect the metallic structures.
3. To identify different types of polymers and their applications in various engineering fields.
4. To understand the basic concepts of fuels and its products.
5. To gain knowledge on wide variety of engineering materials like composite materials, smart materials and lubricants which have excellent engineering properties.

Unit –I Water and its treatment:**(8 hours)**

Introduction – hardness of water – causes of hardness; Types of hardness - temporary and permanent – expression and units of hardness-numerical problems on hardness; Potable water and its specifications - Steps involved in the treatment of potable water-Disinfection of potable water by chlorination and break-point chlorination.

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

Unit–II Battery Chemistry & Corrosion:**(8 hours)**

Introduction - Classification of batteries-primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction and working of 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. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical (oxidation) and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, waterline and pitting corrosion. Factors affecting rate of corrosion- nature of metal (position, passivity, purity, relative areas of anode and cathode); nature of environment (temperature, pH and humidity); Corrosion control methods- Cathodic protection –Sacrificial anode and impressed current methods.

Unit-III: Polymeric materials:**(8 hours)**

Definition–Classification of polymers based on source with examples–Types of polymerization– characteristics of addition and condensation polymerization with examples.

Plastics: Definition and characteristics-thermoplastic and thermosetting plastics, Preparation, properties and engineering applications of PVC, Teflon and Bakelite.

Fibers: preparation, properties and applications of Nylon 6,6.

Rubbers: Natural rubber and its vulcanization.

Conducting polymers: Characteristics and classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages – preparation, properties of Polylactic acid and its applications.

Unit-IV: Energy Sources: (8 hours)

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

Unit- V Engineering Materials: (8 hours)

Composite materials: Introduction-Fiber reinforced plastics (FRPs) - Glass fiber reinforced plastics, Carbon fiber reinforced plastics and their applications.

Smart materials and their engineering applications

Shape memory materials- Poly L-Lactic acid. Thermo-responsive materials-Polyacryl amides, Polyvinyl amides.

Lubricants: Classification of lubricants with examples-characteristics of a good lubricant - properties of lubricants- definition and significance of viscosity, cloud and pour point, flash and fire point.

Suggested Text Books:

1. Engineering Chemistry by P.C. Jain & M. Jain: Dhanpat Rai Publishing Company (P) Ltd, New Delhi. 16th Edition, 2010.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited, 2018.
3. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.

Reference Books:

1. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Engineering Chemistry, by S. S. Dara, S. Chand & Company Ltd, New Delhi.
3. P.W. Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8th edition (2006).
4. B.R. Puri, L.R. Sharma and M.S. Pathania, "Principles of Physical Chemistry", S. Nagin Chand & Company Ltd., 46th edition (2013).

COURSE OUTCOMES: At the end of the course the student is expected to know the fundamental principles of Engineering Chemistry required for solving engineering problems.

The students will be able

1. To identify water as an engineering material and develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. To relate the knowledge of operating principles of batteries and different corrosion control techniques for sustainable development.
3. To recognize the significance of polymeric compounds in various engineering applications and biodegradable polymers to reduce environmental pollution.
4. To analyze the importance of various energy resources in day to day life.
5. To interpret the role of engineering materials for technological improvements in various sectors.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -I-SEM****L/T/P/C
3/0/0/3****(R24A0501) Programming for Problem Solving****COURSE OBJECTIVES:**

The students will be able

1. To understand basics of programming.
2. To learn how to use conditional statements and loops.
3. To structure Python programs using arrays.
4. To know the need and usage of functions
5. To learn file operations and exception handling

UNIT – I

Introduction to Programming – Computer Systems, Computer Languages, Algorithms and Flowcharts

Introduction to Python Language: Introduction to Python Language, Features of Python, Comments in Python.

Tokens- Keywords, Identifiers, Constants, Variables, Python Input and Output Statements

Basic Data Types: int, float, boolean, complex and string and its operations.

Collection Data Types: List, Tuples, Sets and Dictionaries. Data Type conversions,

UNIT – II

Operators in Python: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.

Control Flow and Loops: Indentation, if statement, if-else statement, nested if else, chained conditional if- elif -else statement, Loops: while loop, for loop using ranges, Loop manipulation using break, continue and pass.

UNIT- III

Arrays: Definition, Advantages of Arrays, Creating an Array, Operations on Arrays, Arrays vs List, Importing the Array Module, Indexing and Slicing on Arrays,

working with arrays using numPy - Creating arrays using numpy, numpy Attributes and functions, Matrices in numpy.

UNIT-IV

Functions: Defining a function, Calling a Function, Passing parameters and arguments, Python Function arguments: Positional Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Scope of the Variables in a Function—Local and Global Variables.

Recursive functions, Anonymous functions, Higher order functions - map(), filter() and reduce() functions in Python, command-line arguments.

UNIT-V

File Handling in Python: Introduction to files, Text files and Binary files, Access Modes, Writing Data to a File-write() and writelines(), Reading Data from a File-read(),readline() and readlines(), Random access file operations-seek() and tell().

Error Handling in Python: Introduction to Errors and Exceptions: Compile-Time Errors, Logical Errors, Runtime Errors, Types of Exceptions, Python Exception Handling Using try, except and finally statements.

COURSE OUTCOMES:

Upon completion of the course, students will be able to

1. Express proficiency in handling data types in python.
2. Understand the syntax and semantics of python control flow statements
3. Develop programs using arrays
4. Know how to write modular programs using functions.
5. Perform file operations and handle exceptions

TEXT BOOKS

1. “Mastering C”, K R Venugopal, S R Prasad, Tata McGraw Hill Education (India) Private Limited.
2. R.NageswaraRao, “Core Python Programming”, Dreamtech.
3. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist” 2nd edition, Updated for Python3, Shroff/O’Reilly Publishers, 2016.
4. Python Programming: A Modern Approach, Vamsi Kuramanchi, Pearson.

REFERENCEBOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage.
3. Learning Python, Mark Lutz, Orielly.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -I-SEM****L/T /P /C
-/0/3/1.5****(R24A0083)Engineering Chemistry Lab****COURSE OBJECTIVES:**

The students will be able:

1. To understand and explain scientifically the various chemistry related problems in the industry/engineering and develop experimental skills for building technical competence.
2. To familiarize with the practical implementation of fundamental concepts.
3. To gain hands on experience in handling the instruments.
4. To demonstrate the digital and instrumental methods of analysis.
5. To correlate the practical aspect with theoretical concepts.

List of Experiments**Titrimetry:**

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Ferrous ion by Dichrometry

Instrumental Methods**Conductometry:**

3. Estimation of concentration of HCl by Conductometric titrations.
4. Estimation of concentration of Acetic acid by Conductometric titrations.

Potentiometry:

5. Estimation of amount of Fe^{2+} by Potentiometric titration using KMnO_4 .

pH Metry:

6. Determination of an acid concentration using pH meter.

Preparation

7. Preparation of a Polymer-**Bakelite**

Physical Property

8. Determination of Surface Tension of a given liquid by Stalagmometer.
9. Determination of Viscosity of a given liquid using Ostwald's Viscometer.

Corrosion control method

10. Electroplating of Copper on an Iron object.

Virtual lab experiments

1. Construction of Fuel cell and it's working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

Text Book:

1. In organic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S.Dara

Suggested Readings:

1. Lab manual for Engineering chemistry by B.Ramadevi and P.Aparna, S Chand Publications, New Delhi (2022)
2. Practical Engineering Chemistry by K.Mukkanti, etal, B.S.Publications, Hyderabad.

Course outcomes:

The students will be able:

1. To estimate the total hardness present in a sample of water.
2. To know the strength of an acid by conductometry, potentiometry and pHmetry.
3. To prepare a thermo setting polymer.
4. To determine the surface tension and viscosity of a given liquid.
5. To understand the electroplating method for corrosion protection of metals.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -I-SEM****L/T /P /C
-/0/3/1.5****(R24A0581) Programming for Problem Solving Lab****COURSE OBJECTIVES:**

This course will enable the students:

- 1) to understand syntax and semantics of different data types in python
- 2) to learn categories of operators and control structures.
- 3) to know how to use arrays in python scripts.
- 4) to learn usage of functions.
- 5) to know how to handle Files and exceptions in Python.

Week 1:

Introduction to OS
Steps for creating and running python code

Week 2:

Programs using output statement
Simple programs on usage of variables and constants
Programs to read different kinds of data from user

Week 3:

Programs on creation of strings and its methods
Programs on List creation, indexing and slicing and methods

Week 4:

Programs on tuples, sets and dictionaries

Week 5 & 6:

Programs on different categories of operators and conditional statements

Week 7 & 8:

Programs using iterative statements

Week 9 & 10:

Programs on arrays using array module and numpy module

Week 11 & 12:

Programs using functions

Week 13 & 14:

Implementation of operations on files and exception handling

TEXT BOOKS:

1. R. Nageswara Rao, "Core Python Programming", dream tech
2. Allen B. Downey , " Think Python: How to Think Like a Computer Scientist", Second Edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016.

COURSE OUTCOMES:

After completion of the course, Students will be able to:

1. Build basic programs using python statements and expressions.
2. Use python data structures like lists, tuples and dictionaries to represent compound data.
3. Implement conditional and loop statements in python programs.
4. Express usage of arrays and functions in code
5. Understand and summarize different file handling operations and exceptions.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -I-SEM****L/T/P/C
-/0/ 3/1.5****(R24A0281) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB****COURSE OBJECTIVES:**

1. To design an electrical systems.
2. To analyze a given network by applying various circuit laws and network theorems.
3. To expose the students to the operation of DC machine and transformer.
4. To exhibit the students to the operation of PN junction diode and Zener diode.
5. To expose the students to the operation of Rectifier.

Among the following experiments any 10 are to be conducted

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Super position theorem.
5. Magnetization characteristics of DC shunt generator.
6. Speed control of DC shunt motor using armature control method.
7. Speed control of DC shunt motor using flux control method
8. Load test on single phase transformer.
9. PN Junction diode characteristics.
10. Zener diode characteristics.
11. Half wave rectifier.
12. Full wave rectifier.

COURSE OUTCOMES:

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

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving them.
3. Perform the required tests on transformers and DC motors.
4. Plot the characteristics of Zener diodes.
5. Determine the working of rectifiers in detail.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -I-SEM****L/T/P/C
-/0/3/1.5****(R24A0084) Engineering and Computing Hardware Workshop**

It is consisting of 2 parts: **Part I:** Computing Hardware Workshop

Part II: Engineering Workshop

COURSE OBJECTIVES:

- Understand the internal structure of computer system and learn to diagnose minor problems with the computer functioning.
- Know the proper usage and threats of the World Wide Web & Study in detail about the various features of Ms-Word, Excel, PowerPoint and Google Forms
- To obtain the knowledge about Electrical wiring and Soldering – Desoldering procedures.
- To provide hands on experience in usage of different engineering materials, tools equipments and processes which are common in the engineering field.
- To develop professional attitude, team work, precision and safety practices at workplace.

Part I: COMPUTING HARDWARE WORKSHOP**Task- 1: PC HARDWARE**

Identification of the peripherals of a computer, components in a CPU and its functions. Block diagram of the CPU along with the configuration of each peripheral. Functions of Motherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

Task- 2: TROUBLESHOOTING

Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.

Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Task 3: INTERNET

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

MS OFFICE**Task 4: MICROSOFT WORD**

Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

Task 5: MICROSOFT EXCEL

Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.

Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting)

Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel)

Task 6: MICROSOFT POWER POINT

Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

Task 7: GOOGLE FORMS

Google forms introduction, opening Google forms, editing forms, add questions, copy duplicate questions, delete questions, required questions, more button, form color and themes, preview form, advance form settings, send form, view responses, close form

PART II: ENGINEERING WORKSHOP**A. LIST OF EXPERIMENTS:**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring
3. Stair case wiring
4. Soldering and Desoldering practice – components, devices and circuits using general Purpose PCB.

Note: Minimum ONE experiment need to be conducted in each trade

B. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry:

To prepare T-Lap Joint, Dovetail Joint.

To prepare Mortise & Tenon Joint.

2. Fitting:

To prepare V-Fit, Dovetail Fit & Semi-circular fit.

3. Tin-Smithy:

To make Square Tin, Rectangular Tray & Conical Funnel.

Note: Minimum ONE experiment need to be conducted in each trade

Trades to demonstrate:

1. Plumbing
2. Foundry
3. Welding
4. Black smithy
5. Metal cutting (Water Plasma)

Note: Minimum a total of 3 trades to be demonstrated.

TEXT BOOKS – IT WORKSHOP

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2. Excel Functions and Formulae, Bernd held, Theodor Richardson, Third Edition

TEXT BOOKS – ENGINEERING WORKSHOP

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech, 2015
2. Printed Circuit Boards - Design, Fabrication, Assembly and Testing, R. S. Khandpur, Tata McGraw-Hill Education, 2005.

COURSE OUTCOMES:

- Ability to identify, assemble and troubleshoot the major components of a computer and perform the installation of Operating System.
- Capacity to make effective usage of the internet for academics and develop professional documents, spreadsheets and presentations.
- Students will be able to understand the domestic, illumination, stair-case wiring procedures and soldering de soldering practice
- The student will have hands-on experience on manufacturing of components using different trades of engineering processes
- The student will be able to perform in a team, adhering to industrial safety practices and follow professional working standards.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B.TECH –I-SEM****L/T/P/C****2/0/0 /0****(R24A0003) HUMAN VALUES AND PROFESSIONAL ETHICS****COURSE OBJECTIVES:**

This introductory course input is intended:

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT - I:

Course Introduction -Need, Basic Guidelines, Content and Process for Value Education.

Self-Exploration – Definition, content and process., A look at basic Human Aspirations- Continuous Happiness and Prosperity, Right understanding of Relationships and Physical Facilities, Method to fulfill the above human aspirations. Understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself, Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body'. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body- Sanyam and Swasthya, Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society- Understanding harmony in the Family- Understanding values in human - human relationship, Meaning of Nyaya and program for its fulfillment to ensure Ubhay- tripti, Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the harmony in the society- Samadhan, Abhay, Sah-astiva as comprehensive Human Goals, Undivided Society (Akhand Samaj), Universal Order.

UNIT - IV:

Understanding Harmony in the Nature and Existence - Understanding the harmony in the Nature-Interconnectedness and mutual fulfillment among the four orders of nature. Recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all- pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:**Implications of the above Holistic Understanding of Harmony on Professional Ethics:**

Basic concepts of Professional Ethics, Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Competence in Professional ethics, Ethical dilemmas, Role of Emotional intelligence in ethical decision-making

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Common wealth Publishers. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
7. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
8. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
9. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

COURSE OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.
3. They can have satisfying human behavior throughout their life

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -II-SEM****L/T/P/C
2/0/0/2****(R24A0001) ENGLISH FOR SKILL ENHANCEMENT****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 Black Swan, Hyderabad.****Vocabulary** : The Concept of Word Formation**Grammar** : Articles and Prepositions.**Reading** : Reading and Its Importance-Techniques for Effective Reading.**Writing** : Sentence Structures-Use of Phrases and Clauses in Sentences-Importance of Proper Punctuation-Techniques for writing precisely-Paragraph Writing-Types, Structures and Features of a Paragraph – Creating Coherence-Organizing Principles of Paragraphs in Documents.**UNIT-II****Chapter entitled ‘Appro JRD’ by Sudha Murthy from “English: Language, Context and Culture” published by Orient Black Swan, Hyderabad.****Vocabulary** : Words Often Miss pelt- Homophones, Homonyms and Homographs**Grammar** : Noun- pronoun Agreement and Subject- verb Agreement.**Reading** : Sub- Skills of Reading– Skimming and Scanning– Exercises for Practice**Writing** : Defining/ Describing People, Objects, Places and Events–Classifying-Providing Examples or Evidence.

UNIT-III

Chapter entitled '**Abraham Lincoln's Letter to His Son's Teacher**'

Vocabulary : Idioms & Words Often Confused.

Grammar : Misplaced Modifiers and Tenses.

Reading : Intensive Reading and Extensive Reading – Exercises for Practice.

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

UNIT-IV

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

Vocabulary : Standard Abbreviation in English

Grammar : Transitive and Intransitive and Voices

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

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

UNIT-V

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

Vocabulary : Technical Vocabulary and their Usage

Grammar : Direct and Indirect Speech and Degrees of Comparison

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 need of the students in their respective colleges for effective teaching/learning in the class.
- **Note: 2.** Based on the recommendations of NEP 2020, 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.CambridgeUniversityPress
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).EnglishforTechnicalCommunicationforEngineeringStudents.Mc Graw-HillEducationIndia Pvt.Ltd.
7. Swan, Michael. (2016).Practical English Usage. Oxford University Press. Fourth Edition.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -II-SEM****L / T / P / C****3 / 1 / 0 / 4****(R24A0024) NUMERICAL METHODS AND VECTOR CALCULUS****Course Objectives: To Learn**

- 1) Numerical methods which provide systematic methods for solving problems in a numerical form using the given initial data, also used to find the roots of an equation and to solve differential equations.
- 2) The Concept of interpolation to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
- 3) The concept of multiple integrals.
- 4) The physical quantities involved in engineering field related to vector valued functions.
- 5) The basic properties of vector-valued functions and their applications to line, surface and volume integrals.

UNIT – I: Interpolation and Curve fitting**[12 hrs]**

Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, Backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae, Interpolation with unevenly spaced points - Lagrange's Interpolation.

Curve Fitting: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

UNIT – II: Numerical Methods**[12 hrs]**

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.

Numerical integration: Generalized quadrature formula - Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and Simpson's $3/8^{\text{th}}$ rules.

Numerical solution of ordinary differential equations: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge - Kutta fourth order method.

UNIT - III: Double and Triple Integrals**[12 hrs]**

Double integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Triple integrals (Cartesian form). Applications: Areas (by double integrals) and volumes (by triple integrals).

UNIT-IV: Vector Differentiation**[8hrs]**

Introduction, Scalar point function and Vector point function, Gradient, Directional derivative, Divergence and Curl- Solenoidal and irrotational vectors, Vector identities.

UNIT-V: Vector Integration**[10hrs]**

Line integral - Work done, Surface integrals, Volume integral. Vector integral theorems - Green's theorem, Stoke's theorem and Gauss's Divergence theorems (Statement & their Verification).

Text Books:

- i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
- ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
- iii) Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

Reference Books:

- i) Elementary Numerical Analysis by Atkinson-Han, Wiley Student Edition.
- ii) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
- iii) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

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

1. Find the roots of algebraic, non-algebraic equations and predict the value at an intermediate point from a given discrete data.
2. Find the most appropriate relation of the data variables using curve fitting and this method of data analysis helps engineers to understand the system for better interpretation and decision making.
3. Evaluate multiple integrals.
4. Find Gradient, Divergence, Directional Derivative and Curl.
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -II-SEM****L / T / P / C
3 / 1 / 0 / 4****(R24A0021) APPLIED PHYSICS****COURSE OBJECTIVES:**

- 1 To understand the basic principles of lasers and optical fibers.
- 2 To interpret dual nature of the matter quantum mechanically and classify the solids based on electrical conductivity.
- 3 To understand the concepts of semiconductors and devices.
- 4 To analyze dielectric, magnetic and superconducting properties of the materials.
- 5 To understand the properties of nano materials and analyze its characterization techniques.

UNIT – I**LASERS & FIBER OPTICS****(15 Hours)**

Lasers: Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's coefficients, Meta stable state, Population inversion, Types of pumping, Components of Laser, Lasing action, Construction and working of Ruby Laser, He-Ne Laser, Semiconductor diode Laser, Applications of lasers.

Fiber Optics: Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and index profile, Optical Fibers in Communication System, Applications of optical fibers.

UNIT – II**QUANTUM MECHANICS AND FREE ELECTRON THEORY OF SOLIDS****(15 Hours)**

Introduction, wave and particle, de-Broglie's hypothesis, Matter waves, Davisson and Germer's experiment, Heisenberg's uncertainty principle, Schrodinger's time-independent wave equation-Physical significance of wave function, Particle in one dimensional square well potential.

Classical free electron theory-Assumptions and drawbacks, Quantum free electron theory-Assumptions and drawbacks, Fermi-Dirac statistical distribution, Fermi level, Electron in a periodic potential - Bloch's theorem(qualitative), Kronig-Penny model (qualitative), E-k curve, Effective mass of an electron, Origin of energy bands in solids, Classification of materials: Metals, semiconductors and insulators.

UNIT-III**SEMICONDUCTOR PHYSICS****(15Hours)**

Intrinsic and Extrinsic semiconductors, Carrier concentration of electrons and holes in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, Formation of PN Junction, V-I characteristics of PN Junction diode, Energy Diagram of PN diode, Hall effect, Construction and working of LED, Solar cell.

UNIT – IV**DIELECTRICS, MAGNETIC AND SUPERCONDUCTING MATERIALS****(12 Hours)**

Dielectrics: Introduction, Types of polarizations – Electronic, Ionic polarizations and calculation of polarizabilities, Internal field, Clausius Mossotti relation.

Magnetic materials: Introduction, Bohr magneton, Classification of Dia, Para, Ferro magnetic materials based on magnetic moment, Properties of Anti-Ferro and Ferri magnetic materials, Hysteresis curve , Soft and Hard magnetic materials.

Super conductivity: Introduction, Meissener effect, Types of superconductors.

UNIT-V**NANO SCIENCE & NANO TECHNOLOGY****(8 Hours)**

Nano scale, Types of Nano materials , Surface to volume ratio, Quantum confinement, Bottom-up synthesis : Precipitation, Sol-gel method, Top-down synthesis: Ball milling, Physical vapor deposition (PVD), Chemical vapor deposition (CVD), Characterization techniques - XRD, SEM, Applications of nano materials.

COURSE OUTCOMES:

At the end of the course students,

- 1 Can apply the principles of lasers and optical fibers in various industrial applications.
- 2 Basic principles of quantum mechanics can be applied to analyze the band structure of solids.
- 3 Concepts of semiconductors can be applied to predict the importance of electronic devices relevant to engineering domains.
- 4 Examine the dielectric, magnetic and superconducting properties of the materials and apply them in engineering material technology.
- 5 Can identify and compare the nano fabrication methods and gaining insight to the nano materials.

TEXT BOOKS:

1. Engineering Physics by Kshirsagar & Avadhanulu, S. Chand publications.
2. Engineering Physics - B.K.Pandey, S.Chaturvedi, Cengage Learning
3. Essentials of Nano science & Nano technology by Narasimha Reddy Katta, Typical Creative's NANODIGEST, 1st Edition, 2021.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L. Gupta, Dhanpat Rai Publishers.
2. A.K.Bhandhopadhyaya- Nano Materials, New Age International, 1st Edition, 2007.
3. Engineering physics 2nd edition –H.K. Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -II-SEM****L/T/P/C
2/0/2/3****(R24A0301) COMPUTER AIDED ENGINEERING GRAPHICS****Course Objectives:**

1. To learn basic engineering graphics and Auto CAD concepts.
2. To learn the 2D principles of orthographic projections and Multiple views of the same
3. To know the planes and solid Projection
4. To gain the capability of designing 3D objects with isometric principles by using computer aided sketches
5. To know the conversion of Orthographic Views to isometric Views and isometric to Orthographic views

UNIT-I

Introduction to Auto CAD: Introduction to software interface, Standard toolbar/menu; Understanding the co-ordinate systems-2D and 3D Visualization; Setting the Paper sizes and title block importance, printing and plotting; Draw commands: line, arc, circle, rectangle, polygons, ellipse, polyline, splines, text; Modify commands: copy, mirror, offset, arrays, move, extend, break, trim, lengthen, chamfer, fillet, etc.; Constraints: horizontal, vertical, parallel, concentric, perpendicular, symmetric, equal, collinear; Dimensioning Commands: Dimensioning and Dimension Style; Division: Line division, and circle division; Polygons: Constructing regular polygons - inscribed and circumscribed methods and general method.

UNIT-II

Projection of Points: Introduction to reference planes, four quadrants, importance of reference lines; Projection of points in all the four quadrants.

Projection of Lines: Parallel to both the reference planes, Parallel to one plane and perpendicular to other plane, Inclined to one plane and parallel to other plane, Inclined to both planes.

UNIT-III

Projection of Planes: Introduction to Regular planes, Parallel/Perpendicular to one reference plane, Inclined to one reference plane, Inclined to both the reference planes.

Projection of Solids: Introduction - Prisms, Pyramids, Cone and Cylinder, Axis parallel and perpendicular to one reference plane, Axis inclined to one reference plane.

UNIT-IV

Isometric Projection: Introduction, Isometric projection of simple plane figures, Solids - right regular prisms, pyramids, cylinder, cone on H.P, V.P.

UNIT -V

Conversions: Conversion of Isometric Views to Orthographic Views and Orthographic Views to Isometric Views.

TEXT BOOKS:

1. Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar Publishing House, Gujarat.
2. "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Prem Kumar Fifth edition, New Age International Publishers

REFERENCE BOOKS:

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers, Bangalore.

COURSE OUTCOMES:

After the completion of course the student will be able:

1. To produce geometric construction, dimensioning & Curves and detail drawings.
2. To compile Projections of points, lines, then create virtual drawing by using computer
3. To sketch the Planes and Solid Projections
4. To develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. To understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D -3D and Vice-Versa.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH –II-SEM****L/T /P/C****3/0/0/3****(R24A0502) Data structures and Algorithms****COURSE OBJECTIVES:****This course will enable students to**

1. Understand Algorithm complexities and build program logic on Array-Based Search and Sorting Techniques.
2. Learn Object Oriented Programming concepts in Python.
3. Understand the usage of linear data structures.
4. Implement graphs and its traversal techniques in Python.
5. Analyse how non- linear data structures will work.

UNIT – I

Data Structures: Introduction to Algorithm and their properties, Concepts of Analysis of algorithm with asymptotic notations (Big Oh) and their properties, time and space complexities
Types of Data Structures in Python: Built-in and user-defined data structures.

Searching - Linear Search and Binary Search

Sorting - Bubble Sort, Selection Sort, Merge Sort, Quick Sort - efficiency of algorithms - notation of time and space complexity; notations of best, worst and average case performance analysis.

UNIT – II

Oops Concepts - class, object, constructors, types of variables, types of methods. Inheritance: single, multiple, multi-level, hierarchical, hybrid, Polymorphism: with functions, with class methods, with inheritance, Abstraction: abstract classes.

UNIT – III

Stacks - Overview of Stack, Implementation of Stack (List), Applications of Stack

Queues: Overview of Queue, Implementation of Queue (List), Applications of Queues,

Linked Lists – Implementation of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists. Implementation of Stack and Queue using Linked list.

UNIT – IV

Non-linear Data Structure - **Graphs** - Introduction, Characteristics of a Graphs, Graph Traversals: Breadth First Search, Depth First Search - Applications of Graphs.

UNIT –V

Non-linear Data Structure: Trees- Tree Terminologies, Characteristics of Trees, Operations on Binary Trees and Binary Search Trees: find, insert and delete.

Tree traversal techniques: Inorder, Preorder, Postorder Traversal, Applications of Trees.

TEXTBOOKS:

1. Core Python Programming -Second Edition ,R. Nageswara Rao, Dreamtech Press
2. Data structures and algorithms in python by Michael T. Goodrich
3. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

REFERENCE BOOKS:

1. Hands-On Data Structures and Algorithms with Python: Write complex and powerful code using the latest features of Python 3.7, 2nd Edition by Dr. Basant Agarwal, Benjamin Baka.
2. Data Structures and Algorithms with Python by Kent D. Lee and Steve Hubbard.
3. Problem Solving with Algorithms and Data Structures Using Python by Bradley N Miller and David L.Ranum.

COURSE OUTCOMES:

The students should be able to:

1. Interpret the concepts of Object-Oriented Programming as used in Python.
2. Know the usage of various searching and sorting techniques
3. Design programs using linear and non-linear data structures, including stacks, queues and Linked lists
4. Develop few Graph traversal techniques
5. Design programs for implementing Tree data structure.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -II-SEM****L/T/P/C
-/0/2/1****(R24A0081)English Language and Communication Skills Lab**

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

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

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

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

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

Speaking Skills:**Objectives**

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

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

Lab.**Exercise – I****CALL Lab:**

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs Consonant Clusters- Past Tense Marker and Plural Marker- Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

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

Exercise – II**CALL Lab:**

Understand: Structure of Syllables – Word Stress– Stress pattern in sentences – Intonation.

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

ICS Lab:

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

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

Exercise - III**CALL Lab:**

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

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

ICS Lab:

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

Exercise – IV**CALL Lab:**

Understand : Listening for General Details.
Practice : Listening Comprehension Tests - Testing Exercises

ICS Lab:

Understand : Public Speaking – Exposure to Structured Talks - Non-verbal Communication
Presentation Skills.
Practice : Making a Short Speech – Extempore- Making a Presentation.

Exercise – V**CALL Lab:**

Understand : Listening for Specific Details.
Practice : Listening Comprehension Tests -Testing Exercises

ICS Lab:

Understand : 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 audiovisual 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 University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- 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. 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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -II-SEM****L/T/P/C
-/0/3/1.5****(R24A0082)Applied Physics Lab****COURSE OBJECTIVES:**

1. To experience the mechanical oscillations and resonance phenomena.
2. To verify the basic concepts of magnetism
3. To understand the concepts of laser and optical fibers.
4. To analyze voltage/current phase behavior of RC and LCR circuits.
5. To study the characteristics of semiconductor devices.

LIST OF EXPERIMENTS:

1. Melde's experiment –Frequency of electrical vibrator.
2. Stewart and Gee's method- Variation of magnetic field along the axis of current carrying coil.
3. Laser-Wavelength of light by using Diffraction grating.
4. CR circuit – Time constant of an RC circuit.
5. LCR Circuit- Quality factor and resonant frequency of LCR circuit.
6. LED -Characteristics of LED.
7. Solar cell -Characteristics of a Solar cell.
8. Optical fiber- Numerical aperture of an optical fiber.
9. Semiconductor-Energy gap of a given semiconductor.
10. Hall Effect – Hall coefficient of semiconducting samples.

REFERENCE BOOKS:

1. Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S. Publications.
2. Engineering physics practical lab manual – MRCET.

COURSE OUTCOMES:

1. Students can analyze how stationary waves are produced to determine the frequency of vibrating bar in different modes.
2. Students can realize Tangent and Biot-Savart law of magnetism.
3. Wavelength of the given laser can be determined by using diffraction phenomenon.
4. By understanding basic electrical principles, Time constant of RC and resonance phenomenon of LCR circuits can be analyzed.
5. Energy gap and V-I characteristics of various semiconductor devices can be illustrated.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**I Year B. TECH -II-SEM****L / T / P / C****- / 0 / 3 / 1.5****(R24A0582) Data Structures And Algorithms Lab****COURSE OBJECTIVES:**

1. To simulate searching and sorting techniques.
2. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
3. To know how linear data structures work
4. To illustrate non-linear data structures.
5. To develop programs for performing operations on Trees and Graphs.

LIST OF PROGRAMS:

1.
 - a. Write a program to implement Linear Search
 - b. Program on Binary search using oops concepts in python (iterative or non recursive function)
2.
 - a. Write a program to arrange the following list in ascending order using bubble sort
 - b. Write a program to arrange all the alphabets of "CSIPLEARNING" hub into descending order using bubble sort
3.
 - a. Write a python program to sort the following data using Selection sort
 - b. Write a python program to sort the following data using Selection sort
14, 21, 27, 41, 43, 45, 46, 57, 70
4. Write a Python program for implementation of MergeSort
5.
 - a. Write a python program to implement Quick Sort Algorithm
 - b. Write a python program to implement Quick sort using following list
50, 23, 9, 18, 61, 32
6.
 - a. Write a simple program to create class and object to access the class members
 - b. Write a python program to Create Student Class
 - c. Write a python program to Create Student Class with Constructor and Destructor
7.
 - a. Write a program to implement single Inheritance
 - b. Write a python program to implement multiple or multilevel inheritance
 - c. Write a program to implement abstract classes

8.
 - a. Write a program to implement Method Overloading
 - b. Write a program to implement Method Overriding
 - c. Write a python program to implement operator Overloading
9. Implement the following stack operations in python
 - a. Insertion b. Deletion c. Display
 - d. Implement a python program to reverse a string using stack
10. Implement the following Queue operations in python
 - a. Insertion b. Deletion c. Display
11. Write a python program to implement a following singly linked list operations.
 - a. Create a singly linked list
 - b. Add the elements in single linked list
 - c. Access elements from the singly linked list
 - d. Remove elements from the singly linked list
12. Write a python program to implement a doubly linked list.
 - a. Create a doubly linked list
 - b. Add elements to a doubly linked list
 - c. Access elements from the doubly linked list
 - d. Remove elements from the doubly linked list.
13.
 - a. Write a python program to implement stack a using list
 - b. Write a python program to implement Queue using list
14.
 - a. Write a program to implement any one operation on Binary Search Tre
 - b. Write a python program to implement Binary tree traversal
 - i. Preorder ii. Inorder iii. Postorder

COURSE OUTCOMES:

After completion of the course, the students should be able to:

1. Illustrate how searching and sorting can be done.
2. Interpret the concepts of Object-Oriented Programming as used in Python.
3. Implement stacks, queues and linked list.
4. Implement Non-Linear data structures like graphs
5. Solve problems using various trees

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.TECH –II-SEM

L/T/P/C
2/0/0 /0(R24A0004) ENVIRONMENTAL SCIENCES
(Mandatory Course)**Course Objectives:** On successful completion of this course, students will be able:

1. To differentiate the inter relationship between biotic and abiotic component.
2. To categorize various types of natural resources available on the earth surface.
3. To detect the causes, and control measures for various environmental pollution.
4. To articulate the issues related to solid waste and its management.
5. To understand the importance of ecological balance for sustainable development.

UNIT-I ECOSYSTEM (6 hours)

Definition: Scope, and Importance of ecosystem. **Classification:** natural and artificial ecosystems, **Structure-** abiotic and biotic component, functions of an ecosystem, food chains, food webs and ecological pyramids, biomagnification and bioaccumulation, ecosystem value, services and carrying capacity.

Activities: Case studies, poster making**UNIT-II NATURAL RESOURCES (6 hours)**

Classification of Resources: Definition of natural resource, renewable and non-renewable resources.

Renewable resources: water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Land resources:** Forest functions and deforestation. **Energy resources:** growing energy needs-solar energy, hydro energy, biogas and biofuel.

Non-Renewable Resources: Fossil fuels, refining of coal, petroleum, and natural gas.

Activities: Case studies, News articles**UNIT-III ENVIRONMENTAL POLLUTION AND CONTROL MEASURES (6 hours)**

Definition, Types of pollution: **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards, control measures of air pollution and prevention techniques. **Water pollution:** causes, effects, control measures and techniques.

Activities: Work sheets, Debate**UNIT-IV SOLID WASTE MANAGEMENT AND GLOBAL ISSUES (6 hours)**

Definition of Solid waste, characteristics of solid waste, solid waste management: collection to disposal methods, e-waste management techniques. **Global environmental Issues and efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting

substances (ODS). **International conventions/protocols:** Earth summit, Kyoto protocol, and Montreal Protocol, NAPCC-GOI Initiatives.

Activities: Quiz, seminars

UNIT-V SUSTAINABLE DEVELOPMENT (6 hours)

Introduction to concept of sustainable development: Sustainable development goals, threats and strategies to achieve sustainability. Sustainable developmental activities: Green building concept, Crazy Consumerism, Ecological Foot Print, Low carbon life style.

Activities: Seminars, slogans

SUGGESTED TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi, 12 Edition, 2015.

REFERENCE BOOKS

1. Environmental Studies by AnubhaKaushik, 4 Edition, New age international publishers.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi.
4. Environmental Science by Daniel B. Botkin& Edward A. Keller, Wiley INDIA edition.

COURSE OUTCOMES: The basic concepts included in this course will help the student to:

1. Gain knowledge and appreciate the interdependence of environment with ecosystem.
2. Learn about natural resource, its importance and environmental impacts of human activities on natural resources.
3. Understand severity of environmental pollution, its impact on environment and evaluate relevant practices.
4. Develop empathy towards environment and apply the knowledge of recycling techniques associated with waste management.
5. Adopting sustainability as a practice into their lifestyle on the basis of ecological principles.