GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
LINEAR ALGEBRA AND FUNCTION APROXIMATION

(COMMON TO CSE, ECE, EEE, CE, ME, CSE(DS), CSE(AIML))

Course Code: GR24A1001 **L/T/P/C: 3/1/0/4**
I Year I Semester

Prerequisites: Elementary knowledge of vectors, matrices and pre-calculus

COURSE OUTCOMES

1. Work with the essential tools of vector and matrix algebra
2. Compute eigenvalues and vectors for engineering applications
3. Illustrate matrix decomposition techniques to determine the exact or approximate solutions of a linear algebraic system.
4. Illustrate the concepts of function approximation with measurement of error
5. Develop the skill of finding multivariable function optima

UNIT I
FUNDAMENTALS OF VECTOR AND MATRIX ALGEBRA
Operations on vectors and matrices- Orthogonal projection of vectors- Exact and generalized inverse of a matrix- Rank of a matrix- Linear independence of vectors- Structured square matrices (Symmetric, Hermitian, skew-symmetric, skew-Hermitian, orthogonal and unitary matrices)- Vector and matrix norms

Solution of a linear algebraic system of equations (homogeneous and non-homogeneous) using Gauss elimination

UNIT II
MATRIX EIGENVALUE PROBLEM AND QUADRATIC FORMS
Determination of eigenvalues and eigenvectors of a matrix, properties of eigenvalues and eigenvectors (without proof)- Similarity of matrices- Diagonalization of a matrix- Orthogonal diagonalization of a symmetric matrix- Definiteness of a symmetric matrix

Quadratic Forms- Definiteness and nature of a quadratic form- Reduction of a quadratic form to the canonical form using an orthogonal transformation

UNIT III
MATRIX DECOMPOSITION AND LEAST SQUARES SOLUTION OF ALGEBRAIC SYSTEMS
LU decomposition- Cholesky decomposition- Gram-Schmidt orthonormalization process- QR factorization- Eigen decomposition of a symmetric matrix- Singular value decomposition

Least squares solution of an over determined system of equations using QR factorization and the generalized inverse- Estimation of the least squares error

UNIT IV

FUNCTION APPROXIMATION TOOLS IN ENGINEERING

Mean value theorems- Lagrange's mean value theorem, Taylor's theorem (without proof), Approximation off a function by Taylor's series

The principle of least squares- Function approximation using polynomial, exponential and power curves using matrix notation- Estimating the Mean squared error

UNIT V

MULTIVARIABLE DIFFERENTIAL CALCULUS AND FUNCTION OPTIMIZATION

Partial Differentiation- Chain rule- Total differentiation- Jacobian- Functional dependence

Multivariable function Optimization- Taylor's theorem for multivariable functions- Unconstrained optimization of functions using the Hessian matrix- Constrained optimization using the Lagrange multiplier method

TEXTBOOKS

1. Advanced Engineering Mathematics, 5th edition, R.K.Jain and S.R.K.Iyengar, Narosa publishing house
2. Higher Engineering Mathematics- B.S.Grewal- Khanna publications

REFERENCES

1. Introduction to Linear Algebra, Gilbert Strang, 5th edition, Wellesley,2017.
2. Numerical methods for scientific and engineering computation, M.K.Jain, S.R.K.Iyengar, R.K.Jain- 3rd edition- New Age publishers
3. Applied Mathematics, Vol. I & II, P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan,2010

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
ENGINEERING CHEMISTRY
(Common to all Branches)

Course Code: GR24A1004 **L/T/P/C: 3/1/0/4**
I Year I Semester

COURSE OUTCOMES

1. Assess the specification of water regarding its usage in domestic & Industrial scenarios.
2. Learn the working principles of various energy storage devices, and electrochemical reactions involved in corrosion.
3. Analyse the efficacy of polymers in diverse applications.
4. Distinguish various energy sources to prioritize eco-friendly fuels for environmentally sustainable development.
5. Interpret the role of engineering materials in various sectors.

UNIT I
WATER AND ITS TREATMENT:
Introduction to the 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. 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 processes. Desalination of water – Reverse osmosis

UNIT II
BATTERY CHEMISTRY AND CORROSION
Introduction - Classification of **Batteries**- primary, and secondary 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 electric vehicles.
Fuel Cells - Definition, Construction, working principle and applications of Hydrogen-Oxygen fuel cell and Solid oxide fuel cell, Differences between battery and a fuel cell.
Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods-Cathodic protection – Sacrificial anode and impressed current methods.

UNIT III
POLYMERS
Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6
Plastics: Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Compounding and fabrication of plastics - compression moulding and injection moulding. Fiber-reinforced

plastics (FRP).

Conducting Polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.
Biodegradable Polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

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

UNIT V
ENGINEERING MATERIALS
Smart materials and their engineering applications: Shape memory materials- Poly L-Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinyl amides.
Biosensors: Definition, characteristics, classification-, construction & working, applications and advantages of biosensors. Biochips -Definition, advantages, and applications.
Semiconductors: Si and Ge - Preparation, Ultra-purification and Crystal Growth by Zone Refining and Czochralski Crystal Pulling methods, Doping – Epitaxy, Diffusion and Ion-implantation.

TEXTBOOKS

1. Engineering Chemistry by P.C. Jain and M. Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Engineering Chemistry, Rama Devi, Venkata Ramana Reddy and Rath, Cengage Learning, 2016

REFERENCES

1. A Textbook of Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Engineering Chemistry by O.G.Palanna, Tata McGraw Hills Private Ltd.
3. Engineering Chemistry, Shikha Agarwal, Cambridge University Press, 2015

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING
(EEE)

Course Code: GR24A1010 **L/T/P/C: 2/0/0/2**
I Year I Semester

COURSE OUTCOMES

1. Summarize the basic fundamental laws of electric circuits.
2. Distinguish the single phase and three phase circuits.
3. Analyze the basics and principle of PN junction diode.
4. Illustrate the principle and operation of BJT and MOSFET transistors
5. Outline the protection principles using Switchgear components.

UNIT I
DC FUNDAMENTALS
Passive components, Voltage and Current sources, dependent and independent sources, fundamentals of circuit Laws, Source Transformation, Passive components in series and parallel, Delta – star conversion, Nodal and Mesh Analysis.

UNIT II
AC FUNDAMENTALS
Representation of sinusoidal waveforms, average and rms values, phasor representation, real power, reactive power, apparent power, power factor, impedance, Admittance. Introduction to three-phase circuits, types of connection. voltage and current relations in star and delta connections, analysis of balanced and unbalanced circuits, measurement of power by three- and two-wattmeter methods, measurement of reactive power by single wattmeter.

UNIT III
DIODE CIRCUITS
P-N junction diode, biasing, V-I characteristics of a diode, diode equivalent circuits, static resistance, dynamic resistance, Zener breakdown, & Avalanche breakdown. Working principle of Half-wave and full-wave rectifiers.

UNIT IV
TRANSISTORS
BJT Structure, construction, Principle and Operation of BJT, Types NPN, PNP, Common Emitter, Common Base and Common Collector Configurations, Input characteristics and Output Characteristics of a BJT.
MOSFET: Construction, Principle and Operation of Enhancement mode, Depletion mode devices, NMOS, PMOS, CMOS transistors, CMOS Inverter, Inverter characteristics.

UNIT V
ELECTRICAL INSTALLATION COMPONENTS
Components of LT Switchgear: Switch Fuse Unit (SFU), MCB (Miniature Circuit Breaker), ELCB (Earth Leakage Circuit Breaker), MCCB (Moulded Case Circuit Breaker),RCCB, Earthing: Plate and pipe earthing ,Types of batteries: Primary and secondary, UPS(Uninterrupted power supply):Components, Calculation of ratings for UPS components to specific load, power factor improvement methods.

TEXTBOOKS

1.“Basic Electrical Engineering”,D.P. Kothari and I.J. Nagrath, Third edition 2010, Tata McGraw Hill.
2. “Electrical Engineering Fundamentals”, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

REFERENCES

1. “A Textbook of Electrical Technology”,-BL Theraja volume-I, S.Chand Publications.
2. “Electronic Devices and circuits” by Jacob Milliman, McGraw-Hill, 1967
3. “Electrical and Electronics Technology”, E. Hughes, 10th Edition, Pearson, 2010.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

PROGRAMMING FOR PROBLEM SOLVING

Course Code: GR24A1006 **L/T/P/C: 2/0/0/2**
I Year I Semester

COURSE OUTCOMES

1. Design algorithms and flowcharts for problem solving and illustrate the fundamentals of C language.
2. Apply control structures and arrays to solve problems.
3. Discover the need for strings and functions in problem solving and apply it.
4. Analyze the need for pointers and structures in C and implement for solutions.
5. Demonstrate file handling mechanism, preprocessor directives and command line arguments in C.

UNIT I
INTRODUCTION TO PROGRAMMING

Introduction to Algorithms: Representation of Algorithm, Flowchart, Pseudo code with examples, compiling and executing programs, syntax and logical errors.

Introduction to C Programming Language: Structure of C program, keywords, variables, constants, datatypes, operators, precedence and associativity, expression evaluation, implicit and explicit type conversion, formatted and unformatted I/O.

UNIT II
DECISION MAKING AND ARRAYS

Branching and Loops: Conditional branching with simple if, if-else, nested if else, else if ladder, switch-case, loops: for, while, do-while, jumping statements: goto, break, continue, exit.

Arrays: One and two dimensional arrays, creating, accessing and manipulating elements of arrays. **Searching:** Introduction to searching, Linear search and Binary search.

UNIT III
STRINGS AND FUNCTIONS

Functions: Introduction to structured programming, function declaration, signature of a function, parameters and return type of a function, categories of functions, parameter passing techniques, passing arrays and strings to functions, recursion, merits and demerits of recursive functions, storage classes.

Strings: Introduction to strings, operations on characters, basic string functions available in C -strlen, strcat, strcpy, strrev, strcmp, String operations without string handling functions, arrays of strings.

UNIT IV
POINTERS AND STRUCTURES

Pointers: Idea of pointers, declaration and initialization of pointers, pointer to pointer, voidpointer, null pointer, pointers to arrays and structures, function pointer.

Structures and Unions: Defining structures, declaring and initializing structures, arrays within structures, array of structures, nested structures, passing structures to functions,

unions, typedef.

UNIT V

FILE HANDLING AND PREPROCESSOR IN C

Files: Text and binary files, creating, reading and writing text and binary files, random access tofiles, error handling in files.

Preprocessor: Commonly used preprocessor commands like include, define, undef, if, ifdef,ifndef, elif, command line arguments, enumeration data type.

Teaching methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

TEXTBOOKS

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCES

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB

(EEE)

Course Code: GR24A1011 **L/T/P/C:0/0/2/1**
I Year I Semester

COURSE OUTCOMES

1. Demonstrate the common electrical components and their ratings.
2. Summarize the basic fundamental laws of electric circuits.
3. Distinguish the measurement and relation between the basic electrical parameters
4. Examine the response of different types of electrical circuit connections with three phase excitation.
5. Illustrate the characteristics of BJT and MOSFET.

LIST OF EXPERIMENTS

Any ten experiments should be conducted.

1. Verification of Ohms Law, KVL and KCL
2. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
3. Verification of relationship between three phase voltages and currents in star and delta connection.
4. Measurement of Active & Reactive Power for star and delta connected balanced loads.
5. Power factor improvement by using capacitor bank in parallel with inductive load.
6. Measurement of Earth Electrode Resistance.
7. Volt ampere Characteristics of a PN Junction Diode.
8. Single Phase Half & Full wave diode Rectifier**.**
9. Input & Output Characteristics of NPN Bipolar Junction Transistor.
10. Drain Characteristics of MOSFET.
11. Breakdown Characteristics of a Zener Diode.
12. Transfer Characteristics of MOSFET.

TEXTBOOKS

1. “Basic Electrical Engineering”, D.P. Kothari and I.J. Nagrath, Third edition 2010, Tata McGraw Hill.

2. “Electrical Engineering Fundamentals”, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

REFERENCES

1. “A Textbook of Electrical Technology”, -BL Theraja volume-I, S.Chand Publications.
2. “Electronic Devices and circuits” by Jacob Milliman, McGraw-Hill, 1967
3. “Electrical and Electronics Technology”, E. Hughes, 10th Edition, Pearson, 2010.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
ENGINEERING CHEMISTRY LAB

Course Code: GR24A1019 **L/T/P/C: 0/0/3/1.5**
I Year I Semester

COURSE OUTCOMES

1. Determination of parameters like hardness of water chloride content in water
2. Able to handle instruments like conductometer and potentiometer to find out the concentrations of acids and bases.
3. Estimate the amount of metal ion present in a given sample.
4. Prepare polymers like bakelite, nylon-6, and aspirin in the laboratory.
5. Find out the physical properties of fluids like adsorption, surface tension, and viscosity.

List of Experiments

1. Determination of Total Hardness of water by a complexometric method using EDTA.
2. Determination of Chloride content of water by Argentometry.
3. Redox titration: Estimation of Ferrous ion using standard $KMnO_4$ by Permanganometry.
4. Estimation of HCl by Conductometric titrations.
5. Estimation of Ferrous ion by Potentiometry using dichromate.
6. Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.
7. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
8. Determination of Viscosity of liquid by using Ostwald's Viscometer.
9. Determination of Surface tension of liquid by using Stalagmometer.
10. Determination of Partition Coefficient of Acetic acid between n-butanol and water.
11. Preparation of phenol-formaldehyde resin (Bakelite).
12. Synthesis of Aspirin.

REFERENCES

1. Vogel's textbook of Practical Organic Chemistry, 5th Edition.
2. A Textbook on Experiments and Calculations in Engineering Chemistry-S. S. Dara, S Chand & Company; 9th edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROGRAMMING FOR PROBLEM SOLVING LAB

Course Code: GR24A1021 **L/T/P/C: 0/0/3/1.5**
I Year I Semester

COURSE OUTCOMES

1. Translate algorithms into a working program and analyze and debug the codes usingbasics of C language.
2. Develop programs by choosing appropriate control structures.
3. Select and apply the concept of arrays and strings for problem solving.
4. Demonstrate problem solving using modular programming and pointers.
5. Solve the problems using structures, files and pre-processor directives.

TASK 1

a. Write a C program to convert days into years, weeks and days.(Assume a year has 365days).
b. Write a C program to find greatest and smallest among three numbers using conditionaloperator.
c. Write a C program to enter P, T, R and calculate Compound Interest.

TASK 2

a. Write a C program to swap two numbers using the following:
(i) Using third variable
(ii) Without using third variable
(iii) Using bitwise operators
b. Write a C program to do the following using implicit and explicit type conversion
(i) Convert Celsius temperature to Fahrenheit
(ii) Convert Fahrenheit temperature to Celsius
(iii) Find area of a triangle given sides a,b,c

TASK 3

a. Write a C program to add two numbers without using arithmetic operators in C.
b. Write a C program to determine whether a number is a power of 2 or not using bitwiseoperator and ternary operator.
c. Write a C program to check whether a number is even or odd using bitwise operator andternary operator.

TASK 4

a. Write a C program to find the roots of a quadratic equation using if-else.
b. Write a C program to input electricity unit charges and calculate total electricity bill according to the given condition:
For first 50 units Rs. 0.50/unit
For next 100 units Rs. 0.75/unit
For next 100 units Rs. 1.20/unit
For unit above 250 Rs. 1.50/unit
An additional surcharge of 20% is added to the bill
c. Write a menu driven C program to implement a simple arithmetic calculator.

d. Write a C program to display number of days in month using switch case (The input is month number 1 -12).

TASK 5

a. Write a C program check whether a given number is Perfect number or not.
b. Write a C program check whether a given number is Palindrome number or not.
c. Write a C program check whether a given number is Armstrong number or not.
d. Write a C program check whether a given number is Strong number or not.

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TASK 6

a. Write a C program to display the following patterns:

(ii)

```
* * * *
*     *
*     *
* *   *
*
```

(iii)

```
1           1
2 3         2 2
4 5 6       3 3 3
7 8 9 10    4 4 4 4
```

b. Write a C program to generate the prime numbers between x and y where x and y arestarting and ending values to be supplied by the user.
c. Write a C program to calculate the sum of following series:(i) $S1=1+x/1!-x^2/2!+x^3/3!-x^4/4!+\ldots..xn/n!$
(ii) $S2= x^1/1+x^3/3+x^5/5+\ldots.+x^n/n$

TASK 7

a. Write a C program to find sum, average and minimum and maximum in a list of numbers.
b. Write a C program to implement Linear search.
c. Write a C program to implement Binary search.

TASK 8

a. Write a C program to implement matrix addition.
b. Write a C program to implement matrix multiplication.

TASK 9

a. Write a C program to display binary equivalent of a given decimal number usingfunctions.
b. Write a C program to implement transpose of a matrix using functions
c. Write a C program using functions that compares two strings to see whether they areidentical or not. The function returns 1 if they are identical, 0 otherwise.

TASK 10

a. Write a C program to implement factorial of a given integer using recursive and non-recursive functions.

b. Write a C programto find the GCD (greatest common divisor) of two given integers usingrecursive and non-recursive functions.
c. Write a C program to print first 'n' terms of Fibonacci series using recursive and non- recursive functions.

TASK 11

a. Write a C program to implement the following with and without string functions:
(i) Reverse a string (ii) Concatenate 2 strings.
b. Write a C program to read a string and determine whether it is palindrome or not.
c. Write a C program to sort the 'n' strings in the alphabetical order.

TASK 12

a. Write a C program to implement function pointer to find sum and product of two numbers.
b. Write a C program to sort list of numbers using pointers.

TASK 13

a. Define a structure Student, to store the following data about a student: rollno(int), name(string) and marks. Suppose that the class has 'n' students. Use array of type Studentand create a function to read the students data into the array. Your program should be menu driven that contains the following options :
(i) Print all student details
(ii) Search student by rollno
(iii) Print the names of the students having the highest test score
b. Write a C program that uses structures and functions to perform addition and product oftwo complex numbers? (use structures and functions)

TASK 14

a. Write a C program to merge two files into a third file.
b. Write a C program to count number of characters in a file and also convert all lower casecharacters to upper case and display it
c. Write a C program to append a file and display it

TASK 15

a. Write a C program to find sum of 'n' numbers using command line arguments.
b. Write a C program to implement following pre-processor directives:
i. define ii. undef iii. ifdef iv. ifndef.
c. Write a C program to create a user defined header file to find sum, product and greatestof two numbers.

TEXTBOOKS

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, CengageLearning, (3rd Edition)

REFERENCE BOOKS

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PrenticeHall of India
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)

3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education
4. Herbert Schildt, C: The Complete Reference, McGraw Hill, 4th Edition

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ENGINEERING WORKSHOP

Course Code: GR24A1025 **L/T/P/C: 1/0/ 3/2.5**
I Year I Semester

COURSE OUTCOMES

1. Identify workshop tools and their operational capabilities
2. Practice on manufacturing of components using workshop trades including Carpentry, Fitting, Tin Smithy, Welding, Foundry and Black Smithy
3. Apply basic electrical engineering knowledge for House Wiring Practice
4. Develop various trades applicable to industries
5. Create hands on experience for common trades with taking safety precautions

TRADES FOR EXERCISES: At least two tasks from each trade

1. **Carpentry:** Demonstration and practice of carpentry tools
   Task 1: Preparation of T- Lap Joint
   Task 2: Preparation of Dove Tail Joint.

2. **Fitting -** Demonstration and practice of fitting tools
   Task 3: Preparation of Straight Fit
   Task 4: Preparation of V-Fit

3. **Tin-Smithy -** Demonstration and practice of Tin Smithy tools
   Task 5: Preparation of Rectangular Tray
   Task 6: Preparation of Open Scoop

4. **Welding :** Demonstration and practice on Arc Welding tools
   Task 7: Preparation of Lap joint,
   Task 8: Preparation of Butt Joint

5. **House-wiring:** Demonstration and practice on House Wiring tools
   Task 9: Exercise on One way switch controlled two bulbs in series one bulb in Parallel.
   Task 10: Exercise on Stair Case connection.

6. **Foundry :** Demonstration and practice on Foundry tools
   Task 11: Preparation of Mould using Single Piece Pattern.
   Task 12: Preparation of Mould using Split Piece Pattern.

7. **Black Smithy:** Demonstration and practice on Black Smithy tools
   Task 13: Preparation of U-Hook
   Task 14: Preparation of S-Hook

8. Preparation of a prototype model of any trade under G-LOBE activity

TEXTBOOKS

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019.
2. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5thEdn. 2015.
3. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

REFERENCES

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Elements of Workshop Technology, Vol. II by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 12th edition
3. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
4. Technology of machine tools, Steve F. Krar, Arthur R. Gill and Peter Smid, McGraw Hill Education (India) Pt. Ltd., 2013.
5. Engineering Practices Laboratory Manual, Ramesh Babu.V., VRB Publishers Private Limited, Chennai, Revised edition, 2013 – 2014.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

GRAPHICS FOR ENGINEERS

Course Code: GR24A1016 **L/T/P/C: 1/0/4/3**
I Year I Semester

COURSE OUTCOMES

1. Generate two dimensional drawings and apply AutoCAD commands.
2. Interpret projection methods and draw projections of line or point objects.
3. Imagine and generate multi-view projections of planes and solid objects in different positions
4. Construct and interpret sectional views and develop solid surfaces.
5. Create isometric drawings from given orthographic views and familiar with isometric to orthographic transformations.

UNIT I

Introduction to AutoCAD software: user interface, tool bar -draw, modify, dimension, layers, setting drawing area, status bar, print setup, generation of two-dimensional drawings.

Construction of Engineering Curves- Ellipse, Parabola and Hyperbola -general method only.

UNIT II

Orthographic projection – Introduction, definition, and classification of projections; pictorial and multi-view, significance of first and third angle methods of projections; **Projections of points** -in all quadrants and **straight lines** -inclined to one reference plane only.

UNIT III

Projections of planes - definition and types of regular plane figures like triangle, square, pentagon, hexagon, and circle; projections of planes -inclined to one reference plane only.

Projections of solids - definition and types of right regular solids objects like prism, cylinder, pyramid, and cone; projections of solids -axis inclined to one reference plane only.

UNIT IV

Sections of solids- Section and sectional views of right regular solids like Prism, Cylinder, Pyramid and Cone – Auxiliary Views.

Development of surfaces- Development of surfaces of Right Regular Solids like Prism, Pyramid, Cylinder and Cone.

UNIT V

Isometric views– isomeric views of lines, planes (polygons) and solids (prism, cylinder, pyramid, and cone); generation of Isometric line diagrams. World Coordinate System, User Coordinate System.

Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.

TEXTBOOKS

1. Engineering Drawing by N. D. Bhatt, Fiftieth Revised and Enlarged Edition:2011, Charotar Publishing House Pvt. Ltd.
2. Engineering Graphics by Basant Agrawal and C M Agrawal, fifth re-print 2011, Tata McGraw Hill Education Private Limited, New Delhi.

REFERENCES

1. Engineering Graphics with AutoCAD 2020 by James D. Bethune, Copyright © 2020 by Pearson Education, Inc. All rights reserved.
2 Engineering Graphics by M. B. Shah, B. C. Rana, S. N. Varma, Copyright © 2011 Dorling Kindersley (India) Pvt. Ltd, Licensees of Pearson Education in South Asia.
3. Engineering Drawing and Graphics by K Venu Gopal /New Age International Pvt. Ltd, Publishers, fifth edition, 2002.
4. Engineering Graphics by Koushik Kumar, Apurba Kumar Roy, Chikesh Ranjan, S Chand and Company limited, first edition 2019.
5. Engineering Drawing with Auto Cad by B. V. R. Gupta, M. Raja Roy, IK International Pub., 2009.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

DESIGN THINKING

Course Code: GR22A1022 **L/T/P/C: 2/0/0/0**
I Year I Semester

COURSE OUTCOMES

1. Use design thinking and hypothesis-driven innovation processes to develop viable solutions to user challenges
2. Use multiple brainstorming techniques to find innovative solutions
3. Develop and test a business model or business case to support the viability of the solution
4. Prototype a solution to a user challenge
5. Investigate the cultural, emotional, technological, and business factors relevant to developing a new product or service design concept

UNIT I
REVISITING DESIGN THINKING

Creative thinking as basis of innovation; Empathy process for deep understanding of challenge with practical ingenuity; Making sense of observations and insights; Defining a point of view and context Design thinking skills for Problem Discovery, Definition, and Ideation – Identifying problems in daily lives and in the world at large, Understanding user and customer perspectives.

UNIT II
IDEATION PROCESS

Clear Articulation of problem statement with focus on latent needs; Brainstorming potential solutions; Ideation methods with case-study based approach to using Systematic Inventive Thinking (SIT) Methods such as Addition, Subtraction, Multiplication, Division and Task Unification Strategic Innovation for competition in future: Linear Innovation vs. non-linear innovation, Understanding and identifying weak signals, 3-box thinking, 3-Box framework and Box-3 ideation.

UNIT III
DESIGNING CUSTOMER EXPERIENCE

Understanding Innovation through Design Thinking; Enhancing Customer Experience; Service Design and Development Process and Case Studies; Service Experience Cycle and Case Studies .

UNIT IV
SUSTAINABLE DESIGN APPROACHES

Concern for Environment and Sustainability in Design, Case Studies to understand good Design For Environment (DFE) Decisions; Design Considerations in the five stages of the Product Life Cycle.

UNIT V

INTEGRATIVE ENGINEERING DESIGN SOLUTIONS

Identifying and resolving issues with working in diverse teams, Modularising, prototype building by different engineering disciplines within the team, validated learning with accessible metrics, Capstone Project (Interdisciplinary) Applying Design Thinking Principles and Methods for Ideation and Prototyping, Testing Solution, Refining Solution, and Taking the Solution to the Users.

TEXTBOOKS

1. 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization, Vijay Kumar, John Wiley & Sons, ISBN: 978-1118083468, 2012

2. Living with Complexity, Donald A Norman, MIT Press, ISBN: 978-0262528948, 2016

3. Design Thinking for Entrepreneurs and Small Businesses: Putting the Power of Design to Work, Beverly Rudkin Ingle, A Press, ISBN: 978-1430261810, 2013

REFERENCES

1. Emotionally Durable Design: Objects, Experiences and Empathy, Jonathan Chapman, 2nd Edition, Routledge, ISBN: 978-0415732161, 2015

2. Innovation Design: How Any Organization Can Leverage Design Thinking to Produce Change, Drive New Ideas, and Deliver Meaningful Solutions, Thomas Lockwood, Edgar Papke, New Page Books, ISBN: 978-1632651167, 2017

3. Design Thinking Business Analysis: Business Concept Mapping Applied, Thomas Frisendal, Springer, ISBN: 978-3642434822, 2012

4. Chapter 1: A Simple Framework for Leading Innovation, The Three Box Solution, HBR Press, 2016

5. Design a Better Business: New Tools, Skills and Mindset for Strategy and Innovation, Patrick Van Der Pijl, Justin Lokitz, Lisa Kay Solomon, Erik van der Pluijm, Maarten van Lieshout, Wiley, ISBN: 978-8126565085, 2016

I YEAR II SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(COMMON TO CSE, ECE, EEE, CE, ME, CSE(DS), CSE(AIML))

Course Code: GR24A1002 **L/T/P/C: 3/1/0/4**
I Year II Semester

COURSE OUTCOMES

1. Classify the differential equations of first order and solve them analytically by suggested methods
2. Solve linear differential equations of higher order under various forcing functions
3. Evaluate double and triple integrals and apply them to some problems in geometry and mechanics
4. Apply vector differential operators on scalar and vector fields and apply them to solve some field related problems
5. Apply classical vector integral theorems for fast evaluation of work done around closed curves and flux across closed surfaces

UNIT I
ORDINARY DIFFERENTIAL EQUATIONS OF THE FIRST ORDER

LDE of the first order: Solution of Exact, Linear and Bernoulli equations, modeling Newton's law of cooling, growth and decay models.

UNIT II
ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER

LDE with constant coefficients: Complementary function, Particular integrals for *f(x)* of the form e^{ax}, x^n, $cosax$, $sinax$, $e^{ax}V(x)$ and $x\ V(x)$where $V(x)$=$cosax$ and $sinax$, the method of variation of parameters, LDE with variable coefficients: Cauchy's homogeneous equation.

UNIT III
MULTIPLE INTEGRALS

Double integrals: Evaluation of Double Integrals, change of order of integration (only Cartesian form), change of variables (Cartesian and polar coordinates) Triple Integrals: Evaluation of triple integrals, change of variables (Cartesian to Spherical and Cylindrical polar coordinates) Applications: Area using the double integral –Volume of a solid using the double and triple integral-

UNIT IV
VECTOR DIFFERENTIATION AND LINE INTEGRATION

Vector differentiation: Scalar and vector point functions, Concepts of gradient, divergence and curl of functions in cartesian framework, solenoidal field, irrotational field, scalar potential

Vector line integration: Evaluation of the line integral, concept of work done by a force field, Conservative fields

UNIT V
SURFACE INTEGRATION AND VECTOR INTEGRAL THEOREMS

Surface integration: Evaluation of surface and volume integrals, flux across a surface
Vector integral theorems: Green's, Gauss and Stokes theorems (without proof) and their applications

TEXTBOOKS

1. R.K.Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa publishing house, Fourth edition 2014
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006

4.. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

REFERENCES

1. GRIET reference manual
2. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
APPLIED PHYSICS
(Common to all branches)

Course Code: GR24A1003 **L/T/P/C: 3/1/0/4**
I Year II Semester

COURSE OUTCOMES

1. Solve engineering problems involving quantum nature of radiation and matter waves.
2. Understand the characteristics of semiconductor devices and operation of optoelectronic devices.
3. Identify magnetic and superconducting materials based on their properties for various applications.
4. Analyze the properties of Laser and its propagation in different types of optical fibers.
5. Explore the features of nanomaterials.

UNIT I
QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction, Black body radiation, Planck's law, Photoelectric effect- Einstein's Photoelectric equation(quantitative), Wave-Particle duality: de Broglie hypothesis, Davisson and Germer experiment, Heisenberg's uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional infinite potential box.

Solids: Classification of solids into metals, semiconductors, and insulators.

UNIT II
SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors(qualitative) - Hall Effect and its applications, direct and indirect band gap semiconductors, Construction and principle of operation of p-n junction diode, I-V characteristics of p-n junction diode and Zener diode.

Radiative transition: Absorption, Spontaneous and Stimulated emissions, Principle, Construction, Working, Characteristics and Applications: LED and Solar cell.

UNIT III
MAGNETIC MATERIALS AND SUPERCONDUCTIVITY

Magnetic Materials: Introduction, permeability, field intensity, magnetic field induction, magnetisation, magnetic susceptibility, origin of magnetic moment: Bohr magneton, classification of magnetic materials: Ferro, Para, Dia, Antiferro and Ferri, Hysteresis curve based on domain theory of ferromagnetism, Soft and hard magnetic materials, Applications of magnetic materials.

Superconductivity: Superconductivity phenomenon, Meissner effect, Type I and Type II superconductors, applications of superconductors.

UNIT IV

LASERS AND FIBER OPTICS

Lasers: Introduction, Characteristics of lasers, Lasing action, Essential components of laser, Construction and working: Ruby laser, He-Ne laser and Semiconductor laser, Applications of lasers.

Fiber Optics: Introduction, Principle and Structure of an optical fiber, Basic components in optical fiber communication system, Advantages of optical fibers over conventional cables, Types of optical fibers, Acceptance angle-Numerical aperture, Losses associated with optical fibers, Applications of optical fibers.

UNIT V

NANOTECHNOLOGY

Introduction, Quantum confinement, Surface to volume ratio, Classification of Nanomaterials, Synthesis methods: Top-Down Technique: Ball milling method, Bottom-Up technique: Sol-Gel method, Characterization techniques: SEM, TEM and EDAX.

TEXTBOOKS

1. Engineering Physics, B.K. Pandey, S. Chaturvedi – Cengage Learing.

2. Applied Physics, T. Bhīma Sankaram, BSP Publishers.

3. Engineering Physics, P.K Palanisamy, Scitech Publishers.

4. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand.

REFERENCES

1. Fundamentals of Semiconductor Devices, Second Edition, Anderson and Anderson, McGraw Hill.

2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw- Hill Inc. (1995)

3. Semiconductor Physics and Devices, 4e, Neamen and Biswas, McGraw Hill.

4. Online Course: “Optoelectronic Materials and Devices” by Monica Katiyar and Deepak Guptha on NPTEL.

5. Halliday and Resnick, Physics – Wiley.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
ENGLISH
Common to CSE (SEM-I), and CE, EEE, CSE (AIML), CSE(DS), ECE & ME(SEM-II)

Course Code: GR24A1005 **L/T/P/C: 2/0/0/2**
I Year II Semester

COURSE OUTCOMES

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire proficiency in English including reading and listening comprehension, writing and speaking skills.
5. Convey complex ideas clearly and accurately in academic and professional settings

UNIT I

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

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

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

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

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

UNIT II

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

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

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

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

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events

– Classifying- Providing Examples or Evidence.

UNIT III

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

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

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

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

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

UNIT IV

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

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

UNIT V

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

Vocabulary: Technical Vocabulary and their Usage
Grammar: Common Errors in English (*Covering all the other aspects of grammar which were notcovered in the previous units*)
Reading: Reading Comprehension-Exercises for Practice
Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

<u>Note</u>: Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are coveredin the syllabus of ELCS Lab Course.

- **<u>Note</u>: 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 theneeds of the students in their respective colleges for effective teaching/learning in the class.

- **<u>Note</u>**: **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 BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCES

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.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

DATA STRUCTURES

Course Code: GR24A1017 **L/T/P/C:2/0/0/2**

I Year II Semester

COURSE OUTCOMES

1. Implement various sorting techniques and analyze the computational complexity of algorithms.
2. Analyze the basics of data structures and its types and translate to programs the operationson stack and queue and their applications.
3. Develop algorithms for various operations on linked lists and convert them to programs.
4. Interpret operations on non-linear data structure binary tree and BST.
5. Summarize the operations on graphs and apply graph traversals techniques and outlinehashing techniques.

UNIT I

Algorithms and Complexities: Analysis of algorithms, Basic concept of order of complexity, Asymptotic Notations: Big Oh notation, Omega notation, Theta notation, little oh notation and little omega notation.

Sorting: Bubble sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, Radix Sort, Counting sort.

UNIT II

Stacks: Introduction to Data Structures and types, Stack – Operations: pop, push, display, peek, Representation and implementation of stack operations using arrays, stack applications, recursion, infix to postfix transformation, evaluating postfix expressions.

Queues: Queue – Operations: enqueue, dequeue, display, representation and implementation of queue operations using array, applications of queues, circular queues - representation and implementation.

UNIT III

LIST: Introduction, dynamic memory allocation, self-referential structures, single linked list, advantages and disadvantages of single linked list, single linked list vs arrays, representation ofa linked list in memory, operations-insertion, deletion, display, search.

Types and applications: Circular linked list, double linked list, implementation of stack, queueusing linked list.

UNIT IV

Trees: Basic tree concepts, Binary trees**:** properties, types, representation of binary trees using arrays and linked lists, traversals of binary tree.

Binary Search Tree –Representation and implementation of operations, Binary Search Tree Traversals (recursive), creation of binary tree and BST from given traversals.

UNIT V

Graphs: Definition, basic terminology, representation of graphs, graph traversal techniques – Breadth First Traversal, Depth First Traversal.

Hashing - Introduction to hashing, hash function and types, hash table, implementation, collision resolution techniques–separate chaining, linear probing, quadratic probing, double hashing (onlyexamples – no implementation).

Teaching methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

TEXTBOOKS

1. Data Structures, 2/e, Richard F, Gilberg, Forouzan, Cengage
2. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH

REFERENCES

1. Data Structures with C, Seymour Lipschutz, TMH
2. Classic Data Structures, 2/e, Debasis, Samanta, PHI, 2009
3. Fundamentals of Data Structures in C, 2/e, Horowitz, Sahni, Anderson Freed, University Press

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

ELECTRICAL CIRCUIT ANALYSIS

Course Code: GR24A1014 **L/T/P/C:2/0/0/2**
I Year II Semester

COURSE OUTCOMES

1. Analyze the electric circuits with suitable theorems and coupled circuits.
2. Illustrate the transient response of given DC circuits.
3. Infer electrical circuit responses using Laplace and Inverse Laplace transform.
4. Summarize the concepts of Fourier Series and Fourier transforms.
5. Simplify the network by using two port parameters.

UNIT I
NETWORK THEOREMS AND COUPLED CIRCUITS

Linearity and Superposition, Thevenin's and Norton's theorems, Maximum power transfer theorem and Reciprocity theorem (DC &AC).

Coupled Circuits: Self & Mutual Inductance, Dot convention, Coefficient of Coupling, Analysis of circuits with mutual inductance.

UNIT II
DC TRANSIENTS AND RESONANCE

Solution of first and second order differential equations for Series and Parallel RL, RC, RLC circuits, time constants, steady state and transient response. Current locus diagrams of RL and RC series circuits.

Resonance: Series and parallel circuits, Bandwidth, Q-factor, initial and final conditions in network elements

UNIT III
ELECTRICAL CIRCUIT ANALYSIS USING LAPLACE TRANSFORMS

Introduction to Laplace Transform, Properties of Laplace Transforms, initial and Final value theorems, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, Inverse Laplace Transform, transformed network with initial conditions, Transfer function representation, Poles and Zeros.

UNIT IV
FOURIER SERIES AND FOURIER TRANSFORM

Representation of continuous-time periodic signals by Fourier series; Dirichlet's conditions; Symmetry conditions, Properties of Fourier series, Trigonometric and Exponential Fourier series.

Fourier transform: Fourier transform of periodic signals, Properties of Fourier transforms. Application to simple networks.

UNIT V
TWO PORT NETWORKS

Two Port Networks, terminal pairs, relationship of two port variables, impedance,

admittance, hybrid and transmission parameters, condition for symmetry and reciprocity, interrelation ship between various parameters, interconnections of two port networks (series, parallel and cascade).

TEXTBOOKS

1. "Fundamentals of Electric Circuits" by C.K.Alexander and M.N.O.Sadiku, McGraw Hill Education,2004.
2. "Engineering Circuit Analysis" by W.H.Hayt and J.E.Kemmerly, McGraw Hill Education,2013.

REFERENCES

1. "Basic Electrical Engineering" by A.Sudhakar and Shyam Mohan, McGraw Hill Education.
2. "Circuit Theory" (Analysis and Synthesis) by A.Chakrabarti, Dhanpat Rai & Co
3. "Networks and Systems" by D Roy Choudhury, New Age International Publications, 1998.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

APPLIED PHYSICS LAB

(Common to all branches)

Course Code: GR24A1018 **L/T/P/C:0/0/3/1.5**

I Year II Semester

COURSE OUTCOMES

1. Compare the behavior of Solar cells and LED.
2. Analyze the behavior of magnetic fields and their applications.
3. Infer the work function of a material through photoelectric effect.
4. Discuss the characteristics of Lasers and infer the losses in optical fibers.
5. Estimate the frequency of tuning fork through the phenomena of resonance.

List of Experiments

1. Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode.
2. Solar Cell: To study the V-I Characteristics of solar cell.
3. Light emitting diode: To study V-I characteristics of light emitting diode.
4. Stewart – Gee's experiment: Determination of magnetic field along the axis of a current carrying coil.
5. Hall effect: To determine Hall co-efficient of a given semiconductor.
6. Photoelectric effect: To determine work function of a given material and Planck's constant.
7. LASER: To study the V-I characteristics of LASER sources.
8. Optical fiber: To determine the bending losses of Optical fibers.
9. Optical fiber: To determine the Numerical Aperture of Optical fibers.
10. Melde's experiment: To determine the frequency of a tuning fork using Melde's arrangement.

Note: Any 8 experiments are to be performed.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

DATA STRUCTURES LAB

Course Code: GR24A1024 **L/T/P/C: 0/0/2/1**
I Year II Semester

COURSE OUTCOMES
1. Construct executable C programs for sorting techniques.
2. Implement stack and queue data structures and their applications.
3. Interpret various linked list operations to produce executable codes.
4. Develop working procedure for operations on BST using DMA.
5. Demonstrate graph operations and hashing techniques.

TASK 1
a. Implement Bubble sort using a C program.
b. Implement Selection sort using a C program.
c. Implement Insertion sort using a C program.

TASK 2
a. Develop a C program for Quick sort.
b. Demonstrate Merge sort using a C program.
c. Design a C program for Radix Sort.

TASK 3
a. Write a C program to implement Stack operations using arrays.
b. Write a C program to implement Queue operations using arrays.
c. Write a C program to implement Circular Queue operations using arrays

TASK 4
a. Write a C program to convert infix expression to postfix expression.
b. Write a C program to evaluate a postfix expression.

TASK 5
a. Write a C program to check for balanced parenthesis.
b. Write a C program to implement priority queue using arrays.

TASK 6
a. Implement the following operations on Single Linked List using a C program.
i. create
ii. insert
iii. delete
iv. search
v. display

TASK 7

a. Write a C program to implement Circular Linked List operations – create, insert, deleteand display.

TASK 8

a. Write a C program to implement Double Linked List operations – create, insert, deleteand display.

TASK 9

a. Implement a C program for Stack using Linked list.
b. Implement a C program for Queue using Linked list.

TASK 10

a. Implement the following operations on Binary Search Tree

i. create
ii. insert
iii. search
iv. delete

TASK 11

a. Implement the following operations on Binary Search Tree

i. count-nodes
ii. height
iii. minimum node
iv. maximum node

TASK 12

a. Develop a C code for preorder, inorder and postorder traversals of a Binary Search Treeusing recursion.
b. Design a C program for level order traversal of a Binary Search Tree.

TASK 13

a. Write a C program to implement Adjacency Matrix of a given graph.
b. Write a C program to implement Adjacency List of a given graph.

TASK 14

a. Implement a C program for DFS traversal on graph.
b. Implement a C program for BFS traversal on graph.

TASK 15

a. Implement a C program for the following operations on Hashing:

i. insert
ii. delete
iii. search
iv. display

TEXTBOOK

1. Data Structures, 2/e, Richard F, Gilberg, Forouzan, Cengage
2. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH

REFERENCES

1. Data Structures with C, Seymour Lipschutz, TMH
2. Classic Data Structures, 2/e, Debasis, Samanta, PHI, 2009
3. Fundamentals of Data Structures in C, 2/e, Horowitz, Sahni, Anderson Freed, University Press

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Common to CSE (SEM-I), and CE, EEE, CSE(AIML), CSE(DS), ECE & ME(SEM-II)

Course Code: GR24A1020 **L/T/P/C:0/0/2/1**
I Year II Semester

COURSE OUTCOMES

1. Interpret the role and importance of various forms of communication skills.
2. Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively by listening carefully and respect others point of view.
3. Utilize various media of verbal and non-verbal communication with reference to various professional contexts.
4. Recognize the need to work in teams with appropriate ethical, social and professional responsibilities.
5. Speak and pronounce English intelligibly

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

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

Exercise I

CALL Lab:

Understand: Introduction to Phonetics – Speech Sounds – Consonant and Vowel Sounds.
Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Ice Breaking and JAM.
Practice: Ice-Breaking Activity and JAM Session. Introducing oneself and others

Exercise II

CALL Lab:

Understand: Structure of Syllables– Weak Forms and Strong Forms in Context– Word Stress and
Rhythm.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.
Practice: Role-Play- Expressions in Various Situations –Making Requests and Seeking

Permissions- Telephone Etiquette, Rapid Round –Memory Games.

Exercise III

CALL Lab:

Understand: Intonation--Errors in Pronunciation-the Influence of Mother Tongue (MTI).
Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.
Practice: Making a Short Speech – Extempore.

Exercise IV

CALL Lab:
Understand: Presentation Skills – Elements of Presentation – Organizing Content – Use of Power Point
– Slides Preparation
Practice: Presentation Skills

ICS Lab:

Understand: How to make informal and Formal Presentations
Practice: Collages / Poster Presentations-Power point presentations

Exercise V

CALL Lab:

Understand: Listening Skills and its importance-– Purpose- Process- Types- Barriers of Listening - Listening for General/Specific Details.
Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Mind map - Story Telling - Narrating a story using mind maps
Practice: Weaving Stories

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab**
2. **Interactive Communication Skills (ICS) Lab**

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

ELECTRICAL CIRCUIT ANALYSIS LAB

Course Code: GR24A1022 **L/T/P/C:0/0/2/1**
I Year II Semester

COURSE OUTCOMES

1. Solve the circuits using various network theorems.
2. Analyze the performance of R-L, R-C and R-L-C circuits and draw the locus diagrams.
3. Measure the self and mutual inductance and determine the coefficient of coupling.
4. Determine the two-port network parameters.
5. Examine the resonance parameters and verify them practically.

LIST OF EXPERIMENTS

Any ten experiments should be conducted.

1. Verification of Thevenin's Theorem & Norton's Theorem
2. Verification of Superposition Theorem.
3. Verification of Reciprocity Theorem.
4. Verification of Maximum Power Transfer Theorem.
5. Determination of time constant for series RL and RC circuits.
6. Draw the Locus Diagrams of RL (R-Varying) and RC (R-Varying) Series Circuits.
7. Draw the locus Diagrams of RL (L-Varying) and RC (C-Varying) Series Circuits.
8. Analysis of Series Resonant Circuit.
9. Analysis of Parallel Resonant Circuit.
10. Determination of self, mutual inductances and coefficient of coupling.
11. Determination of Z &Y parameters of a two- port network.
12. Determination of Hybrid & Transmission parameters of a two-port network.

TEXTBOOKS

1. "Fundamentals of Electric Circuits" by C.K.Alexander and M.N.O.Sadiku, McGraw Hill Education,2004.
2. "Engineering Circuit Analysis" by W.H.Hayt and J.E.Kemmerly, , McGraw Hill Education,2013.

REFERENCES

1. “Basic Electrical Engineering” by A.Sudhakar and Shyam Mohan, McGraw Hill Education.
2. “Circuit Theory” (Analysis and Synthesis) by A.Chakrabarti ,Dhanpat Rai & Co
3. “Networks and Systems” by D Roy Choudhury, New Age International Publications,1998.