GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY: NELLORE

(AUTONOMOUS)

NELLORE–524317 (A.P) INDIA

B.TECH IN MECHANICAL ENGINEERING

(ACCREDITATED BY NBA)

COURSE STRUCTURE AND SYLLABI UNDER RG 22 REGULATIONS

DEPARTMENT VISION

To evolve as a prospective learning centre producing competent Mechanical Engineers to fulfil the ever changing needs of society and industry demands

DEPARTMENT MISSION

DM_1: To Impart comprehensive knowledge and experience in Mechanical Engineering domain through the effective implementation of Teaching-Learning methodologies

DM_2: To promote the culture of Interdisciplinary learning and facilitate Industrial training to resolve global Engineering issues

DM_3: To Impart training on modern drafting and analysis software sharpening computational capabilities and promoting higher studies

DM_4: To Initiate Industry-Institute Interface facilitating skill enhancement keeping pace with emerging industrial trends

DM_5 To Infuse moral and ethical values to groom environmentally conscious and socially responsible technocrats with professional integrity.

Program Educational Objectives (PEOs)

PEO1: Examine and Analyze Mechanical Engineering problems and provide sustainable solutions.

PEO2: Pursue successful professional career in industry, academia or research.

PEO3: Engage in continuous learning to keep abreast of emerging technologies with a sense of professional commitment and ethics.

PEO4: Contribute in multi-disciplinary teams through effective inter personal skills.

Program Outcomes

PO1 **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6 **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

PO8 **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

PSO1 **Professional Skills:** Apply the knowledge of materials and manufacturing principles to plan, design and monitor the production operations of an Industry.

PSO2 **Design Skills:** Employ the governing laws of Thermodynamics, Heat transfer and Refrigeration & Air Conditioning to design and develop Thermo Fluid systems.

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B.TECH Mechanical Engineering

Course Structure (RG22)

Semester 0

Induction Program: 3 weeks
(Common for All Branches of Engineering)

S.No	Course No	Course Name	Category	L-T-P-C
1		Physical Activities--Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2		Career Counseling	MC	2-0-2-0
3		Orientation to all branches—career options, tools, etc.	MC	3-0-0-0
4		Orientation on admitted Branch-corresponding labs, tools and platforms	EC	2-0-3-0
5		Proficiency Modules & Productivity Tools	ESC	2-1-2-0
6		Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7		Remedial Training in Foundation Courses	MC	2-1-2-0
8		Human Values & Professional Ethics	MC	3-0-0-0
9		Communication Skills—focus on Listening, Speaking, Reading, Writing skills	BSC	2-1-2-0
10		Concepts of Programming	ESC	2-0-2-0

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B.TECH Mechanical Engineering

Course Structure (RG22)

Semester - 1 (Theory-5, Lab-3)							
Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	BSC	22A0001T	Linear Algebra and Calculus	2	1	0	3
2	BSC	22A0007T	Engineering Chemistry	3	0	0	3
3	ESC	22A0518T	C-Programming & Data Structures	3	0	0	3
4	ESC	22A0203T	Basic Electrical & Electronics Engineering	3	0	0	3
5	ESC (Lab)	22A0304P	Engineering Workshop Lab	0	0	3	1.5
6	ESC (Lab)	22A0502P	IT Workshop Lab	0	0	3	1.5
7	BSC (Lab)	22A0012P	Engineering Chemistry Lab	0	0	3	1.5
8	ESC (Lab)	22A0519P	C-Programming & Data Structures Lab	0	0	3	1.5
9	ESC (Lab)	22A0204P	Basic Electrical & Electronics Engineering Lab	0	0	3	1.5
			Total credits				**19.5**

Category	Credits
Basic Science Course (BSC)	7.5
Engineering Science Course (ESC)	12
Total	19.5

Linear Algebra & Calculus					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0001T	**2: 1:0 :0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**BSC**

Course Objectives:

This course will illuminate the students in the concepts of calculus and linear algebra. To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Syllabus		**Total Hours:45**
Unit - I	**Matrices**	**9 Hrs**

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous equations linear equations. Applications: Finding the current in electrical circuits Eigen values and Eigenvectors and their properties, Cayley- Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix.

Unit - II	**Mean Value Theorems**	**9 Hrs**

Rolle's Theorem (Without Proof), Lagrange's mean value theorem (Without Proof), Cauchy's mean value theorem (Without Proof), related problems, Taylor's and Maclaurin theorems with remainders (without proof) - related problems, Taylor's and Maclaurin series (without proof) Expansions of functions by Taylors and Maclaurin's series.

Unit - III	**Multivariable Calculus**	**9 Hrs**

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Unit - IV	**Multiple Integrals**	**9 Hrs**

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates. Finding areas and volumes using double and triple integrals.

Unit - V	**Beta and Gamma functions**	**9 Hrs**

Beta and Gamma functions and their properties, relation between beta and gamma functions,evaluation of definite integrals using beta and gamma functions.

Course Outcomes (CO):

On completion of this course, student will be able to

- Solving the system of linear equations, find the eigen values and eigenvectors and use thisinformation to facilitate the calculation of matrix characteristics.
- Translate the given function as series of Taylor's and Maclaurin's with remainders, analyzethe behavior of functions by using mean value theorems.
- Acquire the Knowledge maxima and minima functions of several variables. Utilize Jacobian ofa coordinate transformation to deal with the problems in change of variables.

- Apply multiple integration techniques in evaluating areas and volumes bounded by the region.
- Understand beta and gamma functions and its relations, conclude the use of special function in evaluating definite integrals.

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal , 44/e, Khanna Publishers, 40 edition-2017.
2. Linear Algebra & Calculus by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication 2019.

Reference Books:

1. "Advanced Engineering Mathematics", Erwin Kreyszig, Wiley India 2016.
2. B.V.Ramana, "Higher Engineering Mathematics", Mc Graw Hill publishers 2012.
3. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, S. Chand Publications 2015.

Engineering Chemistry (Common to ME and CE)					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0007T	**3:0:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**BSC**

Prerequisite: Student should know fundamental concepts about Engineering Chemistry

Course Objectives:

This course will enable students to:

- To familiarize engineering chemistry and its applications
- To impart the concept of soft and hard waters, softening methods of hard water
- To train the students on the principles and applications of electrochemistry, polymers, and cement.

Syllabus	**Total Hours: 48**
Unit I - Water and its treatment	**10**

Introduction - hardness of water - causes of hardness - types of hardness: temporary and permanent - expression and units of hardness - Estimation of hardness of water by EDTA method. Numerical problems, Boiler troubles-Sludges, scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning - Softening of water : Zeolite process, ion- exchange process, Desalination of water - Reverse osmosis and Electro dialysis.

Unit–II Electrochemistry and Applications	**10**

Electrodes – concepts, electrochemical cell, Nernst equation, cell potential calculations.
Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (Ni Cad),and lithium ion batteries- working of the batteries including cell reactions; Fuel cells: hydrogen-oxygen, methanol-oxygen fuel cells – working of the cells.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, metal oxide formation by dry corrosion-Pilling Bedworth Rule, differential aeration cell corrosion, galvanic corrosion, Factors affecting the corrosion, cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

Unit–III Polymers	**10**

Introduction to polymers, functionality of monomers, Types of polymerization- Addition , condensation and coordination polymerization with Mechanism.
Plastics-Definition and characteristics- thermoplastic and thermosetting plastics. Preparation, properties and applications of PVC and Nylons.
Rubbers- Natural rubber and its vulcanization - compounding of rubber. Elastomers- Preparation, properties and applications of Buna S, Buna N,
Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications.
Bio degradable polymers : poly lactic acid, Nylon-2-Nylon-6

Unit–IV Fuels and Combustion	8
Fuels – Types of fuels, solid fules-classification Calorific value of fuel - HCV, LCV and numerical problems based on calorific value, determination of calorific value by bomb calorimeter. Analysis of coal, Liquid Fuels- refining of petroleum, fuels for IC engines, knocking and anti-knock agents, Octane and Cetane values, cracking of oils, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels - composition and uses of natural gas, Producer gas and water gas.	
Unit–V Advanced Engineering Materials	**10**
Composites: Definition, classification with examples and applications. Cement: Composition, Classification, preparation (Dry and Wet processes), Setting and Hardening of Portland cement Refractories: Classification, characteristics of good refractories, properties- Refractoriness, refractoriness under load, porosity and chemical inertness – applications of refractories. Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure) - properties of lubricants: viscosity, cloud point, pour point, flash point and fire point and Aniline point.	

Course Outcomes:

On completion of this course, the students are able to:

- Recognize the basic properties of water and its significance in domestic and industrial purposes.(L2)
- Discuss the principles of electrochemistry in batteries.(L2)
- Discuss the knowledge of corrosion of metals and methods for its prevention towards the technological applications.(L2)
- Explain polymerization and the preparation, properties, and applications of thermoplastics & thermosetting, elastomers, & conducting polymers.(L1)
- Explain calorific values, octane number, refining of petroleum and cracking of oils and Select suitable fuels for IC engines. (L1)
- Describe the various engineering materials.(L1)

Text Books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, McGraw Hill, 2020.
2. Douglas A. Skoog, Stanley R. Crouch, F. James Holler, Principles of Instrumental Analysis, 6/e, Thomson Books, 2007.
3. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
4. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman,1992.

E-resources:

1. https://libguides.humboldt.edu/openedu/chem
2. https://libraryguides.unh.edu/oer/chemistry
3. https://libraries.etsu.edu/research/guides/chemistry/oer

C-Programming & Data Structures					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0502T	**2: 1:0 :0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**ESC**

Course Objectives:

- Illustrate the basic concepts of C programming language.
- Choose a suitable C-construct to develop C code for a given problem.
- Illustrate the fundamental concept of data structures and Arrays
- Emphasize the importance of data structures in developing and implementing efficient algorithms
- Illustrate a variety of data structures such as linked structures, stacks, queues, trees, and graphs

Syllabus		**Total Hours:45**
Module - I	**Introduction to C Language**	**9 Hrs**

Structure of C program, C Tokens, Data types, Operators, Precedence and Associativity of operators, Expressions and its evaluation, control structures – sequence, selection and Iteration statements, unconditional control structures – break, goto, continue. Arrays: Introduction to arrays, types of arrays, applications of arrays, Programming examples

Module - II	**Strings, Functions and Pointers**	**9 Hrs**

String: Declaring and Initializing string, Printing and reading strings, string manipulation functions, String input and output functions, array of strings, Programming examples

Functions: Defining function, user defined functions, standard functions, passing array as argument to function, recursion

Pointers: declaring and initializing pointers, pointers and arrays, pointer to pointer, pointer arithmetic, dynamic memory allocation,

Structures and Unions

Module - III	**Data Structures**	**9 Hrs**

Introduction to Data Structures: Definitions, Concept of Data Structures, Overview of Data Structures, Implementation of Data Structures

Linked Lists: Definition, Single Linked List, Circular Linked List, Double Linked List, Circular Double Linked List, Applications of Linked List

Module - IV	**Stacks & Queues**	**9 Hrs**

Stacks: Introduction, Definition, Representation of Stack, Operations on Stacks, Applications of Stacks

Queues: Introduction, Definition, Representation of Queues, Operations on Queues, Various Queue Structures, Applications of Queues

Module - V	Trees ,Graphs ,Searching and Sorting	9 Hrs

Trees: Basic Terminologies, Definition and Concepts, Binary Tree, Representation of Binary Tree, operations on Binary Tree, Binary Search Tree, Heap Tree

Graphs: Introduction, Graph Terminologies, Representation of graphs, Operations on Graphs, Graph, Graph Traversal Techniques: BFS and DFS

Searching and Sorting – sequential search, binary search, exchange (bubble) sort, selection sort, insertion sort.

Course Outcomes (CO):

On completion of this course, student will be able to

- Illustrate and explain the basic computer concepts and programming principles of C language(L2)
- Select the best selection and loop construct for solving given problem(L2)
- Develop C programs to demonstrate the applications of derived data types such as arrays, pointers, strings.(L2)
- Implement basic operations on stack and queue using array representation(L2)
- Use linked structures, trees, and Graphs in writing programs(L2)
- Demonstrate different methods for traversing Graphs and Trees (L2)

Textbooks:

1. C Programming & Data Structures – Behrouz A. Fourazan, Richard F. Gilberg.
2. Programming with C – Byron Gottfried, Third edition, Scham's Outlines
3. C Programming : A Problem Solving Approach- Behrouz A. Fourazan , E.V.Prasad, Richard F. Gilberg
4. Classic Data Structures , Second Edition, Debasissamanta, PHI
5. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S.Sahni and Susan Anderson Freed, Universities Press

Reference Books:

1. Let us C,YashwantKanetkar, 6th Edition , BPB
2. C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications
3. C Programming, E.Balagurusamy, 3rd edition, TMHPublishers
4. Programming in C, Ashok N. Kamthane, AmitKamthane, Pearson
5. Data Structures: A Pseudo code Approach with C, 2nd Edition, R.F.Gilberg and B. A. Forouzan, Cengage Learning.
6. "Data Structures and Algorithm Analysis in C" by Weiss
7. "Data Structure Through C" by Yashavant P Kanetkar

E-resources:

1. https://www.geeksforgeeks.org/c-programming-language/
2. http://en.cppreference.com/w/c
3. https://onlinecourses.nptel.ac.in/noc19_cs42/
4. https://www.linuxtopia.org/online_books/programming_books/gnu_c_programming_tutorial/index.html
5. https://codeforwin.org/

Basic Electrical and Electronics Engineering					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0203T	**3: 0:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**ESC**

Course Objectives:

To introduce the concept of electrical circuits and its components. To introduce the characteristics of various electronic devices. To impart the knowledge of various configurations, characteristics and applications of electrical & electronic components.

1) To understand the basic principles of all semiconductor devices.
2) To be able to solve problems related to diode circuits, and amplifier circuits.
3) To analyze diode circuits, various biasing and small signal equivalent circuits of amplifiers.
4) To be able to compare the performance of BJTs and MOSFETs.
5) To design rectifier circuits and various amplifier circuits using BJTs and MOSFETs.

Syllabus		**Total Hours:48**
Unit - I	**Fundamentals**	**9 Hrs**

DC&AC Circuits : Electrical circuit elements (R - L and C) - Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power - power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits, Resonance.

Unit - II	**DC & AC Machines**	**9 Hrs**

DC & AC Machines : A: DC Machines : Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC shut Motor.

B: AC Machines: Principle and operation of Single Phase Transformer-EMF equation - OC and SC tests on transformer - Principle and operation of 3-phase induction motor and alternator., [Elementary treatment only]

Unit - III	**Basics of Power Systems**	**10 Hrs**

Basics of Power Systems: Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations – Typical
AC Power Supply scheme – Elements of Transmission line – Types of Distribution systems: Primary & Secondary distribution systems.

Unit - IV	**P-N Junction Diode**	**10 Hrs**

Basic Electronic Devices : P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances. Zener diode operation, Zener diode as voltage regulator.

Rectifiers : P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier.

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations and Input-Output Characteristics, Comparison of CE, CB and CC configurations

Junction Field Effect Transistor and MOSFET: Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET.

Unit - V	**Junction Field Effect Transistor& Digital Electronics**	**10 Hrs**

Digital Electronics & Micro processors :
Digital Electronics: Logic Gates, Simple combinational circuits–Half and Full Adders, BCD Adder.Latches and Flip-Flops (S-R, JK and D), Shift Registers and Counters
8085 Micro processor: 8085 Micro processors architecture

Course Outcomes (CO):

On completion of this course, student will be able to

- Apply KCL, KVL and network theorems to analyse DC circuit.
- Analyze the single-phase AC Circuits, the representation of alternating quantities and determining the power and power factor in these circuits..
- Comprehend the construction and Operation of DC and AC machines.
- Understand the operation of PN Junction diode and its application in rectifier circuits.
- Compare the different configurations of BJT and draw the V-I characteristics of BJT, JFET and MOSFET..

Textbooks:

1. M.Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, **" Basic Electrical and Electronics Engineering"**, S.Chand and Company Limited, New Delhi, 1st Edition, 2017.
2. R.L.Boylestad and Louis Nashlesky, **"Electronic Devices & Circuit Theory"**, Pearson Education, 2007.

Reference Books:

1. V.K. Mehtha and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand & Co., 2009.
2. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), "Electronic Devices and Circuits",

Engineering Workshop Lab
(Common to All Branches of Engineering)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
22A0303	0 :0:3:0	1.5	CIE:30 SEE:70	3 Hours	ESC

Course Objectives:

To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills.

Syllabus | **Total Hours:45**

Wood Working:

Familiarity with different types of woods and tools used in wood working and make following joints

a) Half – Lap joint
b) Mortise and Tenon joint
c) Corner Dovetail joint or Bridle joint

Sheet Metal Working:

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

a) Tapered tray
b) Conical funnel
c) Elbow pipe
d) Brazing

Fitting:

Familiarity with different types of tools used in fitting and do the following fitting exercises

a)V-fit
b) Dovetail fit
c) Semi-circular fit
d) Bicycle tire puncture and change of two wheeler tyre

Electrical Wiring:

Familiarities with different types of basic electrical circuits and make the following connections

a) Parallel and series
b) Two-way switch
c) Godown lighting
d) Tube light
e) Three phase motor
f) Soldering of wires

Course Outcomes (CO):

On completion of this course, student will be able to

- Apply wood working skills in real world applications. (l3)
- Build different objects with metal sheets in real world applications. (l3)
- Apply fitting operations in various applications. (l3)
- Apply different types of basic electric circuit connections. (l3)
- Use soldering and brazing techniques. (l2)

Note: In each section a minimum of three exercises are to be carried out.

It Workshop Lab (Common to All Branches of Engineering)					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0502P	**0: 0: 3:0**	**1.5**	**CIE:30 SEE:70**	**3 Hours**	**ESC**

Course Objectives:

1. To make the students know about the internal parts of a computer, assembling and dissembling a computer from the parts, preparing a computer for use by installing the operating system
2. To provide Technical training to the students on Productivity tools like Word processors Spreadsheets, Presentations and LAteX
3. To learn about Networking of computers and use Internet facility for Browsing and Searching

Syllabus	**Total Hours:45**

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Operating system features: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process. Networking and Internet

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc. should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account

and send email. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating email account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc. Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered, Image Manipulation tools.

Task 9: Presentations: creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show.

Task 10: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet

Task 11: LateX: Introduction to Latex and its installation and different IDEs. Creating first document using Latex, using content into sections using article and book class of LaTeX. Styling Pages: reviewing and customizing different paper sizes and formats. Formatting text (styles, size, alignment, colors and adding bullets and numbered items, inserting mathematical symbols, and images, etc.). Creating basic tables, adding simple and dashed borders, merging rows and columns. Referencing and Indexing: cross-referencing (refer to sections, table, images), bibliography (references).

Course Outcomes (CO):

On completion of this course, student will be able to

1. Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
2. Prepare the Documents using Word processors and Prepare spread sheets for calculations using excel and also the documents using LAteX.
3. Prepare Slide presentations using the presentation tool.
4. Interconnect two or more computers for information sharing.
5. Access the Internet and Browse it to obtain the required information.

Reference Books:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. MOS study guide for word, Excel, Powerpoint& Outlook Exams, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs, Bigelows, TMH
6. Lamport L. LATEX: a document preparation system: user's guide and reference manual. Addison-wesley; 1994.

Note: Use open source tools for implementation of the above exercises.

Engineering Chemistry Lab					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0012P	**0 :0:3:0**	**1.5**	**CIE:30 SEE:70**	**3 Hours**	**BSC**

Course Objectives:

This course will enable students to:

- To Verify the fundamental concepts with experiments

Syllabus **Total Hours:45**

Note: In the following list, out of 14 experiments conduct any 10 experiments from the below list

List of Experiments

1. Determination of Hardness of a groundwater sample and mineral water sample.
2. Determination of Copper by EDTA method.
3. Conductometric estimation of strong acid using standard sodium hydroxide solution.
4. Estimation of iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).
5. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
6. pH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base.
7. Estimation of Dissolved Oxygen by Winkler's method.
8. Potentiometry - determination of redox potentials and emfs.
9. Determination of Strength of an acid in Pb-Acid battery.
10. Colorometric estimation of manganese.
11. Preparation of a polymer.
12. Determination of Viscosity of lubricating oil by Redwood Viscometer- 1
13. Determination of Viscosity of lubricating oil by Redwood Viscometer -2
14. Determination alkalinity of water sample.

Course Outcomes (CO):

On completion of this course, student will be able to

- Measure the strength of an acid present in secondary battery and Determine the rate of corrosion for mild steel in hydrochloric acid medium.(L2)
- Determine the Hardness of a groundwater sample and estimate the Copper by EDTA method. (L1)
- Determine the cell constant and conductance of solutions using conductivity meter and different acid-base titrations by pH meter. (L1)
- Synthesize of advanced polymer materials. (L2)
- Determine the potentials and EMFs of solutions by Potentiometry and Estimate the iron (II) using diphenylamine indicator. (L1)
- Determine the viscosity of different lubricants using Redwood Viscometer. (L1)

Textbooks:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – Mendham J et al, Pearson Education, 2012.

Reference Books:

1. Chemistry Practical– Lab Manual, First edition, Chandra Sekhar KB, Subba Reddy GV and Jayaveera KN, SM Enterprises, Hyderabad, 2014.
2. Engineering Chemistry Laboratory Manual, For B.Tech. I year (ME, CE)Students, Dr. A. Ravikrishna, Dr. B. Tirumalarao Sri Krishna Hitech Publishing company, Chennai, 2019.

E-resources:

1. https://guides.lib.purdue.edu/chemlabs.
2. https://chemcollective.org/.
3. http://chemistry.alanearhart.org/Lab/index.html.
4. https://www.acs.org/content/acs/en/education/students/highschool/chemistryclubs/activities/simulations.html.
5. https://instr.iastate.libguides.com/oer/chemistry.

C-Programming & Data Structures Lab					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0519P	**0:0:3:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**ESC**

Course Objectives:

This course will enable students to:

- To get familiar with the basic concepts of C programming.
- To design programs using arrays, strings, pointers and structures.
- To illustrate the use of Stacks and Queues
- To apply different operations on linked lists.
- To demonstrate Binary search tree traversal techniques.
- To design searching and sorting techniques.

Syllabus **Total Hours:45**

Note: In the following list, out of 12 experiments conduct any 10 experiments from the below list

List of Experiments

Week l

Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Week 2

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C program that uses functions to perform the following:

i) Addition of Two Matrices ii) Multiplication of Two Matrices

Week 3

a) Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to a given main string from a given position.

ii) To delete n characters from a given position in a given string.

Week 4

a) Write a C program that displays the position or index in the string S where the string T begins, or - 1 if S doesn't contain T.

b) Write a C program to count the lines, words and characters in a given text.

Week 5

a) Write a C Program to perform various arithmetic operations on pointer variables.

b) Write a C Program to demonstrate the following parameter passing mechanisms:

i) call-by-value ii) call-by-reference

Week 6

Write a C program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 7

Write C programs that implement stack (its operations) using

i) Arrays

ii) Pointers

Week 8

Write C programs that implement Queue (its operations) using

i) Arrays

ii) Pointers

Week 9

Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Week 10

Write a C program that uses functions to perform the following operations on singly linked list.

i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 11

Write a C program that uses functions to perform the following operations on Doubly linkedlist.

i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 12

Write a C program that uses functions to perform the following operations on circular linkedlist.

i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 13

Write a C program that uses functions to perform the following:

i) Creating a Binary Tree of integers

ii) Traversing the above binary tree in preorder, inorder and postorder.

Week 14

Write C programs that use both recursive and non-recursive functions to perform the following

searching operations for a key value in a given list of integers:

i) Linear search

ii) Binary search

Week 15

Write a C program that implements the following sorting methods to sort a given list of integers in

ascending order

i) Bubble sort

ii) Selection sort

iii) Insertion sort

Course Outcomes (CO):

On completion of this course, student will be able to

- Demonstrate basic concepts of C programming language. (L2)
- Develop C programs using functions, arrays, structures and pointers. (L6)
- Illustrate the concepts Stacks and Queues. (L2)
- Design operations on Linked lists. (L6)
- Apply various Binary tree traversal techniques. (L3)
- Develop searching and sorting methods. (L6)

Textbooks:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
2. B.A. Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming Approach Using C", Third edition, CENGAGE Learning, 2016.
3. Richard F. Gilberg & Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Second Edition, CENGAGE Learning, 2011.

Reference Books:

1. PradipDey and ManasGhosh, Programming in C, Oxford University Press, 2nd Edition 2011.
2. E.Balaguruswamy, "C and Data Structures", 4th Edition, Tata Mc Graw Hill.
3. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.
4. M.T.Somashekara, "Problem Solving Using C", PHI, 2nd Edition 2009.

Basic Electrical & Electronics Engineering Lab					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0204P	**0 :0:3:0**	**1.5**	**CIE:30 SEE:70**	**3 Hours**	**ESC**

Course Objectives:

- To get practical knowledge about basic electrical circuits, electronic devices like Diodes, BJT, JFET and also analyze the performance of DC Motors, AC Motors and Transformers.

Syllabus	**Total Hours:45**

List of Experiments

LIST OF EXPERIMENTS: (Conduct all experiments).

Note: All the experiments shall be implemented using both Hardware and Software/ Equipment Required:

1.Verification of Kirchhoff's Laws.

2. Verification of Superposition Theorem.

3. Determination of Phase Angle for RL&RC series circuit.

4. Brake Test on DC-Shunt Motor. Determination of Performance curves.

5. OC & SC Tests on Single Phase Transformer.

6. Brake Test on Three Phase Induction Motors. Determination of Performance curves

7. V-I Characteristics of Solar Cell.

8. V-I Characteristics of PN junction Diode and Zener Diode

9. Half Wave Rectifier and Full Wave rectifier.

10. Input and Output characteristics of BJT with CE configuration

11. Input and Output characteristics of BJT with CB configuration

12. Input and Output Characteristics of JFET.

Course Outcomes (CO):

On completion of this course, student will be able to

- Experimentally verify the basic circuit theorems, KCL and KVL
- Measure power, power factor and phase angle in RL&RC circuits experimentally.
- Acquire hands on experience of conducting various tests on dc shunt motor, single phase transformers and three phase induction motors and obtaining their performance indices using standard analytical as well as graphical methods
- Draw the characteristics of different semiconductor devices like PN junction Diode, Zener Diode, BJT and JFET by conducting suitable experiments.
- Experimentally verify the working of half and full wave rectifier by using PN Junction diodes