

**Regulations for
UG Programs in Engineering (R18UG)
(Effective from 2018-19)
and
B. Tech I Sem, II Sem (R18) Syllabus (All branches)**



**Kandula Srinivasa Reddy Memorial College of Engineering
(Autonomous)**

Kadapa 516003 AP

**(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)
(An ISO 9001-2008 Certified Institution)**

Annexure-1 Curriculum For B. Tech (Civil Engineering)

First Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - I	3	1	0	30	70	4
	BSC	Engineering Chemistry	3	1	0	30	70	4
	HSMC	English	2	0	0	30	70	2
	ESC	Programming for Problem Solving	3	0	0	30	70	3
	BSC	Chemistry Lab	0	0	3	50	50	1.5
	ESC	Programming for Problem Solving Lab	0	0	4	50	50	2
	HSMC	English Lab	0	0	2	50	50	1
		Total	11	2	9	270	430	17.5

Second Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - II	3	1	0	30	70	4
	BSC	Engineering Physics	3	1	0	30	70	4
	ESC	Basic Electrical Engineering	3	1	0	30	70	4
	ESC	Engineering Graphics & Design	1	0	4	50	50	3
	BSC	Engineering Physics Lab	0	0	3	50	50	1.5
	ESC	Basic Electrical Engineering Lab	0	0	2	50	50	1
	ESC	Workshop and Manufacturing Practices	1	0	4	50	50	3
		Total	11	3	13	290	410	20.5

Annexure-1 Curriculum For B. Tech (Mechanical Engineering)

First Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - I	3	1	0	30	70	4
	BSC	Engineering Chemistry	3	1	0	30	70	4
	HSMC	English	2	0	0	30	70	2
	ESC	Programming for Problem Solving	3	0	0	30	70	3
	BSC	Chemistry Lab	0	0	3	50	50	1.5
	ESC	Programming for Problem Solving Lab	0	0	4	50	50	2
	HSMC	English Lab	0	0	2	50	50	1
		Total	11	2	9	270	430	17.5

Second Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - II	3	1	0	30	70	4
	BSC	Engineering Physics	3	1	0	30	70	4
	ESC	Basic Electrical Engineering	3	1	0	30	70	4
	ESC	Engineering Graphics & Design	1	0	4	50	50	3
	BSC	Engineering Physics Lab	0	0	3	50	50	1.5
	ESC	Basic Electrical Engineering Lab	0	0	2	50	50	1
	ESC	Workshop and Manufacturing Practices	1	0	4	50	50	3
		Total	11	3	13	290	410	20.5

Annexure-1 Curriculum For B. Tech (Electrical and Electronics Engineering)

First Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - I	3	1	0	30	70	4
	BSC	Engineering Chemistry	3	1	0	30	70	4
	HSMC	English	2	0	0	30	70	2
	ESC	Programming for Problem Solving	3	0	0	30	70	3
	BSC	Chemistry Lab	0	0	3	50	50	1.5
	ESC	Programming for Problem Solving Lab	0	0	4	50	50	2
	HSMC	English Lab	0	0	2	50	50	1
		Total	11	2	9	270	430	17.5

Second Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - II	3	1	0	30	70	4
	BSC	Engineering Physics	3	1	0	30	70	4
	ESC	Basic Electrical Engineering	3	1	0	30	70	4
	ESC	Engineering Graphics & Design	1	0	4	50	50	3
	BSC	Engineering Physics Lab	0	0	3	50	50	1.5
	ESC	Basic Electrical Engineering Lab	0	0	2	50	50	1
	ESC	Workshop and Manufacturing Practices	1	0	4	50	50	3
		Total	11	3	13	290	410	20.5

Annexure-1 Curriculum
For B. Tech (Electronics and Communication Engineering)

First Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - I	3	1	0	30	70	4
	BSC	Engineering Physics	3	1	0	30	70	4
	ESC	Basic Electrical Engineering	3	1	0	30	70	4
	ESC	Engineering Graphics & Design	1	0	4	50	50	3
	BSC	Engineering Physics Lab	0	0	3	50	50	1.5
	ESC	Basic Electrical Engineering Lab	0	0	2	50	50	1
	ESC	Workshop and Manufacturing Practices	1	0	4	50	50	3
		Total	11	3	13	290	410	20.5

Second Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - II	3	1	0	30	70	4
	BSC	Engineering Chemistry	3	1	0	30	70	4
	HSMC	English	2	0	0	30	70	2
	ESC	Programming for Problem Solving	3	0	0	30	70	3
	BSC	Chemistry Lab	0	0	3	50	50	1.5
	ESC	Programming for Problem Solving Lab	0	0	4	50	50	2
	HSMC	English Lab	0	0	2	50	50	1
		Total	11	2	9	270	430	17.5

Annexure-1 Curriculum For B. Tech (Computer Science and Engineering)

First Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - I	3	1	0	30	70	4
	BSC	Engineering Physics	3	1	0	30	70	4
	ESC	Basic Electrical Engineering	3	1	0	30	70	4
	ESC	Engineering Graphics & Design	1	0	4	50	50	3
	BSC	Engineering Physics Lab	0	0	3	50	50	1.5
	ESC	Basic Electrical Engineering Lab	0	0	2	50	50	1
	ESC	Workshop and Manufacturing Practices	1	0	4	50	50	3
		Total	11	3	13	290	410	20.5

Second Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
	BSC	Mathematics - II	3	1	0	30	70	4
	BSC	Engineering Chemistry	3	1	0	30	70	4
	HSMC	English	2	0	0	30	70	2
	ESC	Programming for Problem Solving	3	0	0	30	70	3
	BSC	Chemistry Lab	0	0	3	50	50	1.5
	ESC	Programming for Problem Solving Lab	0	0	4	50	50	2
	HSMC	English Lab	0	0	2	50	50	1
		Total	11	2	9	270	430	17.5

Note: The curriculum and syllabus for III to VIII Semesters will be ratified in subsequent Academic council/BOS meetings

Annexure-2 Syllabus

B. Tech I Semester Civil Engineering

MATHEMATICS – I

(Common to All Branches)

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- The essential tool of matrices in a comprehensive manner.
- The convergence of series.
- Maxima and minima of a function and the radius of curvature
- The Jacobians and extrema of a function.
- Evaluate the definite integrals, Beta and Gamma functions. Apply Fourier series in engineering problems.

Unit I: Matrices: (14 Hours)

Basic definitions of Symmetric, skew-symmetric and orthogonal matrices– Elementary transformations – Rank – Echelon form, Normal form– System of linear equations –Eigen values and Eigen vectors for real matrices– Cayley-Hamilton theorem – Diagonalization of matrix by orthogonal transformation.

Unit II: Sequences and series: (8Hours)

Convergence of sequences and series – Comparison test – p test– D’Alemberts ratio test– Cauchy’s root test. Power series – Series for exponential, trigonometric and logarithm functions.

Unit III: Differential Calculus: (10Hours)

Taylor’s and Maclaurin’s series – Maxima and minima of single variable –Curvature: Curvature of a curve – Curvature of a circle – Radius of a curvature – Centre of Curvature – Equation to the circle of curvature.

Unit IV: Multivariable Calculus: (10Hours)

Functions of two or more variables – Partial derivatives, Total derivative – Jacobians – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.

Unit V: Integral Calculus:(12Hours)

Evaluation of definite integrals– Beta and Gamma functions and their properties. Fourier series: Half range Fourier sine and cosine expansions– Parseval’s theorem.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition- 2013.
3. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. Linear Algebra: A Modern Introduction, D Poole, 2nd Edition, Brooks/Cole, 2005.
3. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Course Outcomes:

On completion of course Students are able to

- Apply the essential tool of matrices in a comprehensive manner.
- Find the convergence of series.
- Find the radius of curvature and maxima and minima of a function.
- Find the Jacobians and extrema of a function.
- Evaluation of definite integrals, Beta and Gamma functions. Application of Fourier series in engineering problems.

ENGINEERING CHEMISTRY
(Common to CE, ME, EEE- I SEM)
(Common to ECE & CSE - II SEM)

Objectives:

- Knowledge in Chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depend on the outcome of basic sciences.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial! Engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry principles (or) applications in the field of engineering.
- An attempt has been made to logically correlate the topic with its application.
- After the completion of the course, the student would understand about the concepts of chemistry .

Module-1 : Atomic and molecular structure

Schrodinger wave equation. Particle in a box(one dimensional) and their applications .Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

Module-2: Periodic properties

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard, soft acids and bases.

Module-3:

Intermolecular forces

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena.

Use of free energy in chemical equilibria

Thermodynamic functions: Introduction, define energy, entropy , Free energy. Free energy and emf. Cell potentials, the Nernst equation and applications. Water chemistry-types of water and Boiler troubles. Corrosion-types of corrosion and factors influencing corrosion.

Module-4: Spectroscopic techniques and applications

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules.

Module-5:

Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of Cyclohexane.

Simple Organic Reactions

Introduction to reactions involving Substitution (SN^1 & SN^2), Addition Reactions involving $C=C$ (Markonikoff reaction) & $C=O$ (Grignard reagent), Elimination (E_1 & E_2) Oxidation (Baeyer villiger reaction), Reduction (Clemmensen reduction).

Suggested Text Books

1. Engineering Chemistry, Satyaprakash, Khanna Book Publishing, Delhi
2. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
3. . Essentials of Physical Chemistry, Bahl & Tuli, S.Chand Publishing
4. Applied Chemistry, Sunita Rattan, Kataria
5. Engineering Chemistry, Baskar, Wiley
6. . Engineering Chemistry – I, D. Grou Krishana, Vikas Publishing
7. . Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels.

The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

ENGLISH

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

- 1. Vocabulary Building**
 - 1.1 The concept of Word Formation
 - 1.2 Root word from foreign languages and their use in English
 - 1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
 - 1.4 Synonyms, antonyms
 - 1.5 Idioms and phrases.
- 2. Basic Writing Skills**
 - 2.1 Sentence Structures
 - 2.2 Use of phrases and clauses in sentences
 - 2.3 Importance of proper punctuation
 - 2.4 Creating coherence
 - 2.5 Organizing principles of paragraphs in documents
 - 2.6 Techniques for writing precisely
- 3. Transformation**
 - 3.1 Interchange of parts of speech
 - 3.2 Active voice and Passive voice
 - 3.3 Direct and Indirect speech
 - 3.4 3.4Degrees of comparison
 - 3.5 3.5Simple, compound and complex sentences
- 4. Identifying Common Errors in Writing**
 - 4.1 Subject-Verb agreement
 - 4.2 Noun-pronoun agreement
 - 4.3 Misplaced modifiers
 - 4.4 Articles
 - 4.5 Prepositions
 - 4.6 Redundancies
 - 4.7 Clichés
 - 4.8 Tenses
- 5 Reading and Writing Practices**
 - 5.1 Comprehension
 - 5.2 Précis Writing
 - 5.3 Essay writing
 - 5.4 Essay writing

PROGRAMMING FOR PROBLEM SOLVING

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Course Objectives

- The course aims to provide exposure to problem-solving through programming
- It aims to train the student to the basic concepts of the C programming language

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic and logical problems and to translate the algorithms to programs (in C language).
- Choose the loops and decision making statements to solve the problem.
- To implement different Operations on arrays.
- To use functions to solve the given problem.
- To understand structures, unions and pointers,

UNIT 1:

Introduction to Computers: - Introduction, computer hardware and software, creating and running programs, software development life cycle, algorithms, flowcharts.

Introduction to C programming: - Overview of C, structure of a C program, variables, constants, data types, identifiers, keywords, Input/output statements in C, programming examples.

UNIT 2:

Operators and Expressions:- Operators, expressions, precedence and associativity, evaluating expressions, type conversion, typedef, enumerations.

Decision making statements:if statement, if-else statement, nested if-else statement, switch statement.

Loops in C: while loop, for loop, do-while loop, nested for loops,

Jumping statements:break, continue and goto statements.

UNIT 3:

Arrays: Introduction, Declaration and initialization of 1D and 2D arrays.

Array applications: -bubble (exchange) sort, selection sort, linear search, binary search.

Strings: -Definition, declaration and initialization of strings, string I/O functions,string handling functions,array of strings (table of strings).

UNIT 4:

Functions: introduction, category of functions, parameter passing methods, storage classes, recursive function.

Pointers: Understanding pointers, declaring and initialization of pointer variable, accessing the address of variables, accessing a variable through its pointer, chain of pointers.

UNIT 5:

Structures and union: Introduction, defining a structure, declaring structure variable, structure initialization, accessing members of structure, copying and comparing structure variables, structures within structures, array of structures, and introduction of union.

TEXT BOOKS

1. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
2. Rema Theraja, Programming in C, second edition, Oxford.

REFERENCE TEXT BOOKS

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.
3. Yashavant Kanetkar, Let us C, 15th edition, BPB Publications.
4. Dr. P. Chenna Reddy, Computer Fundamentals and C Programming, Second Edition.

CHEMISTRY LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Choice of experiments from the following:

1. Estimation of Hardness of Water present in given water sample by EDTA method.
2. Determination of surface tension and viscosity.
3. Determination of chloride content of water.
4. Colligative properties using freezing point depression.
5. Estimation of Dissolved Oxygen present in given water sample by Winkler's method.
6. Potentiometry - determination of Redox potentials and emfs.
7. Synthesis of a polymer/drug.
8. Saponification/acid value of an oil.
9. Determination of cell constant and conductance of solutions..
10. Chemical oscillations- Iodine clock reaction.
11. Determination of the partition coefficient of a substance between two immiscible liquids.
12. Adsorption of acetic acid by charcoal.

Laboratory Outcomes

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.

The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

PROGRAMMING FOR PROBLEM SOLVING LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Laboratory Objectives

To impart knowledge so that the student will

- know how to write and debug programs
- know the principles of designing structured programs
- Know when and how to use the appropriate statements available in the C language.
- Write basic C programs using, Selection statements, Repetitive statements, Functions, Pointers, Arrays, Strings and structures

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to create, read and write to and from simple text files.

The student is expected to solve at least 12 assignments from different concepts. (Every year 12 different experiments).

DOS commands, Algorithms, Flowcharts and sample C programs

1. Practice DOS commands necessary for design of C programs.
2. Design and develop algorithms and flowcharts for simple and logical problems
3. If the total selling price of 15 items and total profit earned on them is input through the keyboard. Write a C program to find the cost price of one item.
4. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary. Write a C program to calculate his gross salary.
5. The distance between two cities (in km) is input through the keyboard. Write a C program to convert and print the distance in meters, centimetres, inches and feet.

6. Write a program to take input of name, roll no and marks obtained by a student in 5 subjects each have its 100 full marks and display the name, roll no with percentage score secured.

Problems involving if-then-else structures

7. Write a C program to find out whether a given number is even number or odd number.
8. Write a C program to check whether a given year is leap year or not.
9. Design and develop an algorithm that takes three coefficients (a , b , and c) of a Quadratic equation ($ax^2+bx+c=0$) as input and compute all possible roots. Implement a C program for the developed algorithm and execute the same to output the possible roots for a given set of coefficients with appropriate messages.
10. If the ages of the Ramesh, Suresh and Mahesh are input through the keyboard, write a C program to determine youngest of the three.
11. A character is entered through keyboard. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-else and switch case. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A – Z	65 – 90
a – z	97 – 122
0 – 9	48 – 57
Special symbols	0 – 47, 58 – 64, 91 – 96, 123 – 127.

12. A library charges fine for every book returned late. For first five days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a C program to accept the number of days that the member is late to return the book and display the fine or appropriate message.
13. Write a C program which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use switch statement).

Problems involving Looping statements

14. If the sum of the cubes of each digit of a number is equal to the number itself, then the number is called Armstrong number. (for example, $153 = 1^3 + 5^3 + 3^3$). Design and develop an algorithm to find whether a given number is Armstrong number or not. Implement a C program for the developed algorithm.
15. Design and develop an algorithm to find the square root of a given number N . Implement a C program for the same and execute for all possible inputs with appropriate messages. Note: **Don't use library function $\text{sqrt}(n)$.**
16. If a number and its reversed number are same then the number is called as palindrome number. Design and develop an algorithm to check whether a given number is palindrome or not. Implement a C program for the same.
17. Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
18. Write a C program to evaluate the $\sin(x)$ function series

$$\sin x = \frac{x}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

19. Fibonacci Sequence

A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

Arrays

20. Write a C program to find the smallest and largest number in a given array.
21. Write a C program to find the frequency of a particular number in a list of integers.
22. Write a C program to sort the list of elements using
 - a) Bubble Sort
 - b) Selection sort.
23. Write a C program to search for an element in a list of elements using
 - a) Linear search
 - b) Binary search
24. Write a C program to find the transpose of a matrix.

25. Write a C program to read two matrices and perform the following operations
- Addition of two matrices
 - Multiplication of two matrices

Additional Problems on arrays

26. Partitioning an array

Given a randomly ordered array of n elements, write a C program to partition the elements into two subsets such that elements $\leq X$ are in one subset and elements $\geq X$ are in another subset.

27. Finding the kth smallest element

Given a randomly ordered array of n elements, write a C program to determine the kth smallest element.

28. Array order reversal

Write a C program to rearrange the elements in an array so that they appear in reverse order.

Strings

29. If a string and its reversed string are same then the string is called as palindrome string. Design and develop an algorithm to check whether a given string is a palindrome or not and implement a C program for the same.
30. Write a C program to sort the names of students in a class in alphabetical order.

Additional Problems on strings

31. Write a C program to read two strings and perform the following operations without using built string library functions.

- String length
- String reversing
- Comparison of two strings
- Concatenation of two strings

32. Write a C program to count the number of vowels, consonants, digits, blank spaces and special characters in a given string.

Functions and Recursion

33. Write a C program to swap the contents of two variables using
- Call by value
 - Call by reference.

34. Write a C program using recursion to
- Find the factorial of a given number
 - Print the Fibonacci series up to a given number.
 - Find the GCD of two integers.

Structures

35. Write a C program to define a structure with the following members.
Roll No., Name, marks in Sub1, Sub2, Sub3. Read the n students records and find the total marks of each student and print the result in the following format.

Roll No	Name	Sub1	Sub2	Sub3	Total marks	result
189Y1A0501	Kavya	80	70	75	225	Distinction

Files

36. Write a C program to copy the contents of one file to another file.

TEXT BOOKS

- Yashavant Kanetkar, Let us C, 15th edition, BPB publications.
- E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
- R.G. Dromey, How to solve it by Computer, Pearson.

ENGLISH LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Oral Communication

(This unit involve interactive practice sessions in Language Lab)

- Listening Comprehension ----- Language Lab
- Pronunciation, Intonation, Stress and Rhythm ----- Language Lab
- Common Everyday Situations: Conversations and Dialogues ----- Communication Lab
- Communication at workplace ----- Communication Lab
- Interviews ----- Communication Lab
- Formal Presentations ----- Communication Lab

B. Tech II Semester Civil Engineering

MATHEMATICS-II (Common to All Branches)

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- * First order differential equations.
- * Linear differential equations with constant coefficients.
- * Laplace transforms in engineering problems.
- * Evaluate multiple integrals.
- * Understand Vector Calculus concepts and their applications.

Unit I: First order ordinary differential equations:(10 Hours)

Linear, Bernoulli equations, Exact and equations reducible to Exact. Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Unit II: Ordinary differential equations of higher order: (10Hours)

Linear differential equations of second and higher order with constant coefficients – R.H.S term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$ – Method of variation of parameters.

Unit III:Laplace transforms: (12Hours)

Laplace transforms of standard functions – Properties of Laplace Transforms – Transforms of derivatives and integrals– Evaluation of integrals by Laplace transforms – Laplace transform of periodic functions. Convolution theorem. Inverse Laplace Transforms – Applications of Laplace transforms to ordinary differential equations.

Unit IV: Multiple Integrals:(10Hours)

Evaluation of double integrals in Cartesian coordinates and polar coordinates – Change of variables in double integrals – Change the order of integration in double integrals – Evaluation of triple integrals in Cartesian and polar coordinates – Change of variables in triple integrals.

Unit V: Vector calculus: (12Hours)

Vector differentiation: Scalar point function - Vector point function – Vector operator Del – Gradient – Divergence – Curl. Vector integration: Line, Surface and Volume integrals. Green's theorem in a plane, Stoke's theorem and Gauss-divergence theorems (Statements only). Applications of Green's, Stoke's and Gauss divergence theorems.

Text Books:

- a. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
- b. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013
- c. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

- i. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
- ii. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Outcomes:

On completion of course Students are able to

- * Solve the first order differential equations.
- * Solve linear differential equations with constant coefficients.
- * Apply Laplace Transforms in engineering problems.
- * Evaluation of multiple integrals.
- * Understand Vector Calculus concepts and their applications.

ENGINEERING PHYSICS

(Physics for CE)

L T P C

3 1 0 4

Prerequisite: Plus two level physics course

Course Description:

Physics for Civil Engineers is a physics course which provides fundamental knowledge to understand the concepts of interference, diffraction, lasers, mechanics, solids and Semiconductors.

Course Objectives:

1. Expose students to theoretical and mathematical aspects of interference and diffraction of light for testing of materials.
2. Expose the importance of Mechanics of particles & Rigid body.
3. Expose students to the fundamental principles and laws of mechanics in Physics to understand the types of motion.
4. Develop knowledge and understanding the fundamental concepts of Solids and semiconductors.
5. Adaptability to new developments in science and technology.

Course Syllabus:

Unit I: Interference & Diffraction

Introduction to Interference, Interference in thin film by reflection, Newton's rings experiment, Diffraction, Farunhofer diffraction due to single slit, double slit and Diffraction grating (N-slit), Grating Spectrum, Applications of Diffraction.

(10 lectures)

Unit II: Lasers

Introduction to lasers, characteristics of laser, interaction of radiation with matter- spontaneous and stimulated emission, Einstein's coefficients; population inversion, excitation mechanisms, types of lasers: Solid-state lasers – Nd-YAG laser, Gas lasers - He-Ne Laser, Semiconductor p-n junction diode laser, Applications of lasers

(08 lectures)

Unit III: Mechanics of particles

Velocity and Acceleration, Motion in one dimension, several dimensions, formal solution of kinematical equations. Polar Co-ordinates, velocity and acceleration in polar coordinates. Newton's Laws, applications of Newton's laws. Conservative and non-conservative forces.

(08 lectures)

UnitIV: Rigid body Mechanics

Definition and motion of a rigid body in the plane, Rotation in the plane, Kinematics in a coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler's laws of motion, their independence from Newton's laws, and their necessity in describing rigid body motion; Examples;

(08 lectures)

UnitV: Solids & Semiconductors

Introduction to solids and semiconductors. Free electron theory of metals (drift velocity and electrical conductivity), Fermi energy level, Kronig-Penney model and origin of energy bands, band structure of metals, semiconductors, and insulators. Direct and indirect bandgap semiconductors, Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), diffusion and drift, p -n junction.

(12 lectures)

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Define and evaluate the fundamentals of materials testing using Interference and Diffraction techniques.
2. Identify the working elements of different lasers and estimate laser operation parameters.
3. Describe and explain the fundamental physical principles and laws of Mechanics in Physics.
4. Explain the role of semiconductors in different realms of physics and their applications in both science and technology.

Text Books:

1. Theory of Vibrations with Applications — WT Thomson.
2. Engineering Physics by **K. Thygarajan**, Mac Graw – Hill Publishing Co. New Delhi.

Reference books:

1. Engineering Mechanics - Dynamics, 7th ed. - JL Meriam.
2. An Introduction to Mechanics — D Kleppner & R Kolenkow.

BASIC ELECTRICAL ENGINEERING

(Common to CE, ME – II SEM)

(Common to ECE,CSE- I SEM)

UNIT 1: DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources – source transformation, Series & Parallel networks - Star-Delta transformation, Kirchoff's current and voltage laws, Mesh and Nodal analysis of simple circuits with DC -Problems.

UNIT 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, average, peak and rms values, Form factor Peak factor for sinusoidalwave form -Problems

Phasor-Phasor representation, Impedance, Admittance, Reactance, Susceptance, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits forseries & parallel combinations –simple Problems

UNIT 3: DC machines (8 hours)

DC Generators: Construction– working principle – EMF equation – types of DC generators- applications - simple problems.

Working Principle of DC motor, types, Torque Equation, Concept of Back EMF- applications - simple Problems.

UNIT 4: Transformers & Induction Machines (8 hours)

Single Phase Transformers: Principle of Operation, Constructional details, EMF equation, losses in transformers, regulation and efficiency, equivalent circuit - simple Problems.

Three phase Induction Motor: Construction and working principle, slip, rotor frequency, rotor current, and rotor power factor –simple Problems

UNIT 5: Electrical Installations (6 hours)

Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Wires and Cables, Earthing. Batteries, Introduction to power converters.

Suggested Text / Reference Books

- (i) D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
- (ii) D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
- (iii) L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
- (iv) E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
- (v) V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.
- (vi) A. Chakarabarthi “Circuit Theory”, Dhanapath Roy & Co
- (vii) Electrical Circuits – N. Sreenivasulu – Reem Publications

ENGINEERING GRAPHICS & DESIGN

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Detailed contents:

Traditional Engineering Graphics:

Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

Computer Graphics:

Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation; Spatial Manipulation; Surface Modeling; Solid Modeling; Introduction to Building Information Modeling (BIM)

(Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)

Module 1: Overview of Computer Graphics

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

Module 2: Customization & CAD Drawing

Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module 3: Introduction to Engineering drawing

Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute.

Module 4: Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes

Module 5: Projections of Regular Solids

Projections of solids inclined to both planes.

Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Module 6: Sections and Sectional Views of Right Angular Solids

Sections of Prism, Cylinder, Pyramid and Cone

Development of surfaces of Right Regular Prism, Pyramid, Cylinder and Cone

Module 7: Isometric Projections

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

Module 8: Annotations, layering & other functions

Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

Suggested Text/Reference Books:

- (i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- (ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- (iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- (iv) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
- (v) (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

The student will learn:

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

ENGINEERING PHYSICS LAB
(Common to CE, ME, EEE- II SEM)
(Common to ECE & CSE - I SEM)

Course Description:

Physics Practical course is meant for making the students to gain practical knowledge to co relate with the theoretical studies. It covers experiments on Principles of Mechanics and Optics, Measurement of Magnetic field and studying Resonance using LCR Circuit.

Objectives:-

- To explore the application of interference and diffraction by doing concerned experiments.
- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- Develop an ability to apply the knowledge of physics experiments in the later studies.
- To understand the concept of energy gap, B-H curve, and synthesis of nano material by performing the experiments.

LIST OF EXPERIMENTS

Any 7 of the following experiments has to be performed in a semester:

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method.
2. Determination of dispersive power of the prism.
3. Rigidity Modulus- Torsional Pendulum.
4. Study of resonance effect in series and parallel LCR circuit.
5. Determination of thickness of thin object by wedge method.
6. Determination of radius of curvature of lens by Newton's Rings.
7. Laser : Determination of wavelength using diffraction grating.
8. Energy gap of a semiconductor using p-n junction diode.
9. Hysteresis: B-H curve.
10. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
11. Frequency of the tuning fork - Melde's apparatus.
12. Spring constant - Coupled Pendulums.

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Students can aware of the application of interference, diffraction phenomena along with laser.
2. Apply the scientific process in the conduct and reporting of experimental investigations.
3. Understand measurement technology, usage of new instruments and real time applications in engineering studies.
4. Verify the theoretical ideas and concepts covered in lecture by doing hands on in the experiments.
5. Know about the characteristics of various materials in a practical manner and gain knowledge about various optical technique methods.
6. Acquire and interpret experimental data to examine the physical laws.

Lab Manual: Laboratory Manual for Engineering Physics.

Mode of Evaluation: Continuous Internal Evaluation, Practical End Examination.

BASIC ELECTRICAL ENGINEERING LAB

(Common to CE,ME – II SEM)

(Common to ECE, CSE – I SEM)

List of Laboratory Experiments/Demonstrations:

Basic safety precautions. Introduction and use of measuring instruments – Voltmeter. Ammeter, Wattmeter, Multi-meter and oscilloscope.

1. Determination of values of R, L and C parameters of a given R-L-C series circuit
2. Verification of KCL and KVL.
3. Determination of Active, reactive and apparent power for R-L circuit (series & parallel).
4. Determination of Active, reactive and apparent power for R-C circuit (series & parallel).
5. Load test on 1-phase transformer.
6. OC & SC tests on 1-phase transformer to obtain equivalent circuit.
7. Torque-speed characteristics of DC shunt motor.
8. Speed Control of three –phase induction motors using pole changing method
9. Demonstration of cut out sections of DC & AC machines
10. Study of fuse, MCB, Batteries

WORKSHOP AND MANUFACTURING PRACTICES

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Lectures & videos: (10 hours)

Detailed contents

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods **(3 lectures)**
2. CNC machining and Additive manufacturing **(1 lecture)**
3. Fitting operations & power tools **(1 lecture)**
4. Electrical & Electronics **(1 lecture)**
5. Carpentry **(1 lecture)**
6. Plastic molding, glass cutting **(1 lecture)**
7. Metal casting **(1 lecture)**
8. Welding (arc welding & gas welding) and brazing **(1 lecture)**

Text/Reference Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. (Kalpakjian S. And Steven S. Schmid, “Manufacturing Engineering and Technology”, 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu,”Manufacturing Technology – I” Pearson Education, 2008.
4. Roy A. Lindberg, “Processes and Materials of Manufacture”, 4th edition, Prentice Hall India, 1998.
5. Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course Outcomes:

Upon completion of this course

The students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Workshop Practice:(60 hours)

1. Machine shop (10 hours)
2. Fitting shop (8 hours)
3. Carpentry (6 hours)
4. Electrical (8 hours)

5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs)

6. Casting (8 hours)

7. Tin Smithy (6 hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

S.NO	EXPERIMENTS IN THE SYLLABUS
	<u>MACHINE SHOP</u>
1	STEP TURNING OPERATION
2	TAPER TURNING OPERATION
	<u>FITTING SECTION</u>
1	SQUARE FITTING
2	STEEPED FITTING
	<u>CARPENTRY SECTION</u>
1	TEE HALVING JOINT
2	DOVETAIL TEE HALVING JOINT
	<u>HOUSE WIRING SECTION</u>
1	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(IN SERIES)
2	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(PARALLEL)
	<u>WELDING SECTION</u>
1	SINGLE V BUTT JOINT
2	LAP JOINT
	<u>FOUNDRY SECTION</u>
1	SINGLE PIECE SQUARE PATTERN
2	SINGLE PIECE ROUND PATTERN
	<u>SHEETMETAL SECTION</u>
1	SQUARE TRY
2	CYLINDER

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

B. Tech I Semester Electrical & Electronics Engineering

MATHEMATICS – I *(Common to All Branches)*

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- The essential tool of matrices in a comprehensive manner.
- The convergence of series.
- Maxima and minima of a function and the radius of curvature
- The Jacobians and extrema of a function.
- Evaluate the definite integrals, Beta and Gamma functions. Apply Fourier series in engineering problems.

Unit I: Matrices: (14 Hours)

Basic definitions of Symmetric, skew-symmetric and orthogonal matrices– Elementary transformations – Rank – Echelon form, Normal form– System of linear equations –Eigen values and Eigen vectors for real matrices– Cayley-Hamilton theorem – Diagonalization of matrix by orthogonal transformation.

Unit II: Sequences and series: (8Hours)

Convergence of sequences and series – Comparison test – p test– D’Alemberts ratio test– Cauchy’s root test. Power series – Series for exponential, trigonometric and logarithm functions.

Unit III: Differential Calculus: (10Hours)

Taylor’s and Maclaurin’s series – Maxima and minima of single variable –Curvature: Curvature of a curve – Curvature of a circle – Radius of a curvature – Centre of Curvature – Equation to the circle of curvature.

Unit IV: Multivariable Calculus: (10Hours)

Functions of two or more variables – Partial derivatives, Total derivative – Jacobians – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.

Unit V: Integral Calculus:(12Hours)

Evaluation of definite integrals– Beta and Gamma functions and their properties. Fourier series: Half range Fourier sine and cosine expansions– Parseval’s theorem.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition- 2013.
3. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. Linear Algebra: A Modern Introduction, D Poole, 2nd Edition, Brooks/Cole, 2005.
3. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Course Outcomes:

On completion of course Students are able to

- Apply the essential tool of matrices in a comprehensive manner.
- Find the convergence of series.
- Find the radius of curvature and maxima and minima of a function.
- Find the Jacobians and extrema of a function.
- Evaluation of definite integrals, Beta and Gamma functions. Application of Fourier series in engineering problems.

ENGINEERING CHEMISTRY

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Objectives:

- Knowledge in Chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depend on the outcome of basic sciences.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial! Engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry principles (or) applications in the field of engineering.
- An attempt has been made to logically correlate the topic with its application.
- After the completion of the course, the student would understand about the concepts of chemistry .

Module-1 : Atomic and molecular structure

Schrodinger wave equation. Particle in a box(one dimensional) and their applications .Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

Module-2: Periodic properties
Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard, soft acids and bases.

Module-3:

Intermolecular forces

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena.

Use of free energy in chemical equilibria
Thermodynamic functions: Introduction, define energy, entropy , Free energy. Free energy and emf. Cell potentials, the Nernst equation and applications. Water chemistry-types of water and Boiler troubles. Corrosion-types of corrosion and factors influencing corrosion.

Module-4: Spectroscopic techniques and applications

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules.

Module-5:

Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of Cyclohexane.

Simple Organic Reactions

Introduction to reactions involving Substitution (SN^1 & SN^2), Addition Reactions involving $C=C$ (Markonikoff reaction) & $C=O$ (Grignard reagent), Elimination (E_1 & E_2) Oxidation (Baeyer villiger reaction), Reduction (Clemmensen reduction).

Suggested Text Books

1. Engineering Chemistry, Satyaprakash, Khanna Book Publishing, Delhi
2. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
3. Essentials of Physical Chemistry, Bahl & Tuli, S.Chand Publishing
4. Applied Chemistry, Sunita Rattan, Kataria
5. Engineering Chemistry, Baskar, Wiley
6. . Engineering Chemistry – I, D. Groukrishana, Vikas Publishing
7. . Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels.

The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

ENGLISH

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

1. Vocabulary Building

- 1.1 The concept of Word Formation
- 1.2 Root word from foreign languages and their use in English
- 1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
- 1.4 Synonyms, antonyms
- 1.5 Idioms and phrases.

2. Basic Writing Skills

- 2.1 Sentence Structures
- 2.2 Use of phrases and clauses in sentences
- 2.3 Importance of proper punctuation
- 2.4 Creating coherence
- 2.5 Organizing principles of paragraphs in documents
- 2.6 Techniques for writing precisely

3. Transformation

- 3.1** Interchange of parts of speech
- 3.2** Active voice and Passive voice
- 3.3** Direct and Indirect speech
- 3.4** 3.4 Degrees of comparison
- 3.5** 3.5 Simple, compound and complex sentences

4. Identifying Common Errors in Writing

- 4.1 Subject-Verb agreement
- 4.2 Noun-pronoun agreement
- 4.3 Misplaced modifiers
- 4.4 Articles
- 4.5 Prepositions
- 4.6 Redundancies
- 4.7 Clichés
- 4.8 Tenses

5. Reading and Writing Practices

- 5.1 Comprehension
- 5.2 Précis Writing
- 5.3 Essay writing
- 5.4 Essay writing

PROGRAMMING FOR PROBLEM SOLVING

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Course Objectives

- The course aims to provide exposure to problem-solving through programming
- It aims to train the student to the basic concepts of the C programming language

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic and logical problems and to translate the algorithms to programs (in C language).
- Choose the loops and decision making statements to solve the problem.
- To implement different Operations on arrays.
- To use functions to solve the given problem.
- To understand structures, unions and pointers,

UNIT 1:

Introduction to Computers: - Introduction, computer hardware and software, creating and running programs, software development life cycle, algorithms, flowcharts.

Introduction to C programming: - Overview of C, structure of a C program, variables, constants, data types, identifiers, keywords, Input/output statements in C, programming examples.

UNIT 2:

Operators and Expressions:- Operators, expressions, precedence and associativity, evaluating expressions, type conversion, typedef, enumerations.

Decision making statements:if statement, if-else statement, nested if-else statement, switch statement.

Loops in C: while loop, for loop, do-while loop, nested for loops,

Jumping statements:break, continue and goto statements.

UNIT 3:

Arrays: Introduction, Declaration and initialization of 1D and 2D arrays.

Array applications: -bubble (exchange) sort, selection sort, linear search, binary search.

Strings: -Definition, declaration and initialization of strings, string I/O functions,string handling functions,array of strings (table of strings).

UNIT 4:

Functions: introduction, category of functions, parameter passing methods, storage classes, recursive function.

Pointers: Understanding pointers, declaring and initialization of pointer variable, accessing the address of variables, accessing a variable through its pointer, chain of pointers.

UNIT 5:

Structures and union: Introduction, defining a structure, declaring structure variable, structure initialization, accessing members of structure, copying and comparing structure variables, structures within structures, array of structures, and introduction of union.

TEXT BOOKS

1. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
2. Rema Theraja, Programming in C, second edition, Oxford.

REFERENCE TEXT BOOKS

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.
3. Yashavant Kanetkar, Let us C, 15th edition, BPB Publications.
4. Dr. P. Chenna Reddy, Computer Fundamentals and C Programming, Second Edition.

CHEMISTRY LAB
(Common to CE, ME, EEE- I SEM)
(Common to ECE & CSE - II SEM)

Choice of experiments from the following:

1. Estimation of Hardness of Water present in given water sample by EDTA method.
2. Determination of surface tension and viscosity.
3. Determination of chloride content of water.
4. Colligative properties using freezing point depression.
5. Estimation of Dissolved Oxygen present in given water sample by Winkler's method.
6. Potentiometry - determination of Redox potentials and emfs.
7. Synthesis of a polymer/drug.
8. Saponification/acid value of an oil.
9. Determination of cell constant and conductance of solutions..
10. Chemical oscillations- Iodine clock reaction.
11. Determination of the partition coefficient of a substance between two immiscible liquids.
12. Adsorption of acetic acid by charcoal.

Laboratory Outcomes

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.

The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

PROGRAMMING FOR PROBLEM SOLVING LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Laboratory Objectives

To impart knowledge so that the student will

- know how to write and debug programs
- know the principles of designing structured programs
- Know when and how to use the appropriate statements available in the C language.
- Write basic C programs using, Selection statements, Repetitive statements, Functions, Pointers, Arrays, Strings and structures

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to create, read and write to and from simple text files.

The student is expected to solve at least 12 assignments from different concepts. (Every year 12 different experiments).

DOS commands, Algorithms, Flowcharts and sample C programs

1. Practice DOS commands necessary for design of C programs.
2. Design and develop algorithms and flowcharts for simple and logical problems
3. If the total selling price of 15 items and total profit earned on them is input through the keyboard. Write a C program to find the cost price of one item.
4. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary. Write a C program to calculate his gross salary.
5. The distance between two cities (in km) is input through the keyboard. Write a C program to convert and print the distance in meters, centimetres, inches and feet.

6. Write a program to take input of name, roll no and marks obtained by a student in 5 subjects each have its 100 full marks and display the name, roll no with percentage score secured.

Problems involving if-then-else structures

7. Write a C program to find out whether a given number is even number or odd number.
8. Write a C program to check whether a given year is leap year or not.
9. Design and develop an algorithm that takes three coefficients (a , b , and c) of a Quadratic equation ($ax^2+bx+c=0$) as input and compute all possible roots. Implement a C program for the developed algorithm and execute the same to output the possible roots for a given set of coefficients with appropriate messages.
10. If the ages of the Ramesh, Suresh and Mahesh are input through the keyboard, write a C program to determine youngest of the three.
11. A character is entered through keyboard. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-else and switch case. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A – Z	65 – 90
a – z	97 – 122
0 – 9	48 – 57
Special symbols	0 – 47, 58 – 64, 91 – 96, 123 – 127.

12. A library charges fine for every book returned late. For first five days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a C program to accept the number of days that the member is late to return the book and display the fine or appropriate message.
13. Write a C program which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use switch statement).

Problems involving Looping statements

14. If the sum of the cubes of each digit of a number is equal to the number itself, then the number is called Armstrong number. (for example, $153 = 1^3 + 5^3 + 3^3$). Design and develop an algorithm to find whether a given number is Armstrong number or not. Implement a C program for the developed algorithm.
15. Design and develop an algorithm to find the square root of a given number N . Implement a C program for the same and execute for all possible inputs with appropriate messages. Note: **Don't use library function $\text{sqrt}(n)$.**
16. If a number and its reversed number are same then the number is called as palindrome number. Design and develop an algorithm to check whether a given number is palindrome or not. Implement a C program for the same.
17. Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
18. Write a C program to evaluate the $\sin(x)$ function series

$$\sin x = \frac{x}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

19. Fibonacci Sequence

A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

Arrays

20. Write a C program to find the smallest and largest number in a given array.
21. Write a C program to find the frequency of a particular number in a list of integers.
22. Write a C program to sort the list of elements using
 - b) Bubble Sort
 - b) Selection sort.
23. Write a C program to search for an element in a list of elements using
 - b) Linear search
 - b) Binary search
24. Write a C program to find the transpose of a matrix.

25. Write a C program to read two matrices and perform the following operations
- c) Addition of two matrices
 - d) Multiplication of two matrices

Additional Problems on arrays

26. Partitioning an array

Given a randomly ordered array of n elements, write a C program to partition the elements into two subsets such that elements $\leq X$ are in one subset and elements $\geq X$ are in another subset.

27. Finding the k^{th} smallest element

Given a randomly ordered array of n elements, write a C program to determine the k^{th} smallest element.

28. Array order reversal

Write a C program to rearrange the elements in an array so that they appear in reverse order.

Strings

29. If a string and its reversed string are same then the string is called as palindrome string. Design and develop an algorithm to check whether a given string is a palindrome or not and implement a C program for the same.
30. Write a C program to sort the names of students in a class in alphabetical order.

Additional Problems on strings

31. Write a C program to read two strings and perform the following operations without using built string library functions.

- v) String length
- vi) String reversing
- vii) Comparison of two strings
- viii) Concatenation of two strings

32. Write a C program to count the number of vowels, consonants, digits, blank spaces and special characters in a given string.

Functions and Recursion

33. Write a C program to swap the contents of two variables using
- c) Call by value
 - d) Call by reference.

34. Write a C program using recursion to
- d) Find the factorial of a given number
 - e) Print the Fibonacci series up to a given number.
 - f) Find the GCD of two integers.

Structures

35. Write a C program to define a structure with the following members.
Roll No., Name, marks in Sub1, Sub2, Sub3. Read the n students records and find the total marks of each student and print the result in the following format.

Roll No	Name	Sub1	Sub2	Sub3	Total marks	result
189Y1A0501	Kavya	80	70	75	225	Distinction

Files

36. Write a C program to copy the contents of one file to another file.

TEXT BOOKS

1. Yashavant Kanetkar, Let us C, 15th edition, BPB publications.
2. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
3. R.G. Dromey, How to solve it by Computer, Pearson.

ENGLISH LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Oral Communication

(This unit involve interactive practice sessions in Language Lab)

- Listening Comprehension ----- Language Lab
- Pronunciation, Intonation, Stress and Rhythm ----- Language Lab
- Common Everyday Situations: Conversations and Dialogues ----- Communication Lab
- Communication at workplace ----- Communication Lab
- Interviews ----- Communication Lab
- Formal Presentations ----- Communication Lab

B. Tech II Semester Electrical & Electronics Engineering

MATHEMATICS-II (Common to All Branches)

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- * First order differential equations.
- * Linear differential equations with constant coefficients.
- * Laplace transforms in engineering problems.
- * Evaluate multiple integrals.
- * Understand Vector Calculus concepts and their applications.

Unit I: First order ordinary differential equations:(10 Hours)

Linear, Bernoulli equations, Exact and equations reducible to Exact. Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Unit II: Ordinary differential equations of higher order: (10Hours)

Linear differential equations of second and higher order with constant coefficients – R.H.S term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$ – Method of variation of parameters.

Unit III:Laplace transforms: (12Hours)

Laplace transforms of standard functions – Properties of Laplace Transforms – Transforms of derivatives and integrals– Evaluation of integrals by Laplace transforms – Laplace transform of periodic functions. Convolution theorem. Inverse Laplace Transforms – Applications of Laplace transforms to ordinary differential equations.

Unit IV: Multiple Integrals:(10Hours)

Evaluation of double integrals in Cartesian coordinates and polar coordinates – Change of variables in double integrals – Change the order of integration in double integrals – Evaluation of triple integrals in Cartesian and polar coordinates – Change of variables in triple integrals.

Unit V: Vector calculus: (12Hours)

Vector differentiation: Scalar point function - Vector point function – Vector operator Del – Gradient – Divergence – Curl. Vector integration: Line, Surface and Volume integrals. Green's theorem in a plane, Stoke's theorem and Gauss-divergence theorems (Statements only). Applications of Green's, Stoke's and Gauss divergence theorems.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013
3. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Outcomes:

On completion of course Students are able to

- * Solve the first order differential equations.
- * Solve linear differential equations with constant coefficients.
- * Apply Laplace Transforms in engineering problems.
- * Evaluation of multiple integrals.
- * Understand Vector Calculus concepts and their applications.

ENGINEERING PHYSICS

(Physics for EEE & ECE)

(Common to EEE- II SEM)

(Common to ECE- I SEM)

Prerequisite: Plus two level physics course

Course Description: Physics for Electrical and Computer Engineers is a basic physics course which provides fundamental knowledge to understand the concepts of Waves, Optics, Lasers, Quantum Mechanics, Solids and Semiconductors.

Course Objectives:

1. Expose students in understanding the basic laws of nature through wave equation using the principles of oscillations and waves.
2. Expose students to theoretical and mathematical aspects of Interference, Diffraction techniques and Lasers for testing of materials.
3. Develop knowledge and understanding the fundamental concepts of Quantum mechanics.
4. Develop knowledge and understanding the fundamental concepts of solids and semiconductors.
5. Adaptability to new developments in science and technology.

Course Syllabus:

Unit I: Waves

Introduction, Simple harmonic motion, Characteristics of Simple harmonic motion, Energy of Simple harmonic motion, Principle of Superposition of waves, Linear superposition of two waves of same frequency. Damped harmonic oscillations, Energy and power dissipations in Damped harmonic oscillations, forced harmonic oscillations, Resonance.
(08 lectures)

Unit II: Wave Optics

Introduction, Huygens' Principle, Superposition of waves, Young's double slit experiment, expression for fringe width, interference in thin film by reflection, Newton's rings experiment, Diffraction Farunhofer diffraction due to single slit, and Diffraction grating (N-slits).
(10 lectures)

Unit III: Lasers

Introduction to lasers, characteristics of laser, interaction of radiation with matter- spontaneous and stimulated emission, Einstein's coefficients; population inversion, excitation

mechanisms, types of lasers: Solid-state lasers – Nd-YAG laser, Gas lasers - He-Ne Laser, Semiconductor p-n junction diode laser, Applications of lasers

(08 lectures)

UnitIV: Quantum Mechanics& Wave Equations

Introduction, Wave nature of matter, Uncertainty principle, Time-dependent and time-independent Schrodinger equations for wave function, Physical significance of wave function, Schrodinger equation for one dimensional particle in a box.

(8 lectures)

UnitV: Solids &Semiconductors

Introduction, Free electron theory of metals (drift velocity and electrical conductivity), Fermi energy level, Kronig-Penney model and origin of energy bands, band structure of metals, semiconductors, and insulators. Direct and indirect bandgap semiconductors, Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), diffusion and drift, p -n junction.

(12 lectures)

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Describe a mathematical wave equation using the principles of waves and oscillations
2. Apply the knowledge for materials testing using Interference and Diffraction techniques.
3. Understand the idea of wave function and to solve Schrodinger equation for simple potentials.
4. Explain the role of semiconductors in different realms of physics and their applications in both science and technology.
5. Identify the working elements of different lasers and estimate laser operation parameters.

Text Books:

1. H. J. Pain, “The physics of vibrations and waves”, Wiley, 2006.
2. Engineering Physics by **K. Thygarajan**, Mac Graw – Hill Publishing Co. New Delhi.

Reference Books:

1. Physics Vol I & II, Halliday/Resnick/Krane 5th Edition, John Wiley, 2003.
2. A. Ghatak, “Optics”, McGraw Hill Education, 2012.
3. D. A. Neamen, “Semiconductor Physics and Devices”, Mac Graw – Hill Education, 2002.

BASIC ELECTRICAL ENGINEERING

(for EEE)

UNIT 1: DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources – source transformation, network reduction techniques for simple Series & Parallel networks, Kirchhoff's current and voltage laws, Mesh and Nodal analysis of simple circuits with DC -Problems.

UNIT2: Network Theorems (8 hours)

Thevenin's & Norton's, Super position and Maximum power transfer theorems for DC excitation.

UNIT3: AC Circuits (8 hours)

Representation of sinusoidal waveforms, average, peak and rms values, Form factor Peak factor for sinusoidal wave form -Problems

Phasor - Phasor representation, Impedance, Admittance, Reactance, Susceptance, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits for series & parallel combinations –sample Problems

UNIT4: Magnetic Circuits (8 hours)

Concept of self & mutual inductances, Dot Convention, Problems, Coefficient of coupling, Composite Magnetic circuit, analysis of Series and Parallel Magnetic Circuits, Duality and dual Circuits, problems

UNIT 5: Network Topology(6 hours)

Definition – Graph, tree, Co-tree, Incidence Matrix, Tie-Set & Cut – Set Matrices for Planar networks, Formulation of equilibrium equations based on graph theory, problems.

Suggested Text / Reference Books

- (i) D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
- (ii) D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
- (iii) L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
- (iv) E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
- (v) V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.
- (vi) Electrical Circuits – N. Sreenivasulu – Reem Publications
- (vii) A. Chakarabarthi “Circuit Theory”, Dhanapath Roy & Co

ENGINEERING GRAPHICS & DESIGN

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Detailed contents:

Traditional Engineering Graphics:

Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

Computer Graphics:

Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation; Spatial Manipulation; Surface Modeling; Solid Modeling; Introduction to Building Information Modeling (BIM)

(Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)

Module 1: Overview of Computer Graphics

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

Module 2: Customization & CAD Drawing

Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module 3: Introduction to Engineering drawing

Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute.

Module 4: Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes

Module 5: Projections of Regular Solids

Projections of solids inclined to both planes.

Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Module 6: Sections and Sectional Views of Right Angular Solids

Sections of Prism, Cylinder, Pyramid and Cone

Development of surfaces of Right Regular Prism, Pyramid, Cylinder and Cone

Module 7: Isometric Projections

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

Module 8: Annotations, layering & other functions

Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

Suggested Text/Reference Books:

- (i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- (ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- (iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- (iv) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
- (v) (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

The student will learn:

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

ENGINEERING PHYSICS LAB

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Course Description:

Physics Practical course is meant for making the students to gain practical knowledge to co relate with the theoretical studies. It covers experiments on Principles of Mechanics and Optics, Measurement of Magnetic field and studying Resonance using LCR Circuit.

Objectives:-

- To explore the application of interference and diffraction by doing concerned experiments.
- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- Develop an ability to apply the knowledge of physics experiments in the later studies.
- To understand the concept of energy gap, B-H curve, and synthesis of nano material by performing the experiments.

LIST OF EXPERIMENTS

Any 7 of the following experiments has to be performed in a semester:

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method.
2. Determination of dispersive power of the prism.
3. Rigidity Modulus- Torsional Pendulum.
4. Study of resonance effect in series and parallel LCR circuit.
5. Determination of thickness of thin object by wedge method.
6. Determination of radius of curvature of lens by Newton's Rings.
7. Laser : Determination of wavelength using diffraction grating.
8. Energy gap of a semiconductor using p-n junction diode.
9. Hysteresis: B-H curve.
10. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
11. Frequency of the tuning fork - Melde's apparatus.
12. Spring constant - Coupled Pendulums.

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Students can aware of the application of interference, diffraction phenomena along with laser.
2. Apply the scientific process in the conduct and reporting of experimental investigations.
3. Understand measurement technology, usage of new instruments and real time applications in engineering studies.
4. Verify the theoretical ideas and concepts covered in lecture by doing hands on in the experiments.
5. Know about the characteristics of various materials in a practical manner and gain knowledge about various optical technique methods.
6. Acquire and interpret experimental data to examine the physical laws.

Lab Manual: Laboratory Manual for Engineering Physics.

Mode of Evaluation: Continuous Internal Evaluation, Practical End Examination.

BASIC ELECTRICAL ENGINEERING LAB

(for EEE)

List of Laboratory Experiments/Demonstrations:

Basic safety precautions. Introduction and use of measuring instruments – Voltmeter. Ammeter, Wattmeter, Multi-meter and oscilloscope.

1. Determination of values of R, L and C parameters of a given R-L-C series circuit
2. Verification of KCL and KVL.
3. Verification of Superposition Theorem
4. Verification of Thevenini's Theorem
5. Verification of Norton's Theorem
6. Verification of Maximum Power Transfer Theorem.
7. Determination of Active, reactive and apparent power for R-L circuit (series & parallel).
8. Determination of Active, reactive and apparent power for R-C circuit (series & parallel).
9. Determination of Active, reactive and apparent power for R-L-C circuit (series).
10. Determination of coefficient of coupling for Single Phase Transformer.

WORKSHOP AND MANUFACTURING PRACTICES

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Lectures & videos: (10 hours)

Detailed contents

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods **(3 lectures)**
2. CNC machining and Additive manufacturing **(1 lecture)**
3. Fitting operations & power tools **(1 lecture)**
4. Electrical & Electronics **(1 lecture)**
5. Carpentry **(1 lecture)**
6. Plastic molding, glass cutting **(1 lecture)**
7. Metal casting **(1 lecture)**
8. Welding (arc welding & gas welding) and brazing **(1 lecture)**

Text/Reference Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. (Kalpakjian S. And Steven S. Schmid, “Manufacturing Engineering and Technology”, 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, “Manufacturing Technology – I” Pearson Education, 2008.
4. Roy A. Lindberg, “Processes and Materials of Manufacture”, 4th edition, Prentice Hall India, 1998.
5. Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course Outcomes:

Upon completion of this course

The students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Workshop Practice:(60 hours)

1. Machine shop (10 hours)
2. Fitting shop (8 hours)
3. Carpentry (6 hours)
4. Electrical (8 hours)
5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs)

6. Casting (8 hours)

7. Tin Smithy (6 hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

S.NO	EXPERIMENTS IN THE SYLLABUS
	<u>MACHINE SHOP</u>
1	STEP TURNING OPERATION
2	TAPER TURNING OPERATION
	<u>FITTING SECTION</u>
1	SQUARE FITTING
2	STEEPED FITTING
	<u>CARPENTRY SECTION</u>
1	TEE HALVING JOINT
2	DOVETAIL TEE HALVING JOINT
	<u>HOUSE WIRING SECTION</u>
1	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(IN SERIES)
2	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(PARALLEL)
	<u>WELDING SECTION</u>
1	SINGLE V BUTT JOINT
2	LAP JOINT
	<u>FOUNDRY SECTION</u>
1	SINGLE PIECE SQUARE PATTERN
2	SINGLE PIECE ROUND PATTERN
	<u>SHEETMETAL SECTION</u>
1	SQUARE TRY
2	CYLINDER

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

B. Tech I Semester Mechanical Engineering

MATHEMATICS – I *(Common to All Branches)*

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- The essential tool of matrices in a comprehensive manner.
- The convergence of series.
- Maxima and minima of a function and the radius of curvature
- The Jacobians and extrema of a function.
- Evaluate the definite integrals, Beta and Gamma functions. Apply Fourier series in engineering problems.

Unit I: Matrices: (14 Hours)

Basic definitions of Symmetric, skew-symmetric and orthogonal matrices– Elementary transformations – Rank – Echelon form, Normal form– System of linear equations –Eigen values and Eigen vectors for real matrices– Cayley-Hamilton theorem – Diagonalization of matrix by orthogonal transformation.

Unit II: Sequences and series: (8Hours)

Convergence of sequences and series – Comparison test – p test– D’Alemberts ratio test– Cauchy’s root test. Power series – Series for exponential, trigonometric and logarithm functions.

Unit III: Differential Calculus: (10Hours)

Taylor’s and Maclaurin’s series – Maxima and minima of single variable –Curvature: Curvature of a curve – Curvature of a circle – Radius of a curvature – Centre of Curvature – Equation to the circle of curvature.

Unit IV: Multivariable Calculus: (10Hours)

Functions of two or more variables – Partial derivatives, Total derivative – Jacobians – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.

Unit V: Integral Calculus:(12Hours)

Evaluation of definite integrals– Beta and Gamma functions and their properties. Fourier series: Half range Fourier sine and cosine expansions– Parseval’s theorem.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013.
3. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. Linear Algebra: A Modern Introduction, D Poole, 2nd Edition, Brooks/Cole, 2005.
3. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Course Outcomes:

On completion of course Students are able to

- Apply the essential tool of matrices in a comprehensive manner.
- Find the convergence of series.
- Find the radius of curvature and maxima and minima of a function.
- Find the Jacobians and extrema of a function.
- Evaluation of definite integrals, Beta and Gamma functions. Application of Fourier series in engineering problems.

ENGINEERING CHEMISTRY

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Objectives:

- Knowledge in Chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depend on the outcome of basic sciences.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial! Engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry principles (or) applications in the field of engineering.
- An attempt has been made to logically correlate the topic with its application.
- After the completion of the course, the student would understand about the concepts of chemistry .

Module-1 : Atomic and molecular structure

Schrodinger wave equation. Particle in a box(one dimensional) and their applications .Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

Module-2:

Periodic

properties

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard, soft acids and bases.

Module-3:

Intermolecular forces

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena.

Use of free energy in chemical equilibria

Thermodynamic functions: Introduction, define energy, entropy , Free energy. Free energy and emf. Cell potentials, the Nernst equation and applications. Water chemistry-types of water and Boiler troubles. Corrosion-types of corrosion and factors influencing corrosion.

Module-4: Spectroscopic techniques and applications

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules.

Module-5:

Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of Cyclohexane.

Simple Organic Reactions

Introduction to reactions involving Substitution (SN^1 & SN^2), Addition Reactions involving $C=C$ (Markonikoff reaction) & $C=O$ (Grignard reagent), Elimination (E_1 & E_2) Oxidation (Baeyer villiger reaction), Reduction (Clemmensen reduction).

Suggested Text Books

1. Engineering Chemistry, Satyaprakash, Khanna Book Publishing, Delhi
2. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
3. Essentials of Physical Chemistry, Bahl & Tuli, S. Chand Publishing
4. Applied Chemistry, Sunita Rattan, Kataria
5. Engineering Chemistry, Baskar, Wiley
6. . Engineering Chemistry – I, D. Groukrishana, Vikas Publishing
7. . Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels.

The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

ENGLISH

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

1. Vocabulary Building

- 1.1 The concept of Word Formation
- 1.2 Root word from foreign languages and their use in English
- 1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
- 1.4 Synonyms, antonyms
- 1.5 Idioms and phrases.

2 Basic Writing Skills

- 2.1 Sentence Structures
- 2.2 Use of phrases and clauses in sentences
- 2.3 Importance of proper punctuation
- 2.4 Creating coherence
- 2.5 Organizing principles of paragraphs in documents
- 2.6 Techniques for writing precisely

3 Transformation

- 3.1** Interchange of parts of speech
- 3.2** Active voice and Passive voice
- 3.3** Direct and Indirect speech
- 3.4** 3.4 Degrees of comparison
- 3.5** 3.5 Simple, compound and complex sentences

4. Identifying Common Errors in Writing

- 4.1 Subject-Verb agreement
- 4.2 Noun-pronoun agreement
- 4.3 Misplaced modifiers
- 4.4 Articles
- 4.5 Prepositions
- 4.6 Redundancies
- 4.7 Clichés
- 4.8 Tenses

5. Reading and Writing Practices

- 5.1 Comprehension
- 5.2 Précis Writing
- 5.3 Essay writing
- 5.4 Essay writing

PROGRAMMING FOR PROBLEM SOLVING

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Course Objectives

- The course aims to provide exposure to problem-solving through programming
- It aims to train the student to the basic concepts of the C programming language

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic and logical problems and to translate the algorithms to programs (in C language).
- Choose the loops and decision making statements to solve the problem.
- To implement different Operations on arrays.
- To use functions to solve the given problem.
- To understand structures, unions and pointers,

UNIT 1:

Introduction to Computers: - Introduction, computer hardware and software, creating and running programs, software development life cycle, algorithms, flowcharts.

Introduction to C programming: - Overview of C, structure of a C program, variables, constants, data types, identifiers, keywords, Input/output statements in C, programming examples.

UNIT 2:

Operators and Expressions:- Operators, expressions, precedence and associativity, evaluating expressions, type conversion, typedef, enumerations.

Decision making statements:if statement, if-else statement, nested if-else statement, switch statement.

Loops in C: while loop, for loop, do-while loop, nested for loops,

Jumping statements:break, continue and goto statements.

UNIT 3:

Arrays: Introduction, Declaration and initialization of 1D and 2D arrays.

Array applications: -bubble (exchange) sort, selection sort, linear search, binary search.

Strings: -Definition, declaration and initialization of strings, string I/O functions,string handling functions,array of strings (table of strings).

UNIT 4:

Functions: introduction, category of functions, parameter passing methods, storage classes, recursive function.

Pointers: Understanding pointers, declaring and initialization of pointer variable, accessing the address of variables, accessing a variable through its pointer, chain of pointers.

UNIT 5:

Structures and union: Introduction, defining a structure, declaring structure variable, structure initialization, accessing members of structure, copying and comparing structure variables, structures within structures, array of structures, and introduction of union.

TEXT BOOKS

1. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
2. Rema Theraja, Programming in C, second edition, Oxford.

REFERENCE TEXT BOOKS

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.
3. Yashavant Kanetkar, Let us C, 15th edition, BPB Publications.
4. Dr. P. Chenna Reddy, Computer Fundamentals and C Programming, Second Edition.

CHEMISTRY LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Choice of experiments from the following:

1. Estimation of Hardness of Water present in given water sample by EDTA method.
2. Determination of surface tension and viscosity.
3. Determination of chloride content of water.
4. Colligative properties using freezing point depression.
5. Estimation of Dissolved Oxygen present in given water sample by Winkler's method.
6. Potentiometry - determination of Redox potentials and emfs.
7. Synthesis of a polymer/drug.
8. Saponification/acid value of an oil.
9. Determination of cell constant and conductance of solutions..
10. Chemical oscillations- Iodine clock reaction.
11. Determination of the partition coefficient of a substance between two immiscible liquids.
12. Adsorption of acetic acid by charcoal.

Laboratory Outcomes

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.

The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

PROGRAMMING FOR PROBLEM SOLVING LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Laboratory Objectives

To impart knowledge so that the student will

- know how to write and debug programs
- know the principles of designing structured programs
- Know when and how to use the appropriate statements available in the C language.
- Write basic C programs using, Selection statements, Repetitive statements, Functions, Pointers, Arrays, Strings and structures

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to create, read and write to and from simple text files.

The student is expected to solve at least 12 assignments from different concepts. (Every year 12 different experiments).

DOS commands, Algorithms, Flowcharts and sample C programs

1. Practice DOS commands necessary for design of C programs.
2. Design and develop algorithms and flowcharts for simple and logical problems
3. If the total selling price of 15 items and total profit earned on them is input through the keyboard. Write a C program to find the cost price of one item.
4. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary. Write a C program to calculate his gross salary.
5. The distance between two cities (in km) is input through the keyboard. Write a C program to convert and print the distance in meters, centimetres, inches and feet.
6. Write a program to take input of name, roll no and marks obtained by a student in 5 subjects each have its 100 full marks and display the name, roll no with percentage score secured.

Problems involving if-then-else structures

7. Write a C program to find out whether a given number is even number or odd number.
8. Write a C program to check whether a given year is leap year or not.
9. Design and develop an algorithm that takes three coefficients (a , b , and c) of a Quadratic equation ($ax^2+bx+c=0$) as input and compute all possible roots. Implement a C program for the developed algorithm and execute the same to output the possible roots for a given set of coefficients with appropriate messages.
10. If the ages of the Ramesh, Suresh and Mahesh are input through the keyboard, write a C program to determine youngest of the three.
11. A character is entered through keyboard. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-else and switch case. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A – Z	65 – 90
a – z	97 – 122
0 – 9	48 – 57
Special symbols	0 – 47, 58 – 64, 91 – 96, 123 – 127.

12. A library charges fine for every book returned late. For first five days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a C program to accept the number of days that the member is late to return the book and display the fine or appropriate message.
13. Write a C program which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use switch statement).

Problems involving Looping statements

14. If the sum of the cubes of each digit of a number is equal to the number itself, then the number is called Armstrong number. (for example, $153 = 1^3 + 5^3 + 3^3$). Design and develop an algorithm to find whether a given number is Armstrong number or not. Implement a C program for the developed algorithm.
15. Design and develop an algorithm to find the square root of a given number N . Implement a C program for the same and execute for all possible inputs with appropriate messages. Note: **Don't use library function $\text{sqrt}(n)$.**
16. If a number and its reversed number are same then the number is called as palindrome number. Design and develop an algorithm to check whether a given number is palindrome or not. Implement a C program for the same.
17. Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
18. Write a C program to evaluate the $\sin(x)$ function series

$$\sin x = \frac{x}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

19. Fibonacci Sequence

A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

Arrays

20. Write a C program to find the smallest and largest number in a given array.
21. Write a C program to find the frequency of a particular number in a list of integers.
22. Write a C program to sort the list of elements using
 - c) Bubble Sort
 - b) Selection sort.
23. Write a C program to search for an element in a list of elements using
 - c) Linear search
 - b) Binary search
24. Write a C program to find the transpose of a matrix.

25. Write a C program to read two matrices and perform the following operations
- e) Addition of two matrices
 - f) Multiplication of two matrices

Additional Problems on arrays

26. Partitioning an array

Given a randomly ordered array of n elements, write a C program to partition the elements into two subsets such that elements $\leq X$ are in one subset and elements $\geq X$ are in another subset.

27. Finding the kth smallest element

Given a randomly ordered array of n elements, write a C program to determine the kth smallest element.

28. Array order reversal

Write a C program to rearrange the elements in an array so that they appear in reverse order.

Strings

29. If a string and its reversed string are same then the string is called as palindrome string. Design and develop an algorithm to check whether a given string is a palindrome or not and implement a C program for the same.
30. Write a C program to sort the names of students in a class in alphabetical order.

Additional Problems on strings

31. Write a C program to read two strings and perform the following operations without using built string library functions.

- ix)** String length
- x)** String reversing
- xi)** Comparison of two strings
- xii)** Concatenation of two strings

32. Write a C program to count the number of vowels, consonants, digits, blank spaces and special characters in a given string.

Functions and Recursion

33. Write a C program to swap the contents of two variables using
- e) Call by value
 - f) Call by reference.
34. Write a C program using recursion to
- g) Find the factorial of a given number
 - h) Print the Fibonacci series up to a given number.
 - i) Find the GCD of two integers.

Structures

35. Write a C program to define a structure with the following members.
Roll No., Name, marks in Sub1, Sub2, Sub3. Read the n students records and find the total marks of each student and print the result in the following format.

Roll No	Name	Sub1	Sub2	Sub3	Total marks	result
189Y1A0501	Kavya	80	70	75	225	Distinction

Files

36. Write a C program to copy the contents of one file to another file.

TEXT BOOKS

1. Yashavant Kanetkar, Let us C, 15th edition, BPB publications.
2. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
3. R.G. Dromey, How to solve it by Computer, Pearson.

ENGLISH LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Oral Communication

(This unit involve interactive practice sessions in Language Lab)

- Listening Comprehension ----- Language Lab
- Pronunciation, Intonation, Stress and Rhythm ----- Language Lab
- Common Everyday Situations: Conversations and Dialogues ----- Communication Lab
- Communication at workplace ----- Communication Lab
- Interviews ----- Communication Lab
- Formal Presentations ----- Communication Lab

B. Tech II Semester Mechanical Engineering

MATHEMATICS-II

(Common to All Branches)

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- * First order differential equations.
- * Linear differential equations with constant coefficients.
- * Laplace transforms in engineering problems.
- * Evaluate multiple integrals.
- * Understand Vector Calculus concepts and their applications.

Unit I: First order ordinary differential equations:(10 Hours)

Linear, Bernoulli equations, Exact and equations reducible to Exact. Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Unit II: Ordinary differential equations of higher order: (10Hours)

Linear differential equations of second and higher order with constant coefficients – R.H.S term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$ – Method of variation of parameters.

Unit III:Laplace transforms: (12Hours)

Laplace transforms of standard functions – Properties of Laplace Transforms – Transforms of derivatives and integrals– Evaluation of integrals by Laplace transforms – Laplace transform of periodic functions. Convolution theorem. Inverse Laplace Transforms – Applications of Laplace transforms to ordinary differential equations.

Unit IV: Multiple Integrals:(10Hours)

Evaluation of double integrals in Cartesian coordinates and polar coordinates – Change of variables in double integrals – Change the order of integration in double integrals – Evaluation of triple integrals in Cartesian and polar coordinates – Change of variables in triple integrals.

Unit V: Vector calculus: (12Hours)

Vector differentiation: Scalar point function - Vector point function – Vector operator Del – Gradient – Divergence – Curl. Vector integration: Line, Surface and Volume integrals. Green's theorem in a plane, Stoke's theorem and Gauss-divergence theorems (Statements only). Applications of Green's, Stoke's and Gauss divergence theorems.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013
3. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Outcomes:

On completion of course Students are able to

- * Solve the first order differential equations.
- * Solve linear differential equations with constant coefficients.
- * Apply Laplace Transforms in engineering problems.
- * Evaluation of multiple integrals.
- * Understand Vector Calculus concepts and their applications.

ENGINEERING PHYSICS

(Physics for ME)

Theory Prerequisite: Plus two level physics course

Course Description:

This course intends to provide the students to have a fair knowledge with an understanding about the theory and problems, Wave optics, lasers, Simple harmonic oscillators and their interaction, solids and semiconductors and to enable them to use these concepts in applications.

Course Objectives:

1. Expose students to theoretical and mathematical aspects of Interference, Diffraction techniques and Lasers for testing of materials.
2. To understand the concepts of Simple harmonic Oscillator & non dispersive Transverse & Longitudinal waves .
3. Develop knowledge and understanding the fundamental concepts of solids and semiconductors.
4. Adaptability to new developments in science and technology.

Course Syllabus:

Unit I: Wave Optics

Introduction, Huygens' Principle, Superposition of waves, Young's double slit experiment, expression for fringe width, interference in thin film by reflection, Newton's rings experiment, Diffraction Farunhofer diffraction due to single slit, and Diffraction grating (N-slits).

(10 lectures)

Unit II: Lasers

Introduction to lasers, characteristics of laser, interaction of radiation with matter- spontaneous and stimulated emission, Einstein's coefficients; population inversion, excitation mechanisms, types of lasers: Solid-state lasers – Nd-YAG laser, Gas lasers - He-Ne Laser, Semiconductor p-n junction diode laser, Applications of lasers

(08 lectures)

Unit III: Damped and Forced Simple Harmonic Oscillator

Mechanical and electrical simple harmonic oscillators, Damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, Quality factor, Forced Mechanical and Electrical oscillators, Electrical and Mechanical impedance.

(10 lectures)

UNIT IV:

Non-dispersive transverse and longitudinal waves in one dimension String

Transverse wave on a string, the wave equation on a string, Harmonic waves, reflection and transmission of waves at a boundary, impedance matching, standing waves and their eigenfrequencies, longitudinal waves and the wave equation for them. (08 lectures)

UnitV: Solids & Semiconductors

Introduction, Free electron theory of metals (drift velocity and electrical conductivity), Fermi energy level, Kronig-Penney model and origin of energy bands, band structure of metals, semiconductors, and insulators. Direct and indirect bandgap semiconductors, Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), diffusion and drift, p -n junction.

(10 lectures)

Course Outcomes:

Upon successful completion of the course, students will be able to

1. Apply the knowledge for materials testing using Interference and Diffraction techniques.
2. Identify the working elements of different lasers and estimate laser operation parameters
3. Compute Damped & Forced Simple Harmonic Oscillations.
4. Solve Transverse & Longitudinal waves.
5. Explain the role of semiconductors in different realms of physics and their applications in both science and technology.

Text Books:

1. Engineering Physics by **K. Thygarajan**, Mac Graw – Hill Publishing Co. New Delhi.
2. ‘ Oscillations and waves in physics’, Ian G. Main.

Reference Books:

1. The physics of vibrations and waves, ‘H.J. Pain’.
2. Semiconductor Physics & Devices, ‘Neamen’.

BASIC ELECTRICAL ENGINEERING

(Common to CE, ME – II SEM)

(Common to ECE , CSE – I SEM)

UNIT 1: DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources – source transformation, Series & Parallel networks - Star-Delta transformation, Kirchoff's current and voltage laws, Mesh and Nodal analysis of simple circuits with DC -Problems.

UNIT 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, average, peak and rms values, Form factor Peak factor for sinusoidalwave form -Problems

Phasor-Phasor representation, Impedance, Admittance, Reactance, Susceptance, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits forseries & parallel combinations –simple Problems

UNIT 3: DC machines (8 hours)

DC Generators: Construction– working principle – EMF equation – types of DC generators- applications - simple problems.

Working Principle of DC motor, types, Torque Equation, Concept of Back EMF- applications - simple Problems.

UNIT 4: Transformers & Induction Machines (8 hours)

Single Phase Transformers: Principle of Operation, Constructional details, EMF equation, losses in transformers, regulation and efficiency, equivalent circuit - simple Problems.

Three phase Induction Motor: Construction and working principle, slip, rotor frequency, rotor current, and rotor power factor –simple Problems

UNIT 5: Electrical Installations (6 hours)

Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Wires and Cables, Earthing. Batteries, Introduction to power converters.

Suggested Text / Reference Books

- (viii) D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
- (ix) D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
- (x) L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
- (xi) E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
- (xii) V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.
- (xiii) A. Chakarabarthi “Circuit Theory”, Dhanapath Roy & Co
- (xiv) Electrical Circuits – N. Sreenivasulu – Reem Publications

ENGINEERING GRAPHICS & DESIGN

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Detailed contents:

Traditional Engineering Graphics:

Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

Computer Graphics:

Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation; Spatial Manipulation; Surface Modeling; Solid Modeling; Introduction to Building Information Modeling (BIM)

(Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)

Module 1: Overview of Computer Graphics

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

Module 2: Customization & CAD Drawing

Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module 3: Introduction to Engineering drawing

Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute.

Module 4: Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes

Module 5: Projections of Regular Solids

Projections of solids inclined to both planes.

Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Module 6: Sections and Sectional Views of Right Angular Solids

Sections of Prism, Cylinder, Pyramid and Cone

Development of surfaces of Right Regular Prism, Pyramid, Cylinder and Cone

Module 7: Isometric Projections

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

Module 8: Annotations, layering & other functions

Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

Suggested Text/Reference Books:

- (i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- (ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- (iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- (iv) Narayana, K.L. & P Kanniah (2008), Text book on Engineering Drawing, Scitech Publishers
- (v) (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

The student will learn:

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

ENGINEERING PHYSICS LAB

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Course Description:

Physics Practical course is meant for making the students to gain practical knowledge to co relate with the theoretical studies. It covers experiments on Principles of Mechanics and Optics, Measurement of Magnetic field and studying Resonance using LCR Circuit.

Objectives:-

- To explore the application of interference and diffraction by doing concerned experiments.
- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- Develop an ability to apply the knowledge of physics experiments in the later studies.
- To understand the concept of energy gap, B-H curve, and synthesis of nano material by performing the experiments.

LIST OF EXPERIMENTS

Any 7 of the following experiments has to be performed in a semester:

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method.
2. Determination of dispersive power of the prism.
3. Rigidity Modulus- Torsional Pendulum.
4. Study of resonance effect in series and parallel LCR circuit.
5. Determination of thickness of thin object by wedge method.
6. Determination of radius of curvature of lens by Newton's Rings.
7. Laser : Determination of wavelength using diffraction grating.
8. Energy gap of a semiconductor using p-n junction diode.
9. Hysteresis: B-H curve.
10. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
11. Frequency of the tuning fork - Melde's apparatus.
12. Spring constant - Coupled Pendulums.

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Students can aware of the application of interference, diffraction phenomena along with laser.
2. Apply the scientific process in the conduct and reporting of experimental investigations.
3. Understand measurement technology, usage of new instruments and real time applications in engineering studies.
4. Verify the theoretical ideas and concepts covered in lecture by doing hands on in the experiments.
5. Know about the characteristics of various materials in a practical manner and gain knowledge about various optical technique methods.
6. Acquire and interpret experimental data to examine the physical laws.

Lab Manual: Laboratory Manual for Engineering Physics.

Mode of Evaluation: Continuous Internal Evaluation, Practical End Examination.

BASIC ELECTRICAL ENGINEERING LAB

(Common to CE, ME – II SEM)

(Common to ECE, CSE – I SEM)

List of Laboratory Experiments/Demonstrations:

Basic safety precautions. Introduction and use of measuring instruments – Voltmeter. Ammeter, Wattmeter, Multi-meter and oscilloscope.

1. Determination of values of R, L and C parameters of a given R-L-C series circuit
2. Verification of KCL and KVL.
3. Determination of Active, reactive and apparent power for R-L circuit (series & parallel).
4. Determination of Active, reactive and apparent power for R-C circuit (series & parallel).
5. Load test on 1-phase transformer.
6. OC & SC tests on 1-phase transformer to obtain equivalent circuit.
7. Torque-speed characteristics of DC shunt motor.
8. Speed Control of three –phase induction motors using pole changing method
9. Demonstration of cut out sections of DC & AC machines
10. Study of fuse, MCB, Batteries

WORKSHOP AND MANUFACTURING PRACTICES

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Lectures & videos: (10 hours)

Detailed contents

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods **(3 lectures)**
2. CNC machining and Additive manufacturing **(1 lecture)**
3. Fitting operations & power tools **(1 lecture)**
4. Electrical & Electronics **(1 lecture)**
5. Carpentry **(1 lecture)**
6. Plastic molding, glass cutting **(1 lecture)**
7. Metal casting **(1 lecture)**
8. Welding (arc welding & gas welding) and brazing **(1 lecture)**

Text/Reference Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. (Kalpakjian S. And Steven S. Schmid, “Manufacturing Engineering and Technology”, 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, “Manufacturing Technology – I” Pearson Education, 2008.
4. Roy A. Lindberg, “Processes and Materials of Manufacture”, 4th edition, Prentice Hall India, 1998.
5. Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course Outcomes:

Upon completion of this course

The students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Workshop Practice:(60 hours)

1. Machine shop (10 hours)
2. Fitting shop (8 hours)
3. Carpentry (6 hours)
4. Electrical (8 hours)
5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs)

6. Casting (8 hours)

7. Tin Smithy (6 hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

S.NO	EXPERIMENTS IN THE SYLLABUS
	<u>MACHINE SHOP</u>
1	STEP TURNING OPERATION
2	TAPER TURNING OPERATION
	<u>FITTING SECTION</u>
1	SQUARE FITTING
2	STEEPED FITTING
	<u>CARPENTRY SECTION</u>
1	TEE HALVING JOINT
2	DOVETAIL TEE HALVING JOINT
	<u>HOUSE WIRING SECTION</u>
1	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(IN SERIES)
2	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(PARALLEL)
	<u>WELDING SECTION</u>
1	SINGLE V BUTT JOINT
2	LAP JOINT
	<u>FOUNDRY SECTION</u>
1	SINGLE PIECE SQUARE PATTERN
2	SINGLE PIECE ROUND PATTERN
	<u>SHEETMETAL SECTION</u>
1	SQUARE TRY
2	CYLINDER

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

B. Tech I Semester Electronics & Communication Engineering

MATHEMATICS – I

(Common to All Branches)

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- The essential tool of matrices in a comprehensive manner.
- The convergence of series.
- Maxima and minima of a function and the radius of curvature
- The Jacobians and extrema of a function.
- Evaluate the definite integrals, Beta and Gamma functions. Apply Fourier series in engineering problems.

Unit I: Matrices: (14 Hours)

Basic definitions of Symmetric, skew-symmetric and orthogonal matrices– Elementary transformations – Rank – Echelon form, Normal form– System of linear equations –Eigen values and Eigen vectors for real matrices– Cayley-Hamilton theorem – Diagonalization of matrix by orthogonal transformation.

Unit II: Sequences and series: (8Hours)

Convergence of sequences and series – Comparison test – p test– D’Alemberts ratio test– Cauchy’s root test. Power series – Series for exponential, trigonometric and logarithm functions.

Unit III: Differential Calculus: (10Hours)

Taylor’s and Maclaurin’s series – Maxima and minima of single variable –Curvature: Curvature of a curve – Curvature of a circle – Radius of a curvature – Centre of Curvature – Equation to the circle of curvature.

Unit IV: Multivariable Calculus: (10Hours)

Functions of two or more variables – Partial derivatives, Total derivative – Jacobians – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.

Unit V: Integral Calculus:(12Hours)

Evaluation of definite integrals– Beta and Gamma functions and their properties. Fourier series: Half range Fourier sine and cosine expansions– Parseval’s theorem.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013.
3. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. Linear Algebra: A Modern Introduction, D Poole, 2nd Edition, Brooks/Cole, 2005.
3. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Course Outcomes:

On completion of course Students are able to

- Apply the essential tool of matrices in a comprehensive manner.
- Find the convergence of series.
- Find the radius of curvature and maxima and minima of a function.
- Find the Jacobians and extrema of a function.
- Evaluation of definite integrals, Beta and Gamma functions. Application of Fourier series in engineering problems.

ENGINEERING PHYSICS **(Physics for EEE & ECE)**

Prerequisite: Plus two level physics course

Course Description: Physics for Electrical and Computer Engineers is a basic physics course which provides fundamental knowledge to understand the concepts of Waves, Optics, Lasers, Quantum Mechanics, Solids and Semiconductors.

Course Objectives:

1. Expose students in understanding the basic laws of nature through wave equation using the principles of oscillations and waves.
2. Expose students to theoretical and mathematical aspects of Interference, Diffraction techniques and Lasers for testing of materials.
3. Develop knowledge and understanding the fundamental concepts of Quantum mechanics.
4. Develop knowledge and understanding the fundamental concepts of solids and semiconductors.
5. Adaptability to new developments in science and technology.

Course Syllabus:

Unit I: Waves

Introduction, Simple harmonic motion, Characteristics of Simple harmonic motion, Energy of Simple harmonic motion, Principle of Superposition of waves, Linear superposition of two waves of same frequency. Damped harmonic oscillations, Energy and power dissipations in Damped harmonic oscillations, forced harmonic oscillations, Resonance.
(08 lectures)

Unit II: Wave Optics

Introduction, Huygens' Principle, Superposition of waves, Young's double slit experiment, expression for fringe width, interference in thin film by reflection, Newton's rings experiment, Diffraction Farunhofer diffraction due to single slit, and Diffraction grating (N-slits).
(10 lectures)

Unit III: Lasers

Introduction to lasers, characteristics of laser, interaction of radiation with matter- spontaneous and stimulated emission, Einstein's coefficients; population inversion, excitation mechanisms, types of lasers: Solid-state lasers – Nd-YAG laser, Gas lasers - He-Ne Laser, Semiconductor p-n junction diode laser, Applications of lasers

(08 lectures)

UnitIV: Quantum Mechanics& Wave Equations

Introduction, Wave nature of matter, Uncertainty principle, Time-dependent and time-independent Schrodinger equations for wave function, Physical significance of wave function, Schrodinger equation for one dimensional particle in a box.

(8 lectures)

UnitV: Solids &Semiconductors

Introduction, Free electron theory of metals (drift velocity and electrical conductivity), Fermi energy level, Kronig-Penney model and origin of energy bands, band structure of metals, semiconductors, and insulators. Direct and indirect bandgap semiconductors, Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), diffusion and drift, p -n junction.

(12 lectures)

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Describe a mathematical wave equation using the principles of waves and oscillations
2. Apply the knowledge for materials testing using Interference and Diffraction techniques.
3. Understand the idea of wave function and to solve Schrodinger equation for simple potentials.
4. Explain the role of semiconductors in different realms of physics and their applications in both science and technology.
5. Identify the working elements of different lasers and estimate laser operation parameters.

Text Books:

1. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.
2. Engineering Physics by **K. Thygarajan**, Mac Graw – Hill Publishing Co. New Delhi.

Reference Books:

1. Physics Vol I & II, Halliday/Resnick/Krane 5th Edition, John Wiley, 2003.
2. A. Ghatak, "Optics", McGraw Hill Education, 2012.
3. D. A. Neamen, "Semiconductor Physics and Devices", Mac Graw – Hill Education, 2002.

BASIC ELECTRICAL ENGINEERING

(Common to CE, ME – II SEM)

(Common to ECE, CSE – I SEM)

UNIT 1: DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources – source transformation, Series & Parallel networks - Star-Delta transformation, Kirchoff's current and voltage laws, Mesh and Nodal analysis of simple circuits with DC -Problems.

UNIT 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, average, peak and rms values, Form factor Peak factor for sinusoidal wave form -Problems

Phasor-Phasor representation, Impedance, Admittance, Reactance, Susceptance, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits for series & parallel combinations –simple Problems

UNIT 3: DC machines (8 hours)

DC Generators: Construction– working principle – EMF equation – types of DC generators- applications - simple problems.

Working Principle of DC motor, types, Torque Equation, Concept of Back EMF- applications - simple Problems.

UNIT 4: Transformers & Induction Machines (8 hours)

Single Phase Transformers: Principle of Operation, Constructional details, EMF equation, losses in transformers, regulation and efficiency, equivalent circuit - simple Problems.

Three phase Induction Motor: Construction and working principle, slip, rotor frequency, rotor current, and rotor power factor –simple Problems

UNIT 5: Electrical Installations (6 hours)

Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Wires and Cables, Earthing. Batteries, Introduction to power converters.

Suggested Text / Reference Books

- (i) D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
- (ii) D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
- (iii) L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
- (iv) E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
- (v) V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.
- (vi) A. Chakarabarthi “Circuit Theory”, Dhanapath Roy & Co
- (vii) Electrical Circuits – N. Sreenivasulu – Reem Publications

ENGINEERING GRAPHICS & DESIGN

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Detailed contents:

Traditional Engineering Graphics:

Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

Computer Graphics:

Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation; Spatial Manipulation; Surface Modeling; Solid Modeling; Introduction to Building Information Modeling (BIM)

(Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)

Module 1: Overview of Computer Graphics

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

Module 2: Customization & CAD Drawing

Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module 3: Introduction to Engineering drawing

Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute.

Module 4: Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes

Module 5: Projections of Regular Solids

Projections of solids inclined to both planes.

Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Module 6: Sections and Sectional Views of Right Angular Solids

Sections of Prism, Cylinder, Pyramid and Cone

Development of surfaces of Right Regular Prism, Pyramid, Cylinder and Cone

Module 7: Isometric Projections

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

Module 8: Annotations, layering & other functions

Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

Suggested Text/Reference Books:

- (i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- (ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- (iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- (iv) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
- (v) (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

The student will learn:

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

ENGINEERING PHYSICS LAB

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Course Description:

Physics Practical course is meant for making the students to gain practical knowledge to co relate with the theoretical studies. It covers experiments on Principles of Mechanics and Optics, Measurement of Magnetic field and studying Resonance using LCR Circuit.

Objectives:-

- To explore the application of interference and diffraction by doing concerned experiments.
- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- Develop an ability to apply the knowledge of physics experiments in the later studies.
- To understand the concept of energy gap, B-H curve, and synthesis of nano material by performing the experiments.

LIST OF EXPERIMENTS

Any 7 of the following experiments has to be performed in a semester:

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method.
2. Determination of dispersive power of the prism.
3. Rigidity Modulus- Torsional Pendulum.
4. Study of resonance effect in series and parallel LCR circuit.
5. Determination of thickness of thin object by wedge method.
6. Determination of radius of curvature of lens by Newton's Rings.
7. Laser : Determination of wavelength using diffraction grating.
8. Energy gap of a semiconductor using p-n junction diode.
9. Hysteresis: B-H curve.
10. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
11. Frequency of the tuning fork - Melde's apparatus.
12. Spring constant - Coupled Pendulums.

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Students can aware of the application of interference, diffraction phenomena along with laser.
2. Apply the scientific process in the conduct and reporting of experimental investigations.
3. Understand measurement technology, usage of new instruments and real time applications in engineering studies.
4. Verify the theoretical ideas and concepts covered in lecture by doing hands on in the experiments.
5. Know about the characteristics of various materials in a practical manner and gain knowledge about various optical technique methods.
6. Acquire and interpret experimental data to examine the physical laws.

Lab Manual: Laboratory Manual for Engineering Physics.

Mode of Evaluation: Continuous Internal Evaluation, Practical End Examination.

BASIC ELECTRICAL ENGINEERING LAB

(Common to CE, ME- II SEM)
(Common to ECE & CSE - I SEM)

List of Laboratory Experiments/Demonstrations:

Basic safety precautions. Introduction and use of measuring instruments – Voltmeter. Ammeter, Wattmeter, Multi-meter and oscilloscope.

1. Determination of values of R, L and C parameters of a given R-L-C series circuit
2. Verification of KCL and KVL.
3. Determination of Active, reactive and apparent power for R-L circuit (series & parallel).
4. Determination of Active, reactive and apparent power for R-C circuit (series & parallel).
5. Load test on 1-phase transformer.
6. OC & SC tests on 1-phase transformer to obtain equivalent circuit.
7. Torque-speed characteristics of DC shunt motor.
8. Speed Control of three –phase induction motors using pole changing method
9. Demonstration of cut out sections of DC & AC machines
10. Study of fuse, MCB, Batteries

WORKSHOP AND MANUFACTURING PRACTICES

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Lectures & videos: (10 hours)

Detailed contents

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods **(3 lectures)**
2. CNC machining and Additive manufacturing **(1 lecture)**
3. Fitting operations & power tools **(1 lecture)**
4. Electrical & Electronics **(1 lecture)**
5. Carpentry **(1 lecture)**
6. Plastic molding, glass cutting **(1 lecture)**
7. Metal casting **(1 lecture)**
8. Welding (arc welding & gas welding) and brazing **(1 lecture)**

Text/Reference Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. (Kalpakjian S. And Steven S. Schmid, “Manufacturing Engineering and Technology”, 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, “Manufacturing Technology – I” Pearson Education, 2008.
4. Roy A. Lindberg, “Processes and Materials of Manufacture”, 4th edition, Prentice Hall India, 1998.
5. Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course Outcomes:

Upon completion of this course

The students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Workshop Practice:(60 hours)

1. Machine shop (10 hours)
2. Fitting shop (8 hours)
3. Carpentry (6 hours)
4. Electrical (8 hours)
5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs)

6. Casting (8 hours)

7. Tin Smithy (6 hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

S.NO	EXPERIMENTS IN THE SYLLABUS
	<u>MACHINE SHOP</u>
1	STEP TURNING OPERATION
2	TAPER TURNING OPERATION
	<u>FITTING SECTION</u>
1	SQUARE FITTING
2	STEEPED FITTING
	<u>CARPENTRY SECTION</u>
1	TEE HALVING JOINT
2	DOVETAIL TEE HALVING JOINT
	<u>HOUSE WIRING SECTION</u>
1	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(IN SERIES)
2	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(PARALLEL)
	<u>WELDING SECTION</u>
1	SINGLE V BUTT JOINT
2	LAP JOINT
	<u>FOUNDRY SECTION</u>
1	SINGLE PIECE SQUARE PATTERN
2	SINGLE PIECE ROUND PATTERN
	<u>SHEETMETAL SECTION</u>
1	SQUARE TRY
2	CYLINDER

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

B. Tech II Semester Electronics & Communication Engineering

MATHEMATICS-II (Common to All Branches)

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- * First order differential equations.
- * Linear differential equations with constant coefficients.
- * Laplace transforms in engineering problems.
- * Evaluate multiple integrals.
- * Understand Vector Calculus concepts and their applications.

Unit I: First order ordinary differential equations:(10 Hours)

Linear, Bernoulli equations, Exact and equations reducible to Exact. Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Unit II: Ordinary differential equations of higher order: (10Hours)

Linear differential equations of second and higher order with constant coefficients – R.H.S term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$ – Method of variation of parameters.

Unit III:Laplace transforms: (12Hours)

Laplace transforms of standard functions – Properties of Laplace Transforms – Transforms of derivatives and integrals– Evaluation of integrals by Laplace transforms – Laplace transform of periodic functions. Convolution theorem. Inverse Laplace Transforms – Applications of Laplace transforms to ordinary differential equations.

Unit IV: Multiple Integrals:(10Hours)

Evaluation of double integrals in Cartesian coordinates and polar coordinates – Change of variables in double integrals – Change the order of integration in double integrals – Evaluation of triple integrals in Cartesian and polar coordinates – Change of variables in triple integrals.

Unit V: Vector calculus: (12Hours)

Vector differentiation: Scalar point function - Vector point function – Vector operator Del – Gradient – Divergence – Curl. Vector integration: Line, Surface and Volume integrals. Green's

theorem in a plane, Stoke's theorem and Gauss-divergence theorems (Statements only). Applications of Green's, Stoke's and Gauss divergence theorems.

Text Books:

- a. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
- b. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013
- c. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

- i. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
- ii. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Outcomes:

On completion of course Students are able to

- * Solve the first order differential equations.
- * Solve linear differential equations with constant coefficients.
- * Apply Laplace Transforms in engineering problems.
- * Evaluation of multiple integrals.
- * Understand Vector Calculus concepts and their applications.

ENGINEERING CHEMISTRY

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Objectives:

- Knowledge in Chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depend on the outcome of basic sciences.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial! Engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry principles (or) applications in the field of engineering.
- An attempt has been made to logically correlate the topic with its application.
- After the completion of the course, the student would understand about the concepts of chemistry .

Module-1 : Atomic and molecular structure

Schrodinger wave equation. Particle in a box(one dimensional) and their applications .Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

Module-2: Periodic properties

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard, soft acids and bases.

Module-3:

Intermolecular forces

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena.

Use of free energy in chemical equilibria

Thermodynamic functions: Introduction, define energy, entropy , Free energy. Free energy and emf. Cell potentials, the Nernst equation and applications. Water chemistry-types of water and Boiler troubles. Corrosion-types of corrosion and factors influencing corrosion.

Module-4: Spectroscopic techniques and applications

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules.

Module-5:

Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of Cyclohexane.

Simple Organic Reactions

Introduction to reactions involving Substitution (SN^1 & SN^2), Addition Reactions involving $C=C$ (Markonikoff reaction) & $C=O$ (Grignard reagent), Elimination (E_1 & E_2) Oxidation (Baeyer villiger reaction), Reduction (Clemmensen reduction).

Suggested Text Books

1. Engineering Chemistry, Satyaprakash, Khanna Book Publishing, Delhi
2. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
3. . Essentials of Physical Chemistry, Bahl & Tuli, S.Chand Publishing
4. Applied Chemistry, Sunita Rattan, Kataria
5. Engineering Chemistry, Baskar, Wiley
6. . Engineering Chemistry – I, D. Groukrishana, Vikas Publishing
7. . Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels.

The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

ENGLISH

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

1. Vocabulary Building

- 1.1 The concept of Word Formation
- 1.2 Root word from foreign languages and their use in English
- 1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
- 1.4 Synonyms, antonyms
- 1.5 Idioms and phrases.

2. Basic Writing Skills

- 2.1 Sentence Structures
- 2.2 Use of phrases and clauses in sentences
- 2.3 Importance of proper punctuation
- 2.4 Creating coherence
- 2.5 Organizing principles of paragraphs in documents
- 2.6 Techniques for writing precisely

3. Transformation

- 3.1 Interchange of parts of speech
- 3.2 Active voice and Passive voice
- 3.3 Direct and Indirect speech
- 3.4 Degrees of comparison
- 3.5 Simple, compound and complex sentences

4. Identifying Common Errors in Writing

- 4.1 Subject-Verb agreement
 - 4.2 Noun-pronoun agreement
 - 4.3 Misplaced modifiers
 - 4.4 Articles
 - 4.5 Prepositions
 - 4.6 Redundancies
 - 4.7 Clichés
 - 4.8 Tenses

5. Reading and Writing Practices

- 5.1 Comprehension
- 5.2 Précis Writing
- 5.3 Essay writing
- 5.4 Essay writing

PROGRAMMING FOR PROBLEM SOLVING

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Course Objectives

- The course aims to provide exposure to problem-solving through programming
- It aims to train the student to the basic concepts of the C programming language

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic and logical problems and to translate the algorithms to programs (in C language).
- Choose the loops and decision making statements to solve the problem.
- To implement different Operations on arrays.
- To use functions to solve the given problem.
- To understand structures, unions and pointers,

UNIT 1:

Introduction to Computers: - Introduction, computer hardware and software, creating and running programs, software development life cycle, algorithms, flowcharts.

Introduction to C programming: - Overview of C, structure of a C program, variables, constants, data types, identifiers, keywords, Input/output statements in C, programming examples.

UNIT 2:

Operators and Expressions:- Operators, expressions, precedence and associativity, evaluating expressions, type conversion, typedef, enumerations.

Decision making statements:if statement, if-else statement, nested if-else statement, switch statement.

Loops in C: while loop, for loop, do-while loop, nested for loops,

Jumping statements:break, continue and goto statements.

UNIT 3:

Arrays: Introduction, Declaration and initialization of 1D and 2D arrays.

Array applications: -bubble (exchange) sort, selection sort, linear search, binary search.

Strings: -Definition, declaration and initialization of strings, string I/O functions,string handling functions,array of strings (table of strings).

UNIT 4:

Functions: introduction, category of functions, parameter passing methods, storage classes, recursive function.

Pointers: Understanding pointers, declaring and initialization of pointer variable, accessing the address of variables, accessing a variable through its pointer, chain of pointers.

UNIT 5:

Structures and union: Introduction, defining a structure, declaring structure variable, structure initialization, accessing members of structure, copying and comparing structure variables, structures within structures, array of structures, and introduction of union.

TEXT BOOKS

1. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
2. Rema Theraja, Programming in C, second edition, Oxford.

REFERENCE TEXT BOOKS

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.
3. Yashavant Kanetkar, Let us C, 15th edition, BPB Publications.
4. Dr. P. Chenna Reddy, Computer Fundamentals and C Programming, Second Edition.

CHEMISTRY LAB
(Common to CE, ME, EEE- I SEM)
(Common to ECE & CSE - II SEM)

Choice of experiments from the following:

1. Estimation of Hardness of Water present in given water sample by EDTA method.
2. Determination of surface tension and viscosity.
3. Determination of chloride content of water.
4. Colligative properties using freezing point depression.
5. Estimation of Dissolved Oxygen present in given water sample by Winkler's method.
6. Potentiometry - determination of Redox potentials and emfs.
7. Synthesis of a polymer/drug.
8. Saponification/acid value of an oil.
9. Determination of cell constant and conductance of solutions..
10. Chemical oscillations- Iodine clock reaction.
11. Determination of the partition coefficient of a substance between two immiscible liquids.
12. Adsorption of acetic acid by charcoal.

Laboratory Outcomes

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.

The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

PROGRAMMING FOR PROBLEM SOLVING LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Laboratory Objectives

To impart knowledge so that the student will

- know how to write and debug programs
- know the principles of designing structured programs
- Know when and how to use the appropriate statements available in the C language.
- Write basic C programs using, Selection statements, Repetitive statements, Functions, Pointers, Arrays, Strings and structures

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to create, read and write to and from simple text files.

The student is expected to solve at least 12 assignments from different concepts. (Every year 12 different experiments).

DOS commands, Algorithms, Flowcharts and sample C programs

1. Practice DOS commands necessary for design of C programs.
2. Design and develop algorithms and flowcharts for simple and logical problems
3. If the total selling price of 15 items and total profit earned on them is input through the keyboard. Write a C program to find the cost price of one item.
4. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary. Write a C program to calculate his gross salary.
5. The distance between two cities (in km) is input through the keyboard. Write a C program to convert and print the distance in meters, centimetres, inches and feet.

6. Write a program to take input of name, roll no and marks obtained by a student in 5 subjects each have its 100 full marks and display the name, roll no with percentage score secured.

Problems involving if-then-else structures

7. Write a C program to find out whether a given number is even number or odd number.
8. Write a C program to check whether a given year is leap year or not.
9. Design and develop an algorithm that takes three coefficients (a , b , and c) of a Quadratic equation ($ax^2+bx+c=0$) as input and compute all possible roots. Implement a C program for the developed algorithm and execute the same to output the possible roots for a given set of coefficients with appropriate messages.
10. If the ages of the Ramesh, Suresh and Mahesh are input through the keyboard, write a C program to determine youngest of the three.
11. A character is entered through keyboard. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-else and switch case. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A – Z	65 – 90
a – z	97 – 122
0 – 9	48 – 57
Special symbols	0 – 47, 58 – 64, 91 – 96, 123 – 127.

12. A library charges fine for every book returned late. For first five days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a C program to accept the number of days that the member is late to return the book and display the fine or appropriate message.
13. Write a C program which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use switch statement).

Problems involving Looping statements

14. If the sum of the cubes of each digit of a number is equal to the number itself, then the number is called Armstrong number. (for example, $153 = 1^3 + 5^3 + 3^3$). Design and develop an algorithm to find whether a given number is Armstrong number or not. Implement a C program for the developed algorithm.
15. Design and develop an algorithm to find the square root of a given number N . Implement a C program for the same and execute for all possible inputs with appropriate messages. Note: **Don't use library function $\text{sqrt}(n)$.**
16. If a number and its reversed number are same then the number is called as palindrome number. Design and develop an algorithm to check whether a given number is palindrome or not. Implement a C program for the same.
17. Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
18. Write a C program to evaluate the $\sin(x)$ function series

$$\sin x = \frac{x}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

19. Fibonacci Sequence

A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

Arrays

20. Write a C program to find the smallest and largest number in a given array.
21. Write a C program to find the frequency of a particular number in a list of integers.
22. Write a C program to sort the list of elements using
 - d) Bubble Sort
 - b) Selection sort.
23. Write a C program to search for an element in a list of elements using
 - d) Linear search
 - b) Binary search
24. Write a C program to find the transpose of a matrix.
25. Write a C program to read two matrices and perform the following operations
 - g) Addition of two matrices
 - h) Multiplication of two matrices

Additional Problems on arrays

26. Partitioning an array

Given a randomly ordered array of n elements, write a C program to partition the elements into two subsets such that elements $\leq X$ are in one subset and elements $\geq X$ are in another subset.

27. Finding the k^{th} smallest element

Given a randomly ordered array of n elements, write a C program to determine the k^{th} smallest element.

28. Array order reversal

Write a C program to rearrange the elements in an array so that they appear in reverse order.

Strings

29. If a string and its reversed string are same then the string is called as palindrome string. Design and develop an algorithm to check whether a given string is a palindrome or not and implement a C program for the same.

30. Write a C program to sort the names of students in a class in alphabetical order.

Additional Problems on strings

31. Write a C program to read two strings and perform the following operations without using built string library functions.

- xiii)** String length
- xiv)** String reversing
- xv)** Comparison of two strings
- xvi)** Concatenation of two strings

32. Write a C program to count the number of vowels, consonants, digits, blank spaces and special characters in a given string.

Functions and Recursion

33. Write a C program to swap the contents of two variables using

- g)** Call by value
- h)** Call by reference.

34. Write a C program using recursion to

- j)** Find the factorial of a given number
- k)** Print the Fibonacci series up to a given number.
- l)** Find the GCD of two integers.

Structures

35. Write a C program to define a structure with the following members.

Roll No., Name, marks in Sub1, Sub2, Sub3. Read the n students records and find the total marks of each student and print the result in the following format.

Roll No	Name	Sub1	Sub2	Sub3	Total marks	result
189Y1A0501	Kavya	80	70	75	225	Distinction

Files

36. Write a C program to copy the contents of one file to another file.

TEXT BOOKS

1. Yashavant Kanetkar, Let us C, 15th edition, BPB publications.
2. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
3. R.G. Dromey, How to solve it by Computer, Pearson.

ENGLISH LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Oral Communication

(This unit involve interactive practice sessions in Language Lab)

- Listening Comprehension ----- Language Lab
- Pronunciation, Intonation, Stress and Rhythm ----- Language Lab
- Common Everyday Situations: Conversations and Dialogues ----- Communication Lab
- Communication at workplace ----- Communication Lab
- Interviews ----- Communication Lab
- Formal Presentations ----- Communication Lab

B. Tech I Semester Computer Science & Engineering

MATHEMATICS – I

(Common to All Branches)

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- The essential tool of matrices in a comprehensive manner.
- The convergence of series.
- Maxima and minima of a function and the radius of curvature
- The Jacobians and extrema of a function.
- Evaluate the definite integrals, Beta and Gamma functions. Apply Fourier series in engineering problems.

Unit I: Matrices: (14 Hours)

Basic definitions of Symmetric, skew-symmetric and orthogonal matrices– Elementary transformations – Rank – Echelon form, Normal form– System of linear equations –Eigen values and Eigen vectors for real matrices– Cayley-Hamilton theorem – Diagonalization of matrix by orthogonal transformation.

Unit II: Sequences and series: (8Hours)

Convergence of sequences and series – Comparison test – p test– D’Alemberts ratio test– Cauchy’s root test. Power series – Series for exponential, trigonometric and logarithm functions.

Unit III: Differential Calculus: (10Hours)

Taylor’s and Maclaurin’s series – Maxima and minima of single variable –Curvature: Curvature of a curve – Curvature of a circle – Radius of a curvature – Centre of Curvature – Equation to the circle of curvature.

Unit IV: Multivariable Calculus: (10Hours)

Functions of two or more variables – Partial derivatives, Total derivative – Jacobians – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.

Unit V: Integral Calculus:(12Hours)

Evaluation of definite integrals– Beta and Gamma functions and their properties. Fourier series: Half range Fourier sine and cosine expansions– Parseval’s theorem.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013.
3. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. Linear Algebra: A Modern Introduction, D Poole, 2nd Edition, Brooks/Cole, 2005.
3. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Course Outcomes:

On completion of course Students are able to

- Apply the essential tool of matrices in a comprehensive manner.
- Find the convergence of series.
- Find the radius of curvature and maxima and minima of a function.
- Find the Jacobians and extrema of a function.
- Evaluation of definite integrals, Beta and Gamma functions. Application of Fourier series in engineering problems.

ENGINEERING PHYSICS

(Physics for CSE)

Prerequisite: Plus two level physics course

Course Objectives:

1. Analyze and understand the concepts of waves and optics to prepare the students for advanced level courses.
2. Expose students to theoretical and mathematical aspects of Interference, Diffraction techniques and Lasers for testing of materials.
3. Develop knowledge and understanding the fundamental concepts of Electronic materials.
4. Develop knowledge and understanding the fundamental concepts of semiconductors and nanomaterials.
5. Adaptability to new developments in science and technology.

Course Syllabus:

Unit I: Light & Optics

Huygens' Principle, superposition of waves, Young's double slit experiment, expression for fringe width, interference in thin film by reflection, Newton's rings experiment, Diffraction Farunhofer diffraction due to single slit, and Diffraction grating (N-slit)

(12 lectures)

Unit II: Lasers

Introduction to lasers, characteristics of laser, interaction of radiation with matter- spontaneous and stimulated emission, Einstein's coefficients; population inversion, excitation mechanisms, types of lasers: Solid-state lasers – Nd-YAG laser, Gas lasers - He-Ne Laser, Semiconductor p-n junction diode laser, Applications of lasers

(08 lectures)

UNIT III: Electronic materials

Free electron theory, Density of states and energy band diagrams, Kronig-Penny model (to introduce origin of band gap), E-k diagram, Energy bands in solids, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors, and insulators, Density of states, Fermi level, Effective mass, Phonons.

(10 lectures)

UNIT IV: Semiconductors

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices.

(10 lectures)

UNIT 5: Engineered Nanomaterials

Introduction, significance of Nano scale and types of nanomaterials, Properties of nanomaterials: physical, optical, thermal, mechanical and magnetic properties. Synthesis of nanomaterials: Ball-milling, Chemical Vapour Deposition and Sol-Gel methods. Applications of nanomaterials.

(06 lectures)

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Apply the knowledge for materials testing using Interference and Diffraction techniques.
2. Identify the working elements of different lasers and estimate laser operation parameters
3. Understand the idea Electronic materials & its applications.
4. Explain the role of semiconductors in different realms of physics and their applications in both science and technology.
5. Explain the role of nanomaterials in different realms of physics and their applications in both science and technology.

Text Books:

1. Engineering Physics by **K. Thygarajan**, Mac Graw – Hill Publishing Co. New Delhi.
2. P. Bhattacharya, Semiconductor Optoelectronic Devices, Pearson Education, 2003.

References:

1. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
2. Online course: “Semiconductor Optoelectronics” by M R Shenoy on NPTEL

BASIC ELECTRICAL ENGINEERING

(Common to CE, ME- II SEM)
(Common to ECE & CSE - I SEM)

UNIT 1: DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources – source transformation, Series & Parallel networks - Star-Delta transformation, Kirchoff's current and voltage laws, Mesh and Nodal analysis of simple circuits with DC -Problems.

UNIT 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, average, peak and rms values, Form factor Peak factor for sinusoidal wave form -Problems

Phasor-Phasor representation, Impedance, Admittance, Reactance, Susceptance, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits for series & parallel combinations –simple Problems

UNIT 3: DC machines (8 hours)

DC Generators: Construction– working principle – EMF equation – types of DC generators- applications - simple problems.

Working Principle of DC motor, types, Torque Equation, Concept of Back EMF- applications - simple Problems.

UNIT 4: Transformers & Induction Machines (8 hours)

Single Phase Transformers: Principle of Operation, Constructional details, EMF equation, losses in transformers, regulation and efficiency, equivalent circuit - simple Problems.

Three phase Induction Motor: Construction and working principle, slip, rotor frequency, rotor current, and rotor power factor –simple Problems

UNIT 5: Electrical Installations (6 hours)

Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Wires and Cables, Earthing. Batteries, Introduction to power converters.

Suggested Text / Reference Books

- i. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
- ii. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
- iii. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
- iv. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
- v. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.
- vi. A. Chakarabarthi “Circuit Theory”, Dhanapath Roy & Co
- vii. Electrical Circuits – N. Sreenivasulu – Reem Publications

ENGINEERING GRAPHICS & DESIGN

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Detailed contents:

Traditional Engineering Graphics:

Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

Computer Graphics:

Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation; Spatial Manipulation; Surface Modeling; Solid Modeling; Introduction to Building Information Modeling (BIM)

(Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)

Module 1: Overview of Computer Graphics

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

Module 2: Customization & CAD Drawing

Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module 3: Introduction to Engineering drawing

Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute.

Module 4: Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes

Module 5: Projections of Regular Solids

Projections of solids inclined to both planes.

Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Module 6: Sections and Sectional Views of Right Angular Solids

Sections of Prism, Cylinder, Pyramid and Cone

Development of surfaces of Right Regular Prism, Pyramid, Cylinder and Cone

Module 7: Isometric Projections

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

Module 8: Annotations, layering & other functions

Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

Suggested Text/Reference Books:

- (i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- (ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- (iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- (iv) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
- (v) (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

The student will learn:

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

ENGINEERING PHYSICS LAB

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Course Description:

Physics Practical course is meant for making the students to gain practical knowledge to co relate with the theoretical studies. It covers experiments on Principles of Mechanics and Optics, Measurement of Magnetic field and studying Resonance using LCR Circuit.

Objectives:-

- To explore the application of interference and diffraction by doing concerned experiments.
- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- Develop an ability to apply the knowledge of physics experiments in the later studies.
- To understand the concept of energy gap, B-H curve, and synthesis of nano material by performing the experiments.

LIST OF EXPERIMENTS

Any 7 of the following experiments has to be performed in a semester:

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method.
2. Determination of dispersive power of the prism.
3. Rigidity Modulus- Torsional Pendulum.
4. Study of resonance effect in series and parallel LCR circuit.
5. Determination of thickness of thin object by wedge method.
6. Determination of radius of curvature of lens by Newton's Rings.
7. Laser : Determination of wavelength using diffraction grating.
8. Energy gap of a semiconductor using p-n junction diode.
9. Hysteresis: B-H curve.
10. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
11. Frequency of the tuning fork - Melde's apparatus.
12. Spring constant - Coupled Pendulums.

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Students can aware of the application of interference, diffraction phenomena along with laser.
2. Apply the scientific process in the conduct and reporting of experimental investigations.
3. Understand measurement technology, usage of new instruments and real time applications in engineering studies.
4. Verify the theoretical ideas and concepts covered in lecture by doing hands on in the experiments.
5. Know about the characteristics of various materials in a practical manner and gain knowledge about various optical technique methods.
6. Acquire and interpret experimental data to examine the physical laws.

Lab Manual: Laboratory Manual for Engineering Physics.

Mode of Evaluation: Continuous Internal Evaluation, Practical End Examination.

BASIC ELECTRICAL ENGINEERING LAB

(Common to CE, ME - II SEM)

(Common to ECE & CSE - I SEM)

List of Laboratory Experiments/Demonstrations:

Basic safety precautions. Introduction and use of measuring instruments – Voltmeter. Ammeter, Wattmeter, Multi-meter and oscilloscope.

1. Determination of values of R, L and C parameters of a given R-L-C series circuit
2. Verification of KCL and KVL.
3. Determination of Active, reactive and apparent power for R-L circuit (series & parallel).
4. Determination of Active, reactive and apparent power for R-C circuit (series & parallel).
5. Load test on 1-phase transformer.
6. OC & SC tests on 1-phase transformer to obtain equivalent circuit.
7. Torque-speed characteristics of DC shunt motor.
8. Speed Control of three –phase induction motors using pole changing method
9. Demonstration of cut out sections of DC & AC machines
10. Study of fuse, MCB, Batteries

WORKSHOP AND MANUFACTURING PRACTICES

(Common to CE, ME, EEE- II SEM)

(Common to ECE & CSE - I SEM)

Lectures & videos: (10 hours)

Detailed contents

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods **(3 lectures)**
2. CNC machining and Additive manufacturing **(1 lecture)**
3. Fitting operations & power tools **(1 lecture)**
4. Electrical & Electronics **(1 lecture)**
5. Carpentry **(1 lecture)**
6. Plastic molding, glass cutting **(1 lecture)**
7. Metal casting **(1 lecture)**
8. Welding (arc welding & gas welding) and brazing **(1 lecture)**

Text/Reference Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. (Kalpakjian S. And Steven S. Schmid, “Manufacturing Engineering and Technology”, 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, “Manufacturing Technology – I” Pearson Education, 2008.
4. Roy A. Lindberg, “Processes and Materials of Manufacture”, 4th edition, Prentice Hall India, 1998.
5. Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course Outcomes:

Upon completion of this course

The students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Workshop Practice:(60 hours)

1. Machine shop (10 hours)
2. Fitting shop (8 hours)
3. Carpentry (6 hours)
4. Electrical (8 hours)
5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs)

6. Casting (8 hours)

7. Tin Smithy (6 hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

S.NO	EXPERIMENTS IN THE SYLLABUS
	<u>MACHINE SHOP</u>
1	STEP TURNING OPERATION
2	TAPER TURNING OPERATION
	<u>FITTING SECTION</u>
1	SQUARE FITTING
2	STEEPED FITTING
	<u>CARPENTRY SECTION</u>
1	TEE HALVING JOINT
2	DOVETAIL TEE HALVING JOINT
	<u>HOUSE WIRING SECTION</u>
1	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(IN SERIES)
2	TO CONTROL TWO LAMPS BY ONE SINGLE WAY SWITCH(PARALLEL)
	<u>WELDING SECTION</u>
1	SINGLE V BUTT JOINT
2	LAP JOINT
	<u>FOUNDRY SECTION</u>
1	SINGLE PIECE SQUARE PATTERN
2	SINGLE PIECE ROUND PATTERN
	<u>SHEETMETAL SECTION</u>
1	SQUARE TRY
2	CYLINDER

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

B. Tech II Semester Computer Science & Engineering

MATHEMATICS-II (Common to All Branches)

Scheme	: 2018			
Internal Assessment	: 30	L	T	C
End Exam	: 70	3	1	4

Objectives:

To enable the students to apply the knowledge of mathematics in various engineering fields by making them to learn the following:

- * First order differential equations.
- * Linear differential equations with constant coefficients.
- * Laplace transforms in engineering problems.
- * Evaluate multiple integrals.
- * Understand Vector Calculus concepts and their applications.

Unit I: First order ordinary differential equations:(10 Hours)

Linear, Bernoulli equations, Exact and equations reducible to Exact. Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Unit II: Ordinary differential equations of higher order: (10Hours)

Linear differential equations of second and higher order with constant coefficients – R.H.S term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$ – Method of variation of parameters.

Unit III:Laplace transforms: (12Hours)

Laplace transforms of standard functions – Properties of Laplace Transforms – Transforms of derivatives and integrals– Evaluation of integrals by Laplace transforms – Laplace transform of periodic functions. Convolution theorem. Inverse Laplace Transforms – Applications of Laplace transforms to ordinary differential equations.

Unit IV: Multiple Integrals:(10Hours)

Evaluation of double integrals in Cartesian coordinates and polar coordinates – Change of variables in double integrals – Change the order of integration in double integrals – Evaluation of triple integrals in Cartesian and polar coordinates – Change of variables in triple integrals.

Unit V: Vector calculus: (12Hours)

Vector differentiation: Scalar point function - Vector point function – Vector operator Del – Gradient – Divergence – Curl. Vector integration: Line, Surface and Volume integrals. Green's

theorem in a plane, Stoke's theorem and Gauss-divergence theorems (Statements only). Applications of Green's, Stoke's and Gauss divergence theorems.

Text Books:

- a. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
- b. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013
- c. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

- i. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
- ii. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.

Outcomes:

On completion of course Students are able to

- * Solve the first order differential equations.
- * Solve linear differential equations with constant coefficients.
- * Apply Laplace Transforms in engineering problems.
- * Evaluation of multiple integrals.
- * Understand Vector Calculus concepts and their applications.

ENGINEERING CHEMISTRY

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Objectives:

- Knowledge in Chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depend on the outcome of basic sciences.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial! Engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry principles (or) applications in the field of engineering.
- An attempt has been made to logically correlate the topic with its application.
- After the completion of the course, the student would understand about the concepts of chemistry .

Module-1 : Atomic and molecular structure

Schrodinger wave equation. Particle in a box(one dimensional) and their applications .Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

Module-2: Periodic properties

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard, soft acids and bases.

Module-3:

Intermolecular forces

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena.

Use of free energy in chemical equilibria

Thermodynamic functions: Introduction, define energy, entropy , Free energy. Free energy and emf. Cell potentials, the Nernst equation and applications. Water chemistry-types of water and Boiler troubles. Corrosion-types of corrosion and factors influencing corrosion.

Module-4: Spectroscopic techniques and applications

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules.

Module-5:

Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of Cyclohexane.

Simple Organic Reactions

Introduction to reactions involving Substitution (SN^1 & SN^2), Addition Reactions involving $C=C$ (Markonikoff reaction) & $C=O$ (Grignard reagent), Elimination (E_1 & E_2) Oxidation (Baeyer villiger reaction), Reduction (Clemmensen reduction).

Suggested Text Books

1. Engineering Chemistry, Satyaprakash, Khanna Book Publishing, Delhi
2. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
3. Essentials of Physical Chemistry, Bahl & Tuli, S.Chand Publishing
4. Applied Chemistry, Sunita Rattan, Kataria
5. Engineering Chemistry, Baskar, Wiley
6. . Engineering Chemistry – I, D. Grou Krishana, Vikas Publishing
7. . Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels.

The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

ENGLISH

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

1. Vocabulary Building

- 1.1 The concept of Word Formation
- 1.2 Root word from foreign languages and their use in English
- 1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
- 1.4 Synonyms, antonyms
- 1.5 Idioms and phrases.

2. Basic Writing Skills

- 2.1 Sentence Structures
- 2.2 Use of phrases and clauses in sentences
- 2.3 Importance of proper punctuation
- 2.4 Creating coherence
- 2.5 Organizing principles of paragraphs in documents
- 2.6 Techniques for writing precisely

3. Transformation

- 3.1** Interchange of parts of speech
- 3.2** Active voice and Passive voice
- 3.3** Direct and Indirect speech
- 3.4** 3.4Degrees of comparison
- 3.5** 3.5Simple, compound and complex sentences

4. Identifying Common Errors in Writing

- 4.1 Subject-Verb agreement
- 4.2 Noun-pronoun agreement
- 4.3 Misplaced modifiers
- 4.4 Articles
- 4.5 Prepositions
- 4.6 Redundancies
- 4.7 Clichés
- 4.8 Tenses

5. Reading and Writing Practices

- 5.1 Comprehension
- 5.2 Précis Writing
- 5.3 Essay writing
- 5.4 Essay writing

PROGRAMMING FOR PROBLEM SOLVING

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Course Objectives

- The course aims to provide exposure to problem-solving through programming
- It aims to train the student to the basic concepts of the C programming language

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic and logical problems and to translate the algorithms to programs (in C language).
- Choose the loops and decision making statements to solve the problem.
- To implement different Operations on arrays.
- To use functions to solve the given problem.
- To understand structures, unions and pointers,

UNIT 1:

Introduction to Computers: - Introduction, computer hardware and software, creating and running programs, software development life cycle, algorithms, flowcharts.

Introduction to C programming: - Overview of C, structure of a C program, variables, constants, data types, identifiers, keywords, Input/output statements in C, programming examples.

UNIT 2:

Operators and Expressions:- Operators, expressions, precedence and associativity, evaluating expressions, type conversion, typedef, enumerations.

Decision making statements:if statement, if-else statement, nested if-else statement, switch statement.

Loops in C: while loop, for loop, do-while loop, nested for loops,

Jumping statements:break, continue and goto statements.

UNIT 3:

Arrays: Introduction, Declaration and initialization of 1D and 2D arrays.

Array applications: -bubble (exchange) sort, selection sort, linear search, binary search.

Strings: -Definition, declaration and initialization of strings, string I/O functions,string handling functions,array of strings (table of strings).

UNIT 4:

Functions: introduction, category of functions, parameter passing methods, storage classes, recursive function.

Pointers: Understanding pointers, declaring and initialization of pointer variable, accessing the address of variables, accessing a variable through its pointer, chain of pointers.

UNIT 5:

Structures and union: Introduction, defining a structure, declaring structure variable, structure initialization, accessing members of structure, copying and comparing structure variables, structures within structures, array of structures, and introduction of union.

TEXT BOOKS

1. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
2. Rema Theraja, Programming in C, second edition, Oxford.

REFERENCE TEXT BOOKS

3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
4. R.G. Dromey, How to solve it by Computer, Pearson.
5. Yashavant Kanetkar, Let us C, 15th edition, BPB Publications.
6. Dr. P. Chenna Reddy, Computer Fundamentals and C Programming, Second Edition.

CHEMISTRY LAB
(Common to CE, ME, EEE- I SEM)
(Common to ECE & CSE - II SEM)

Choice of experiments from the following:

1. Estimation of Hardness of Water present in given water sample by EDTA method.
2. Determination of surface tension and viscosity.
3. Determination of chloride content of water.
4. Colligative properties using freezing point depression.
5. Estimation of Dissolved Oxygen present in given water sample by Winkler's method.
6. Potentiometry - determination of Redox potentials and emfs.
7. Synthesis of a polymer/drug.
8. Saponification/acid value of an oil.
9. Determination of cell constant and conductance of solutions..
10. Chemical oscillations- Iodine clock reaction.
11. Determination of the partition coefficient of a substance between two immiscible liquids.
12. Adsorption of acetic acid by charcoal.

Laboratory Outcomes

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.

The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

PROGRAMMING FOR PROBLEM SOLVING LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Laboratory Objectives

To impart knowledge so that the student will

- know how to write and debug programs
- know the principles of designing structured programs
- Know when and how to use the appropriate statements available in the C language.
- Write basic C programs using, Selection statements, Repetitive statements, Functions, Pointers, Arrays, Strings and structures

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to create, read and write to and from simple text files.

The student is expected to solve at least 12 assignments from different concepts. (Every year 12 different experiments).

DOS commands, Algorithms, Flowcharts and sample C programs

1. Practice DOS commands necessary for design of C programs.
2. Design and develop algorithms and flowcharts for simple and logical problems
3. If the total selling price of 15 items and total profit earned on them is input through the keyboard. Write a C program to find the cost price of one item.
4. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary. Write a C program to calculate his gross salary.
5. The distance between two cities (in km) is input through the keyboard. Write a C program to convert and print the distance in meters, centimetres, inches and feet.

- Write a program to take input of name, roll no and marks obtained by a student in 5 subjects each have its 100 full marks and display the name, roll no with percentage score secured.

Problems involving if-then-else structures

- Write a C program to find out whether a given number is even number or odd number.
- Write a C program to check whether a given year is leap year or not.
- Design and develop an algorithm that takes three coefficients (a , b , and c) of a Quadratic equation ($ax^2+bx+c=0$) as input and compute all possible roots. Implement a C program for the developed algorithm and execute the same to output the possible roots for a given set of coefficients with appropriate messages.
- If the ages of the Ramesh, Suresh and Mahesh are input through the keyboard, write a C program to determine youngest of the three.
- A character is entered through keyboard. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-else and switch case. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A – Z	65 – 90
a – z	97 – 122
0 – 9	48 – 57
Special symbols	0 – 47, 58 – 64, 91 – 96, 123 – 127.

- A library charges fine for every book returned late. For first five days the fine is 50 paise, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a C program to accept the number of days that the member is late to return the book and display the fine or appropriate message.
- Write a C program which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use switch statement).

Problems involving Looping statements

- If the sum of the cubes of each digit of a number is equal to the number itself, then the number is called Armstrong number. (for example, $153 = 1^3+5^3+3^3$). Design and develop an algorithm to find whether a given number is Armstrong number or not. Implement a C program for the developed algorithm.

15. Design and develop an algorithm to find the square root of a given number N . Implement a C program for the same and execute for all possible inputs with appropriate messages. Note: **Don't use library function $\text{sqrt}(n)$.**
16. If a number and its reversed number are same then the number is called as palindrome number. Design and develop an algorithm to check whether a given number is palindrome or not. Implement a C program for the same.
17. Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
18. Write a C program to evaluate the $\sin(x)$ function series

$$\sin x = \frac{x}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

19. Fibonacci Sequence

A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

Arrays

20. Write a C program to find the smallest and largest number in a given array.
21. Write a C program to find the frequency of a particular number in a list of integers.
22. Write a C program to sort the list of elements using
 - e) Bubble Sort
 - b) Selection sort.
23. Write a C program to search for an element in a list of elements using
 - e) Linear search
 - b) Binary search
24. Write a C program to find the transpose of a matrix.
25. Write a C program to read two matrices and perform the following operations
 - i) Addition of two matrices
 - j) Multiplication of two matrices

Additional Problems on arrays

26. Partitioning an array

Given a randomly ordered array of n elements, write a C program to partition the elements into two subsets such that elements $\leq X$ are in one subset and elements $\geq X$ are in another subset.

27. Finding the k^{th} smallest element

Given a randomly ordered array of n elements, write a C program to determine the k^{th} smallest element.

28. Array order reversal

Write a C program to rearrange the elements in an array so that they appear in reverse order.

Strings

29. If a string and its reversed string are same then the string is called as palindrome string. Design and develop an algorithm to check whether a given string is a palindrome or not and implement a C program for the same.

30. Write a C program to sort the names of students in a class in alphabetical order.

Additional Problems on strings

31. Write a C program to read two strings and perform the following operations without using built string library functions.

xvii) String length

xviii) String reversing

xix) Comparison of two strings

xx) Concatenation of two strings

32. Write a C program to count the number of vowels, consonants, digits, blank spaces and special characters in a given string.

Functions and Recursion

33. Write a C program to swap the contents of two variables using

i) Call by value

j) Call by reference.

34. Write a C program using recursion to

m) Find the factorial of a given number

n) Print the Fibonacci series up to a given number.

o) Find the GCD of two integers.

Structures

35. Write a C program to define a structure with the following members.

Roll No., Name, marks in Sub1, Sub2, Sub3. Read the n students records and find the total marks of each student and print the result in the following format.

Roll No	Name	Sub1	Sub2	Sub3	Total marks	result
189Y1A0501	Kavya	80	70	75	225	Distinction

Files

36. Write a C program to copy the contents of one file to another file.

TEXT BOOKS

1. Yashavant Kanetkar, Let us C, 15th edition, BPB publications.
2. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGraw Hill.
3. R.G. Dromey, How to solve it by Computer, Pearson.

ENGLISH LAB

(Common to CE, ME, EEE- I SEM)

(Common to ECE & CSE - II SEM)

Oral Communication

(This unit involve interactive practice sessions in Language Lab)

- Listening Comprehension ----- Language Lab
- Pronunciation, Intonation, Stress and Rhythm ----- Language Lab
- Common Everyday Situations: Conversations and Dialogues ----- Communication Lab
- Communication at workplace ----- Communication Lab
- Interviews ----- Communication Lab
- Formal Presentations ----- Communication Lab

Annexure-3 Guidelines for Internal Assessment

The following guidelines shall apply for internal assessment of theory subjects

A3.1. Purpose

The purpose of internal assessment is to engage students in continuous learning

A3.2. Guidelines

- a. *Allocation*: For theory subjects the total internal assessment marks is 30 of which 25 marks are assessed thorough midterm tests and 5 marks by assignments
- b. *Assignments*: The assignments shall aid and hone the daily routine of students. Assignments shall be stimulating and thought provoking to the student. While some questions may test student's understanding of the subject, there shall be questions that imply connect to real world applications. A variety of questions can posed in assignments
 - i. *Number*: A minimum of four assignments shall be given in each subject with one assignment from Unit I to IV of syllabus of that subject
 - ii. *Quantum of work*: An assignment shall take about four to six hours of study/work per week. Assignments shall not be overloaded nor under loaded. As a guideline, each assignment may contain five questions, each question taking an hour to answer
 - iii. *Marks*: Each assignment must be evaluated for fifty marks. Final marks is obtained by averaging all the assignment marks and reducing it to five marks
 - iv. *Deadlines*: Students shall be given at least one-week time to complete and submit assignments. Assignments shall be submitted within deadline. Late submissions should be awarded zero marks
 - v. *General*: It is advised to administer assignments using Google Classroom
- c. *Midterm tests*: Midterm tests shall check students' understanding and application concepts learned in the subjects. Performance in these tests is a direct measure the course outcomes (COs)
 - i. *Number and duration*: There shall be two midterm tests each with a duration of two hours. Time duration for objective part is 20 minutes and that for subjective part is 100 minutes
 - ii. *Format of test and division of marks*: Internal test shall consist of two parts: objective part for 5 marks and subjective part for 20 marks
 - iii. *Objective part*: Objective part shall contain twenty objective questions. The type of questions can be multiple choice, fill the blank, matching etc.
 - iv. *Subjective part*: Subjective part shall contain four questions and all questions shall be answered. However, each question can have internal choice (either or type question). Generally, each question shall test one course outcome (CO)
 - v. *Syllabus*: Each test shall cover 50% of the syllabus, approximately