GAYATRI VIDYA PARISHAD COLLEGE FOR DEGREE AND PG COURSES (A),
RUSHIKONDA, VISAKHAPATANAM 530045 | website: www.gvpcdpgc.edu.in

(Approved by A.I.C.T.E | Affiliated to Andhra University | An ISO 9001:2015 Certified Institute)

ENGINEERING AND TECHNOLOGY PROGRAM

DEPARTMENT OF MECHANICAL ENGINEERING

(Accredited by NBA)

I Year I Semester Syllabus with effective from 2020-21 (R20 Regulation)

I Year II Semester Syllabus with effective from 2020-21 (R20 Regulation)

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ENGINEERING AND TECHNOLOGY PROGRAM

DEPARTMENT OF MECHANICAL ENGINEERING

R-20 Regulation

B. Tech I Year - I Semester

Course code	Category	Course Title	Hours per week			Internal Marks	External Marks	Total Marks	Credits
			L	T	P				
2009101	Basic Science Course	Mathematics – I	3	0	0	30	70	100	3
2009104	Basic Science Course	Physics	3	0	0	30	70	100	3
2009106	Engineering Science Course	Engineering Graphics	2	0	4	30	70	100	3
2009107	Engineering Science Course	Engineering Mechanics	3	0	0	30	70	100	3
2009108	Engineering Science Course	Electrical and Electronics Engineering	3	0	0	30	70	100	3
2009110P	Engineering Science Course	Workshop	0	0	3	50	50	100	1.5
2009104P	Basic Science Course	Physics Lab	0	0	3	50	50	100	1.5
2009108P	Engineering Science Course	Electrical and Electronics Engineering Lab	0	0	3	50	50	100	1.5
2095109	Non-Audit	Professional Development	0	0	3	0	0	0	0
		Total	**14**	**0**	**16**	**300**	**500**	**800**	**19.5**

B. Tech I Year - II Semester

Course code	Category	Course Title	Hours per week			Internal Marks	External Marks	Total Marks	Credits
			L	T	P				
2009201	Basic Science Course	Mathematics – II	3	0	0	30	70	100	3
2009203	Basic Science Course	Chemistry	3	0	0	30	70	100	3
2009209	Humanities and Social Science Course	English	3	0	0	30	70	100	3
2009205	Engineering Science Course	Computer Programming withC and Numerical Methods (CPNM)	3	0	0	30	70	100	3
2095201	Professional Core Course	Mechanics of Solids-I	3	0	0	30	70	100	3
209209P	Humanities and Social Science Course	English Language Lab	0	0	3	50	50	100	1.5
209203P	Basic Science Course	Chemistry Lab	0	0	3	50	50	100	1.5
20092105P	Engineering Science Course	CPNM Lab	0	0	3	50	50	100	1.5
		Total	**15**	**0**	**9**	**300**	**500**	**800**	**19.5**

MATHEMATICS - I

(Common for Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering and Mechanical Engineering)
(Effective from the admitted batch of 2020-21)

Description	Subject Teaching Methodology	L	T	P	C
Course Code	**MATHEMATICS -I**	**3**	**0**	**0**	**3**
	Total Marks : 100	**Ses.**		**Ext.**	
		30		**70**	
2009101		**Ext. Exam Time 3 Hrs.**			

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Course Objectives:

- To transmit the knowledge of Partial differentiation.
- To know of getting maxima and minima of function of two variables and finding errors and approximations.
- To expand a periodical function as Fourier series and half-range Fourier series.
- To evaluate double and triple integrals, volumes of solids and area of curved surfaces.

Course Outcomes:

CO 1: Find the partial derivatives of functions of two or more variables.
CO 2: Evaluate maxima and minima, errors and approximations.
CO 3: To expand a periodical function as Fourier series and half-range Fourier series.
CO 4: Have a fundamental understanding of Fourier series and be able to give Fourier expansions of a given function.
CO 5: Evaluate double and triple integrals, volumes of solids and area of curved surfaces.

SYLLABUS

UNIT-I
(Partial Differentiation)

Introduction - Functions of two or more variables - Partial derivatives - Homogeneous functions – Euler's theorem - Total derivative - Change of variables – Jacobins. Mean value Theorems (without proofs)

UNIT-II
(Applications of Partial Differentiation)

Geometrical interpretation -Tangent plane and Normal to a surface -Taylor's theorem for functions of two variables - Errors and approximations -Total differential. Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers - Differentiation under the integral Sign - Leibnitz's rule.

UNIT-III
(Fourier Series)

Introduction - Euler's Formulae - Conditions for a Fourier Expansion - Functions having points of discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even Periodic Functions, Half-Range Series - Parseval's Formula. Practical Harmonic analysis.

UNIT-IV

(Multiple Integrals)

Introduction - Double Integrals - Change of Order of Integration - Double Integrals in Polar Coordinates - Triple Integrals - Change of Variables.

UNIT-V

(Multiple Integrals-Applications)

Area enclosed by plane curves - Volumes of solids - Area of a curved surface - Calculation of Mass - Center of gravity - Moment of inertia - product of inertia – principal axes- Beta Function - Gamma Function - Relation between Beta and Gamma Functions.

TEXT BOOK:

Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43rd Edition, Khanna publishers.

REFERENCE BOOKS:

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K.International publishing house Pvt. Ltd.
2. Advanced Engineering Mathematics by Erwin Kreyszig.
3. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal, Lakshmi Publications.
4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.
6. Higher Engineering Mathematics by Dr. M.K.Venkataraman.

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PHYSICS

(Common for CE, CSE, ECE and ME)
(Effective from the admitted batch of 2020-2021)

Description	Subject Teaching Methodology		L	T	P	C
Course Code **2009104**	**PHYSICS**		**3**	**1**	**0**	**3**
Teaching	**Total Contact Hours : 60**	**Total Marks : 100**	**Ses. 30**		**Ext. 70**	
Prerequisite (s)	Knowledge of theoretical and experimental Physics from +2 Level. Application of Physics theory and calculations to required course		**Ext. Exam Time 3 Hrs.**			

Course Objectives:

The fundamentals of sciences are essential to learn as the application of science in solving problems is technology. The physics curriculum is designed in such a way that all branches of engineering will study the basic fundamentals of technology from where it is originated. The course objectives are

1. To impart knowledge in basic concept of physics of Thermodynamics relevant to engineering applications.
2. To grasp the concepts of physics for electromagnetism and its application to engineering. Learn production of Ultrasonics and their applications in engineering.
3. To Develop understanding of interference, diffraction and polarization: connect it to a few engineering applications.
4. To learn basics of lasers and optical fibers and their use in some applications.
5. To understand concepts and principles in quantum mechanics and Nanopahse Materials. Relate them to some applications.

Course Outcomes:

By the end of this course, student would have

CO.1. Understand the fundamentals of Thermodynamics and Laws of thermodynamics. Understand the working of Carnot cycle and concept of entropy.

CO.2. Gain Knowledge on the basic concepts of electric and magnetic fields. Understand the concept of the nature of magnetic materials. Gain knowledge on electromagnetic induction and its applications.

CO.3. Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit

CO.4. Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fiber. Realize their role in optical fiber communication.

CO.5. Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomicparticles using Time independent one Dimensional Schrodinger's wave equation.

SYLLABUS

THERMODYNAMICS

Introduction, Heat and Work, First law of thermodynamics and applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Second law of thermodynamics, Carnot's Theorem, Entropy, Second law in terms of entropy, Entropy and disorder, Third law of thermodynamics (statement only).

ELECTROMAGNETISM

Concept of electric flux, Gauss's law - some applications, Magnetic field - Magnetic force on current, torque on current loop, The Biot-Savart's Law, B near a long wire, B for a circular Current loop, Ampere's law, B for a solenoid, Hall effect, Faraday's law of induction, Lenz's law, Induced magnetic fields, Displacement current, Maxwell's equations (no derivation), Magnetic materials: Classification of magnetic materials and properties.

OPTICS

Interference: Principles of superposition – Young's Experiment – Coherence - Interference in thin films (reflected light), Newton's Rings, Michelson Interferometer and its applications.

Diffraction: Introduction, Differences between interference and diffraction, Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit **(**Qualitative and quantitative treatment**)**.

Polarisation: Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization.

LASERS and FIBRE OPTICS

Introduction, characteristics of a laser beam, spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, Semiconductor laser, applications of lasers

Introduction to optical fibers, principle of propagation of light in optical fibers, Acceptance Angle and cone of a fibre, Numerical aperture, Modes of propagations, classification of fibers, Fibre optics in communications, Application of optical fibers.

MODERN PHYSICS

Introduction, De Broglie concept of matter waves, Heisenberg uncertainty principle, Schrodinger time independent wave equation, application to a particle in a box. Free electron theory of metals, Kronig - Penney model (qualitative treatment), Origin of energy band formation in solids, Classification of materials into conductors, semiconductors and insulators.

Nanophase Materials : Introduction, properties, Top-down and bottom up approaches, Synthesis - Ball milling, Chemical vapour deposition method , sol-gel methods, Applications of nano materials.

TEXT BOOKS:

1. Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Engineering Physics by R.K. Gaur and S.L. Gupta –Dhanpat Rai

Reference Books:

1. Modern Engineering Physics by A.S. Vadudeva
2. University Physics by Young and Freedman

ENGINEERING GRAPHICS

(Common for CE, CSE, ECE and ME)

(Effective from the admitted batch of 2020-2021)

Course Code	*Credits*	*Periods*			*Total*	*Sessional Marks*	*Exam Marks*	*Total Marks*
		Theory	***Tutorial***	***Lab***	*Contact Hrs/Week*			
2009106	**3**	2	-	4	6	30	70	100

COURSE OBJECTIVES

COB 1 The course is aimed at developing Basic Graphic skills.

COB 2 Develop Skills in Preparation of Basic Drawings

COB 3 Skills in Reading and Interpretation of Engineering Drawings

COURSE OUTCOMES

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

CO 1	Graphically construct and understand, the importance of mathematical curves in Engineering applications
CO 2	Graphically visualize and construct orthographic projection of points and lines
CO 3	Visualize and construct different views of planes and solids in different orientations
CO 4	Construct and develop the sectioned surfaces of geometrical solids
CO 5	Interpret and draw the Orthographic and Isometric views of different solids.

SYLLABUS

UNIT-I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions.

Curves: Construction of Conic sections, cycloids and involutes - Normal and tangent to the curves.

UNIT – II

Projections of Points and Straight Lines: Principal or Reference Planes - Projections of a point lying in any one of the four quadrants. Projections of straight lines parallel to both reference planes - perpendicular to one reference plane and parallel to other reference plane - inclined to one plane and parallel to the other - Projections of straight line inclined to both the reference planes - Traces.

UNIT – III

Projections of Planes: Projection of Perpendicular planes: Perpendicular to both reference planes, perpendicular to one reference plane and parallel to other - perpendicular to one reference plane and inclined to other plane - Projection of Oblique planes. Introduction to Auxiliary Planes.

Projections of Solids: Types of solids: Polyhedral and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane - vertical plane -parallel to both the reference planes - Projection of Solids with axis inclined to one reference plane and parallel to other - inclined to both the reference planes.

UNIT – IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section - Sections of solids (Prism, Pyramid, Cylinder and Cone) in simple positions only. Development of Surfaces: Methods of Development: Parallel line development and radial line development - Development of a cube, prism, cylinder, pyramid and cone.

UNIT – V

Isometric Views: Isometric projection - Isometric scale and Isometric view. Isometric view of Prisms, Pyramids, cylinder, cone, sphere and their combinations.

TEXT BOOK

Elementary Engineering Drawing by N.D. Bhatt, Charotar Publishing House.

REFERENCE BOOK

Engineering Graphics by K.L. Narayana and P. Kannaiah, Tata Mc-Graw Hill.

Engineering Mechanics (2009107)

Course Code	*Credits*	*Periods*			*Total*	*Sessional Marks*	*Exam Marks*	*Total Marks*
		Theory	***Tutorial***	***Lab***	*Contact Hrs/Week*			
2009107	**3**	3	-	0	3	30	70	100

COURSE OBJECTIVES:

- To make the students to know the importance of this subject in the field of engineering
- Particularly related to Mechanical Engineering.
- To make them learn the fundamentals of Mechanics, equation of static equilibrium &
- Dynamic equilibrium of particles and rigid bodies.
- To learn the effect of friction on equilibrium.
- To learn kinematics, kinetics of particle and rigid body, related principles.
- To implement the above concepts to solve practical engineering problems.

COURSE OUTCOMES: At the end of the course, the student will be able to:

CO 1: Compute the resultant of different coplanar and non-coplanar force systems and analyze the equilibrium of coplanar and non-coplanar force systems

CO 2: Study the equilibrium of bodies on rough planes in different cases and to analyze simple plane trusses using method of joints and method of sections

CO 3: Locate centroid and centre of gravity of plane figures and material bodies respectively and to compute area moment of inertia and mass moment of inertia of plane figures and material bodies respectively

CO 4: Analyze the rectilinear motion of a particle and rigid body under the study of kinematics and kinetics and also to analyze the curvilinear motion of a particle and rigid body under the study of kinematics and kinetics

CO 5: Analyze the rotation of a rigid body under the study of kinematics and kinetics and also to analyze the plane motion of a rigid body under the study of kinematics and kinetics

SYLLABUS

UNIT- I:

Force systems in a plane:

Concept of force and force system- Types of force systems-Concept of Resultant of a force system- Resultant of concurrent force system, parallel force system and general case of forces in a plane - Concept of moment of a force about a point, Concept of equilibrium of a force system- Lame's theorem- Equilibrium equations- Concept of free body diagram- Equilibrium of concurrent force system, parallel force system and general case of forces in a plane.

Force systems in space:

Representation of force vector- Moment of a force about a point in space- Moment of a force about a line in space- Resultant of concurrent force system, parallel force system and general case of forces in space- Equilibrium of concurrent force system, parallel force system and Equilibrium of general case of forces in space.

UNIT- II:

Friction:

Concept of friction- types of friction- laws of friction- limiting friction-coefficient of friction- angle of friction- angle of repose- Equilibrium of bodies on a rough horizontal plane, rough inclined plane- Impending motion of connected bodies- ladder friction - wedge friction.

Analysis of Plane Trusses:

Plane truss- Determinacy and Stability- Assumptions for analyzing plane trusses-Analysis of plane trusses using method of joints and method of sections.

UNIT- III:

Centroid and Centroid of Gravity:
Concept of centroid and centre of gravity- Centroid of simple plane figures- Centroid of composite plane figures - Centre of gravity of simple bodies - Centre of gravity of composite bodies - Theorems of Pappus.
Area Moment of Inertia and Mass Moment of Inertia
Concept of Area Moment of inertia, Moment of inertia of a plane figure with respect to an axis in its plane - Polar moment of inertia-Perpendicular axis theorem, Parallel-axis theorem with reference to plane figures - Moment of Inertia of an area by integration- Radius of gyration. Determination of area moment of inertia of simple plane figures (rectangle, square, triangle, circle, semi-circle, quarter circle, circular sector only) – Area moment of inertia of composite plane figures- Concept of mass moment of Inertia of a rigid body- Perpendicular axis theorem, Parallel axis theorem with reference to material bodies-moment of inertia of simple bodies (slender rod, circular disc, solid cylinder, right circular cone, solid sphere and solid hemisphere only)-Moment of inertia of composite bodies.

UNIT- IV:
Rectilinear Translation:
Introduction to kinematics and kinetics – Kinematics of rectilinear motion - Principles of dynamics-Differential equation of rectilinear motion- D'Alembert's principle in rectilinear motionMotion of a particle acted upon by a constant force, Force as a function of time- Force proportional to displacement; Momentum and impulse- Impulse –momentum equation ; Work and energy- law of conservation of energy- work-energy equation in rectilinear motion
Curvilinear Translation
Kinematics of curvilinear motion, projectile motion, differential equations of curvilinear motion, D'Alembert's principle in curvilinear motion, Work-energy equation in curvilinear motion.

UNIT-V:
Rotation of a rigid body about a fixed axis:
Kinematics of rotation- Equation of motion for a rigid body, rotation under the action of a constant moment-torsional vibrations- compound pendulum- general case of moment proportional to angle of rotation- D'Alembert's principle of rotation.
Plane motion of a rigid body:
Kinematics of plane motion- instantaneous centre- Equations of plane motion, D'Alembert's principle in plane motion- Energy equation for plane motion.

Text Books:
1. Engineering Mechanics – Statics and Dynamics by A.K.Tayal, Umesh Publications
2. Engineering Mechanics by S.Timoshenko & D.H. Young McGraw-Hill.(5th edition)

References:
1. Engineering Mechanics, Vol.1 & 2 by J.L. Meriam and L.G. Kraige.
2. Engineering Mechanics – Statics and Dynamics by A.Nelson, TMH
3. Engineering Mechanics by Basudeb Bhattacharyya, Oxford University Press. (2^{nd} edition)
4. Engineering Mechanics – Statics and Dynamics by K.Vijay Kumar Reddy, J.Suresh Kumar, B.S. Publications
5. Engineering mechanics by S.S.Bhavikatti. New Age International Publishers

Electrical and Electronics Engineering

(Effective from the admitted batch of 2020-2021)

Course code	Title of the course	Contact periods for delivering the course	Credits
2009108	**Electrical and Electronics Engineering**	**L T P** **3 0 0**	**Credits: 3**

Upon the completion of this course students will have

CO1: An ability to explain the basic concepts of magnetic circuits and electric circuits.
CO2: An ability to understand the fundamental concepts of DC generators and motors.
CO3: An ability to understand and analyze the fundamentals of AC Machines (transformers, 3-phase induction motor, Synchronous machine).
CO4: An ability to explain and analyze the operation of semiconductor devices.
CO5: An ability to analyze the logic gates, K-Maps, Flip flops, Counters.

SYLLABUS:

MAGNETIC CIRCUITS & A.C. CIRCUITS: Definitions of magnetic circuit, Reluctance, Magnetomotive force (m.m.f), Magnetic flux, Simple problems on magnetic circuits, Hysteresis loss. Introduction of steady state analysis of A.C. circuits, Single and balanced 3- phase circuits.

D.C. MACHINES: D.C. generator principle, Construction of D.C. generator, E.M.F. equation of D.C. generator, Types of D.C. generators, Characteristics of D.C. generators, Applications of D.C. generator. D.C. motor principle, Working of D.C. motors, Significance of back E.M.F., Torque equation of D.C. motors, Types of D.C. motors, Characteristics of D.C. motors, Speed control methods of D.C. motors, Applications of D.C. motor, Swinburne's test.

A.C MACHINES: Transformer principle, E.M.F. equation of transformer, Transformer on load, Equivalent circuit of transformer, Voltage regulation of transformer, Losses in a transformer, Calculation of efficiency and regulation by open circuit and short circuit tests.
Construction of 3-phase induction motor, Torque equation of induction motor, Slip-torque characteristics, Torque under running condition, Maximum torque equation.
Alternator working principle, E.M.F. equation of alternator, Voltage regulation by sync, impedance method.

SEMICONDUCTOR DEVICES: Semi-conductor P-N diode, Zener diode - Transistor configurations- Silicon control rectifier. Rectifiers, Amplifiers, Oscillators

INTRODUCTION TO DIGITAL ELECTRONICS: Fundamentals of digital electronics, Logic gates, k-maps, Flip-flops, Flip-flop conversions, counters.

Text Book:

1. Principles of Electrical Engineering and Electronics by V.K. Mehta, S. Chand & Co.
2. Electrical Technology volume-I,II by B. L.THEREJA
3. Microprocessor Architecture, programming and applications with 8085 by Ramesh Gaonkar penram publications 5th Edition.

Reference:

1. A First Course in Electrical Engineering by D.P Kothari.
2. Electrical Machines by J.B Gupta

PHYSICS LABORATORY

(Common for CE, CSE, ECE and ME)

(Effective from the admitted batch of 2020-2021)

Description	Subject Teaching Methodology		L	T	P	C
Course Code: **2009104P**	**PHYSICS LABORATORY**		**0**	**0**	**3**	**1.5**
Teaching	**Total Contact Hours : 30**	**Total Marks : 100**	**Int. 50**		**Ext. 50**	
Prerequisite (s)	Knowledge of theoretical and experimental Physicsfrom +2 Level. Application of Physics theory and calculations to required course		**Ext. Exam Time 3 Hrs.**			

Course Objectives:

To train the student in acquiring skills, techniques of using instruments to observe the physical phenomena, to measure certain physical quantities and constants.

Course Outcomes:

By the end of the course

CO. 1. Experiment and evaluate basic principles of physics by observing and analyzing the data, plotting graphs and interpreting the results.

List of Laboratory Experiments:

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton‘s Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy‘s Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray μo and Extraordinary μe ray.
6. Determination of Thickness Given Paper Strip by Wedge Method.
7. Calibration of Low Range Voltmeter.
8. Calibration of Low Range Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth‘s Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster‘s Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde‘s Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell-Characteristics.
14. Planks Constants.
15. Determination of energy band gap of a given semiconductor.

WORKSHOP LAB
(Common for CE, CSE, ECE and ME)
(Effective from the admitted batch of 2020-2021)

Course Code	Title of the Course	Contact Periods for delivering the course			Credits	Sessional Marks	External Marks
2009110P	WORKSHOP	L 0	T 0	P 3	1.5	50	50

COURSE OUTCOMES

CO 1 Identify and use various tools required for performing operations in Carpentry for making various components

CO 2 Identify and use various tools required for performing operations in Fitting for making various components

CO 3 Identify and use various tools required for performing operations in Tin-smithy for making various components

CO 4 Identify and Usage of House Wiring applications.

LIST OF EXPERIMENTS:

S.No	Trade	Job
1.	Carpentry	(a) Cross Lap Joint (b) Corner Dovetail Joint (c) Mortise and Tenon Joint (d) Bridle Joint
2.	Fitting	(a) V-Fit (b) Square Fit (c) Half Round Fit (d) Dovetail Fit
3.	Tin Smithy	(a) Taper Tray (b) Square Tray (c) 90^{o} Elbow (d) Funnel
4.	House Wiring	(a)Wiring of two bulbs in Parallel (b)Wiring of two bulbs in Series (c) Wiring to control a lamp with two-way switches (d) Wiring to control a fluorescent tube light with one-way switch

REFERENCE

1. Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.
2. A course in Workshop Technology,Vol.1 by B.S.Raghuwanshi, Danpat Rain and M.S. Krishnan (NPTEL).

Electrical and Electronics Engineering Lab (20091809P)

Course Code	Credits	Periods			Exam Hrs.	Sessional	Exam	Total
		Theory	Tutorial	Lab		Marks	Marks	Marks
2009108P	**1.5**	-	-	3	3	50	50	100

Course Objectives:

1. Generate sine, square and triangular waveforms with required frequency and amplitude using function generator and Measure voltage, frequency and phase of any waveform using CRO.
2. Measure the V-I characteristics of various semiconductor diodes, verify their characteristics and applications of diodes as regulators, rectifiers.
3. Verify functionality through V-I characteristics of active devices like BJT and JFET their applications.

Course Outcomes:

By the end of the course the student would be able to

CO1: **Verify** the V-I characteristics of various semiconductor diodes and applications of diodes as regulators, rectifiers. (Level4)

CO2: **Verify** the V-I characteristics of BJT and JFET their applications. (Level2)

LIST OF EXPERIMENTS

1. Study of CRO and Applications
2. V-I Characteristics of PN Junction Diode
3. V-I Characteristics of Zener Diode and Zener regulator characteristics.
4. V-I Characteristics of LED
5. V-I characteristics of Photo diode
6. Half-wave and full-wave rectifiers
7. Half-wave and full-wave rectifiers with capacitor filter
8. CE characteristics of BJT, h-parameters
9. CB characteristics of BJT, h-parameters
10. Voltage gain, input impedance and output impedance of emitter follower
11. Drain and transfer characteristics of JFET
12. Frequency response of CE amplifier

MATHEMATICS - II

(Common for Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering and Mechanical Engineering)
(Effective from the admitted batch of 2020-21)

Description	Subject Name	L	T	P	C	Ext. Exam Time
Course Code 2009201	**MATHEMATICS -II**	**3**	**0**	**0**	**3**	3 Hrs.
	Total Marks : 100	**Ses.**		**Ext.**		
		30		**70**		

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Course Objectives:

- The way of obtaining rank, Eigen values and Eigen vectors of a matrix.
- To know the importance of Cayley-Hamilton theorem and getting canonical form from a given quadratic form.
- To solve the system of equations by using direct and indirect methods.
- To solve first order and higher order differential equations by various methods.
- To obtain the Laplace transforms and inverse Laplace transforms for a given functions and their applications.

Course Outcomes:

- Find rank, Eigen values and Eigen vectors of a matrix and understand the importance of Cayley-Hamilton theorem.
- Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.
- Demonstrate solutions to first order differential equations by various methods and solve basic applications problems related to electrical circuits, orthogonal trajectories and Newton's law of cooling
- Discriminate among the structure and procedure of solving higher order differential equations with constant and variable coefficients.
- Understand Laplace transforms and its properties and finding the solution of ordinary differential equations.

SYLLABUS

UNIT-I

(Linear Algebra)

Rank of a matrix- Echelon form, Normal Form - Solution of Linear System of Equations - Consistency of Linear System of Equations - Gauss elimination method, LU Factorization method, Complex Matrices: Hermitian, Skew-Hermitian and Unitary Matrices and their Properties.

UNIT-II

(Eigen Values and Eigen Vectors)

Eigen Values and Eigen Vectors of a Matrix - Cayley-Hamilton theorem - Inverse and Powers of a Matrix using Cayley-Hamilton's theorem and its applications. Diagonalization of a Matrix - Quadratic Forms - Reduction of Quadratic Form to Canonical Form - Nature of a Quadratic Form.

UNIT-III

(Ordinary Differential Equations of First Order and its Applications)

Formation of ordinary differential equations (ODEs) - Solution of an ordinary differential equation - Equations of the first order and first degree - Linear differential equation - Bernoulli's equation - Exact differential equations - Equations reducible to exact equations - Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay.

UNIT-IV

(Differential Equations of Higher Order)

Solutions of Linear Ordinary Differential Equations with Constant Coefficients - Rules for finding the complimentary function - Rules for finding the particular integral - Method of variation of parameters - Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.

UNIT-V

(Laplace Transforms and it's Application to ODE)

Introduction - Existence Conditions - Transforms of Elementary Functions - Properties of Laplace Transforms - Transforms of Derivatives - Transforms of Integrals - Multiplication by t^n - Division by t – Evaluation of integrals by Laplace Transforms - Inverse Laplace Transform - Applications of Laplace Transforms to Ordinary Differential Equations - Simultaneous Linear Differential Equations with Constant Coefficients - Second Shifting Theorem - Laplace Transforms of Unit Step Function, Unit Impulse Function and Laplace Transforms of Periodic Functions.

TEXT BOOK:

Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43r^d edition, Khanna publishers.

REFERENCE BOOKS:

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K. International publishing house Pvt. Ltd.
2. Advanced Engineering Mathematics by Erwin Kreyszig.
3. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal. Lakshmi Publications.
4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.

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CHEMISTRY

(Common for CSE, ECE and ME)
(Effective from the admitted batch of 2020-2021)

Description	Subject Teaching Methodology	L	T	P	C
Course Code **2009203**	**CHEMISTRY**	**3**	**1**	**0**	**3**
	Total Marks : 100	**Ses. 30**		**Ext. 70**	
Prerequisite (s)	Knowledge of theoretical and experimental chemistry from +2 Level.	**Ext. Exam Time 3 Hrs.**			

Course Objectives

1. To apply the basic knowledge of chemistry to the engineering discipline.
2. To develop knowledge about water and its treatment for industrial and potable purposes.
3. To develop understanding in the areas of polymers, mechanism of corrosion of metals and corrosion control methods, fuels, lubricants and nanomaterials, conducting polymers, bio-degradable polymers and fiber reinforced plastics and apply the knowledge for solving existing challenges faced in various engineering and societal areas.

Course Outcomes

CO.1: Analyze and determine the water quality and prescribe the remedial measures for domestic as well as industrial usage.

CO.2: Student will differentiate the moulding techniques of plastic materials & classify the polymers and can apply to specific purposes.

CO.3: Student can able to design the metallic materials to prevent corrosion.

CO.4: Student will apply suitable lubrication mechanisms for various machinery parts.

CO.5: Will be familiar with the fundamentals of nano materials.

Chapter – 1: Water chemistry (8 Hrs)
Sources of water – impurities and their influence of living systems – WHO Limits – Hardness and its determination – boiler troubles and their removal – Water softening methods – Lime-soda, zeolite and ion-exchange - Municipal water treatment - break point chlorination – desalination of sea water – reverse osmosis method. **(CO1)**

Chapter – 2: Polymers and plastics (8 Hrs)
Polymers: Definition – Types of polymerization (addition- polythene, polyvinylchloride, polystyrene & condensation) – mechanisms of addition polymerization – radical and ionic polymerization- Styrene monomer – storage and biological effects.

Plastics: Thermosetting and thermoplastics – effect of polymer structure on properties of cellulose derivatives – vinyl resins – nylon (6, 6) - reinforced plastics – conducting polymers. **(CO2)**

Chapter – 3: Corrosion (8 Hrs)

Corrosion: Origin and theory – types of corrosion - chemical and electrochemical, pitting, inter granular, waterline, stress – galvanic series – factors effecting corrosion.

Corrosion Controlling Methods: Protective coatings: metallic coatings, electroplating and electroless plating – chemical conversion coatings – phosphate, chromate, anodized, organic coatings – paints and special paints. **(CO3)**

Chapter – 4: Fuels and Lubricants (8 Hrs)

Solid Fuels: Wood and coal, ranking of coal – analysis (proximate and ultimate) - coke manufacture – Otto Hoffmann's process – applications.

Liquid Fuels: Petroleum refining – motor fuels – petrol and diesel oil – knocking – octane number – cetane number.

Gaseous Fuels: Biogas, LPG and CNG – characteristics – applications.

Lubricants: Classification – mechanism – properties of lubricating oils – selection of lubricants for engineering applications. **(CO4)**

Chapter – 5: Nanomaterials (8 Hrs)

Nanomaterials - properties and application of fullerenes, fullerols, carbon nanotubes and nanowires - synthesis - top-down and bottom-up approaches - nanocomposites - nanoelectronics- applications of nanomaterials in catalysis, telecommunication and medicine. **(CO5)**

Text Books

- Engineering Chemistry – P.C. Jain and M. Jain, 16th Ed., Dhanpath Rai and Sons, New Delhi.
- A Text book of Engineering Chemistry, S.S. Dara, 12th Ed., S. Chand & Co. New Delhi.
- Introduction to Nanoscience - S. M. Lindsay, 1st Ed., - Oxford University Press.

Reference Books

- Engineering Chemistry, B.K. Sharma, Krishna Prakashan, 6th Ed., Meerut.

Engineering Chemistry - B.L. Tembe, Kamaluddi

ENGLISH

(Common for all Branches)

(Effective from 2020-2021 Admitted Batches)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	Credits
					Ses.	**Ext.**			
2009209	**ENGLISH**	**3**	**0**	**0**	**30**	**70**	**100**	**3hrs**	**3**

Objectives:

- To make students understand the explicit and implicit meanings of a text/topic;
- To give exposure to new words and phrases, and aid to use them in different contexts;
- To apply relevant writing formats to draft essays, letters, emails and presentations; and
- To adapt oneself to a given situation and develop a functional approach to finding solutions: adaptability and problem solving.

Outcomes:

- Students will be able to analyse a given text and discover the various aspects related to language and literature;
- Learn the various language structures, parts of speech and figures of speech;
- Develop one's reading and writing abilities for enhanced communication; and
- Learn to apply the topics in real-life situations for creative and critical use.

Textbook:

Language and Life: A Skills Approach Board of Editors, Orient Blackswan Publishers, India. 2018.

Topics:

On the conduct of life: William Hazlitt
Life skills: Values and Ethics
If: Rudyard Kipling

The Brook: Alfred Tennyson
Life skills: Self-Improvement
How I Became a Public Speaker: George Bernard Shaw

The Death Trap: Saki
Life skills: Time Management
On saving Time: Seneca

Chindu Yellama
Life skills: Innovation
Muhammad Yunus

Politics and the English Language: George Orwell
Life skills: Motivation
Dancer with a White Parasol: Ranjana Dave

Grammar:

Prepositions – Articles – Noun-Pronoun Agreement, Subject-Verb Agreement – Misplaced Modifiers – Clichés, Redundancies.

Vocabulary:

Introduction to Word Formation – Root Words from other Languages – Prefixes and Suffixes – Synonyms, Antonyms – Common Abbreviations

Writing:

Clauses and Sentences – Punctuation – Principals of Good Writing – Essay Writing – Writing a Summary

Reference Books:

- *Practical English Usage*, Michael Swan. OUP. 1995.
- *Remedial English Grammar*, F.T. Wood. Macmillan.2007
- *On Writing Well*, William Zinsser. Harper Resource Book. 2001
- *Study Writing*, Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
- *Communication Skills*, Sanjay Kumar and PushpLata. Oxford University Press. 2011.
- *Exercises in Spoken English*, Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

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COMPUTER PROGRAMMING WITH C & NUMERICAL METHODS
(Effective from 2020-2021 Admitted Batches) (2009205)

2009205-COMPUTER PROGRAMMING WITH C & NUMERICAL METHODS (Common for ECE and ME)		
Instruction: 3 Hours /week		Credits: 3
Internal: 30 Marks	External Exam: 70 Marks	Total: 100 Marks

COURSE OBJECTIVES:

1. Aims to provide exposure to problem-solving through C programming.
2. Aims to train the student to the basic concepts of the C-programming language and Numerical Methods

COURSE OUTCOMES:

CO1.Student will be able to write code using control structures & arrays.
CO2. Student will be able to write code using strings & functions.
CO3.Student will be able to write code using user defined data types.
CO4.Student will be able to write code using Pointers for operations on files.
CO5.Student will be able to write code for Numerical & Integral Methods.

UNIT-I

Introduction to C, Decision Making, Branching, Looping, Arrays: Basic structure of C program, Constants, Variables and data types, Operators and Expressions,Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations, Formatted Input, Formatted Output, Decision making with if statement, Simple if statement, the if…else statement, Nesting of if…else statement, the else if ladder, switch statement, the (? :) operator, the GOTO statement., The while statement, The do statement, Thefor statement, Jumps in Loops, One, Two-dimensional Arrays.

UNIT-II

Functions & Strings: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values. Nesting of functions, recursion, passing arrays to functions, passing strings to functions, The scope, visibility and lifetime of variables, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

UNIT-III

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within

structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

UNIT-IV

Pointers & File handling: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointes, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures-Program Applications, File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments-Program Applications.

UNIT-V

Solutions of Algebraic and Transcendental Equations: Bisection Method, Newton Raphson Method. Interpolation: Newton's forward and backward Interpolation, Lagrange's Interpolation in unequal intervals, Trapezoidal rule, Simpson's 1/3 rule. Solutions of OrdinaryFirst Order Differential Equations: Euler's Method, Modified Euler's Method and Runge-Kutta Method.

Text Books:

1. Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India)Private Limited.
2. Introduction to Numerical Methods, SS Sastry, Prentice Hall.

Reference Books:

1. Let Us C, YashwantKanetkar, BPB Publications, 5th Edition.
2. Computer Science, A structured programming approach using C", B.A.Forouzan andR.F.Gilberg, 3rd Edition, Thomson, 2007.
3. The C –Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI
4. Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M.Barone (Author), Enzo Marinari (Author), Giovanni Organtini, World cientific.

MECHANICS OF SOLIDS-I
(Effective from 2020-2021 Admitted Batches)

Course code	Title of the course	Contact periods for delivering the course	Credits
2095201	**MECHANICS OF SOLIDS-I**	**L T P** **3 0 0**	**Credits: 3**

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

CO1	The students will be able to understand the basic concepts of stress, strain and relations based on linear elasticity and to understand the theory of elasticity and Hooke's law.
CO2	To analyse beams to determine shear force and bending moments.
CO3	To analyse Bending and shear stress distribution in different sections of beams.
CO4	To determine deflections at any point of the beams and derive the torsion equation and solve problems on torsion of mechanical components.
CO5	The students will be able to solve problems on thin cylinders.

Note: L – Lecture periods; T- Tutorial periods; P- Practical periods

UNIT-I

SIMPLE STRESSES AND STRAIN: Stress, Strain, Stress- Strain curve, Lateral strain, Relationship between elastic constants, Bars of varying cross-section, Compound bars, Temperature stresses in bars. Complex Stresses: Stresses on an inclined plane under different uniaxial and biaxial stress conditions, Principal planes and principal stresses, Mohr's circle, Relation between elastic constants, Strain energy, Impact loading.

UNIT-II

BENDING MOMENTS AND SHEAR FORCES: Beam - Types of loads, Types of supports, S.F. and B.M. diagrams for Cantilever, Simply supported and Over hanging beams.

UNIT-III

STRESSES IN BEAMS: Theory of bending, Flexural formula, Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections, Shear stresses in beams, Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T, angle sections.

UNIT-IV

DEFLECTIONS OF BEAMS AND TORSIONAL STRESSES: Relation between curvature, slope and deflection, double integration method, Macaulay's method, Moment area method -application to simple cases including Cantilever, Simply supported and Over hanging beams. Analysis of torsional stresses, Power transmitted, Combined bending and torsion, Closed and open coiled helical springs.

UNIT-V

CYLINDERS AND SPHERICAL SHELLS: Stresses and strains in thin cylinders, Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders and Thin spherical shell.

Text Books:

1. Analysis of Structures, by Vazirani and Ratwani, Vol. 1, 1993 edition.
2. Mechanics of Materials by James M. Gere , Stephen P. Timoshenko , CBS Publishers
3. Solid Mechanics, by Popov

Reference:

1. Strength of Materials, by Timoshenko
2. Strength of Materials -By Jindal, Umesh Publications.
3. Analysis of structures by Vazirani and Ratwani.
4. Mechanics of Structures Vol-III, by S.B.Junnarkar.
5. Strength of Materials by Andrew Pytel and Ferdinond L. Singer Longman

CHEMISTRY LABORATORY

(Common for Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering and Mechanical Engineering)
(Effective from the admitted batch of 2020-2021)

Description	Subject Teaching Methodology	L	T	P	C
Course Code **2009203P**	**CHEMISTRY LABORATORY**	**0**	**0**	**3**	**1.5**
	Total Marks : 100	**Int. 50**		**Ext. 50**	
Prerequisite (s)	Knowledge of theoretical and experimental chemistry from +2 Level.	**Ext. Exam Time 3 Hrs.**			

Course Objectives

1. To develop the fine skills of quantitative determination of various chemical components through titrimetric analysis.

Course Outcomes

At the end of the course student will be able to

CO.1 Quantitatively determine the amount of various chemical species in solutions by titrations.
CO.2 Conduct the quantitative determinations with accuracy.

List of Laboratory Experiments

1. Determination of sodium hydroxide with HCl (with Na_2CO_3 as primary standard)
2. Determination of alkalinity (carbonate and hydroxide) of water sample
3. Determination of Fe (II)/Mohr's salt by permanganometry
4. Determination of oxalic acid by permanganometry
5. Determination of chromium (VI) by Mohr's salt solution
6. Determination of zinc by EDTA method
7. Determination of hardness of water sample by EDTA method
8. Determination of chlorine in water by iodometric titration

Reference Books

- Vogel's Quantitative Chemical Analysis – V Edition – Longman

Experiments in Applied Chemistry (For Engineering Students) – Sinita Rattan – S. K. Kataria & Sons, New Delhi.

ENGLISH LANGUAGE LAB

(Common for all branches)

(Effective from 2020-2021 Admitted Batches)

Subject Code	Subject Name/ Title	L	T	P	Allotment of Marks		Total Marks	Credits
					Internal Examination	**External Examination**		
209209P	**English Language lab**	**0**	**0**	**2**	**50**	**50**	**100**	**1.5**

Objectives:

- To make students recognize the sounds of English through Audio-Visual aids;
- To help students build their confidence and help them to overcome their inhibitions and self-consciousness while speaking in English;
- To familiarize the students with stress and intonation and enable them to speak English effectively; and
- To give learners exposure to and practice in speaking in both formal and informal contexts.

Outcomes:

- Students will be sensitized towards recognition of English sound patterns and the fluency in their speech will be enhanced;
- Students will be able to participate in group activities like roleplays, group discussions and debates; and
- Students will be able to express themselves fluently and accurately in social as well professional context.

Topics:

Introduction to Phonetics: The Sounds of English (Speech sound – vowels and consonants) - Stress and Intonation - Accent and Rhythm.

Listening Skills: Listening for gist and specific information - listening for Note taking, summarizing and for opinions - Listening to the speeches of eminent personalities.

Speaking Skills: Self-introduction - Conversation Skills (Introducing and taking leave) - Giving and asking for information - Role Play - Just A Minute (JAM) session - Telephone etiquette.

Reading and Writing skills: Reading Comprehension – Précis Writing - E-Mail writing - Punctuation.

Presentation skills: Verbal and non-verbal communication - Body Language - Making a Presentation.

DISTRIBUTION AND WEIGHTAGE OF MARKS

- The practical examinations for the English Language Lab shall be conducted as per the University norms prescribed for the core Engineering practical sessions.
- For the Language lab sessions, there shall be a continuous evaluation during the semester for 50 sessional marks and 50 semester-end Examination marks.
- For the 50 sessional (Internal) marks, 30 marks shall be awarded for day-to-day performance and for completing activities in the lab manual, 20 marks to be awarded by conducting Internal Lab Test(s).

- For the 50 Semester- end (External) marks, 30 marks shall be awarded for written examination (dialogues, the sounds of English and stress) and 20 marks for External Examiner viva-voce.

Reference Books:

- Ashraf Rizvi. *Effective Technical Communication*. Tata McGraw Hill Education Private Limited, New Delhi.
- *Speak Well*. Orient Blackswan Publishers, Hyderabad.
- Allan Pease. *Body Language*. Manjul Publishing House, New Delhi.

COMPUTER PROGRAMMING WITH C & NUMERICAL METHODS LAB (CPNM LAB) (209205P)

Instruction: 3 Hours/week		**Credits: 1.5**
Internal Exam: 50 Marks	**External Exam: 50 Marks**	**Total: 100 Marks**

COURSE OBJECTIVES:

1. To provide complete knowledge of C language.
2. To develop logics which will help them to create programs, applications in C.
3. To learn the basic programming constructs they can easily switch over to any other language in future.

COURSE OUTCOMES:

CO1: Ability to implement the programs using control structures & arrays.
CO2: Ability to implement the programs using strings & functions.
CO3: Ability to implement the programs using user defined datatypes.
CO4: Ability to implement the programs using pointers and operations on files.
CO5: Ability to implement the programs using numerical & integral methods.

1 a. Write a C program to find the roots of a quadratic equation
   b. 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.
   c. Write a C program to find the sum of individual digits of that number and also print and save it in reverse order.

2. Write a program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line?

3. Write a program which generates 100 random real numbers in the range of 10.0 to 20.0 and sort them in descending order.

1. Write a function for transporting a square matrix in place (in place means that you are not allowed to have full temporary matrix).
2. Write a program to add two matrices with the dimension of the matrix specified by the user at the time of executing the program.
3. Write a program e.g., for getting a sub-string from a given position, copying one string to another, reversing a string and adding one string to another with and without using string manipulation functions.
4. Write a program to read the data of four students, each students has a name (string), roll number (string), age (integer), use an array of structure. Later find the average age of the students.
5. Write a program to demonstrate the difference between pointer to an array and array of pointers.
   a) Store your name, address and phone number in a 2-D character array and display the same using pointer notations.
   b) Use pointer to an array and array of pointers.

6. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their mean and standard deviation.
7. Implement bisection method to find the square root of a given number to a given accuracy.
8. Given a table of x and corresponding f(x) values, write a program which will determine f(x) value at an intermediate x value using Lagrange Interpolation.
9. Implement Simpson's 1/3rd rule for numerical integration.

10. Write a program to solve a differential equation using Runge-Kutta Method.
11. Write a C program to tabulate Diode current for given input values.

$$I = I_0\left(e^{\frac{qV}{kT}} - 1\right)$$

12. Write a C program to generate Sinusoidal wave for given frequency?