

KAKATIYA UNIVERSITY
BACHELOR OF TECHNOLOGY First Year
Structure of Curriculum-Common to All Branches

Semester-I (First Year)

Branch/Course Common to all branches of UG Engineering & Technology

Sl. No.	Category/ Code	Course Title	Internal Marks	External Marks	Total marks	Lecture	Tutorial	Practical	No of Credits
1	Basic Sciences Course /BSC 101	Physics	30	70	175	3	1	-	5.5
		Lab.	25	50		-	-	3	
2	Basic Sciences Course /BSC 103	Mathematics-I	30	70	100	3	1	0	4
3	Engineering Science Courses/ESC101	Basic Electrical Engineering	30	70	175	3	1	-	5
		Lab.	25	50				2	
4	Engineering Science Courses/ESC102	Engineering Graphics & Design	30	70	100	1	0	4	3
5	Engineering Science Courses	Engineering Mechanics	30	70	100	3	1	0	4
		Total Credits							21.5

In order to balance the load of the some of the subjects which are made in groups (Physics/Chemistry, Engineering Graphics & Design/ Workshop and Manufacturing Practices, Programming for Problem Solving/Engineering Mechanics, English/BEE), the half of the branches of B. Tech course offer one subject of group in odd semester and other half of the branches of B. Tech course offer another subject of same group in odd semester. In the even semester the subjects of the group will be exchanged

MANDATORY INDUCTION PROGRAM

BEFORE BEGINNING OF FIRST SEMESTER

3 Weeks Duration

- Physical Activity
- Creative Arts
- Universal Human Values
- Literay
- Proficiency Modules
- Lectures by Eminent People
- Visits to Local Areas
- Familiarization to Dept./Branch & Innovations

KAKATIYA UNIVERSITY
B. Tech. First Year
SEMESTER – I
(Common to all branches)

PHYSICS
(Theory)

Course code	BSC101				
Category	Basic Science Course				
Course title	Physics				
Scheme and Credits	L	T	P	Credits	Internal marks = 30
	3	1	-	4	External Marks = 70

Detailed contents:

UNIT-I

SCALARS AND VECTORS

Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical coordinates.(8 lectures)

UNIT II

POTENTIAL ENERGY FUNCTION

Potential energy function; $F = - \text{Grad } V$, equipotential surfaces and meaning of gradient; Conservative and non-conservative forces, curl of a force field; Central forces; Conservation of Angular Momentum; Energy equation and energy diagrams; Elliptical, parabolic and hyperbolic orbits; Kepler's problem; Application: Satellite manocurves.(7 lectures)

SIMPLE HARMONIC MOTION

Harmonic oscillator; Damped harmonic motion – over-damped, critically damped and lightly-damped oscillators; Forced oscillations and resonance.(6 lectures)

UNIT- III

RIGID BODY

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.(5 lectures)

UNIT-IV

ELECTROSTATICS IN VACUUM

Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential and uniqueness of their solution and connection with steady state diffusion and thermal conduction; Practical examples like Faraday's cage and coffee-ring effect. Boundary conditions of electric field and electrostatic potential, method of images, energy of a charge distribution and its expression in terms of electric field (8 lectures)

MAGNETOSTATICS

Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities. *(6 lectures)*

UNIT-V

FARADAY'S LAWS

Faraday's law in terms of EMF produced by changing magnetic flux; equivalence of Faraday's law and motional EMF; Lenz's law. *(3 lectures)*

DISPLACEMENT CURRENT, MAGNETIC FIELD DUE TO TIME DEPENDENT ELECTRIC FIELD AND MAXWELL'S EQUATIONS

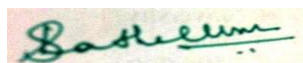
Continuity equation for current densities; Modifying equation for the curl of magnetic field to satisfy continuity equation; displacement current and magnetic field arising from time-dependent electric field; calculating magnetic field due to changing electric fields in quasi-static approximation. Maxwell's equation in vacuum and non-conducting medium; Energy in an electromagnetic field; Flow of energy and Poynting vector with examples. *(5 lectures)*

Suggested Text Books

- (i) Introduction to Mechanics — MK Verma
- (ii) Introduction to Electrodynamics---David Griffiths
- (iii) Engineering Mechanics, 2nd ed. — MK Harbola

Suggested Reference Books:

- (i) Halliday and Resnick, Physics
- (ii) W. Saslow, Electricity, magnetism and light
- (iii) An Introduction to Mechanics — D Kleppner & R Kolenkow
- (iv) Principles of Mechanics — JL Synge & BA Griffiths
- (v) Mechanics — JP Den Hartog
- (vi) Engineering Mechanics - Dynamics, 7th ed. - JL Meriam
- (vii) Mechanical Vibrations — JP Den Hartog
- (viii) Theory of Vibrations with Applications — WT Thomson



Dr. C.J. Sreelatha

Chairperson Board of Studies in Physics, KU, Wgl

Date:

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – I
(Common to all branches)

PHYSICS
(Lab.)

Course code	BSC101				
Category	Basic Science Course				
Course title	Physics-Practical				
Scheme and Credits	L	T	P	Credits	Internal marks = 25
	-	-	3	1.5	External Marks = 50

APPLIED PHYSICS LAB

Choice of experiments from the following:

1. Coupled oscillators.
2. Experiment on moment of inertia measurement.
3. Experiments with gyroscope.
4. Resonance phenomena in mechanical oscillators.
5. LC circuit and CR circuit.
6. Resonance phenomena in LCR circuits.
7. Magnetic field from Helmholtz coil.
8. Measurement of Lorentz force in a vacuum tube.

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – I
(Common to all branches)

MATHEMATICS -1

MAXIMUM HOURS: 48

Unit 1: Sequences and Series

Sequences , series, general properties of series , series of positive terms, comparison test, integral test, ratio test, Cauchy's root test, D' Alembert's ratio test. Fourier series, Euler's formula, condition for Fourier expansion, Even and odd functions.

(Sections 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 10.1, 10.2, 10.3, 10.6 of Text Book)

Unit 2: Calculus

Fundamental theorems (without proofs) Rolle's Theorem (algebraic and geometrical interpretation, geometrical proof), L' Hôpital's mean value theorem, Cauchy's mean value theorem, Taylor's theorem, Maclaurin's series. Asymptote's parallel to axis, curve tracing (simple curves only), radius of curvature for cartesian curves.

(Sections 4.3, 4.10, 4.11, 4.16, 4.17, 9.7 of Text Book)

Unit 3: Multivariable Differential Calculus

Functions of two or more variables, partial derivatives, total derivatives, change of variables, Jacobians, Taylor's theorem (without proof), errors and approximations, maxima and minimum of functions of two variable. Scalar and vector point functions, gradient, divergence, curl, physical interpretation.

(Sections 5.1, 5.2, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 8.5, 8.6 of Text Book)

Unit 4: Multivariable Integral Calculus

Double integrals, change of order of integration , triple integrals, change of variables, beta and gamma function, line integrals, surface integrals, volume integrals, Greens, Gauss and Stokes theorems (without proof) irrotational fields, solenoidal fields.

(7.1, 7.2, 7.5, 7.7, 7.14, 7.15, 7.16, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16, 8.18 of Text Book)

Unit 5: Differential Equations

Differential equations of first order, formation of differential equations. variable separable form, Bernouli's equation, exact equations, physical applications (Newton's law of cooling, rate of decay) linear differential equations, applications of linear differential equations (simple harmonic motion, oscillating electric circuits). (Sections 11.1, 11.3, 11.4, 11.6, 11.10, 11.11, 12.6, 12.8, 14.1, 14.2, 14.5 of Text Book)

Text Book: B.S. Grewal et.al, Higher Engineering Mathematics, 43rd Edition, Khanna Publicationns.

Reference: Erwin Kreyszig, Aadvanced Engineering Mathematics, 8th Edition, John Wiley & Sons.

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – I
(Common to all branches)

BASIC ELECTRICAL ENGINEERING

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks:30
3	1	0	4	External Marks:70

UNIT – I (7+3)

DC circuits: Introduction, network elements (R, L and C), electric power, electrical energy, Ohm's law, Kirchhoff's laws, resistances in series-voltage divider rule; resistances in parallel-current divider rule, series & parallel circuits, mesh analysis and nodal analysis.

DC network theorems: Introduction, superposition theorem, Thevenin's theorem, Norton's theorem and maximum power transfer theorem. Time-domain analysis of first-order RL and RC circuits.

UNIT – II (7+3)

1- ϕ AC circuits: Phasor representation of sinusoidal quantities, average and R.M.S values of sinusoidal wave form, Form Factor, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), series resonance.

3- ϕ AC circuits: Production of 3- ϕ voltages, voltage & current relationships of line and phase values for balanced star and delta connections.

UNIT – III (7+3)

Transformers : Magnetic materials, BH characteristics, Construction, principle of operation & applications of 1- ϕ transformer, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency, Auto-transformer and 3- ϕ transformer connections.

Three Phase Induction motor: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, squirrel cage IM, slip-ring IM, Significance of torque-slip characteristic, starting and speed control of induction motor and Applications.

Single-phase induction motor: Construction and principle of operation, Capacitor start & capacitor run motor, applications.

UNIT – IV (7+3)

DC Generators :Constructional features, operating principle, EMF equation, types of DC Generators, magnetization characteristics of DC shunt generator and Applications.

DC Motors: Principle of Operation, Torque Equations, Operating Characteristics of DC Motor, Speed Control Methods and Applications.

Synchronous Generators : Construction and principle of operation of Synchronous generators.

UNIT –V (6+2)

Power Converters : DC-DC buck and boost converters, duty ratio control. Single-phase voltage source inverters and sinusoidal modulation.

Electrical Installaiton: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Text Books:

1. B.L.Thereja, A.K.Thereja, “Electrical Technology Vol. I & II“, *S.Chand & Company Ltd*, edn , 2005.
2. Edward Hughes, “Electrical & Electronics Technology”, *Pearson Education*, 10^e., 2010.
3. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, *Tata McGraw Hill*, edn , 2010.

Reference Books:

1. K. Uma Rao, “Basic Electrical Engineering”, *Pearson Education*, edn, 2011.
2. Chakravarthy A, Sudhipanath and Chandan Kumar, “Basic Electrical Engineering”, *Tata McGraw Hill Ltd*, edn, 2009.

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – I
(Common to all branches)

BASIC ELECTRICAL ENGINEERING LAB

Class: I/IV B.Tech., I Semester

Branch: Common to all

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks:25
0	0	2	1	External Marks:50

1. Verification of KVL, KCL
2. Transient response of R-L, R-C, R-L-C circuits with DC excitation
3. Verification of Thevenin's Theorem
4. Verification of Norton's Theorem
5. Verification of Maximum Power Transfer Theorem
6. Determination of internal resistance and internal inductance of choke coil
7. Resonance in RLC series circuit
8. Speed control of DC Shunt motor
9. Open Circuit and Short Circuit Test on single phase Transformer.
10. Performance characteristics of 3 phase squirrel cage induction motor
11. Demonstration of components of LT switchgear

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – I
(Common to all branches)

ENGINEERING GRAPHICS

Teaching Scheme				Examination Scheme
L	T	P	c	Internal Evaluation -30
1	0	4	3	External Evaluation -70

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance, Usage of Drawing Instruments, Lettering. Conic Sections including the Rectangular Hyperbola – General method only Cycloid, Epicycloid and Hypocycloid, Scales – Plain, Diagonal and vernier.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions, Projections of Points and Lines, Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere.

UNIT – IV

Isometric Projections: Principles of Isometric Projection – Isometric Scale , Isometric Views ,Conventions , Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions.

UNIT – V

Development of Surfaces: Right Regular Solids – Prism, Cylinder, Pyramid and Cone.

Introduction to CAD: (For Internal Evaluation Weightage only)

Introduction to Auto CAD Commands, Draw Tools, Modify Tools, Text, Dimension Properties, DIMENSION, PROPERTIES tool bar, Standard Tool bar, LAYERS.

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing / M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

Note: Syllabus must be complete in 48 theory hours, however theory hours may be converted in to equal practical hours as per credits

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – I
(Common to all branches)

ENGINEERING MECHANICS

Teaching Scheme :				Examination Scheme :	
L	T	P	C	Internal Evaluation :	30 marks
3	1	-	4	End Semester Exam :	70 marks

Course Learning Objectives (LOs):

- LO1: develop concept of force, reactions, principles of force and their application on engineering structures and machines
- LO2: introduce various kinds of statically determinate pin jointed structures and methods of analysing the trusses
- LO3: understand the importance of geometric centre, cross sectional areas of plane lamina and moment of inertia
- LO4: understand the behavior of particles in motion subjected to system of forces.

UNIT – I (6+2)

Laws of Mechanics: Parallelogram law of forces, triangle law of forces, Newton's law of gravitation, law of superposition and transmissibility of forces.

Force Systems: Types of forces, co-planar, concurrent and parallel forces, moment and couple, free body diagram, resultant of force systems, resolution of forces, composition of forces, equilibrium equations of forces, Lami's theorem, Varignon's theorem, moment equilibrium equations, types of supports, beams and loadings, statically determinate structures, resultant and equilibrium of general force system.

UNIT –II (8+2)

Friction: Introduction, classification, laws of friction, coefficient of friction, angle of friction, ladder friction and wedge friction.

Plane Trusses: Rigid truss, stability and determinacy conditions, basic assumptions for a perfect truss, analysis of trusses by method of joints and method of sections of a cantilever and simply supported statically determinate pin-jointed trusses.

UNIT– III (8+2)

Centroid: Centroid of one dimensional figures, centroid of simple figures from first principles, centroid of composite sections.

Moment of Inertia: Moment of inertia of plane sections from first principles, theorems of moment of inertia – parallel axis theorem and perpendicular axis theorem, moment of inertia of standard sections and composite sections.

UNIT - IV (8+2)

Kinematics: Introduction to dynamics, rectilinear motion of a particle – displacement, velocity and acceleration, motion with uniform acceleration and motion with variable acceleration, curvilinear motion- rectangular components, components, acceleration of normal and tangential acceleration, projectile motion.

UNIT - V (8+2)

Kinetics: Rectilinear motion-equations of rectilinear motion, equations of dynamic equilibrium, D'Alembert's principle, curvilinear motion-equations of motion in rectangular components, tangential and normal components, equations of dynamic equilibrium, applications of work-energy, impulse –momentum principles of rectilinear motion and curvilinear motion.

Text Books:

- Tayal A.K., "Engineering Mechanics: Statics and Dynamics", *Umesh Publishers*, New Delhi, 14th edn., 2014.

Reference Books:

- Timoshenko S., Young D.H., Rao J.V., and Sukumar Pati, "Engineering Mechanics in SI units", *McGraw Hill Education Pvt. Ltd.*, New Delhi, 5th edn., 2013.
- Bhavikatti S.S., "Engineering Mechanics", *New Age International*, New Delhi, 4th edn., 2013 (reprint).
- Basudeb Bhattacharyya, "Engineering Mechanics", *Oxford University Press*, 9th edn., 2013.
- Vijay [HYPERLINK "https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440"](https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440) [HYPERLINK "https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440"](https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440) [HYPERLINK "https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440"](https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440) [HYPERLINK "https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440"](https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440) [HYPERLINK "https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440"](https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440) [HYPERLINK "https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440"](https://www.alibris.com/search/books/author/K-Vijay-Kumar-Reddy?aid=6776440) Kumar Reddy K., Suresh Kumar J. "Singer's Engineering Mechanics Statics and Dynamics" *BS Publications / BSP Books*, 3rd edn. (SI Units), 8th Reprint, 2014

KAKATIYA UNIVERSITY
BACHELOR OF TECHNOLOGY
FIRST YEAR SYLLABUS

Structure of Curriculum-Common to All Branches

Semester –II (First Year)

Branch/Course: Common to all branches of UG Engineering & Technology

Sl. No	Category/ Code	Course Title	Internal Marks	External Marks	Total Marks	Lecture	Tutorial	Practical	No of Credits
1	Basic Sciences Course /BSC 102	Chemistry	30	70	175	3	1	-	5.5
		Lab.	25	50		-	-	3	
2	Basic Sciences Course /BSC 104	Mathematics-II	30	70	100	3	1	0	4
3	Engineering Science Courses/ESC103	Programming for Problem Solving	30	70	175	3	0	-	5
		Lab.	25	50				4	
4	Engineering Science Courses/ESC104	Workshop and Manufacturing Practices	30	70	175	1	0	-	3
		Lab.	25	50		-	-	4	
5	Humanities and Social Sciences including Management courses/HSMC101	English	30	70	175	2	0	-	3
		Lab.	25	50				2	
		Total Credits							20.5

In order to balance the load of the some of the subjects which are made in groups (Physics/Chemistry, Engineering Graphics & Design/ Workshop and Manufacturing Practices, Programming for Problem Solving/Engineering Mechanics, English/BEE), the half of the branches of B.Tech course offer one subject of group in odd semester and other half of the branches of B.Tech course offer another subject of same group in odd semester. In the even semester the subjects of the group will be exchanged

MANDATORY INDUCTION PROGRAM

BEFORE BEGINNING OF FIRST SEMESTER

3 Weeks Duration

- Physical Activity
- Creative Arts
- Universal Human Values
- Literay
- Proficiency Modules
- Lectures by Eminent People
- Visits to Local Areas
- Familiarization to Dept./Branch & Innovations

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – II
(Common to all branches)

CHEMISTRY
(Theory)

Class: B.Tech. I Year
Lectures: 3 Hrs/Week

Internal Marks: 30
External Marks: 70

UNIT-I

1. ELECTROCHEMISTRY

(08 Hrs)

Electrode potential, standard electrode potential, Nernst equation (No derivation); Electrochemical series. Types of electrodes - Hydrogen, Quinhydrone, Calomel, and Ion selective electrode (Glass electrode); Galvanic cell, EMF; Determination of pH using Quinhydrone and Glass electrodes; Potentiometric titrations (Acid-base and Redox). Numerical problems.

Batteries: Primary and secondary batteries - Zinc-Carbon battery & Lead-acid battery.

UNIT-II

1. CORROSION

(07Hrs)

Introduction – causes and effects of corrosion. Dry and wet corrosion. Electrochemical theory of corrosion. Galvanic and differential aeration corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic protection. Surface coatings – metallic coatings – methods of application.

2. WATER ANALYSIS AND TREATMENT

(07Hrs)

Hardness of water - Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness. Determination of hardness of water using EDTA method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Brief review of methods of softening of water - Zeolite process and Ion-exchange process. Desalination of water- Reverse osmosis.

UNIT-III

1 Organic reactions, synthesis of a drug molecule & Stereochemistry

(11 Hrs)

Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N^1 , S_N^2 reactions. *Electrophilic and Nucleophilic addition reactions:* Addition of HBr to propene. Markownikoff's and anti-Markownikoff's additions; Grignard additions on carbonyl compounds; *Elimination reactions:* Dehydrohalogenation of alkylhalides. Saytzeff rule. *Oxidation reactions:* Oxidation of alcohols using $KMnO_4$ and chromic acid. *Reduction reactions:* reduction of carbonyl compounds using $LiAlH_4$ & $NaBH_4$. Hydroboration of olefins. *Synthesis and applications of commonly used drug molecules:* Aspirin and Paracetamol.

Stereochemistry: Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation analysis of n- Butane.

UNIT-IV

1. **Molecular structure and Theories of Bonding:** (08 Hrs)

Atomic and Molecular orbitals: Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules. Molecular orbital energy level diagrams (MOED) of N₂, O₂ and F₂ molecules.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT-V

2 **Spectroscopic techniques and applications:** (07Hrs)

Interaction of radiation with matter, spectrum of electromagnetic radiation, Principles of spectroscopy, selection rules and applications of Electronic spectroscopy, Vibrational and Rotational spectroscopy of diatomic molecules. Applications. Numerical problems.

TEXT BOOKS:

1. Text Book of Physical Chemistry by *PL Soni and OP Dharmarha*, Sulthan Chand & Sons.
2. Engineering Chemistry by *PC Jain & M Jain*, Dhanapathi Rai publishing Co.
3. Text Book of Engineering Chemistry by *Shashi Chawla*, Dhanapathi Rai publishing Co.

REFERENCE BOOKS:

1. Principles of Physical Chemistry by *Maron and Prutton*.
2. Applied Chemistry- A Text Book of Engineers & Technologists by *HD Gesser*.
3. Chemistry in Engineering & Technology by *Kuriacose and Rajaram*.
4. Text Book of Engineering Chemistry by *CP Murthy, Agarwal and A Naidu*.
5. A Text Book of Engineering Chemistry by *SS Dara*.
6. Engineering Chemistry by *RP Mani, KN Mishra and B Ramadevi*.
7. Engineering Chemistry by *OP Agarwal*.
8. Fundamentals of Molecular Spectroscopy, by C.N. Banwell

KAKATIYA UNIVERSITY
B. Tech. First Year
SEMESTER – II
(Common to all branches)

CHEMISTRY LABORATORY

(Common to all branches)

(Credits: 1.5)

Class: B.Tech. I Year

Practical: 3 Hrs/week

Internal Marks: 25

External Marks: 50

LIST OF EXPERIMENTS:

1. Determination of Hardness (Total, Temporary and Permanent) of water using EDTA method.
2. Determination of chloride content of water by Argentometry.
3. Determination of rate constant of acid catalysed hydrolysis of methyl acetate.
4. Colorimetric analysis-verification of Lambert-Beer's law using KMnO_4 solution.
5. Conductometric titration of HCl with NaOH
6. Conductometric titration of CH_3COOH with NaOH
7. Potentiometric titration of HCl with NaOH
8. Potentiometric titration of Fe^{2+} with KMnO_4
9. Verification of Freundlich adsorption isotherm-adsorption of acetic acid on charcoal.
10. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
11. Determination of surface tension of a given liquid using stalagmometer.
12. Synthesis of Urea-Formaldehyde resin polymer / Synthesis of Aspirin.

TEXT BOOKS:

1. *Vogel's Inorganic Quantitative analysis* (2007).
2. *College Practical Chemistry by VK Ahluwalia* (2007)
3. *Senior Practical Physical Chemistry by BD Khosla, A Gulati and VC Garg* (2001)
4. *Practical Physical Chemistry by B Vishwanathan, PS Raghavan.*
5. *Text book on Experiments and calculations in Engineering chemistry – S.S. Dara*
6. *Vogel's text book of practical organic chemistry 5th edition*

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – II
(Common to all branches)

MATHEMATICS -2

(MAXIMUM HOURS: 48)

Unit 1: Integral Transforms

Laplace Transforms: Laplace transforms of elementary functions, properties, transform of derivatives, transform of integrals, multiplication by t , division by t , evaluation of integrals, inverse transforms, convolution theorem, and application to differential equations.

(21.1, 21.2, 21.3, 21.7, 21.8, 21.9, 21.10, 21.11, 21.12, 21.13, 21.14, 21.15 of Text Book)

Unit 2: Linear Algebra

Rank of a matrix, solution of linear system of equations, consistency of linear system of equations, linear independence vectors and linear dependence vectors, Eigen values and Eigen vectors, Caley Hamilton theorem, reduction to diagonal form, complex matrices, Hermition matrix and conjugate matrix.

(Sections 2.7(1), 2.9, 2.10, 2.12, 2.13, 2.14, 2.15, 2.16, 2.19 of Text Book)

Unit 3: Partial Differential Equations

Formation of partial differential equations, linear equations of first order, non-linear equations of first order, Charpit's method, homogenous equations with constant coefficients , applications (one dimensional wave equation, one dimensional heat flow, two dimensional heat flow).

(Sections 17.1, 17.2, 17.3, 17.5, 17.6, 17.7, 17.8, 18.1, 18.3, 18.4, 18.5, 18.6 of Text Book)

Unit 4: Complex Variable - Differentiation

Limit of complex functions, derivative of a complex function, analytic function, Cauchy-Reimann equations, Harmonic functions, applications to flow problems, some standard transformations.

(Sections 20.1, 20.2, 20.3, 20.4, 20.5, 20.6, 20.7, 20.8 of Text Book)

Unit 5: Complex Variables - Integration

Complex integration, Cauchy's theorem, Cauchy's integral formula, Cauchy's inequality, Liouville's theorem, Taylors series, Laurent's series, Singularities of function, residues, residue theorem, evaluation of real definite integrals (integration of trigonometric functions around unit circle, integral of functions around a semi-circle).

(Sections 20.12, 20.13, 20.14, 20.15(2,3), 20.16, 20.17, 20.18, 20.20(a, b) of Text Book)

Text Book: B.S. Grewal et.al. Higher Engineering Mathematics, 43rd Edition, Khanna Publicationns.

Reference: Erwin Kreyszig, Aadvanced Engineering Mathematics, 8th Edition , John Wiley & Sons.

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – II
(Common to all branches)

Programming for Problem Solving

Teaching Scheme				Examination Scheme
L	T	P	C	Internal marks: 30
3	-	4	5	External marks:70

UNIT-I: (6+2)

Introduction:

Block Diagram of Computer, Number system (Binary, Octal and Hexa decimal), Input-Output devices.

Operating system definition goals and services, compilers and interpreter, Problem solving steps, Algorithms, Flow chart, Types of programming languages, Introduction to C –language.

Unit-II: (7+3)

Fundamentals of C-language:

Token of C-languages: Identifiers, key words, Constants, Data types, Declaration and initialization statements, compound statements, Operators, Expressions and evaluation, Type conversion, Input-output statements, Structure of C-program.

Unit-III: (7+3)

Control structures/statements:

Decision statements: if, if-else, if-else-if, nested-if and switch-case

Iterative statements: while, do-while and for

Unconditional branching statements: break, continue, goto and exit .

Unit-IV: (7+3)

Arrays and Pointers:

Arrays: Definition of Arrays, 1-Dimensional arrays, 2-Dimensional arrays and multi dimensional arrays, Strings, String handling functions.

Pointers: Definition and declaration of pointer, operation on pointers, pointer and arrays, pointer to functions

Unit-V: (7+3)

Structure-Union: Definition and syntax of structure, union, Comparison between union & structure, nested structures, array of structures, pointer to structures.

Functions: Definition, function prototype, library and user define functions, types of functions, storage classes, parameter passing methods (call by value and call by address), recursion and macros.

Files: Introduction, File modes, Input and out operations on files.

TEXT BOOKS:

1. Let Us C, 14th Edition, Yashavant P. Kanetkar, BPB Publications, ISBN 13: 9788183331630.
Herbert Schildt, "C: The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.
2. C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, ISBN 0-13-110362-8

TEXT/REFERENCE BOOKS:

1. Programming in ANSI C, SIXTH edition, E.Balaguru Swamy, Tata McGraw Hill Pvt Ltd, ISBN-10: 1259004619.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
3. Programming in C. Second Edition, Reema Thareja, ISBN: 9780199456147, Oxford University Press.

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – II
(Common to all branches)

PROGRAMMING FOR PROBLEM SOLVING LAB USING C

Teaching Scheme

L T P C

- - 4 2

Examination Scheme

Internal Marks: 25

External Marks: 50

LIST OF EXPERIMENTS

1. Programs using input output functions
2. Programs for declaration statement, initialization statement, data type conversions
3. Programs using all operators in C
4. Programs using conditional control structures; if, if-else, nested if, if else if ladder and switch
5. Programs using loop control structures: while, do-while, for,
6. Programs using unconditional statements : break, continue, goto
7. Programs on one dimensional array and two dimensional arrays
8. Programs using functions: different types, parameter passing using call-by-value, call-by-reference
9. Programs using recursion
10. Programs using strings and sharing handling functions
11. Programs using pointers, pointers to arrays, pointer to functions
12. Programs using structures and unions

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – II
(Common to all branches)

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry –

1. Study of Carpentry Tools, Equipment and different joints.
2. Practice of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint

II. Fitting –

1. Preparation of square-Fit as per the given specifications.
2. Preparation of Dovetail Fit as per the given specifications.
3. Preparation of Semi-circular as per the given specifications.

III. Foundry –

1. Introduction to foundry, Patterns, pattern allowances, ingredients of moulding sand and melting furnaces. Foundry tools and their purposes
2. Demo of mould preparation
3. Practice – Preparation of mould by using split pattern.

IV. Welding Practice –

1. Introduction, Study of Tools and welding Equipment (Gas and Arc welding)
2. Selection of welding electrode and current, Bead practice.
3. Practice of Butt Joint, Lap Joint. VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)

V. Plumbing:

1. Practice of Internal threading, external threading, pipe bending, pipe fitting.
2. Pipes with coupling for same diameter and with reducer for different diameters.
3. Practice of T-fitting, Y-fitting, Gate valves fitting.

KAKATIYA UNIVERSITY
B.Tech. First Year
SEMESTER – II
(Common to all branches)

English

Course Code	HSMC 101				
Category	Humanities and Social Sciences Including Management Courses				
Course Title	English				
Scheme and Credits	L	T	P	Credits	Semester-II
	2	0	2	3	
Exam Pattern	Internal 30 Marks and External: 70 Marks				
Course Completion	Max 48 Hours				

Unit 1. Vocabulary Building

- 1.1 The concept of Word Formation
- 1.2 Root words 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, and standard abbreviations.

Unit 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

Unit 3. Identifying Common Errors in Writing

- 3.1 Subject-verb agreement
- 3.2 Noun-pronoun agreement
- 3.3 Misplaced modifiers
- 3.4 Articles
- 3.5 Prepositions
- 3.6 Redundancies
- 3.7 Clichés

Unit 4. Nature and Style of sensible Writing

- 4.1 Describing
- 4.2 Defining
- 4.3 Classifying
- 4.4 Providing examples or evidence
- 4.5 Writing introduction and conclusion

Unit 5. Writing Practices

- 5.1 Comprehension
- 5.2 Précis Writing
- 5.3 Essay Writing

PRACTICALS/LAB: Oral Communication

(This unit involves interactive practice sessions in Language Lab)

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

Prescribed Text Book

Language and Life: A Skills Approach, Orient Blackswan 2018

Suggested Readings:

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

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B.TECH IN ENGINEERING
CSE/IT
III SEMESTER

Sl. No	Category/ Code	Course Title	L	T	P	Credits
1	MC-210	Environmental Science	2	0	0	0
2	BSC105	Mathematics – III	3	0	0	3
3	ESC-301	Analog Electronics	3	1	0	4
4	PCS-301	Data Structures using “C”	3	1	0	4
5	PCS-302	Computer Architecture & Organization	3	1	0	4
6	ECC-301L	Analog Electronics Lab	0	0	3	1.5
7	PCS-301L	Data Structures Lab	0	0	4	2
8	PCS-303L	IT Workshop using “C” Lab.	-	-	3	1.5
		Total Contact Hours		27		20

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Department of Information Technology

B. Tech. (CSE/IT) III SEMESTER

MC-210

ENVIRONMENTAL SCIENCES

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
2	0	0	0	External Marks: 70

UNIT-I (8)

Introduction to Environmental Science: Environment and society, major environmental issues: Ozone layer depletion, Acid rains, global climate change etc, sustainable development, Environmental impact assessment, environmental management

Natural Resources Utilization and its Impacts: Energy, minerals, water and land resources, Resource consumption, population dynamics, urbanization.

UNIT-II (8)

Ecology and Biodiversity: Energy flow in ecosystem, food chain, nutrient cycles, eutrofication value of biodiversity, biodiversity at global, national and local levels, threats for biodiversity, conservation of biodiversity.

UNIT-III (8)

Water Pollution: Sources, types of pollutants and their effects, water quality issues, contaminant transport, self-purification capacity of streams and water bodies, water quality standards, principles of water and wastewater treatment.

UNIT-IV (8)

Air Pollution: Sources, classification and their effects, Air quality standards, dispersion of pollutants, control of air pollution, automobile pollution and its control.

UNIT-V (8)

Solid Waste Management: Sources and characteristics of solid waste, effects, Collection and transfer system, disposal methods.

Text Books:

1. M. Chandrasekhar, Environmental science, Hi Tech Publishers, 2009.
2. P.N. Modi (2006), Water supply Engineering – Environmental Engineering (Vol. I) – Standard Book House.
3. Gerard Kiely, Environmental Engineering, McGraw Hill Education Pvt Ltd, Special Indian Edition, 2007.

References:

1. W P Cunningham, M A Cunningham, Principles of Environmental Science, Inquiry and Applications, Tata McGraw Hill, Eighth Edition, 2016.

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B. Tech. (CSE/IT) III SEMESTER

BSC-105

Mathematics - III

STATISTICS, PROBABILITY, AND NUMERICAL TECHNIQUES

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

Module1: Statistical Methods

Introduction, Collection of Data, Graphical Representation, Measures of Dispersion, Moments, Skewness, Kurtosis, Correlation, Coefficient of Correlation, Lines of Regression.

(Sections 25.1, 25.2, 25.3, 25.6, 25.9, 25.10, 25.11, 25.12, 25.13, 25.14 of Text Book)

Module2: Probability & Distributions

Probability, Addition Law of Probability, Independent Events, Baye's Theorem, Random Variable, Continuous Probability Distribution, Expectation, Moment Generating Function, Binomial Distribution, Poisson Distribution, Normal Distribution, Exponential Distribution. (Sections 26.1, 26.4, 26.5, 26.6, 26.7, 26.9, 26.10, 26.11, 26.14, 26.15, 26.16, 26.19(6) of Text Book)

Module3: Numerical Techniques-I

Solution of Algebraic and Transcendental Equations, Principle of Least Squares, Method of Least Squares, Fitting of Other Curves, Finite Differences, Forward Differences, Backward Differences. (Sections 28.2, 24.4, 24.5, 24.6, 30.2, 30.2(1), 30.2(2) Of Text Book)

Module4: Numerical Techniques-II

Central Differences, Other Difference Operators, Newton's Interpolation Formulae, Gauss's Forward Interpolation Formula, Interpolation with Unequal Intervals, Numerical Differentiation. Sections 29.7, 29.4, 29.6, 29.7(1), 29.9, 30.1. of Text Book)

Module5: Numerical Techniques-III

Numerical Integration, Trapezoidal Rule, Simpson's one-third Rule, Simpson's three-eighth Rule, Weddle's Rule, Solution of Simultaneous Linear Equations (Iterative Methods)

(Sections 30.4, 30.6, 30.7, 30.8, 30.10, 28.5 of Text Book)

Text Book:

B.S Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publications.

References

1. Erwin Kreyszig, Advanced Engineering Mathematics, 8th Edition, John Wiley & Sons
2. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons
3. S.S. Sastry, Introductory Methods of Numerical Analysis, PHI Learning Pvt. Ltd.

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B. Tech. (CSE/IT) III SEMESTER

ESC 301

ANALOG ELECTRONICS

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

UNIT-I

Review of Semiconductor Devices: P-N junction and V-I characteristics, static and dynamic resistance, effect of temperature on V-I characteristics, Avalanche and Zener breakdown, Zener diode

Regulated power supply: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with capacitive and inductive Filters, Voltage regulator, Block diagram of switched mode power supply

UNIT-II

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations and characteristics, Transistor as an amplifier and switch

DC Analysis: Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Thermal runaway and stabilization

UNIT-III

Field Effect Transistor (FET): Construction, Principle of Operation, V-I Characteristic and DC analysis of JFET, MOSFET, FET application as switch and amplifier.
Frequency response of BJT and FET RC coupled amplifier,

UNIT-IV

Feedback: Advantages of negative feedback and effect of negative feedback on amplifier characteristics

Positive feedback: Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Hartley and Colpitts Oscillators, Crystal Oscillator.

UNIT-V

Operational Amplifier: Block diagram and Ideal characteristics, pin diagram and practical characteristics of IC 741, Op-amp application as adder, subtractor, difference amplifier, differentiator, integrator and square wave (clock pulse) generator (Qualitative treatment only)

Timer: 555 timer as mono-stable and astable mode and its basic application as square wave generator. (Qualitative treatment only)

TEXT BOOKS:

1. Jacob Millman & Christos C. Halkias, *Electronic Devices and Circuits*, McGraw Hill Education.
2. Robert L. Boylestad, Louis Nashelsky, *Electronic Devices and Circuits theory*, 11th Edition, 2009, Pearson
3. Roy Choudhary, Shail Jain, *Linear Integrated Circuits*, New Age International, New Delhi.

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Department of Information Technology

B. Tech. (CSE/IT) III SEMESTER
PCS – 301
DATA STRUCTURES USING “ C”

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

UNIT-I

Introduction

Introduction to data structure, types of data structures, revision of arrays, memory representation of arrays, operations on arrays, static versus dynamic memory allocation, pointers, self-referential structure Time complexity.

UNIT-II

Linked lists

Single linked list representation, operations on single linked list, Circular linked list and its operations, Doubly linked list and its operations, applications of lists, polynomial representation using lists.

UNIT-III

Stack-Queue (Linear Data structures)

Definition of stack, operations on stack, implementation of stack using arrays and linked lists, application of stack, postfix evaluation using stack, conversion of infix to postfix and prefix expressions.

Definition of queue, operations on queue, implementation of queue using arrays and linked list, applications of queue, Circular queue and priority queue.

UNIT-IV

Trees-Graphs (Nonlinear Data structures)

Definition of trees, Terminology on trees, binary tree, binary search tree and its operations, tree traversal techniques.

Definition of graph, terminology on graphs, representation of graphs, graph traversal techniques, spanning tree, minimum spanning tree algorithms.

UNIT-V**Searching-Sorting**

Searching: Linear search, Binary search

Sorting: Bubble sort, Insertion sort, selection sort, quick sort and merge sort.

Text Books:

1. Ellis Horowitz, Sartaj Sahani, Dinesh Metha, “Fundamentals of data structures in C”, Galgotia Publications Pvt. Ltd, ISBN 81-203-1874-9.
2. D. Samanta, “Classic data structures”, Printice Hall India, ISBN 81-203-1874-9.

Reference Books:

1. Data Structures Using C, SIXTH edition, E. Balaguru Swamy, Tata McGraw-Hill, ISBN 1-25-9029544-9.
2. Fundamentals Of Data Structures In C, Horowitz, Sahni, Universities Press ISBN 10: 8173716056

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B. Tech. (CSE/IT) III SEMESTER

PCS – 302

COMPUTER ARCHITECTURE AND ORGANIZATION

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

UNIT-I

Review of Computer Systems: The Evolution of Computers, Basic Functional Units and Operation of Digital Computers, Performance Measures.

Number Representation: Integer, Signed, Unsigned, 1's Complement, 2's Complement, r's Complement, Addition and Subtraction of Signed Numbers, Overflow in Integer Arithmetic, Fixed and Floating Point Representation, IEEE 754 Representation, BCD , Gray code.

Instructions: Memory Location and Address: Byte addressability, Big endian & Little endian assignments, Word alignment, Accessing Numbers, Characters and Character strings. Addressing modes, Instruction Format: Three, Two, One, Zero Address Instructions, Risk Instructions, Modes of Instructions, Instruction Sequencing, Assembly Language, Stacks and Queues, Subroutines.

UNIT-II

Central Processing Unit: Fundamental Concepts, Execution of Complete Instruction, Control Unit, Micro Programming Control Unit, Hardwired Control Unit, Study of 8088, Power Pc Processor.

Memory Unit: Basic Concepts of Memory, Memory Hierarchy, Technology: RAM, ROM, Flash Memory, EPROM, Cache Memory: Different Mapping Functions, Replacement Algorithms,

Performance Considerations: Interleaving, Hit Rate, Miss Penalty, Caches on Processor Chip, Virtual Memory: Address Translation, Associative Memory, Page replacement algorithms. Secondary Storage: Magnetic Hard disk, Optical Disk, Magnetic Tape.

UNIT-III

Computer Arithmetic: Addition & Subtraction of Signed Numbers, Carry look ahead adder, Multiplication of positive numbers, Booth's Algorithm, Fast Multiplication, Integer Division, Floating Point Arithmetic Operation: Addition, Subtraction, Multiplication & Division .

Input/Output Unit: I/O Interface: I/O Bus and Interface Modules, I/O Vs Memory Bus, Isolated I/O, Memory Mapped I/O, Synchronous & Asynchronous Data Transfer, Modes of Data Transfer: Programmed I/O, Interrupt initiated I/O, Priority Interrupt: Daisy Chaining Priority, Parallel Priority, Interrupt, Priority Encoder, Interrupt Cycle, Software Routine, DMA, Interface Circuit: Parallel, Port, Serial Port, Standard I/O Interfaces: PCI Bus, SCSI Bus, Universal Serial Bus.

UNIT-IV

Computer Peripherals: Input Devices: Keyboard, mouse, joystick, track ball, touch pad , scanners.
Output Devices: Video displays, flat panel display, printers, graphics accelerators.

Pipelining: Basic concepts, Data & instruction hazards, Influence on instruction sets, Data path and control considerations, Super scalar operations.

Introduction to RISC, CISC. Introduction to parallel processing, interprocessor communication & synchronization

UNIT-V

Large Computer Systems: Forms of Parallel Processing, Array Processors, The Structure of General purpose multiprocessor, Interconnection Networks, Memory Organization, Program Parallelism and Shared Variables

Text Books:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky Computer Organization, Tata McGraw Hill, 5/e

Reference Books:

1. Morris M. Mano, Computer System Architecture, PHI, 3rd Edition
2. John P. Hayes, Computer Architecture and Organization, McGraw Hill, 3/e
3. Andrew S. Tanenbaum, Structured Computer Organization, 6/e

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B. Tech. (CSE/IT) III SEMESTER
ESC – 301L
ANALOG ELECTRONICS - LAB

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

- 1) Characteristics of PN junction and Zener diode
- 2) Full wave rectifier with and without filters
- 3) Characteristics of common base and common emitter BJT amplifier
- 4) Frequency response of RC coupled amplifier
- 5) Characteristics of common source FET amplifier
- 6) Design of different oscillators using BJT and FET
- 7) Op-amp applications as adder/Subtractor,
- 8) Op-amp applications as differentiator/integrator
- 9) 555 timer astable mode of operation i.e. square wave generator

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B. Tech. (CSE/IT) III SEMESTER
PCS- 301L
DATA STRUCTURES USING “C” LAB

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

LIST OF EXPERIMENTS

1. Program to implement array operations.
2. Program to represent sparse matrix using array, and display its transpose.
3. Program to perform addition of two sparse matrices.
4. Program to implement stack and its operations using arrays.
5. Program to implement stack operations using arrays.
6. Program to implement multiple stacks in single array.
7. Program to convert infix expression to postfix expression.
8. Program to convert given infix expression to prefix expression.
9. Program to evaluate given postfix expression.
10. Program to implement queue operations using arrays.
11. Program to implement circular queue operations using arrays.
12. Program to create single linked list and implement its operations.
13. Program to implement double linked list and its operations.
14. Program to implement stack and queue using linked list.
16. Program to implement binary search tree and traversing techniques.
15. Program for linear search and binary search.
16. Programs for bubble sort, selection sort, insertion sort, quick sort and merge sort.

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B. Tech. (CSE/IT) IV SEMESTER

PCS 303L

IT WORKSHOP - LAB

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

LIST OF EXPERIMENTS

PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

LaTeX and Word

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

Task 3: Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

Reference books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech.
2. The Complete Computer upgrade and repair book, 3rd Edition, Cheryl A Schmidt, WILEY Dreamtech.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware and A+Handbook, Kate J. Chase, PHI (Microsoft).
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and KenQuamme. – CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and StudyGuide Third Edition by Patrick Regan – CISCO Press, Pearson Education.
8. Microsoft Office 2007: The Missing Manual - Chris Grover, Mathew MacDonald, E.A. Vander Veer O'reilly Media.

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B.TECH IN ENGINEERING
CSE/IT
IV SEMESTER

Sl. No	Category / Code	Course Title	L	T	P	Credits
1	MC-220	Constitution of Indian	2	0	0	0
2	ESC-401	Digital Electronics	2	1	0	3
3	PCS-401	Mathematical Foundations in Computer Science	3	1	-	4
4	PCS-402	Design and Analysis of Algorithms	3	1	-	4
5	PCS-403	Operating Systems	3	1	-	4
6	PCS-404	OOP Through JAVA	3	1	0	4
7	PCS-403L	Operating Systems Lab.	-	-	3	1.5
8	PCS-404L	OOP Through JAVA Lab	-	-	3	1.5
Total Contact Hours			27			22

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B. Tech. (CSE/IT) IV SEMESTER**MC-220****CONSTITUTION OF INDIA**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
2	0	0	0	External Marks: 70

UNIT -1

1. Making of Indian Constitution - Constituent Assembly
2. Historical Perspective of the Constitution of India
3. Salient Features and characteristics of the Constitution of India

UNIT -2

1. The Fundamental Rights
2. The Fundamental Duties and their Legal Status
3. The Directive Principles of State Policy – Their Importance and Implementation

UNIT -3

1. Federal Structure and Distribution of Administrative, Legislative and Financial Powers between the Union and the States
2. Parliamentary Form of Government in India – The Constitutional Powers and Status of the President of India
3. Amendment of the Constitutional Provisions and Procedure

UNIT -4

1. The Judiciary
2. Constitutional and Legal Frame Work for Protection of Environmental in Global and National Level
3. Corporate Social Responsibility (CSR) International and National Scenario.

Text books:

1. D.D. Basu: An Introduction of Indian Constitution
2. Greanvile Austin: The Indian Constitution
3. Paras Diwan: Studies on Environmental cases

References books:

1. Khanna Justice.H.R: Making of India's Constitution, Eastern Book Companies.
2. Rajani Kothari: Indian Politics
3. Ghosh Pratap Kumar: The Constitution of India. How it has been Formed, World Press.
4. A.Agrawal (Ed): Legal Control of Environmental Pollution.

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B. Tech. (CSE/IT) IV SEMESTER

ESC-401

DIGITAL ELECTRONICS

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
2	1	-	3	External Marks: 70

UNIT-I

Number System and Boolean algebra And Switching Functions: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Alphanumeric Codes, Error Detecting and Correcting Codes.

Boolean Algebra: Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification, Digital Logic Gates, Universal Gates, NAND/NOR realizations.

UNIT-II

Minimization of Boolean logic: Introduction, the Karnaugh Map Method, four Variable Maps, Prime and Essential Implications, Don't Care Map Entries, Tabular Method, Minimization and Combinational Design

Basic Combinational circuits: Half adder, Full adder, half subtractor, full subtractor, serial and parallel adder, carry look ahead adder, adder/subtractor

UNIT-III

Combinational logic circuits: Decoder, implementation of Boolean equations using decoder of suitable size, Multiplexer, Logic implementation using multiplexer, Encoder, priority encoder, demultiplexer, comparator

UNIT-IV

Sequential Circuits: SR Flip flop, edge and level triggered clock pulse, direct and indirect inputs of flip flop, JK, D and T flip flops. Race around condition, Master slave JK flip flop

Application of Flip flop as shift register, Asynchronous counter, synchronous counter and ring counter. (Qualitative treatment only)

UNIT-V

Logic Families: Characteristics of logic families, RTL, DTL, HTL, ECL, TTL and CMOS logic family circuits and its operation.

TEXT BOOKS:

- 1) Switching and Finite Automata Theory- ZviKohavi&Niraj K. Jha, 3rd Edition, Cambridge.
- 2) Digital Design- Morris Mano, PHI, 3rd Edition.
- 3) R. P. Jain, Modern Digital Electronics, McGraw Hill Publishers'.

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B. Tech. (CSE/IT) IV SEMESTER

PCS 401

MATHEMATICAL FOUNDATIONS IN COMPUTER SCIENCE

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

UNIT – I

Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions. Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Groups, Lattices as Partially Ordered Sets, Boolean algebra

UNIT -- II

Mathematical logic: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT - III

Propositional logic: Syntax, semantics, validity of formulas, satisfiable and unsatisfiable formulas, encoding and examining the validity of some logical arguments

Proof techniques: Proof by Induction, proof by contradiction, contra positive proofs, proof of necessity and sufficiency; first order Logic: Brief introduction; Basics of soundness and completeness;

UNIT – IV

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relations by substitution and Generating functions, The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT – V

Graphs: Basic Concepts, Isomorphism's and Sub graphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited. (UNITS - I, II)
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed. (Units - IV, V)

Reference Books:

1. Discrete Mathematics by N Ch SN Iyengar, VM Chandrasekaran.
2. Discrete Mathematics and Graph Theory(Cengage Learning) by Sartha
3. Discrete Mathematics and its Applications. Kenneth H Rosen.(McGraw Hill)
4. Elements of Discrete Mathematics, C. L. Liu and D. P. Mohapatra, 4th edition, McGraw Hill education (India) Private Limited
5. Norman L. Biggs, Discrete Mathematics, Oxford University Press, 2nd edition, 2002.

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B. Tech. (CSE/IT) IV SEMESTER
PCS 402
DESIGN AND ANALYSIS OF ALGORITHMS

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

UNIT - I

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations- Big oh notation, Omega notation, Theta notation and little oh notation. Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT - II

Disjoint Sets: Disjoint set operations, union and find algorithms

Backtracking: General method, applications, n-queen's problem, sum of subsets problem, graph coloring

UNIT - III

Dynamic Programming: General method, applications- Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT - IV

Greedy method: General method, applications-Job sequencing with deadlines, knapsack Problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT - V

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack Problem - LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem

Text Books

1. Introduction to Algorithms, second edition, T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education.
2. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press.

References

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons.

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B. Tech. (CSE/IT) IV SEMESTER

PCS 403

OPERATING SYSTEMS

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

UNIT - I

Overview – Introduction-Operating System objectives, User view, System view, Operating system definition, Computer System Organization, Computer Systems Architecture, OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments.

Operating System services, User and OS interface, system calls, types of system calls, system programs, operating system design and implementation, OS structure. General Structure of MSDOS, Windows 2000, Linux.

UNIT – II

Process and CPU Scheduling- Process Concepts – The Process, Process State, Process Control Block, Threads – Process Scheduling – Schedulers - Context Switch, Operations on Processes, System calls – fork(), exec(), wait(), exit(), Inter Process Communications - Process Management in UNIX.

Process Scheduling- Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real Time Scheduling, Thread Scheduling,

UNIT -III

Process Synchronization, Background, Critical Section Problem – Two process solution, Synchronization Hardware, Semaphores – classic problems of synchronization, Monitors
Case study of Linux and Unix.

Deadlocks – System Model, Deadlock Characterization, Methods of Handling Deadlocks, Deadlock prevention, avoidance, detection, recovery, Starvation, Critical Regions,

UNIT- IV

Memory Management- Memory Management Strategies- Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table,

Virtual Memory Management- Background, Demand Paging – Page Interrupt Fault, Page Replacement Algorithms, Allocation of Frames, Thrashing, Memory Management in UNIX, Windows.

Storage Management – File System- Concept of a File, System calls for file operations, Access Methods, Directory and Disk Structure – File System Mounting, File Sharing Protection.

UNIT -V

File System Implementation – File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance.

Mass Storage Structure- Over of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Swap space management.

Protection - System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation Access Rights, Capability Based Systems, Language Based Protection.

Text Books

1. Operating Systems Concepts – Abraham Silberschatz, Peter Galvin, Greg Gagne, 9th Edition, 2016, Wiley India Publications

References

1. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition Pearson Education Asia Publications.
2. Modern Operating Systems – Andrew S. Tenenbaum, 3rd Edition, PHI Publications.
3. Operating Systems – Deitel & Deitel, Pearson Education Asia.

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B. Tech. (CSE/IT) III SEMESTER

PCS – 404

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

UNIT-I

Programming Paradigms: Procedural Programming, Modular Programming, Object Oriented Programming and Generic Programming, Object Oriented Programming Concepts.

Java basics: Creation of Java, Java buzzwords, Data types, Variables and Arrays, Operators, Control statements, introductions to classes and simple programs.

UNIT-II

Classes and objects: Creating classes and objects , visibility modes, constructors, Overloading methods, Passing and returning objects, Recursion, Variable length arguments, Nested and inner classes, static - variables, Blocks and methods.

String: Exploring String, StringBuffer, StringBuilder and StringTokenizer classes.

UNIT-III

Inheritance: Basic concepts, Types of inheritance, Using super, Creating multilevel inheritance, Method Overriding, Runtime polymorphism, Dynamic method dispatch, Using abstract classes, Using final with inheritance, The Object class.

Packages and interfaces: Packages, Access Protection, Importing packages, Interfaces –Defining an interface, Implementing interfaces, Nested interfaces, Applying interfaces, Variables in interfaces, Interfaces can be extended.

UNIT-IV

Exception handling: Fundamentals of exception handling, exception type, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built in exceptions, creating own exceptions

Using I/O: The Predefined Streams, Using byte streams, Reading and writing Files using byte streams, Using Java's Character-based streams, Using Java's type wrappers to Convert Numeric Strings

UNIT-V

Applets: Applet basics, applet skeleton, Applet initialization and termination, Requesting repainting, Using the status window, Passing parameters to Applets.

AWT: AWT classes, Window Fundamentals, Working with Frame Windows, Creating a Frame Window in an applet AWT Controls: Control Fundamentals, Labels, Using Buttons, Check Boxes, Choice Controls, Lists, Scroll Bars, Text Field, Text Area, Understanding Layout Managers, Menu Bars and Menus, Dialog Boxes.

Text Books:

1. Herbert Schildt, "JAVA The Complete Reference", *9th Edition, McGraw-Hill Education India Pvt.Ltd*, ISBN: 9781259002465, 2011.
2. Herbert Schildt, Dale Skrien, "Java Fundamentals (A Comprehensive Introduction)", *1st Edition, McGraw Hill Education*, ISBN-13: 978-1-25-900659-3, 2013. (Chapters: 11, 15, 17, 18).

Reference Books:

1. Sachin Malhotra, Saurabh Choudhary, "Programming in JAVA", *2nd Edition, Oxford Publications*, ISBN-13: 978-0-19-809485-2, 2013. (Chapters: 1 to 8, 12 to 15)
2. Kathy Sierra, Bert Bates, "Head First Java", *2nd Edition, O'Reilly Publications*, ISBN-13: 978-0596009205, 2013.
3. UttamK.Roy, "Advanced JAVA Programming", *1st edition, Oxford Publications*; ISBN-13: 978-0199455508, 2013.

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B. Tech. (CSE/IT) IV SEMESTER

PCS 403L

OPERATING SYSTEMS - LAB

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

LIST OF EXPERIMENTS

1. Unix Commands, File permissions, VI editor, UNIX shell programming fundamentals.
2. Programs on Process creation using fork(), exec() and wait() system calls.
3. Programs on Implementation of pipes and FIFOs
4. Programs on CPU Scheduling algorithms like FCFS, LRU etc.
5. Programs on semaphores, readers and writers problem.
6. Programs on Implementation of Bankers' Algorithm.
7. Programs on Implementation of paging table.
8. Programs on Implementation of Page Replacement Algorithms,
9. Programs on Implementation of File Access Methods.
10. Programs on Implementation of Access Matrix.
11. Programs on Implementation of File Allocation Methods.

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B. Tech. (CSE/IT) III SEMESTER

PCS – 404L

OBJECT ORIENTED PROGRAMMING THROUGH JAVA - LAB

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

List of Experiments

Experiment-I

1. Write a program to demonstrate control structures using sample of displaying prime numbers within a given range.
2. Write a program to read an array and display them using for-each control. Finally display the sum of array elements.
3. Write a program to read a matrix and display whether it is an identity matrix or not. Use civilized form of *break* statement.
4. Write a program to define a two dimensional array where each row contains different number of columns. Display the 2D-array using for-each.

Experiment-II

1. Write a program to demonstrate creating classes and objects with different visibility modes.
2. Write a program to demonstrate passing objects to methods.
3. Write a program to demonstrate constructors.
4. Write a program to demonstrate static variables.

Experiment-III

1. Read at least 5 strings from command line argument and display them in sorted order.
2. Accept the string, count number of vowels and remove all vowels using *StringBuffer* class.
3. Accept a line of text, tokenize the line using *StringTokenizer* class and print the tokens in reverse order.

Experiment-IV

1. Write program to demonstrate single inheritance.
2. Write program to demonstrate multilevel-inheritance.
3. Write program to demonstrate run time polymorphism java.
4. Write a program to demonstrate use of abstract class.
5. Write a program to demonstrate the use of overriding *equals()* method of an Object class.

Experiment-V

1. Write a program to create a package, and demonstrate to import a package into our file.
2. Write a program to implement multiple interfaces into single class.

Experiment-VI

1. Write a program to demonstrate exceptions using try and catch.
2. Handle *Array Index Of Bounds Exception*, *Number Format Exception* and *Arithmetic Exception* using multiple catch blocks.
3. Write a program to demonstrate re-throw of exception, and finally block.

Experiment-VII

1. Write a program to demonstrate wrapper class using sample of reading two integer numbers from command line and display their quotient.
2. Write a program to demonstrate Character-based streams.
3. Write a program to show the content of the specified file.
4. Write a program to copy the content of one file to another.

Experiment-VIII

1. Develop an applet to display “Good Morning” if current time is between 6AM and 12PM and “Good Afternoon” if the current time is between 12PM and 6PM, and “Good Evening” if the current time is between 6PM and 12AM.
2. Develop an applet which draws different geometric shapes and fill them with different colors.
3. Implement an applet program to display moving banner.

Experiment-X

1. Design a registration form using java frame window with AWT controls
2. Write a program to create frame windows to include different controls with different layouts.
