

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	30		-	-	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	175	1	0	4	3
		Lab.	25	50					
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), 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

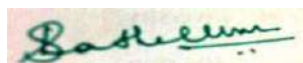
Continuity equation for current densities; Modifying equation for the curl of magnetic field to satisfy continuity equation; displacement current and magnetic field arising from time-dependent electric field; calculating magnetic field due to changing electric fields in quasi-static approximation. Maxwell's 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'egrange'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), 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

Details about Question Paper of External Examination (Model)

Time: 3 Hrs

Marks: 70

The question paper consists of TWO sections. (section-A & section-B)

SECTION-A (10X01=10 Marks)

Attempt **all** Questions. Each Question carries 01 Mark.

Q I: About **10** short answer type Questions from all the units. (02 Questions from each unit)

SECTION-B (05X12=60 Marks)

Attempt any **five (05)** Questions. Each Question carries 12 Marks.

Q II to Q VIII: Should be given **one** question from each unit and set to **07** Questions.

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

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL -506009

Department of Computer Science & Engineering
Department of Information Technology

III SEMESTER OF B.TECH IN ENGINEERING

Sl. No	Category/ Code	Course Title	L	T	P	Credits
1	MC-210	Environmental Science	2	0	0	0
2	BSC-301	Mathematics – III	2	1	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 Lab.	-	-	3	1.5
		Total Contact Hours		27		20

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL-506 009

Department of Computer Science & Engineering
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
3	1	-	4	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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Department of Computer Science & Engineering
Department of Information Technology

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 Computer Science & Engineering
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.

Suggested Text/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

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL -506009

Department of Computer Science & Engineering
Department of Information Technology

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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Department of Computer Science & Engineering
Department of Information Technology

B. Tech. (CSE/IT) III SEMESTER

ESC – 301L Analog Electronics Laboratory

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

Faculty of Engineering & Technology
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Department of Information Technology

B. Tech. (CSE/IT) III SEMESTER

PCS- 301L Data structures Lab Using C

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.

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL -506009

Department of Computer Science & Engineering
Department of Information Technology

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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IV SEMESTER OF B.TECH IN ENGINEERING

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

- 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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Department of Information Technology

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 Publihsers.

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL -506009
Department of Computer Science & Engineering
Department of Information Technology

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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Department of Information Technology

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- Overview 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.

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 ,String Buffer, String Builder and String Tokenizer 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.*

Faculty of Engineering & Technology
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Department of Information Technology

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

OOP Through Java Laboratory

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 in 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 ourfile.
2. Write a program to implement multiple interfaces into singleclass.

Experiment-VI

1. Write a program to demonstrate exceptions using try and catch.
2. Handle *ArrayIndexOutOfBoundsException*, *NumberFormatException* and *ArithmeticException* 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.

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Department of Information Technology

B. Tech. (IT) V SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PC3101IT	Database Management Systems	3	1	0	4	30	70	4
2	PC3102IT	Theory of Computation	3	1	0	4	30	70	4
3	ES3103IT	Principles of Signals and Systems	3	0	0	3	30	70	3
4	PE-I*	Professional Elective – I*	3	1	0	4	30	70	4
5	HS3108-	Managerial Economics and Accountancy	3	0	0	3	30	70	3
6	PC3109IT	Database Management Systems Lab	0	0	3	3	25	50	1.5
7	PE-I**	Professional Elective –I Lab**	0	0	3	3	25	50	1.5
Total			15	3	6	24	200	450	21

***(PE-I)Professional Elective - I**

PE3104IT Web Programming
PE3105IT Advanced Java
PE3106IT Advanced Data Structures

**** (PE-I)Professional Elective – I Lab**

PE3110IT Web Programming Lab
PE3111IT Advanced Java Lab
PE3112IT Advanced Data Structures Lab

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Department of Information Technology

B. Tech. (IT) V SEMESTER

DATABASE MANAGEMENT SYSTEMS (PC3101IT)

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

UNIT – I

Introduction to Database System and its Applications: Evolution of DBMS, File Systems versus a DBMS, Data Models, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS.

Data modeling: Introduction to ER model, Naming, conventions, Entities, Attributes, and Entity Sets, Relationships and Relationship Types, Constraints.

UNIT – II

Relational Model: Introduction, constraints over relations, integrity constraints, Querying relational data, and logical data base design, introduction to views, Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT – III

SQL: Introduction, Syntax, Basic commands, Specifying constraints, Basic Queries, Nested Quires, Queries using different Clauses, Cursors, Triggers, Built-in SQL functions.

Database Design refinement: Informal Design guidelines, Issues of redundancy, null values and decomposition, functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT – IV

Transaction Processing: Introduction, Transaction State and desirable properties, Transaction schedules, Serializability, and Recoverability.

Concurrency control Techniques: Introduction, locking techniques and Timestamp Based Protocols.

Database Recovery techniques: Recovery Techniques based on deferred update, Recovery Techniques based on immediate update. Shadow Paging.

UNIT – V

Data Storage and indexing: File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations.

Text Books

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata McGraw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

References

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7thEdition.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rd Edition,
3. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.

B. Tech. (IT) V SEMESTER**THEORY OF COMPUTATION (PC3102IT)**

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

UNIT – I**Introduction and Finite Automata:**

Alphabets, Strings, Languages, Definition and applications of Finite Automata (FA), acceptance of strings and languages, Deterministic Finite Automata (DFA) and its representation, Non Deterministic Finite Automata (NFA), transition diagrams and Language recognizers. Conversions and Equivalence of NFA and DFA, NFA with ϵ - transitions and its conversion to NFA without ϵ - transitions, Minimization of Automata, Equivalence between two Automata's,.

UNIT – II**Finite Automata with output and Regular Expressions:**

Finite Automata with output- Moore and Mealy machines and its equivalence. Definition of Regular expression(RE), Algebraic laws for Regular Expressions, Applications of REs, Regular sets, Regular languages, Designing of Finite Automata for Regular expression, DFA to Regular expression, Arden's Theorem, Non Regular Languages, Pumping Lemma for regular Language, Applications of Pumping lemma, Closure properties of Regular languages.

UNIT – III**Regular Grammar, Context Free Grammars and Languages:**

Formal definition of Grammar, Regular Grammar, Right linear and left linear grammars, Equivalence between regular grammars and Finite Automata, Chomsky Hierarchy of Grammar Context Free Grammar (CFG), Leftmost, Rightmost derivations, Ambiguity in grammars and languages. Designing of grammar for regular language, Simplification of Context Free Grammars, Closure Properties of CFL.

UNIT – IV**Normal forms and Pushdown Automata:**

Definition of Normal Form, Chomsky Normal Form (CNF), Greiback normal form (GNF), Conversion of CFG to CNF and GNF.

Pushdown Automata: Definition of Push Down Automata(PDA) , Representation and Acceptance of PDA, Designing PDA, Equivalence of CFG and PDA, Pumping Lemma for Context Free Languages.

UNIT –V**Context sensitive Languages and Turing Machine:**

Definition of Linear Bounded Automata and its Representation, Introduction to Turing Machines(TM), Definition and Representation of TM, Variations of TM: Multitape TMs, Non Deterministic TM, Universal TM, Designing of TM.

Undesirability and Recursively enumerable languages: Recursive and Recursively enumerable languages, Definition of Undecidable Problem, Halting Problem, Post's Correspondence Problem (PCP).

Text Book:

John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia, 3rd Edition, ISBN: 978-1292039053, 2013

Mishra K.L.P., Chandrasekaran N, "Theory Of Computer Science: Automata, Languages and Computation", PHI Learning Pvt. Ltd., 3rd Edition, ISBN: 978-81-203-2968-3, 2012

Reference Books:

Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia, 2nd edition, ISBN: 978-0132624787, 1998

Michael Sipser, Introduction to the Theory of Computation, PThomson South-Western, 3rd Edition, ISBN: 1133187811, 2012.

John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw-Hill Education Pvt. Ltd., 4th Edition, ISBN: 9780073191461, 2010.

Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer, 1 st Edition, ISBN: 9781461273097, 2012

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Department of Information Technology

B. Tech. (IT) V SEMESTER**PRINCIPLES OF SIGNALS AND SYSTEMS(ES3103IT)**

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

UNIT-I

Introduction to Signals & Systems: Classification of signals, Operations on signals, types of systems, Exponential and Trigonometric Fourier series, Dirichlet's condition.

UNIT-II

Fourier Transform: Representation of aperiodic signal, Introduction of Fourier transform, Convergence, properties of Fourier Transform, Fourier transform of periodic signals, Singularity function, Parseval's theorem, Energy spectral density, Development of Discrete Time Fourier transform, Convergence issues associated with the DTFT.

UNIT-III

Sampling: Sampling of continuous time signals, sampling theorem, Aliasing effect, reconstruction of a signal and its samples.

Convolution & Correlation of signals: Convolution integral, Properties of convolution, Graphical method of convolution, Convolution of Discrete time signals, overlap-add and overlap-save method of discrete convolution, Definition of correlation, Auto correlation, Properties of Autocorrelation, Cross correlation of signals.

UNIT-IV

Laplace Transform: Review of Laplace transforms, region of convergence and properties, poles and zeros, relation between Laplace and Fourier transforms, properties of Laplace transform, inverse Laplace transform, Solutions to differential equation and system behavior.

UNIT-V

Z Transform: Definition of Z-Transform, Properties of Z-Transform, Region of convergence of Z-Transform, Inverse Z Transform using Inspection, Partial fraction expansion, Power series Expansion, Contour integration methods, Parseval's relation analysis of discrete time systems using Z-Transform. Realization of discrete time system using Direct form, Cascade parallel forms.

References:

1. Alan V. Oppenheim, Alan. S. Willsky, S Hamid Nawab, Signals and Systems, 2nd edition, Prentice Hall of India, 2007.
2. Lathi B.P., Signals Systems Communications", 1st edition, B.S. Publications, 2006.
3. Simon Haykin and Van veen, "Signal and system", Willy, second edition

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Department of Information Technology

B. Tech. (IT) V SEMESTER**Professional Elective - I****WEB PROGRAMMING(PE3104IT)**

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

UNIT – I

Web Basics- Introduction, Concept of Internet- Protocols of Internet, World Wide Web, URL, Web Server, Web Browser. HTML- Introduction, History of HTML, Structure of HTML Document: Text Basics, Images and Multimedia, Links and webs, Document Layout, Cascading Style Sheet- HTML 4 style sheet features, Creating Forms, Frames and Tables.

UNIT – II

Dynamic HTML- Introduction of DHTML- HTML vs. DHTML, Advantages of DHTML, CSS of DHTML, Event Handling, Data Binding, Browser Object Models. XML Introduction- Introduction of XML- Some current applications of XML, Features of XML, Anatomy of XML document, The XML Declaration, Element Tags- Nesting and structure, XML text and text formatting element, Table element, Mark-up Element and Attributes, Document Type Definition (DTD), types. XML Schema, Importance of XML schema, Creating Element in XML Schema, XML Schema Types.

Introduction of Java Script: JavaScript characteristics, Objects in Java Script, Dynamic HTML with Java Script.

UNIT – III

AJAX Introduction- Introduction, AJAX Introduction, AJAX Components, Handling Dynamic HTML with AJAX, CSS to Define Look and Feel, Understand the XML Mark-up, XMLHttpRequest. AJAX using XML and XMLHttpRequest- Introduction, AJAX Using XML and XMLHttpRequest, Accessing, Creating and Modifying XML Nodes, Loading XML Data into an HTML Page, Receiving XML Responses, Handling Response XML.

UNIT – IV

PHP Introduction- PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code and the Complete AJAX Example. AJAX with Database- Introduction, AJAX Database, Working of AJAX with PHP, AJAX PHP Database Form, AJAX PHP MySQL Select Query.

UNIT – V

Active Server Page- Introduction, Introduction of ASP, ASP – Variables, ASP Control Structure, ASP Objects' Properties and Methods. ASP Database Connectivity- Introduction, ASP Components, ASP Database Connection, ASP Scripting Components.

Text Books:

1. Steven Holzner, "HTML Black Book", DreamTech press.
2. Web Technologies, Black Book, DreamTech Press
3. Web Applications: Concepts and Real World Design, Knuckles, Wiley-India
4. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson.

B. Tech. (IT) V SEMESTER**Professional Elective - I****ADVANCED JAVA(PE3105IT)**

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

UNIT – I**Swings, JavaFX and Event Handling:**

Swing: Introduction to swings, Comparison with AWT, Exploring Swing Components: JTextField, JLabel, Swing buttons, JPasswordField, JTable, JComboBox, JList, JTree, JColorChooser, Dialogs and Swing Menus.

Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling action, mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

GUI programming with JavaFX: JavaFX basic concepts, JavaFX Application Structure, JavaFX Controls and Event handling.

UNIT –II**Networking and Collection frame work:**

Networking: Networking API, Inet address, TCP/IP client sockets, URL, URL connection, HttpURL connection, Cookies, TCP/IP server sockets, Datagrams.

Collections Frame work: Collection Interfaces, Collection Classes: Array Class, Vector Class, Stack Class, Dictionary class, Hash table Class. accessing using iterators, working with maps, comparators.

UNIT – III**Java Database Connectivity (JDBC):**

Introduction, JDBC Drivers, JDBC Architecture, JDBC Classes and Interfaces, Loading a Driver, Making a Connection, Execute SQL Statement, statement, prepared statement, callable statement, Retrieving Result, Getting Database Information, Scrollable and Updatable Resultset, Result Set Metadata.

UNIT - IV**Servlets:**

Servlet: Server-Side Java, Servlet Alternatives, Servlet Strengths, Servlet Architecture, Servlet Life Cycle, GenericServlet, HttpServlet, Exploring Servlet API, Handling HTTP Requests and Responses, Passing Parameters to Servlets, Retrieving Parameters, Session Tracking, Filters.

UNIT - V

Java Server Pages(JSP): The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment. JSP Directives, JSP Action elements, JSP Implicit Objects, JSP Form Processing, JSP Session and Cookies Handling, JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling, JSP XML Processing, JSTL.

Text Books

1. Herbert Schildt, Java Complete Reference Tenth Edition, McGraw Hill.
2. JDBC, Servlets and JSP black book, Dreamtech Publishers.
3. Uttam K. Roy, Advanced Java programming, Oxford University Press.

References

1. Bert Bates , Kathy Sierra and , Bryan Basham, “ Head First Servlets & JSP”, O'Relly.
2. Sharanam Shah, Vaishali Shah, Java EE 7 for Beginners
3. Cay S. Horstmann, Gray Coronell, Core Java Vol. II – Advanced Features
4. Joel Murach, Michael Urban, Java Servlets and JSP, 3rd Edition, 2014
5. Cay S. Horstmann, Core Java Volume I – Fundamentals, Pearson, 2019
6. Joel Murach, Java Programming, 5th Edition, 2017

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Department of Information Technology

B. Tech. (IT) V SEMESTER**Professional Elective - I****ADVANCED DATA STRUCTURES (PE3106IT)**

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

UNIT-I

Hashing: General idea, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing.

UNIT-II

Hashing: Quadratic Probing, Double Hashing, Rehashing, Extendible hashing.
Trees: Review of Binary Search Trees (BST), AVL Trees, Splay Trees, B-Trees, B+ Trees, properties and basic operations.

UNIT-III

Graphs: Topological sort, shortest-path algorithms, Unweighted Shortest Paths, Dijkstra's algorithm, Graphs with Negative Edge Costs, Acyclic Graphs, Shortest-Path Example

UNIT-IV

Graphs: Network Flow Problems, A Simple Maximum-Flow Algorithm, Applications of Depth-First Search: Undirected Graphs, Biconnectivity, Euler Circuit.

UNIT-V

Graphs: Directed Graphs, Finding Strong Components.
Pattern matching and Tries: Pattern matching algorithms-Brute force.

TEXT BOOKS:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004.
2. M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002.

REFERENCE BOOKS:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in Java", Third Edition, Published by Addison-Wesley, 2012, ISBN: 0-132-57627-9 / 9780132576277.
2. Mark Allen Weiss, "**Data Structures and Problem Solving Using Java**", Fourth Edition, Published by Addison-Wesley, 2010, ISBN: 0-321-54140-5.
3. Goodrich, Tamassia, Goldwasser, "**Data Structures and Algorithms in Java**", Sixth Edition, Wiley, 2014, ISBN-13 : 978-8126551903.
4. Michael T. Goodrich, Roberto Tamassia, "Algorithm Design and Application", Fourth Edition, Wiley, 2014, ISBN: 978-1-118-33591-8.
5. Data Structures & Algorithms in Java, 6ed

UNIVERSITY, WARANGAL-506 009
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B. Tech. (IT) V SEMESTER

MANAGERIAL ECONOMICS AND ACCOUNTANCY (HS3108-)

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

UNIT-I

Meaning and Nature of Managerial Economics: Managerial Economics and its usefulness to Engineers, Fundamental Concepts of Managerial Economics-Scarcity, Marginalism, Equimarginalism, Opportunity costs, Discounting, Time Perspective, Risk and Uncertainty, Profits, Case study method.

UNIT-II

Consumer Behavior: Law of Demand, Determinants, Types of Demand; Elasticity of Demand (Price, Income and Cross-Elasticity); Demand Forecasting, Law of Supply and Concept of Equilibrium.

UNIT - III

Theory of Production and Markets: Production Function, Law of Variable Proportion, ISO quants, Economics of Scale, Cost of Production (Types and their measurement), Concept of Opportunity Cost, Concept of Revenue, Cost-Output relationship, Break-Even Analysis, Price - Output determination under Perfect Competition and Monopoly.

UNIT-IV

Capital Management: Significance, determination and estimation of fixed and working capital requirements, sources of capital, Introduction to capital budgeting, methods of payback and discounted cash flow methods with problems.

UNIT-V

Book-keeping: Principles and significance of double entry book keeping, Journal, Subsidiary books, Ledger accounts, Trial Balance, concept and preparation of Final Accounts with simple adjustments, Analysis and interpretation of Financial Statements through Ratios.

Suggested Reading:

1. Mehta P.L., Managerial Economics - Analysis, Problems and Cases, Sulthan Chand & Sons Educational Publishers, 2011
2. Maheswari S.N., Introduction to Accountancy, Vikas Publishing House, 2005
3. Pandey I.M., Financial Management, Vikas Publishing House, 2009

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Department of Information Technology

B. Tech. (IT) V SEMESTER**DATABASE MANAGEMENT SYSTEM LAB (PC3109IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

List of Experiments:

- 1) Database design with E-R Model
- 2) Database design with Relational Model
- 3) Practicing DDL commands
- 4) Practicing DML commands
- 5) Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
- 6) Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
- 7) Triggers (Creation of insert trigger, delete trigger, update trigger)
- 8) Usage of Cursors
- 9) Basics of PL/SQL
- 10) Stored Procedures

Text Books

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3/e.
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

References:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel,7/e.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rd Edition.
3. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.

KAKATIYA UNIVERSITY, WARANGAL-506009

Department of Information Technology

B. Tech. (IT) V SEMESTER**Professional Elective-I Lab****WEB PROGRAMMING LAB (PE3110IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

- 1) Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
- 2) Create your class timetable using table tag.
- 3) Create user Student feedback form using textbox, text area , checkbox, radio button, select box etc.
- 4) Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right hand side.
- 5) Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
- 6) Create your resume using HTML tags also experiment with colors, text , link ,size and also other tags you studied.
- 7) Design a web page of your home town with an attractive background color, textcolor, an Image, font etc. (use internal CSS).
- 8) Use Inline CSS to format your resume that you created.
- 9) Use External CSS to format your class timetable as you created.
- 10) Use External, Internal, and Inline CSS to format college web page that you created.
- 11) Develop a JavaScript to display today's date.
- 12) Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript
- 13) Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.
- 14) Create HTML Page that contains form with fields Name, Email, Mobile No , Gender , favourite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked.
- 15) Implement Validation in above Feedback Form.

- 16) Use regular expression for validation in Feedback Form.
- 17) Using AJAX retrieve data from a TXT file and display it.
- 18) Create XML file to store student information like Enrolment Number, Name, Mobile Number and Email Id.
- 19) Create DTD for above XML File. Create XML Schema for above (Practical No. 18)
- 20) Create XSL file to convert above XML file intoXHTML file.
- 21) Write a PHP program to display today's date in dd-mm-yyyy format.
- 22) Write a PHP program to check if number is prime or not.
- 23) Write a PHP program to print first 10 Fibonacci Numbers.
- 24) Create HTML page that contain textbox, submit / reset button. Write PHP program to display this information and also store into text file.
- 25) Write a PHP script to read data from txt file and display it in html table (the file contains info in format Name: Password: Email)
- 26) Write a PHP Script for login authentication. Design an html form which takes username and password from user and validate against stored username and password in file.
- 27) Write PHP Script for storing and retrieving user information from MySql table.
 - a). Design A HTML page which takes Name, Address, Email and Mobile No. from user.
 - b) Store this data in MySql database / text file.
 - c) Next page display all user in html table using PHP.
- 28) Write a PHP script for user authentication using PHP-MYSQL. Use session for storing surname.
- 29) Fetch information from a database with AJAX.
- 30) Students have to create a whole Website which contains above topics in Website

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Department of Computer Science & Engineering

B. Tech. (IT) V SEMESTER**Professional Elective-I Lab****ADVANCED JAVA LAB (PE3111CS)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

List of Experiments

1. Java Program to create login form with swing Components.
2. Java Program to create student registration form with swing components.
3. Java Program to demonstrate Jtree, Menus, Jtable in swing.
4. Java Program to handle action events, key events, mouse events.
5. Write simple JavaFx program to display “welcome message”
6. Write JavaFx Program to insert image in window.
7. Java program to create simple form using JavaFx.
8. Java program to handle action events using JavaFx.
9. Java Program to Create a Server for the purpose of URL supplied to URL class object
10. Java Program to Create a Server that Receives Data from the Client Using BufferedReader and Sends Reply to the Client Using PrintStream
11. Java Program that Accepts the Filename and Checks for its Existence. When the File Exists at Server Side, Send its Contents to the Client
12. Java Program of a Client Program to Accept a File Name from the Keyboard and Send that Name to the Server. The Client Receives the File Contents from the Server.
13. Java Program to Use Datagram Socket for Client Server Communication
14. Demonstrate operations of Vector, ArrayList, LinkedList collection classes?
15. Demonstrate operations of HashMap, TreeMap, LinkedHashMap collection classes?
16. Demonstrate operations of HashSet, TreeSet, LinkedHashSet collection class
17. Demonstrate operations of Stack, ArrayQueue, PriorityQueue collection classes?
18. Create a phone directory with names and phone numbers using hash table?
Search the directory by name?
Search the directory by phone number?
19. Java program to create a SQL table using JDBC and insert data value.
20. Java program to insert, modify, update value in SQL table using JDBC.
21. Java program to demonstrate prepared and callable statements.
22. Java Program to demonstrate scrollable result set.
23. Java Program to display meta data of a SQL table.
24. Java Program to create HTTP servlet and display a Welcome message.
25. Java program to retrieve the details from login form and display using Servlet.
26. Java program to create servlet to servlet communication.
27. Java program to retrieve the parameters from servlet.

28. Java Program to send parameters to servlet.
29. Java Program to handle session tracking using servlet.
30. JSP program to retrieve the name from web form and send greet message.

31. JSP Program to retrieve two integers from client and display their sum at client.
32. Write a JSP application that checks the login credentials and display appropriate message back to the Client?
33. JSP program to perform database operations.
34. JSP program to create cookies.
35. JSP program to handle database operations using JSTL.

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Department of Information Technology

B. Tech. (IT) V SEMESTER**Professional Elective Lab - I****ADVANCED DATA STRUCTURES LAB(PE3112IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

1. Implementation various hash function and hashing techniques.
2. Implementation of Binary search tree operations
3. Implementation of AVL tree operations.
4. Implementation of Splay tree operations.
5. Implementation of B Tree operations.
6. Implementation of B+ Tree operations
7. Implementation of Graph Traversal methods
8. Implementation of Topological sort.
9. Implementation of Shortest Path Algorithms.
10. Implementation of Simple Max flow Algorithm.
11. Implementation of Knuth-Morris Pratt pattern matching Algorithm
12. Implementation of Boyer-Moore pattern matching Algorithm

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B. Tech. (IT) VI SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PC3201IT	Compiler Design	3	1	0	4	30	70	4
2	PC3202IT	Computer Networks	3	1	0	4	30	70	4
3	PC3203IT	Software Engineering	3	1	0	4	30	70	4
4	PE-II*	Professional Elective –II*	3	1	0	4	30	70	4
5	OE-I#	Open Elective-I*	3	0	0	3	30	70	3
6	PC3208IT	Compiler Design Lab	0	0	3	3	25	50	1.5
7	PC3209IT	Software Engineering Lab	0	0	3	3	25	50	1.5
8	PW3210IT	Mini-project	0	0	3	3	50	00	1.5
Total			15	4	9	28	250	450	23.5

***(PE-II) Professional Elective – II**

PE3204IT: Advanced Database Management System

PE3205IT: Advanced Operating System

PE3206IT: Computer Graphics

Please Refer Annexure

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Department of Information Technology

B. Tech. (IT) VI SEMESTER**COMPILER DESIGN (PC3201IT)**

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

UNIT – I

INTRODUCTION TO COMPILER: Definition of Compiler, Interpreter, Analysis of the source program, Phases of a compiler, Cousins of the Compiler, Grouping of Phases, Compiler construction tools.

LEXICAL ANALYSIS: Definition of lexeme, patterns and Tokens, Lexical analyzer, Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Data structures in compilation, LEX- Lexical analyzer generator

UNIT – II

SYNTAX ANALYSIS: Introduction to parser, Role of the parser, Context-Free Grammars; Top-Down parsing-Recursive Descent Parsing, Predictive Parsing; Bottom-Up parsing-Shift Reduce Parsing, Operator Precedent Parsing; LR Parsers–SLR Parser, Canonical LR Parser, LALR Parser; YACC – automatic parser generator.

UNIT – III

SEMANTIC ANALYSIS: Attributed grammars, Syntax Directed Definitions, Evaluation Orders for Syntax directed definitions, Syntax directed translation;

INTERMEDIATE CODE: Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes; Conversion of popular Programming languages into intermediate code forms: Declarations, Assignment Statements, Boolean Expressions and loops.

UNIT – IV

CODE OPTIMIZATION: Introduction, Principal sources of optimization, Optimization of basic blocks, Introduction to global data flow analysis, Basic blocks, Flow graphs, Data flow equation, Global optimization, Data flow analysis for structured programs.

UNIT – V

RUN-TIME ENVIRONMENT AND CODE GENERATION: Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management, Issues in the design of code generator, The target machine, Next-use Information, A simple Code generator, Introduction to DAG, DAG representation of Basic Blocks, Peephole Optimization.

TEXT BOOK:

1. A.V. Aho, M.S. Lam, R. Sethi and J.D. Ullman, "Compilers: Principles, Techniques and Tools", 2nd edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. Allen I. Holub, "Compiler Design in C", 1st edition, Prentice Hall of India, 2003.
2. C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", 1st edition, Benjamin Cummings, 2003.
3. J.P. Bennet, "Introduction to Compiler Techniques", 2nd edition, Tata McGraw-Hill, 2003.
4. Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", 3rd edition, Pearson/Prentice Hall India, 2001.
5. Kenneth C. Loudon, "Compiler Construction: Principles and Practice", 1st edition, Thompson Learning, 2003.
6. K. Muneeswaran "Compiler Design" 1st edition. Oxford University press ,2012

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B. Tech. (IT) VI SEMESTER
COMPUTER NETWORKS (PC3202IT)

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

UNIT – I

Introduction to Computer Networks, Network Hardware and Software, Network Standardization, Protocols and Standards, OSI and TC/IP Reference Models, Example Networks. The Physical Layer: Guided Transmission Media, Wireless Transmission, Communication Satellites, Circuit switched networks, Datagram networks, virtual circuit networks, The Mobile Telephone System.

UNIT – II

The Data Link Layer: Data link layer design issues, framing techniques, error control methods, flow control over noiseless and noisy channels, Example data link protocols. The Medium Access Control Sublayer: The Channel Allocation Problem, Carrier Sense Multiple Access Protocols, Collision free protocols, IEEE Ethernet, Wireless LANs, Bluetooth, Data Link Layer Switching.

UNIT – III

The Network Layer: Network Layer Design Issues, Datagram and Virtual circuit subnets, Routing Algorithms, Multicast Routing Algorithms, Routing in Adhoc networks, Congestion Control Algorithms, Quality of Service, Internetworking, and The Network Layer in the Internet: IPv4 IPv6 and IP Addresses.

UNIT – IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, TCP connection establishment, A Simple Transport Protocol, UDP, and TCP Protocols, The Internet Transport Protocols: TCP

UNIT – V

The Application Layer: DNS—The Domain Name System, Electronic Mail, MIME, SMTP protocol, PoP3, IMAP, The World Wide Web, URLs, HTM and Multimedia. Network Security: Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms.

TEXT BOOKS:

- 1.Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.
- 2.Data Communications and Networking – Behrouz A. Forouzan, Fourth Edition TMH,2006.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition, Pearson Education
- 2.Understanding communications and Networks,3rd Edition, W.A.Shay, Cengage Learning.
- 3.Computer and Communication Networks ,Nader F. Mir, Pearson Education
- 4.Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3rd Edition, Pearson Education.

B. Tech. (IT) VI SEMESTER

SOFTWARE ENGINEERING (PC3203IT)

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

UNIT-I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process, Agile development model.

UNIT-II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: Context models, behavioral models, data models, object models, structured methods.

UNIT-III

Design Engineering: Design process and design quality, design concepts, the design model.

Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

User Interface Design: the golden rules, User Interface Analysis and Design

UNIT-IV

Software Testing Techniques: White box and black box testing, testing for specialized environment, architectures and application, user interface testing.

Software Testing Strategies: A strategic approach to software testing, test strategies for conventional software, validation testing, system testing, the art of debugging.

Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT-V

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

Text Books:

1. Roger S.Pressman , “Software Engineering , A Practitioner ‘s Approach”, 6th Edition, McGraw-Hill International Edition.
2. Ian Sommerville, “Software Engineering”, 7th Edition, Pearson Education.
3. Grady Booch, James Rumbaugh, Ivar Jacobson, “The Unified Modeling Language User Guide”, Pearson Education.

Reference Books:

1. James F. Peters, Witold Pedrycz , “Software Engineering :An Engineering Approach”, John Wiley.
2. Waman S Jawadekar, “Software Engineering Principles and Practice”, The Mc Graw-Hill Companies.

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B. Tech. (IT) VI SEMESTER

Professional Elective – II

ADVANCED DATABASE MANAGEMENT SYSTEMS (PE3204IT)

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

UNIT –I

Parallel and Distributed Databases: Introduction, Architectures for Parallel Databases, Parallel Query Evaluation, Parallelizing Individual Operations, Parallel Query Optimization, Introduction to Distributed Databases, Distributed DBMS Architectures, Storing Data in Distributed DBMS, Distributed Catalog Management.

UNIT –II

Distributed Databases: Distributed Query Processing, Updating Distributed data, Distributed Transactions, Distributed Concurrency Control, Distributed Recovery.

Object-Database Systems: Motivating Example, Structured Data Types, Operations on Structured Data, Encapsulation and ADTs, Inheritance, Objects, OIDs and Reference types, Database design for an ORDBMS.

UNIT –III

Object-Database Systems: ORDBMS Implementation Challenges, OODBMS, Comparing RDBMS, OODBMS, and ORDBMS.

Deductive Databases: Introduction to Recursive Queries, Theoretical Foundations, Recursive Queries with Negation, From Data log to SQL, Evaluating Recursive Queries.

UNIT –IV

Information Retrieval and XML data: Colliding Worlds: Databases, IR, and XML, Introduction to Information Retrieval, Indexing for Text Search, Web Search Engines, Managing Text in DBMS, A Data Model for XML, XQUERY: Querying XML Data, Efficient Evaluation of XML Queries.

UNIT –V

Spatial Data Management: Types of Spatial Data and queries, Applications involving Spatial Data, Introduction to Spatial Indexes, Indexing Based on Space-Filling Curves, Grid Files, R Trees: Point and Region Data, Issues on High Dimensional Indexing.

TEXTBOOKS :

1. Raghu Ramakrishnan and Johannes Gehrke , “Database Management Systems “, Third Edition, McGraw Hill Education, ISBN No: 978-9339213114, 2014.
2. Ramez Elmasri and Shamkanth B. Navathe, “Fundamentals of Database Systems“, Seventh Edition, Pearson Education, ISBN No: 978-9332582705, 2017.
3. Stefano Ceri, Giuseppe Pelagatti , “Distributed Databases: Principles and Systems” , McGraw Hill Education , ISBN No: 978-0070265110, 2017.
4. M. Tamer Ozsu, “Principles of Distributed Database Systems”, Pearson Education , ISBN No: 978-8177581775.

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B. Tech. (IT) VI SEMESTER

Professional Elective – II

ADVANCED OPERATING SYSTEMS (PE3205IT)

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

UNIT – I

Functions of Operating System, Why Advanced Operating Systems, Types of Advanced Operating Systems. Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT – II

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, Non-Token – Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, Token-Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Singhal's Heuristic Algorithm, Raymond's Tree Based Algorithm.

UNIT – III

Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms

UNIT – IV

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures, Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems. Operating System Design Issues, Threads, Process Synchronization, Processor Scheduling. Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT – V

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

TEXT BOOKS:

1. 1.Advanced Concepts in Operating Systems, MukeshSinghal, Niranjan G. Shivaratri, Tata McGraw-Hill Edition 2001

REFERENCES:

1. Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall, 2nd Edition, 2007
2. Sinha, Distributed Operating Systems Concepts and Design, IEEE Computer Society Press, 1997.

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B. Tech. (IT) VI SEMESTER

Professional Elective – II

COMPUTER GRAPHICS (PE3206IT)

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

UNIT-I

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid-point circle and ellipse algorithms

Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT-II

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT-III

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V

Computer animation: Design of animation sequence, general computer animation functions, rasteranimation, computer animation languages, key frame systems, motion specifications

Visible surface detection methods: Classification, back-face detection, depth-buffer, BSP-treemethods and area sub-division methods

Text Books:

1. Steven Harington , “Computer Graphics”, *TMH*.
2. Foley, Van Dam, Feiner, Hughes, “Computer Graphics: Principles and Practice in C”, *2nd Edition, Pearson Education*.
3. Donald Hearn and M.Pauline Baker, “Computer Graphics C Version”, *Pearson Education*.

Reference Books:

1. David F Rogers, “Procedural Elements For Computer Graphics”, *2nd Edition Tata Mc Graw Hill*.
2. Neuman and Sproul, “Principles of Interactive Computer Graphics”, *The Mc Graw Hill*
3. Shalini Govil, “Principles of Computer Graphics”, *2005, Springer*.

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B. Tech. (IT) VI SEMESTER

COMPILER DESIGN LAB(PC3208IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

1. Programs using Lex Tool.
 - a. Specification to skip comments in a file.
 - b. Specification to print two digit numbers in words.
 - c. Specification to check validity of given date.
 - d. Specification to convert given octal number into decimal equivalent.
2.
 - a. Design a lexical analyzer for a given language and the lexical analyzer should ignore redundant spaces, tabs and new lines
 - b. Implement the lexical analyzer using LEX tool to generate tokens from the given C program
3. Write a lexical analyzer program for the following:
 - a) To count the number of vowels and consonants in the given string .
 - b) To count the number of characters, words and lines in the given text.
 - c) To count the number of '+'ve and '-'ve integers from the given program
4. Write a lexical analyzer program for the following:
 - a) To count the number of keywords and identifiers in the given program.
 - b) To convert an octal number to decimal number.
 - c) To recognize numbers in the given program.
5. Programs using Lex Tool.
 - a) To count the number of comment lines in the given C program
 - b) To count the number of scanf and printf statements in the given C program
6. Write lexical analyzer program for the following:
 - a) To add line numbers to the given file and displays the same onto the standard output
 - b) To extract only comments from C program and display the same onto the standard output
7. Write yet another compiler compiler program for the following:
 - a) To recognize nested if control statements and display the level of nesting.
 - b) To check the validity of given simple sentence.
8. Write yet another compiler compiler program for the following:
 - a) To check the validity of given date.
 - b) To test for balanced parentheses in the given input.
 - c) To check the validity of given arithmetic expression.
9. Write yet another compiler compiler (YACC) program for the following:

- a) To recognize a valid variable which starts with a letter followed by any number of letters or digits.
- b) To check whether given string is Palindrome or not.
- c) Implementation of Calculator using LEX and YACC.

10. Program to find all the meaningful words and generate the tokens for the given input program.
11. Program on implementing symbol table for HLL.
12. Program for designing predicative parser.
13. Program on implementing shift reduce parser.
14. Program on implementing SLR Parser.
15. Program on implementing LALR parser.
16. Program for constructing LL(1) parser.

Text Book:

[1] Alfred V.Aho, Ravi Sethi, JeffreyD.Ullman, *Compilers: Principles, Techniques and Tools*, 2nd ed. Hong Kong: Pearson Education Asia, 2013.

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B. Tech. (IT) VI SEMESTER
SOFTWARE ENGINEERING LAB (PC3209IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

List of Experiments

Experiment –I

1. Development of problem statement.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Experiment –II

Perform above exercised for any two sample projects. List of sample projects is given below

1. Online Exam Registration
2. E-ticketing
3. Library Management system
4. Credit Card Processing
5. Hospital Management
6. Student Course Registration
7. Trading System
8. Bank ATM System

ANNEXURE

- ✓ Students should not choose same department subject as an Open elective subject.
- ✓ Students can select any one of the following subjects as an Open elective subject.

Open Elective subjects offered from different department

Sl.No	Course Code	Name of the subject	Branch
1	OE3213EC	Microprocessor and Interfacing	ECE
2	OE3207CS	Fundamentals of Data Structures	CSE

B. Tech. (IT) VI SEMESTER**OPEN ELECTIVE-I****MICROPROCESSORS AND INTERFACING(OE3213EC)**

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

UNIT I

Evolution of microprocessors, 8085 microprocessor architecture, addressing modes and instruction sets. Basic assembly language programming, pin configuration, timing diagram of read and write operation.

UNIT II

8086 architecture-functional block diagram, register organization, memory segmentation, programming model, pins description in maximum mode and minimum mode, timing diagrams.

UNIT III

Instruction formats, addressing modes, classification of instruction set, assembler directives, macros, 8086 microprocessor assembly language programs: simple programs involving data transfer operation, arithmetic operation, logical operation, branch operation, machine control operation, string manipulations, stack and subroutine operations.

UNIT IV

8255 Programmable peripheral interface block diagram and various modes of operation. Interfacing of ADC, DAC, keyboard, seven segment display, stepper motor interfacing and 8254 (8253) programmable interval timers.

UNIT V

Interrupt structure of 8086, interfacing programmable interrupt controller 8259 and DMA Controller 8257 to 8086 microprocessor. Serial communication standards, RS 232, Serial data transfer schemes and block diagram of 8251 USART.

TEXTBOOKS:

1. Ramesh Gaonkar, "Microprocessor architecture, programming and applications with the 8085", Penram International Publication (India) Pvt. Ltd.
2. Douglas V. Hall, "Microprocessors and Interfacing", Tata McGraw Hill Publication.
3. Sivarama P. Dandamudi, "Introduction to Assembly Language Programming From 8086 to Pentium Processors", Springer Publication.
4. Walter A. Triebel and Avtar Singh, "The 8088 and 8086 Microprocessors: Programming, Interfacing Software, Hardware and Applications", Pearson Publication.
5. A. K. Ray and K. M. Bhurchandi, "Advance microprocessors and Peripherals" Tata McGraw Hill Publication.
6. Lyla B. Das, "The X86 Microprocessors, Architecture, Programming and Interfacing (8086 to Pentium)", Pearson Publication.

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B. Tech. (IT) VI SEMESTER**OPEN ELECTIVE-I****FUNDAMENTALS OF DATA STRUCTURES(OE3207CS)**

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

Stack-Queue (Linear Data structures): Definition of stack, operations on stack, implementation of stack. Applications of Stack.

UNIT-III

Definition of queue, operations on queue, implementation of queue using arrays
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. Applications of Trees.

UNIT-V

Graph: definition, terminology on graphs, representation of graphs, graph traversal techniques, spanning tree, minimum cost spanning tree algorithms. Applications of Graphs.

Text Books:

- 1.Sahni Horowitz, "Fundamentals of data structures in C", UniversitiesPress, second edition, 2008, ISBN No-978-8173716058.
- 2.R Venkatesan,SLovelynRose,"Datastructures",Wiley, second edition, 2019, ISBN No-978-8126577149.

References:

- 1.Narasimha Karumanchi, "Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles", Careermonk Publications, 2016, ISBN-No: 978-8193245279.

ABBREVIATIONS

L	:	Lectures	T	:	Tutorials
P	:	Practicals	CIE	:	Continuous Internal Evaluation
SEE	:	Semester End Examination	PC	:	Professional Core
OE	:	Open Elective	PW	:	Project Work

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S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PE-III*	Professional Elective –III*	3	1	0	4	30	70	4
2	PE-IV*	Professional Elective – IV*	3	1	0	4	30	70	4
3	PE-V*	Professional Elective – V*	3	1	0	4	30	70	4
4	PE-VI*	Professional Elective –VI*	3	1	0	4	30	70	4
5	PE-III**	Professional Elective – III Lab**	0	0	3	3	25	50	1.5
6	PE-IV**	Professional Elective –IV Lab**	0	0	3	3	25	50	1.5
7	PW4108IT	Mini Project – II	-	-	3	3	25	50	1.5
Total			12	4	9	25	195	430	20.5

*(PE-III) Professional Elective –III	
PE4101IT	Python

** (PE-III) Professional Elective – III Lab	
PE4109IT	Python Lab

** (PE-IV) Professional Elective –IV	
PE4102IT	Software Testing
PE4103IT	Object Oriented Analysis and Design

** (PE-IV) Professional Elective – IV Lab	
PE4110IT	Software Testing Lab
PE4111IT	Object Oriented Analysis and Design Lab

*(PE-V) Professional Elective –V	
PE4104IT	Artificial Intelligence
PE4105IT	Mobile Application Development

*(PE-VI) Professional Elective –VI	
PE4106IT	Cryptography & Information Security
PE4107IT	Big Data Analytics

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B. Tech. (IT) VII SEMESTER
Professional Elective - III
PYTHON PROGRAMMING (PE4101IT)

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

UNIT – I

Python -Introduction to Python, History, installation, Versions of python, tools for working with data in Python, Features of python, applications; Basic Syntax, Variables, expressions and Data Types, Working with Python: Numbers and String, Python Operators, Python General Programs, Input and output statements in python, reading data from keyboard, type conversions, Conditional Statements - if statements, if-else statement, nested if-else statement: Syntax and executions.

UNIT – II**Control Structures in Python:**

Looping statements -For and For with else , For with range, While and While with Else , Syntax and executions. Control Statements - break, continue and pass – Syntax and executions.

Python Function: Design with functions: hiding redundancy, complexity, basic syntax , scope of variables, arguments and return value, formal vs actual arguments ,types of function, variable function arguments – default argument ,keyword argument ,arbitrary argument , recursion

UNIT – III**List, Tuples, Set and Dictionaries**

Python List: Introduction, accessing List, List operations, Working with Lists, List functions and methods.

Python Tuple:- Introduction, accessing Tuple, operations on Tuple, Working with Tuple ,Functions and Methods.

Python Set - Introduction, accessing Set, Set operations, working with Set, Functions and Methods.

Python Dictionaries – Introduction, working with dictionaries, Properties, Functions. Dictionaries Operations, List Comprehension.

UNIT– IV

Python String Manipulations - Accessing String, Basic Operations, String slices, Functions and Method, String formatting.

Python Modules - Importing Modules, Math Module, Random Module, Packages-creation of packages, importing, Compositions.

Python file handling: Reading files, writing files, loading data, working with and saving data. Enumerate.

UNIT– V

Python Object-Oriented Programming: objects and classes, Encapsulation; Inheritance; Polymorphism, Exception and Error Handling, Regular Expression-match function, searching, Patterns, modifiers., High Order Functions - Lambda, Filter, Map, Reduce.

Creating simple GUI; buttons, labels, entry fields, dialogs; widget attributes - sizes, fonts, colours layouts, nested frames, Database connection- Sqlite

TEXT BOOKS:

1. “Learning Python”, Fifth Edition by Mark Lutz, Published by O‘Reilly Media, ISBN: 978-1-449-35573-9.
2. Yashavant Kanetkar, Let Us Python (1 ed.), BPB Publishers, 2019. ISBN 978-9388511568.

REFERENCE BOOKS:

1. Chun, J Wesley, Core Python Programming, 2 nd Edition, Pearson, 2007 Reprint 2010. 4. Programming Python by Mark Lutz, O'Reilly
2. C. Dierbach, Introduction to Computer Science Using PYTHON: A Computational Problem-Solving Focus (1 ed.), Wiley, 2015. ISBN 978-8126556014. b)
3. Martin C. Brown, Python: The Complete Reference (1 ed.), McGraw-Hill, 2001. ISBN 978-0072127188.

B. Tech. (IT) VII SEMESTER**Professional Elective - IV**
SOFTWARE TESTING (PE4102IT)

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

UNIT – I

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs, Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT – II

Transaction Flow Testing: Transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT – III

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT – IV

Paths, Path products and Regular expressions : Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection, Logic Based Testing Overview, decision tables, path expressions, kv charts, specifications.

UNIT – V

State, State Graphs and Transition testing: State graphs, good & bad state graphs, state testing, matrix of graph, relations, power of a matrix, node reduction algorithm.

TEXT BOOKS

1. Software Testing techniques – Boris Beizer, Dreamtech, second edition.

REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3rd edition, P.C.Jorgensen, Aurbach Publications (Dist. by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann & J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, S.Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham & Others, Cengage Learning.
10. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

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B. Tech. (IT) VII SEMESTER

Professional Elective - IV
OBJECT ORIENTED ANALYSIS AND DESIGN (PE4103IT)

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

UNIT – I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT – II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT – III

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT – IV

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT – V

Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application, ATM application.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education 2nd Edition.
2. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TMH.
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object Oriented Analysis, Design and Implementation, B. Dathan, S. Ramnath, Universities Press.

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B. Tech. (IT) VII SEMESTER
Professional Elective - V
ARTIFICIAL INTELLIGENCE (PE4104IT)

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

UNIT-I

Introduction to Artificial Intelligence: The AI problems, the underlying assumption, Historical Backdrop, What is Intelligence, The level of the model, Criteria for success.

Problems, Problem Spaces and Search: Defining the problem as a state space search, Production systems, Production system characteristics, Introduction to search strategies, Issues in the design of search programs, additional problems.

UNIT-II

Heuristic Search Techniques: Generate-and-Test, Hill climbing; simple & steepest; simulated Annealing, Best-first-search; A* Algorithm, Constraint satisfaction.

Knowledge Representation: Knowledge representations and mappings, Approaches to knowledge representation, Issues in knowledge representation.

UNIT-III

Predicate Logic: Introduction, Representing simple facts in logic, Computable functions and Predicates Unification, Resolution.

Representing Knowledge Using Rules: Procedural versus Declarative knowledge, Logic programming, Forward versus Backward Reasoning.

UNIT-IV

Symbolic Reasoning under Uncertainty: introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation issues.

Game Playing: The MinMax Search procedure, Adding Alpha-Beta Cut-offs, Additional Refinements, Iterative Deepening.

UNIT-V

Planning: overview, An Example Domain: The Blocks World, Components of a Planning System.

Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing, Statistical Natural Language Processing, Spell Checking.

REFERENCE BOOKS:

1. Elaine rich, Kevin knight and Shivashankar B Nair “Artificial Intelligence”, Third Edition, McGraw-Hill, ISBN No: 978-0-07-008770-5, 2015.
2. Deepak Khemani, “A First Course in Artificial Intelligence”, First Edition, McGraw Hill Education, ISBN No: 978-1259029981, 2013.
3. Patterson, “Introduction to Artificial Intelligence” First Edition, 2000, Pearson Education India, ISBN No: 978-8120307773, 2015.

B.Tech. (IT) VII SEMESTER
Professional Elective - V
MOBILE APPLICATION DEVELOPMENT (PE4105IT)

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

UNIT – I

Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools

Discussion on Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes

What is Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT – II

How to Create Android User Interface: Measurements–Device and pixel density independent measuring units.

Layouts – Linear, Relative, Grid and Table Layouts.

Various components of User Interface (UI)– Editable and non-editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers.

Event Handling – Handling clicks or changes of various UI components.

Fragments & Life cycle– Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT – III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS.

Broadcast Receivers and Notifications– Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity **Notifications** – Creating and Displaying notifications, Displaying Toasts

UNIT – IV

Persistent Storage: Files, Saving state and Preferences– Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

Introducing Android Databases – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

UNIT – V

Advanced Topics: Alarms – Creating and using alarms.

Using Internet Resources – Connecting to internet resource, using download manager

Location Based Services – Finding Current Location and showing location on the Map, updating location.

Publishing Android Applications, Using Eclipse for Android Development, Using the Android Emulator

TEXT BOOKS:

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012

2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCE BOOKS:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

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B.Tech. (IT) VII SEMESTER

Professional Elective - VI

CRYPTOGRAPHY AND INFORMATION SECURITY (PE4106IT)

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

UNIT I

Security Attacks: Interruption, Interception, Modification and Fabrication, Security Services: Confidentiality, Authentication, Integrity, Non-repudiation, Access Control and Security Mechanisms, A model for Network Security.

UNIT II

Conventional Encryption: Principles, Feistel Cipher Model, Conventional encryption algorithms (DES, RC4 and Blowfish, cipher block modes of operation, location of encryption devices, key distribution, Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT III

Public key cryptography principles, Euclid's Algorithm, Fermat's and Euler's Theorem, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management: Kerberos, X.509 Directory Authentication Service.

Unit IV

Email Security: Pretty Good Privacy (PGP) and S/MIME.

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security, Associations and Key Management.

UNIT V

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Intruders, Viruses and related threats, Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings 5th Edition, Pearson Education.
2. Information Security, Principles and Practice by Mark Stamp, Wiley India.

REFERENCE BOOKS:

1. Applied Cryptography by Bruce Schneier, 2007.
2. Cryptography and Data Security, Denning D, Addison Wesley, 1982.
3. Cryptography and Network Security : Forouzan Mukhopadhyay, MC Graw Hill, 2nd Edition.

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B. Tech. (IT) VII SEMESTER

Professional Elective - VI

BIG DATA ANALYTICS (PE4107IT)

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

UNIT – I

Big Data Analytics: What is big data, History of Data Management; Structuring Big Data; Elements of Big Data; Big Data Analytics; Distributed and Parallel Computing for Big Data;

Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important

UNIT – II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics; Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT – III

Understanding Map Reduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize Map Reduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFS Files, File system types, commands, org.apache.hadoop.io package, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations- Programming with HBase; Installation, Combining HBase and HDFS;

UNIT – IV

Big Data Technology Landscape and Hadoop: NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFS (Hadoop Distributed File System), HDFS Daemons, read, write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

UNIT – V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets

TEXT BOOKS:

1. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. Big Data, Black Book™, DreamTech Press, 2015 Edition.
3. Business Analytics 5e, BY Albright |Winston

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez, "Business Intelligence –Practice, Technologies and Management", John Wiley 2011.
2. Lariss T. Moss, Shaku Atre, "Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, "Oracle Business Intelligence: The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012.

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B.Tech. (IT) VII SEMESTER

Professional Elective -III Lab

PYTHON PROGRAMMING LAB (PE4109IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	3	1.5	External Marks: 50

LIST OF EXPERIMENTS

Exercise:1 Basics

1. Running instructions in Interactive interpreter and a Python Script
2. Write a program to purposefully raise Indentation Error and Correct it

Exercise: 2 programs on operators & I/O operations.

1. Write a program that takes 2 numbers as command line arguments and prints its sum.
2. Implement python script to show the usage of various operators available in python language.
3. Implement python script to read person's age from keyboard and display whether he is eligible for voting or not.
4. Implement python script to check the given year is leap year or not.

Exercise 3: programs on basic control structures & loops.

1. Write a program for checking the given number is even or odd.
2. Using a for loop, write a program that prints the decimal equivalents of 1/2, 1/3, 1/4, .. 1/10
3. Write a program for displaying reversal of a number.
4. Write a program for finding biggest number among 3 numbers.
5. Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
6. Develop a program that will read a list of student marks in the range 0 ... 50 and tell you how many students scored in each range of 10. how many scored 0 - 9, how many 10 -19, 20 - 29 ... and so on.

Input:

Enter list of Marks: 11 42 33 42 13 3 43

Output:

No of Students Between 1-10 : 1
No of Students Between 11-20 : 2
No of Students Between 21-30 : 0
No of Students Between 31-40 : 1
No of Students Between 41-50 : 1

Exercise 4: programs on Python Script.

1. Implement Python Script to generate first N natural numbers.
2. Implement Python Script to check given number is palindrome or not.
3. Implement Python script to print factorial of a number.
4. Implement Python Script to print sum of N natural numbers.
5. Implement Python Script to check given number is Armstrong or not.
6. Implement Python Script to generate prime numbers series up to n

Exercise5: programs on functions.

1. Define a function max_of_three() that takes three numbers as arguments and returns the largest of them.
2. Write a program which makes use of function to display all such numbers which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.
3. Write a python program to demonstrate all types arguments in a function with examples.
4. Exercise programs on recursion & parameter passing techniques.
5. Define a function which generates Fibonacci series up to n numbers.
6. Define a function that checks whether the given number is Armstrong
7. Implement a python script for factorial of number by using recursion
8. Write function to compute gcd, lcm of two numbers

Exercise 6: programs on Lists, Sets, Tuple and Dictionary.

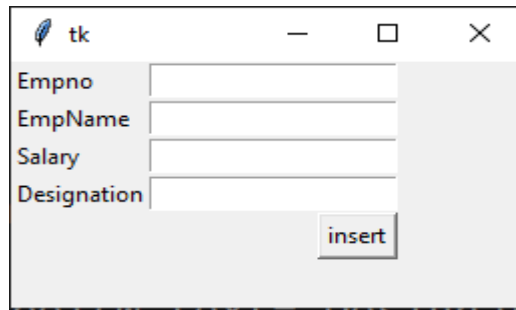
1. Finding the sum and average of given numbers using lists.
2. To display elements of list in reverse order.
3. Finding the minimum and maximum elements in the lists.
4. Write a function reverse to reverse a list. Without using the reverse function.
5. Python Program to Put Even and Odd elements in a List into Two Different Lists.
6. Python program to explain the various operations on Tuple.
7. Python Program to Count the Number of Vowels Present in a String using Sets
8. Python Program to Check Common Letters in Two Input Strings
9. Python Program that Displays which Letters are in the First String but not in the Second
10. Python Program to Add a Key-Value Pair to the Dictionary
11. Python Program to Concatenate Two Dictionaries Into One
12. Python Program to Check if a Given Key Exists in a Dictionary or Not

Exercise 7: programs on Strings, Modules and Files.

1. Implement Python Script to perform various operations on string using string libraries.
2. Implement Python Script to check given string is palindrome or not.
3. Write a program to count the numbers of characters in the string and store them in a dictionary data structure
4. Write a program to use split and join methods in the string.
5. Python Program to Detect if Two Strings are Anagrams
6. Python Program to Count the Number of Vowels in a String
7. Create a module with two functions one for finding Armstrong number, and second is for testing whether the given string is palindrome or not. Write a python application to import the above module some other application
8. Create a python package contains 2 modules of your name functions (minimum 2 functions in each module) and import the packages and modules in other application which perform some task.
9. Write Python script to display file contents.
10. Write Python script to copy file contents from one file to another.
11. Write a python program that accepts filename as an input from the user .Open the file and
12. Count the number of times a character appears in the file.

Exercise 8: Programs on OOPS, Exception Handling, GUI

1. Write a program that has a class Circle. Use a class variable to define the value of constant PI. Use this class variable to calculate area and circumference of a circle with specified radius.
2. Program to raise value error and handle using try-except.
3. Write a python program to validate given phone number is correct or not using regular expression
4. Create a student table in python and insert at leastt 5 records and display the all table entries
5. Write a python program to read group of words into a string and print the results as which words are ended with 'at' by using regular expression
6. Create a GUI application using tkinter where it will accept two numbers and when click the submit button the addition of 2 numbers will be display in sum filed.
7. Design a GUI application using tkinter, it look likes



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B.Tech. (IT) VII SEMESTER

Professional Elective-IV Lab

SOFTWARE TESTING LAB (PE4110IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	3	1.5	External Marks: 50

LIST OF EXPERIMENTS

1. Write a program to demonstrate the working of Do...while construct and write the test cases.
2. Write a program to demonstrate the working of while construct and write the test cases.
3. Write a program to demonstrate the working of If...else construct and write the test cases.
4. Write a program to demonstrate the working of for loop and write the test cases.
5. Write a program to demonstrate the working of If condition and write the test cases.
6. Write a program to demonstrate the working of Switch construct and write the test cases
7. Write the test cases for any ATM Application
8. Write the test cases for any e-ticketing Application
9. GUI checkpoint for window.
10. GUI checkpoint for multiple objects
11. Bitmap checkpoint for screen area
12. Bitmap checkpoint for window
13. Database checkpoint for Default check
14. Database checkpoint for runtime record check

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B. Tech. (IT) VII SEMESTER

Professional Elective IV Lab

OBJECT ORIENTED ANALYSIS AND DESIGN LAB (PE4111IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	3	1.5	External Marks: 50

LIST OF EXPERIMENTS

1. To develop a problem statement
2. To develop IEEE standard SRS document.
3. To identify Use Cases and develop Use Case model.
4. To identify Classes and develop Class diagram.
5. To develop Activity diagram.
6. To develop State chart diagram.
7. To develop Component diagram.
8. To develop Deployment diagram.
 Above tasks are to be implemented for following applications
 Case Study 1: ATM System
 Case Study 2: Library Information System
 Case Study 3: Online Course reservation System
 Case Study 4: E-Trading
 Case Study 5: E-Ticketing
9. Forward Engineer Class diagrams for the following.
 - (a) Generalization Relationship Example
 - (b) Interface Example
10. Reverse Engineer
 - (a) Aggregation Relationship Example
 - (b) Generalization Relationship Example
 - (c) Interface Example.

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B. Tech. (IT) VIII SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs /week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PE-VII*	Professional Elective –VII*	3	1	0	4	30	70	4
2	PE-VIII*	Professional Elective – VIII*	3	1	0	4	30	70	4
3	OE-II*	Open Elective – II*	3	0	0	3	30	70	3
4	PW4205IT	Project Work	0	0	10	10	50	100	5
5	MC	Mandatory Non-Credit course	2	0	0	2	30	-	-
Total			10	2	11	23	170	310	16

*(PE-VII) Professional Elective – VII	
PE4201IT	Machine Learning
PE4202IT	Data Science

*(OE-II) Open Elective – II	
OE4201EE	Non-Conventional Energy Sources
OE4206EC	Basics of IoT
OE4207ME	Basics of Alloy Steel Structures
OE4208EC	VLSI

*(PE-VIII) Professional Elective– VIII	
PE4203IT	Image Processing
PE4204IT	Cloud Computing

*(HS-MC) Mandatory Non Credit Course	
MC- 42aHS	Yoga Practice
MC- 42bHS	NSS

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B. Tech. (IT) VII SEMESTER
Professional Elective – VII
MACHINE LEARNING (PE4201IT)

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

UNIT-I

Introduction: Review of Linear Algebra, Definition of learning systems; Designing a learning system, Goals and applications of machine learning; Classification of learning system, Basic concepts in Machine Learning.

UNIT-II

Regression: introduction, Linear Regression, Multivariate Regression.

Decision Tree Learning: Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning,

UNIT-III

Decision Tree Learning: inductive bias in decision tree learning, issues in decision tree learning.

Bayesian learning: Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting Probabilities, minimum description length principle.

UNIT-IV

Bayesian learning: Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, Bayesian belief networks, the EM algorithm.

Artificial Neural Networks: Introduction, neural network representation, appropriate problems for Neural network learning, perceptions, multilayer networks and the back-propagation algorithm.

UNIT-V

Instance-Based Learning: Introduction, k-nearest neighbour algorithm, locally weighted regression, Radial basis functions, case-based reasoning, remarks on lazy and eager learning.

TEXT BOOKS

1. Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.
2. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

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B. Tech. (IT) VIII SEMESTER

Professional Elective – VII

DATA SCIENCE(PE4202IT)

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

UNIT – I

Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.

UNIT – II

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data Sources

UNIT-III

Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms: Linear regression, SVM, Naive Bayes.

UNIT-IV

Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.

UNIT-V

Applications of Data Science, Technologies for visualization, Bokeh (Python). Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

TEXT BOOKS:

1. Cathy O’Neil and Rachel Schutt. Doing Data Science, Straight Talk from The Frontline. O’Reilly.
2. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press.

B. Tech. (IT) VIII SEMESTER

Professional Elective – VIII

IMAGE PROCESSING (PE4203IT)

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

UNIT – I

FUNDAMENTALS OF IMAGE PROCESSING: Fundamental steps in digital image processing, Components of image processing system, A simple image formation model, Image sampling and quantization, Basic relationships between pixels, Introduction to Fourier Transform and DFT – properties of 2D Fourier Transform, FFT.

UNIT – II

IMAGE ENHANCEMENT IN THE SPATIAL AND FREQUENCY DOMAINS: Basic gray – level transformations, Histogram processing, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters, The basics of filtering in the frequency domain, Image smoothing in frequency domain filters, Image sharpening in frequency domain filters.

UNIT – III

IMAGE SEGMENTATION: Fundamentals, Point, Line and edge detection, Thresholding, Region-based segmentation, Segmentation using morphological watersheds, The use of motion in segmentation.

UNIT – IV

IMAGE RESTORATION: A model of image degradation/restoration, Noise models, inverse filtering, wiener filtering, Constrained Least Squares Filtering, Geometric Mean Filter.

IMAGE COMPRESSION: Fundamentals, Huffman coding, Arithmetic coding, Golomb coding, LZW coding, Run-length coding.

UNIT – V

MORPHOLOGICAL IMAGE PROCESSING: Erosion, Dilation, Opening, Closing, The hit-or-miss transformation; Basic morphological algorithms - boundary extraction, hole filling, extraction of connected components, thinning, thickening, skeletons, pruning.

FEATURE EXTRACTION: Background, Boundary preprocessing, Boundary Feature Descriptors, Region Feature Descriptors, Whole-image features.

TEXT BOOKS

1. Rafeal C Gonzalez and Richard E.Woods, “Digital Image Processing”, 4th edition, Pearson Education/ PHI, 2018.

REFERENCE BOOKS

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, 4th edition, Cengage, 2015.
2. Alasdair McAndrew, “Introduction to Digital Image Processing with Matlab”, Thomson Course Technology, 2004 Course Technology Press, Boston, MA, United States, 2004.
3. William K. Prat, “Digital Image Processing”, 4th edition, Wiley-Interscience, A John Wiley & Sons, Inc., Publication, 2007.

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B.Tech. (IT) VII SEMESTER**Professional Elective – VIII****CLOUD COMPUTING (PE4204IT)**

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

UNIT I

Introduction to Cloud Computing, Roots of Cloud Computing , Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud.

UNIT II

Principles of Parallel and Distributed Computing : Eras of computing, Parallel vs. distributed computing. Elements of parallel computing, Hardware architectures for parallel processing Approaches to parallel programming Levels of parallelism. Elements of distributed computing Components of a distributed system Architectural styles for distributed computing, Models for inter process communication.

Virtualization Characteristics of virtualized environments, Virtualization and cloud computing Pros and cons of virtualization and Advantages of virtualization

UNIT III

Cloud Architecture- Layers and Models Layers in cloud architecture, Software as a Service (SaaS), features of SaaS and benefits, Platform as a Service (PaaS), features of PaaS and benefits, Infrastructure as a Service (IaaS), features of IaaS and benefits, Service providers, challenges and risks in cloud adoption. Cloud deployment model: Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing

UNIT IV

Cloud Platforms: Aneka—Integration of Private and Public Clouds

Introduction , Technologies and Tools for Cloud Computing , Aneka Cloud Platform , Aneka Resource Provisioning Service, Hybrid Cloud Implementation , Visionary thoughts for Practitioners

CometCloud: CometCloud Architecture , Autonomic Behavior of CometCloud , Overview of CometCloud-based Applications , Implementation and Evaluation

T-Systems' Cloud-Based Solutions

UNIT V

Cloud Platforms in Industry: Amazon web services: Computer services, Storage services, Communication services

Google App Engine: Architecture and core concepts, Application lifecycle, Cost model

Microsoft Azure: Azure core concepts, SQL Azure, Windows Azure platform appliance

Cloud Applications: Healthcare: ECG analysis in the cloud. Biology: protein structure prediction, Biology: gene expression data analysis for cancer diagnosis, Geo science: satellite image processing, Social networking, Media applications

TEXT BOOKS:

1. Cloud Computing (Principles and Paradigms) :Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley & Sons, Inc
2. Mastering Cloud Computing: Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, McGraw Hill Education 978-1259029950

REFERENCE BOOKS:

1. Cloud computing for dummies- Judith Hurwitz , Robin Bloor , Marcia Kaufman ,Fern• Halper, Wiley Publishing, Inc, 2010
2. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter, TATA McGraw- Hill , New Delhi – 2010
3. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate

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B. Tech. (IT) VIII SEMESTER
Open Elective – II
NON-CONVENTIONAL ENERGY SOURCES(OE4201EE)

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

UNIT-I

Review of Conventional and Non-Conventional energy sources - Need for non-conventional energy sources Types of Non- conventional energy sources - Fuel Cells - Principle of operation with special reference to H₂O₂ Cell - Classification and Block diagram of fuel cell systems - Ion exchange membrane cell - Molten carbonate cells - Solid oxide electrolyte cells - Regenerative system- Regenerative Fuel Cell - Advantages and disadvantages of Fuel Cells-Polarization - Conversion efficiency and Applications of Fuel Cells.

UNIT-II

Solar energy - Solar radiation and its measurements - Solar Energy collectors -Solar Energy storage systems - Solar Pond - Application of Solar Pond - Applications of solar energy.

UNIT-III

Wind energy- Principles of wind energy conversion systems - Nature of wind - Power in the Wind-Basic components of WECS -Classification of WECS -Site selection considerations -Advantages and disadvantages of WECS -Wind energy collectors -Wind electric generating and control systems - Applications of Wind energy -Environmental aspects.

UNIT- IV

Energy from the Oceans - Ocean Thermal Electric Conversion (OTEC) methods - Principles of tidal power generation -Advantages and limitations of tidal power generation -Ocean waves - Wave energy conversion devices -Advantages and disadvantages of wave energy - Geo-Thermal Energy - Types of Geo-Thermal Energy Systems - Applications of Geo-Thermal Energy.

UNIT-V

Energy from Biomass - Biomass conversion technologies / processes - Photosynthesis - Photosynthetic efficiency - Biogas generation - Selection of site for Biogas plant - Classification of Biogas plants - Details of commonly used Biogas plants in India - Advantages and disadvantages of Biogas generation - Thermal gasification of biomass -Biomass gasifiers.

TEXT BOOKS

1. Rai G.D, Non-Conventional Sources of Energy, Khandala Publishers, New Delhi, 1999.
2. M.M. El-Wakil, Power Plant Technology. McGraw Hill, 1984.

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B. Tech. (IT) VIII SEMESTER

Open Elective – II

BASICS OF IOT (OE4206EC)

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

UNIT- I

Introduction to Internet of Things: IoT vision, Strategic research and innovation directions, IOT Applications, Related future technologies, Infrastructure, Networks and communications, Processes, Data Management, Security, Device level energy issues.

UNIT- II

Internet Principles and communication technology: Internet Communications: An Overview – IP, TCP, IP protocol Suite, UDP. IP addresses – DNS, Static and Dynamic IP addresses, MAC Addresses, TCP and UDP Ports, Application Layer Protocols – HTTP, HTTPS, Cost Vs Ease of Production, Prototypes and Production, Open-Source Vs Closed Source.

UNIT- III

Prototyping for IoT: Prototyping Embedded Devices – Sensors, Actuators, Microcontrollers, SoC, Choosing a platform, Prototyping Hardware platforms – Arduino, Raspberry Pi.

UNIT- IV

Cloud computing and Data Analytics: Introduction to Cloud storage models -SAAS, PAAS, and IAAS. Communication APIs, Amazon web services for IOT.

UNIT- V

IoT Product Manufacturing - From prototype to reality: Business model for IoT product manufacturing, Business models canvas, Funding an IoT Startup.

TEXT BOOKS

1. “Internet of Things” - Converging Technologies for smart environments and Integrated Ecosystems, River Publishers.
2. Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, Wiley India Publishers
3. Daneil W lewies, “Fundamentals of embedded software: where C meets assembly”, Pearson.
4. Arshdeep Bahga, “Internet of things -A hands on Approach” Universities press.

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B.Tech. (IT) VIII SEMESTER
Open Elective – II
BASICS OF ALLOY STEEL STRUCTURES (OE4207ME)

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

UNIT-I

Introduction: Level of structures, structure property relationship, Defects in materials, Strengthening Mechanisms.

UNIT-II

The Iron carbon systems: Definition of phase, phase diagram. Iron Carbon phase diagram. Definition of phases in Fe-C system. Concept of steel and Cast Iron. effect of alloying elements on steel

UNIT-III

Heat Treatment of Steels: Annealing, Normalizing, Hardening and tempering. Thermo Mechanical Treatments. Surface Heat Treatments.

UNIT-IV

Steels: Plain Carbon Steels: Low-carbon Mild steels, Medium Carbon Steels, High Carbon Steels, properties and applications of Plain Carbon Steels. High Strength Steels, Tool Steels, Creep Resistance Steel

UNIT-V

Stainless steels: Composition, properties and applications of Austenitic Stainless steel, Ferritic Stainless steel, Martensitic Stainless steel, Precipitation Hardened Stainless steel.

TEXT BOOKS:

1. Introduction to Physical Metallurgy – SH Avner, TATA Mc GRAW HILL ,1997
2. Alloys Steels – Wilson

REFERENCEBOOKS

1. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007

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B. Tech. (IT) VIII SEMESTER
Open Elective – II
VLSI DESIGN (OE4208EC)

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

UNIT –I

Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS

Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: I_{ds} - V_{ds} relationships, MOS transistor threshold Voltage, g_m , g_{ds} , Figure of merit ω_0 ; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT -II

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 μ m CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

UNIT –III

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan – in, Fan – out, Choice of layers.

UNIT -IV

Data Path Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories.

UNIT -V

Programmable Logic Devices: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, Contemporary Topics.

TEXT BOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, PHI, 2005 Edition
2. CMOS VLSI Design – A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, 3rd Ed, Pearson, 2009.
3. VLSI Design – M. Michael Vai, 2001, CRC Press

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011
2. CMOS logic circuit Design - John .P. Uyemura, Springer, 2007.
3. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
4. VLSI Design- K .Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
5. Introduction to VLSI – Mead & Convey, BS Publications, 2010.

B. Tech. (IT) VIII SEMESTER
Humanity Science Course
YOGA PRACTICE (MC-42aHS)

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

UNIT – I

Introduction: Yoga definition, health definition from WHO, yoga versus health, basis of yoga, yoga is beyond science, Gist of eighteen chapters of Bhagavad-Gita, four types of yoga: Karma, Bhakti, Gnyana and Raja yoga, Internal and External yoga, elements of Ashtanga yoga (Yama, Niyama, Asana, Pranayama, Prathyahara, Dharana, Dhyana and Samadhi), Pancha koshas and their purification through Asana, Pranayama and Dhyana.

UNIT – II

Suryanamaskaras (Sun Salutations): Definition of sun salutations, seven chakras (Mooladhaar, Swadhishtaan, Manipura, Anahata, Vishuddhi, Agnya and Sahasrar), various manthras (Om Mitraya, Om

Ravaye, Om Suryaya, Om Bhanave, Om Marichaye, Om Khagaye, Om Pushne, Om Hiranya Garbhaye, Om Adhityaya, Om Savitre, Om Arkhaya, and Om Bhaskaraya) and their meaning while performing sun salutations, physiology, seven systems of human anatomy, significance of performing sun salutations.

UNIT – III

Asanas (Postures): Pathanjali's definition of asana, sthiram sukham asanam, 3rd limb of Ashtanga yoga, loosening or warming up exercises, sequence of perform in asanas (standing, sitting, prone, supine and inverted), nomenclature of asanas (animals, trees, rishis and so on), asanas versus chakras, asanas versus systems, asanas versus physical health, activation of Annamaya kosha.

UNIT – IV

Pranayama (Breathing Techniques): Definition of Pranayama as per Shankaracharya, 4th limb of Ashtanga yoga, various techniques of breathing, Pranayama techniques versus seasons, bandhas and their

significance in Pranayama, mudras and their significance in Pranayama, restrictions of applying bandhas with reference to health disorders, Pranayama versus concentration, pranayama is the bridge between mind and body, pranayam versus mental health, activation of Pranamaya kosha through Pranayama.

UNIT – V

Dhyana (Meditation): Definition of meditation, 7th limb of Ashtanga yoga, types of mind (Conscious and Sub-Conscious), various types of dhyana. Meditation versus spiritual health, Dharana and Dhyana, extention of Dhyana to Samadhi, Dhyana and mental stress, activation of Manomaya kosha through dhyana, silencing the mind.

SUGGESTED READINGS:

1. Light on Yoga by BKS Iyengar.
2. Yoga Education for Children, Vol-1 by Swami Satyananda Saraswati.
3. Light on Pranayama by BKS Iyengar.
4. Asana Pranayama Mudra and Bandha by Swami Satyananda Saraswati.
5. Hatha Yoga Pradipika by Swami Mukhtibodhananda.
6. Yoga education for children, Vol-11 by Swami Niranjanananda Saraswati.
7. Dynamics of Yoga by Swami Satyananda Saraswati.

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B. Tech. (IT) VIII SEMESTER
Humanity Science Course
NSS (MC42bHS)

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

List of Activities:

1. Orientation programs about the role of NSS in societal development.
2. Swachh Bharat Program.
3. Guest lectures from eminent personalities on personality development.
4. Plantation of saplings/Haritha Haram Program.
5. Blood Donation / Blood Grouping Camp.
6. Imparting computer education to school children.
7. Creating Awareness among students on the importance of Digital transactions.
8. Stress management techniques.
9. Health Check-up Activities.
10. Observation of Important days like Voters' day, World Water Day and so on.
11. Road Safety Awareness Programs.
12. Energy Conservation Activities
13. Conducting Programs on effective communication skills.
14. Awareness programs on national integration.
15. Orientation on Improving Entrepreneurial Skills.
16. Developing Effective Leadership skills.
17. Job opportunity awareness programs in various defense, public sector undertakings.
18. Skill Development Program.
19. Creating awareness among students on the Importance of Yoga and other physical activities.
20. Creating awareness among students on various government sponsored social welfare schemes for the people.

Note: At least Ten Activities should be conducted in the Semester. Each event conducted under Swachh Bharat, Plantation and important days like Voters' Day, world water day may be treated as a separate activity