SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)
Sree Sainath Nagar, Tirupati
Department of Information Technology

Supporting Document for 1.1.3

Courses having focus on

Employability/ Entrepreneurship/ skill Development

Program: B.Tech.- Information Technology

Regulations : SVEC-16

The Courses (with course outcomes) under SVEC-16 Regulations which focus on ***employability/ entrepreneurship/ skill development*** are highlighted with the following colours.

Skill

Employability

Entrepreneurship

I B.Tech. - I Semester

(16BT1HS01) **TECHNICALENGLISH**

(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C

30	70	100	3	1	--	3

PREREQUISITES: English at Intermediate level

COURSE DESCRIPTION:

Introduction to Communication; Active Listening; Effective Speaking; Reading; and Writing.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Demonstrate knowledge in:
   - Process of communication
   - Modes of listening
   - Paralinguistic features
   - Skimming and Scanning
   - Elements of style in writing
2. Analyze the possibilities and limitations of language for understanding.
   - Barriers to Communication
   - Barriers to Effective Listening
   - Barriers to Speaking
   - Formal and metaphorical language
3. Design and develop functional skills for professional practice.
4. Apply writing skills in preparing and presenting documents.
5. Function effectively as an individual and as a member in diverse teams.
6. Communicate effectively with the engineering community and society in formal and informal situations.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO COMMUNICATION

Introduction –Language as a Tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Modes of Communication – Barriers to Communication (classification)

UNIT-II: ACTIVE LISTENING

Introduction – Reasons for poor Listening – Traits of a Good Listener – Listening Modes – Types of Listening – Barriers to Effective Listening – Listening for General Content and Specific Information

UNIT-III: EFFECTIVE SPEAKING

Introduction – Achieving Confidence, Clarity and Fluency – Paralinguistic Features – Barriers to Speaking – Types of Speaking – Persuasive Speaking.

UNIT-IV - READING

Introduction and Reading Rates – Reading and Interpretation – Intensive and Extensive Reading – Critical Reading – Reading

for Different Purposes – SQ3R Reading Technique –Study Skills.

UNIT-V: WRITING

Introduction – Language – Elements of Style – Techniques for Good Technical Writing – Referencing and Styling – Right Words and Phrases – Sentences.

TEXT BOOK:

1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. Ashraf Rizvi*, Effective Technical Communication*, McGraw-Hill Education (India) Pvt.Ltd., New Delhi, 2015.
2. Sanjay Kumar & Pushp Lata, *Communication Skills*, Oxford University university press 2012 University Press, New Delhi, 2013.
3. Teri Kwal Gamble and Michael Gamble, *Communication Works*, Tata Mc Graw-Hill, New Delhi, 2010.
4. Rajendra Pal and J.S. Korlahalli, *Essentials of Business Communication*, Sultan Chand and Sons (P) Ltd, New Delhi, 2010.

I B.Tech. - I Semester

(16BT1BS01) ENGINEERING CHEMISTRY

(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: Water technology, Chemistry of Engineering materials, Nanochemistry, Green Chemistry, Electro chemical cells, Sensors, Corrosion and Lubricants.

COURSE OUTCOMES:

After completion of the course, a successful student is able to:

CO1: Acquire basic knowledge in water technology, engineering plastics, conducting polymers, composites, Electro chemical cells, Nano Chemistry, principles of Green Chemistry, corrosion phenomenon and lubricants.

CO2: Develop analytical skills in:
- a. Determination of hardness of water.
- b. Determination of viscosity, flame and fire points, cloud and pour points.

CO3: Develop designing skills in:
- a. Synthesis of engineering plastics.
- b. Chemical methods for the synthesis of Nano materials.

CO4: Develop skills for providing solutions through:
- a. Mitigation of hardness of water.
- b. Newer Nanomaterials and engineering plastics for specific applications

CO5: Acquire awareness to practice engineering in compliance to modern techniques such as:
- a. Nalgonda technique for defluoridation of water
- b. Electroplating technique for control of corrosion.

CO6: Acquire awareness to societal issues on:
- a. Quality of water.
- b. Bio-diesel
- c. Chemical materials utility and their impact.

DETAILED SYLLABUS:

UNIT–I: WATER TECHNOLOGY (9 periods)

Introduction: Types of water, impurities in water and their consequences, types of hardness of water, units of hardness of water, disadvantages of hardness of water, estimation of hardness of water by EDTA method, Boiler troubles: Scales and Sludges, Caustic embrittlement, Boiler corrosion and Priming and

Foaming.

Softening of water: Zeolite process and Ion exchange process, advantages and disadvantages. Desalination of brackish water by Reverse Osmosis, Numerical problems on estimation of hardness of water.

Fluorides in water: Effects on human health, defluoridation method-Nalgonda method; comparison of merits and demerits of various defluoridation methods (Nalgonda, Bone Charcoal, Activated Alumina, Contact precipitation, Brick, Reverse osmosis).

UNIT – II: CHEMISTRY OF ENGINEERING MATERIALS (9 periods)

Engineering Plastics: Definition, general properties, synthesis, properties and applications of PC, PTFE, and PMMA.

Conducting polymers: Definition, types of conducting polymers: Intrinsic and extrinsic conducting polymers with examples, engineering applications of conducting polymers.

Biodegradable polymers: Definition, properties, classification, mechanism of degradation of biodegradable polymers and their applications.

Composites – Introduction, types of composites: fiber reinforced particulate and layered composites with examples, advantages of composites and applications.

UNIT– III: NANOCHEMISTRY AND GREEN CHEMISTRY (9 periods)

Nanochemistry: Introduction, classification, properties and applications of Nano materials (nano particles, nano tubes, nano wires, nano composites, dendrimers); synthesis of Nano materials – Sol-gel process.

Green Chemistry: Introduction, principles of green chemistry, Tools of Green Chemistry with Examples, Applications of Green Chemistry in science and technology.

Biodiesel: Introduction, Synthesis (Trans esterification method), advantages, disadvantages and applications.

UNIT–IV: ELECTROCHEMICAL CELLS AND SENSORS (9 periods)

Electrochemical cell: Introduction, EMF of an electrochemical cell.

Batteries: Introduction, types of Batteries: primary and secondary batteries with examples, Ni-Cd batteries, Lithium-ion batteries, Lithium- Polymer batteries, Applications of batteries.

Fuel Cells: Definition, examples: $H_2 - O_2$ Fuel cell, solid oxide fuel cell, Bio-fuel cell and applications of fuel cells.

Sensors - Introduction, Types of Sensors, electrochemical sensor: construction and working principle of potentiometric sensor, and applications of electrochemical sensors.

UNIT–V: CORROSION AND LUBRICANTS (9 periods)

Corrosion: Introduction, Definition, types of corrosion (dry and wet corrosion), galvanic corrosion, concentration cell corrosion, Factors influencing corrosion, Corrosion control: cathodic protection; sacrificial anodic protection and impressed current cathodic protection; protective coatings: Galvanizing and Electroplating (Nickel).

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, Aniline points, neutralization number and mechanical strength.

Total periods: 45 periods

TEXT BOOKS:

1. P.C.Jain & Monika Jain, **Engineering Chemistry**, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 16th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah **Engineering Chemistry**, Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2015.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, **Nano Materials,** New Age international publishers, 2nd edition, 2014.
2. Paul T. Anastas and John C Warner, **Green Chemistry: Theory and practice,** Oxford University Press, 2000.

I B.Tech. - I Semester

(16BT1BS03) MATRICES AND NUMERICAL METHODS

(Common to all Branches)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Intermediate /Senior secondary mathematics

COURSE DESCRIPTION: Fundamentals of matrix theory; numerical solutions of equations, curve fitting; interpolation; numerical differentiation and integration; numerical solutions of ordinary differential equations.

COURSE OUTCOMES: After completion of the course a successful student is able to

CO1: Acquire basic **knowledge** in
- (a) Finding the rank of matrices and analyzing them.
- (b) Solving algebraic and transcendental equations by various numerical methods.
- (c) Fitting of various types of curves to the experimental data.
- (d) Estimating the missing data through interpolation methods.
- (e) Identification of errors in the experimental data
- (f) Finding the values of derivatives and integrals through various numerical methods.
- (g) Solving differential equations numerically when analytical methods fail.

CO2: Develop skills in **analyzing** the
- (a) methods of interpolating a given data
- (b) properties of interpolating polynomials and derive conclusions
- (c) properties of curves of best fit to the given data
- (d) algebraic and transcendental equations through their solutions
- (e) properties of functions through numerical differentiation and integration
- (f) properties of numerical solutions of differential equations

CO3: Develop skills in **designing** mathematical models for
- (a) Fitting geometrical curves to the given data
- (b) Solving differential equations
- (c) Constructing polynomials to the given data and drawing inferences.

CO4: Develop numerical skills in **solving the problems** involving
- (a) Systems of linear equations
- (b) Fitting of polynomials and different types of equations

to the experimental data
(c) Derivatives and integrals
(d) Ordinary differential equations

CO5: Use relevant numerical **techniques** for
(a) Diagonalising the matrices of quadratic forms
(b) Interpolation of data and fitting interpolation polynomials
(c) Fitting of different types of curves to experimental data
(d) obtaining derivatives of required order for given experimental data
(e) Expressing the functions as sum of partial fractions

DETAILED SYLLABUS:

UNIT–I: MATRICES (11 periods)

Rank of a matrix, echelon form, normal form, inverse of a matrix by elementary row operations. Solutions of linear system of equations. Eigen values, Eigen vectors and properties (without proof), Diagonalization. Quadratic form (QF), reductions to canonical form using orthogonal transformation and nature of QF.

UNIT-II NUMERICAL SOLUTIONS OF EQUATIONS AND CURVE FITTING (8 periods)

Solutions of Algebraic and Transcendental equations by bisection method, Regula-Falsi method, Newton – Raphson's method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves.

UNIT-III INTERPOLATION (8 periods)

Interpolation, difference operators and their relationships, Newton's forward and backward formulae, Lagrange's interpolation formula. Partial fractions using Lagrange's interpolation formula.

UNIT-IV NUMERICAL DIFFERENTIATION AND INTEGRATION (8 periods)

Numerical differentiation using Newton's forward and backward formulae. Numerical integration using Trapezoidal rule, Simpson's $1/3^{rd}$ rule and $3/8^{th}$ rule.

UNIT- V NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS (10 periods)

Numerical solutions of first order Initial value problems using Taylor series method, Euler's method , modified Euler's method, Runge – Kutta method (4^{th} order only) and Milne's predictor – corrector method.

Total no. of periods: 45

TEXT BOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N.Prasad, ***Mathematical Methods***, S.Chand and Company, 8/e, 2013

REFERENCE BOOKS:

1. B.S. Grewal, ***Higher engineering mathematics***, Khanna Publishers, 42nd Edition. 2012
2. S.S.Sastry, ***Introductory methods of Numerical Analysis***, Prentice Hall of India, 5/e, 2013

I B.Tech. - I Semester

(16BT1BS04) MULTI-VARIABLE CALCULUS AND DIFFERENTIAL EQUATIONS

(Common to all Branches)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Intermediate /Senior secondary mathematics

COURSE DESCRIPTION: First order differential equations; higher order linear differential equations; functions of several variables; applications of integration; multiple integrals; vector calculus.

COURSE OUTCOMES: After completion of the course a successful student is able to

CO1: Acquire knowledge in
- (a) Higher order Differential equations
- (b) Maximum and minimum values for the functions of several variables
- (c) Double and triple integrals
- (d) Differentiation and integration of vector functions.
- (e) Line and surface volume
- (f) transforming integrals from three dimensional surfaces and volumes on to plane surfaces

CO2: Develop skills in analyzing the
- (a) methods for differential equation for obtaining appropriate solutions,
- (b) Properties of oscillatory electrical circuits and heat transfer in engineering systems
- (c) The variations in the properties of functions near their stationary values
- (d) Flow patterns of fluids, electrical and magnetic flux and related aspects

CO3: Develop skills in designing mathematical models for
- (a) R-C and L-R-C oscillatory electrical circuits
- (b) Heat transfer and Newton's law of cooling
- (c) Engineering concepts involving lengths of curves and areas of planes, Flux across surfaces

CO4: Develop analytical skills in solving the problems involving
- (a) Newton's law of cooling
- (b) non homogeneous linear differential equations
- (c) maximum and minimum values for the functions
- (d) lengths of curves, areas of surfaces and volumes of solids in engineering
- (e) transformation of integrals from three dimensional surfaces and volumes on to plane surfaces

CO5: Use relevant mathematical techniques for evaluating

(a) various types of particular integrals in differential equations
(b) stationary values for multi variable functions
(c) multiple integrals in change of variables
(d) integrations of vector functions.

DETAILED SYLLABUS:

UNIT-I: FIRST ORDER DIFFERENTIAL EQUATIONS (6 periods)

Linear and Bernoulli type, exact equations and reducible to exact. Orthogonal trajectories (Both Cartesian and polar forms). Newton's law of cooling.

UNIT II: HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS (9 periods)

Method for solution of linear equations- Differential operator *D*, Solution of second order linear homogeneous equations with constant coefficients, Solution of Higher order homogeneous linear equations with constant coefficients, **Solution of Non homogeneous linear equations**-Operator methods for finding particular integrals- for cases – e^{ax}, sin ax, cos ax, x^n, e^{ax} V(x), xV(x). Method of Variation of parameters. Applications to oscillatory electrical circuits.

UNIT-III: FUNCTIONS OF SEVERAL VARIABLES (8 periods)

Functions of Two Variables: Limits, Continuity; **Partial Derivatives**: Total Differential and Derivatives, Jacobian, Functional dependence, Taylor's Theorem, maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers.

UNIT-IV: APPLICATIONS OF INTEGRATION AND MULTIPLE INTEGRALS (10 periods)

Applications of integration to – lengths of curves, areas of surfaces of revolution, Double and Triple integrals – change of order of integration, change of variables in integrals. Area enclosed by plane curves, volumes of solids.

UNIT-V: VECTOR CALCULUS (12 periods)

Vector differentiation: Gradient of a scalar field and Directional Derivative, Divergence and Curl of a Vector field

Line integrals: Line integrals independent of path – work done.

Surface area and Surface Integrals: Surface Area, Surface Integrals, Flux across a surface.

Green's Theorem: Green's Theorem (without proof)- verification- applications

Gauss Divergence Theorem and Stoke's Theorem: Gauss Divergence theorem (without proof), Stokes's Theorem (without proof) –verifications and applications.

Total no. of periods: 45

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi,S.Ranganatham and M.V.S.S.N. Prasad, ***Engineering Mathematics, Vol-1***, S. Chand &Company, 13/e, 2014

REFERENCE BOOKS:

1. Grewal, B.S., ***Higher engineering mathematics***,Khanna publishers, Delhi, 42/e. 2012.
2. Kreyszig, E., ***Advanced Engineering Mathematics***,John Wiley and Sons, Inc.,9/e.2012.

I B.Tech. - I Semester

(16BT10501) PROGRAMMINGIN C

(Common to all Branches)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*3*	*1*	-	*3*

PRE-REQUISITES: NIL

COURSE DESCRIPTION:

Program design; Operators and Expressions; Data Input and Output; Control Statements; Functions; Arrays; Strings; Pointers; Structures & Unions and File handling Techniques;

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO1: Demonstrate knowledge in:
- o Elements of C Language
- o Selection and Repetition statements.
- o Arrays, Strings and Functional statements.
- o Derived data types, Files and Pointers

CO2: Analyze complex engineering problems to develop suitable solutions

CO3: Design algorithms for specified engineering problems

CO4: Use appropriate 'C' language constructs for solving engineering problems

CO5: Write programs using 'C' language to implement algorithms

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO C PROGRAMMING, OPERATORS & EXPRESSIONS (08 periods)

Introduction to C Programming: The C Character set, Writing First Program of C, Identifiers and Keywords, Data types, Constants, Variables and Arrays, Declarations, Expressions, Statements and Symbolic Constants.

Operators and Expressions: Arithmetic Operators, Unary Operators, Relational and Logical Operators, Assignment Operators, the Conditional Operators.

UNIT II – DATA INPUT AND OUTPUT & CONTROL STATEMENTS (08 periods)

Data Input and Output: Single Character Input and Output, Input Data & Output data, The gets and puts Function.

Control Statements: Branching: The if-else Statement, Looping: The while Statement, More Looping: The do-while Statement, Still More Looping: The for Statement, Nested Control Statement, The switch Statement, The break & continue Statements, The goto Statement.

UNIT III – FUNCTIONS, PROGRAM STRUCTURES & ARRAYS (11 p*eriods*)

Functions: A Brief Overview, Defining a Function, Accessing a Function, Function Prototypes, Parsing Argument to a Function, Recursion.

Program Structure: Storage Classes, Automatic Variables, External (Global) Variables, Static Variables, Multi file Programs,

Arrays: Defining an Array, Processing an Array, Processing Array to function, Multidimensional Arrays. Linear search, Binary search, Fibonacci search, Bubble sort and Insertion sort

UNIT IV – STRINGS & POINTERS (09 periods)

Strings: Defining a String, NULL Character, Initialization of Strings, Reading and Writing a String, Processing a Strings, Character Arithmetic, Searching and Sorting of Strings, Library Functions for Strings.

Pointers: Pointer Declaration, Passing Pointers to a Function, Pointers and One-dimensional Arrays, Dynamic Memory Allocation, Operations on Pointers, Pointers and Multidimensional Arrays, Arrays of Pointers.

UNIT V – STRUCTURES AND UNIONS & FILE HANDLING (09 periods)

Structures and Unions: Defining a Structure, Processing a Structure, User-Defined Data types (typedef), Structures and Pointers, Passing Structures to Function, Self –Referential Structures, Unions

File Handling: Files introduction, Opening and Closing a Data File, Reading and Writing a Data File, Processing a Data File, Unformatted Data File, Concept of Binary Files, Accessing the File Randomly.

Total Periods: *45*

TEXT BOOK:

1. Byron Gottfried and Jitender Kumar C "*Programming with C*," Third Edition, McGraw Hill Education (India) Pvt, Ltd, New Delhi, 2016.

REFERENCE BOOKS:

1. PradipDey and Manas Ghosh, *"Programming in C",* Second Edition, Oxford University Press, NewDelhi, 2007.
2. E. Balagurusamy, "*Programming in C",* Seventh Edition, Mc Graw Hill Education (India) Pvt, Ltd, New Delhi, 2014.

I B.Tech. - I Semester

(16BT1HS31) ENGLISH LANGUAGE LAB

(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PREREQUISITES: English at intermediate or equivalent level.

COURSE DESCRIPTION: Phonetics Vocabulary Building; Functional Grammar; Just a Minute; Elocution/Impromptu; Giving Directions/Conversation Starters; Role Play; Public Speaking; Describing People, Places, Objects and Events; Reading Comprehension; Listening Comprehension; Information Transfer.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Demonstrate knowledge in
   - Phonetics
   - Information Transfer
2. Analyze the functional knowledge in
   - Vocabulary
   - Grammar
3. Design and develop functional skills for professional practice.
4. Apply the techniques of Listening and Reading skills to comprehend Listening and Reading comprehension.
5. Function effectively as an individual and as a member in diverse teams to demonstrate
   - Extempore talk and
   - Role Play
6. Communicate effectively in public speaking in formal and informal situations.
7. Recognize the need to engage in lifelong learning to upgrade competence of knowledge and communication.

LIST OF EXERCISES:

1. Phonetics
2. Vocabulary Building
3. Functional Grammar
4. Just a Minute
5. Elocution/Impromptu

6. Giving Directions/Conversation Starters
7. Role Play
8. Public Speaking
9. Describing People, Places, Objects and Events.
10. Reading Comprehension
11. Listening Comprehension
12. Information Transfer

TEXT BOOK:

1. Department Lab Manual

REFERENCE BOOKS:

1. D. Sudha Rani, *A Manual for English Language Laboratories*, Pearson Education.
2. D. Sudha Rani, *Advanced Communication Skills Laboratory Manual*, Pearson Education.
3. R. Manivannan and G. Immanuel, *Communication Skills Laboratory*, VK Publications, Sivakasi, 2013
4. Nira Kumar*, English Language Laboratories*, PHI Learning Pvt. Ltd., New Delhi, 2011.

SUGGESTED SOFTWARE:

1. ETNL Language Lab Software Version 4.0
2. GEMS - Globarena E- Mentoring System.
3. Speech Solutions.
4. English Pronunciation Dictionary by Daniel Jones.
5. Learn to Speak English 8.1, The Learning Company - 4 CDs.
6. Mastering English: Grammar, Punctuation and Composition.
7. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
8. Dorling Kindersley Series - Grammar.
9. Language in Use 1, 2 & 3.
10. Cambridge Advanced Learner's Dictionary - 3rd Edition.
11. Centronix - Phonetics.
12. Let's Talk English, Regional Institute of English South India.
13. The Ultimate English Tutor.

I B.Tech. - I Semester

(16BT1BS31) ENGINEERING CHEMISTRY LAB

(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE REQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: Estimation of hardness, alkalinity, dissolved oxygen of water samples and estimation of Iron by volumetric methods, determination of effect of P^H on rate of corrosion, measurement of viscosity of lubricants; Instrumental methods like potentiometer, conductivity meter, P^H meter and colorimeter; synthesis of Polymers and Nano materials.

COURSE OUTCOMES:

After completion of the course, a successful student is able to:

CO1: Acquire basic Knowledge about the volumetric analysis and synthesis of materials used for engineering applications.

CO2: Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of Iron through wet laboratory methods.

CO3: Develop designing skills for the synthesis of polymers and Nanomaterials.

CO4: Acquire skills to use instrumental techniques for the determination of Electrical conductance of electrolytes, EMF of a cell, PH of a solution, determination of viscosity of lubricants and estimation of iron in cement.

CO5: Provide solutions for environmental issues through determination of quality of water.

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:.

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Preparation of NovalacResin.
6. Synthesis of Nano metal-oxide using sol– gel process.
7. Conductometric titration of strong acid Vs strong base
8. Estimation of Ferrous ion by Potentiometry.
9. Determination of amount of corrosion of metals in different medium
10. Measurement of viscosity of lubricants by Ostwald viscometer.
11. Determination of P^H of a given solution by P^H metry.
12. Estimation of Ferric iron in cement by Colorimetric method.

Total Time Slots: 12

I B.Tech. - I Semester

(16BT10331) COMPUTER AIDED ENGINEERING DRAWING

(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	1	6	3

PRE-REQUISITES: *None*

COURSE DESCRIPTION:

Engineering drawing conventions; importance of engineering drawing; fundamental concepts of sketching; computed aided drafting and different types of projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES:

After completion of the course, a successful student is able to:

CO1: Understand, write and read the language of engineering drawing in industry through International System of Standards.

CO2: Develop the imagination and mental visualization ability for interpreting the geometrical details of engineering objects.

CO3: Produce different views and projection in drawing.

CO4: Use modern CAD software for design and drafting of drawings.

CO5: Create multi-view drawings suitable for presentation to Engineering community.

CO6: Introduce and communicate universally accepted conventions and symbols for their usage in technical drawing.

DETAILED SYLLABUS:

UNIT : I - BASICS OF ENGINEERING DRAWING PRACTICE, GEOMETRICAL CONSTRUCTIONS, CONICS AND SPECIAL CURVES (18 periods)

Introduction, drawing instruments and its uses, sheet layout, BIS conventions, lines, lettering and dimensioning practices. Geometrical constructions: Construction of regular polygons: Pentagon, Hexagon, Heptagon and Octagon. Conic sections**:** Introduction, construction of ellipse: rectangular method, eccentricity method. Construction of parabola: rectangular method, eccentricity method. Construction of hyperbola: eccentricity method. Special curves***:*** cycloid, involute.

UNIT: II – INTRODUCTION TO COMPUTER AIDED SKETCHING (18 periods)

Computer screen, layout of the software, creation of 2D/3D environment, selection of drawing size and scale, Standard tool bar/menus, Coordinate system, description of most commonly used toolbars, navigational tools: commands and creation of

lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT: III – PROJECTION OF POINTS, STRAIGHT LINES AND PLANES (21 periods)

Introduction, method of projection, planes of projection, reference line and notations. Projection of points: Points in all the four quadrants. Projection of straight lines**:** lines inclined to HP / VP plane, inclined to both HP and VP planes (straight lines are assumed to be in first quadrant only)**.** Projection of planes**:** projection of triangle, square, rectangle, rhombus, pentagon, hexagon and circular plane for the condition inclined to HP / VP by change of position method.

UNIT IV –PROJECTION OF SOLIDS AND SECTION OF SOLIDS (21 Periods)

Projections of Solids: Introduction, projection of solids: prisms, pyramids, cylinders and cones with axis perpendicular to VP/HP and axis inclined to VP/HP only. Sections of solids**:** Introduction, Cutting plane, sectional views of right regular solids resting with base on HP: prisms, pyramids, cylinder and cone and true shapes of the sections.

UNITV –ORTHOGRAPHICAND ISOMETRICPROJECTIONS AND DEVELOPMENT OF SURFACES (22 periods)

Orthographic projection: simple exercises. Isometric projection: Simple exercises.

Development of surfaces: prisms, pyramids, cylinders, cone and miscellaneous surfaces

Total Periods: *100*

Note: *Student shall practice Unit-I using sketch book only and remaining units using sketch book first and later CAD package.*

TEXT BOOKS:

1. D.M.Kulkarni, A.P.Rastogi, A.K.Sarkar, Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi, Revised Edition, 2010.
2. N D Bhat & V M Panchal, Engineering Drawing, Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, AutoCAD 2013 for Engineers and Designers, Dreamtech Press, 2013.
2. M.H.Annaiah & Rajashekar Patil, Computer Aided Engineering Drawing, New Age International Publishers, 4th Edition, 2012.
3. T.Jeyapoovan, Engineering Drawing and Graphics Using

AutoCAD, Vikas Publishing House, 3rd Edition, 2010.
4. Jolhe, Engineering Drawing, Tata McGraw Hill Education PrivateLimited, 1st Edition, 2007.
5. Basant Aggarwal, Engineering Drawing, Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

I B.Tech - I Semester

(16BT10531) PROGRAMMING IN C LAB

(Common to all Branches)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Programming in C"

COURSE DESCRIPTION: Hands on practice in developing and executing simple programs using C Programming constructs– Conditional statements, Loops, Arrays, Strings, Functions, Structures, Pointers and Functions.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Demonstrate practical knowledge of using C language constructs:
   - Selection and Repetition statements.
   - Arrays, Strings and Functional statements.
   - Derived data types, Files and Pointers
2. Analyze problems to develop suitable algorithmic solutions
3. Design Solutions for specified engineering problems
4. Use appropriate 'C' language constructs for solving engineering problems
5. Implement and execute programs using 'C' language
6. Document programs and communicate effectively while conducting Professional transactions.

List of Exercises:

1. a. Let a and b are two integer variables whose values are 10 and 13 respectively. Write a program to evaluate the following arithmetic expressions.
   i) a + b ii) a–b iii) a * b iv) a/b v) a % b
   b. Write a program to evaluate the following algebraic expressions after reading necessary values from keyword.
      i) $(ax + b)/(ax - b)$
      ii) $2.5 \log x + \text{Cos } 32^0 + | x^2 + y^2|$
      iii) $x^5 + 10 x^4 + 8$ and $x^3 + 4 x + 2$
      iv) ae^{kt}
2. a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simple interest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I = P T R / 100)
   b. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.
   c. In a town, the percentage of men is 52. The percentage of total literacy is 48.If total percentage of literate men is 35 of the total population; write a program to find the total number of illiterate men and women if the population of the town is 8000.
3. a. Write a program that prints the given 3 integers in ascending order using if - else.
   b. Write a program to calculate commission for the input value of salesamount.
   Commission is calculated as per the following rules:

i) Commission is NIL for sales amount Rs. 5000.
ii) Commission is 2% for sales when sales amount is >Rs. 5000 and <= Rs. 10000.
iii) Commission is 5% for sales amount >Rs. 10000.

c. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

Characters	**ASCII values**
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57

Special Symbols 0 - 47, 58 - 64, 91- 96, 123 - 127

4. a. If cost price and selling price of an item is input through the keyboard, write program to determine whether the seller has made profit or incurred loss. Also determine how much profit or loss he incurred in percentage.

b. An insurance company calculates premium as follows:

i. If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lakhs.

ii. If a person satisfies all the above conditions and is female then the premium is Rs.3 per thousand and the policy

amount cannot exceed Rs.1 lakh.

iii. If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000.

iv. In all other cases the person is not insured.

Write a program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured.

5. a. Write a program, which takes two integer operands and one operator as input from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %. Use switch statement)

b. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:

i. If the student gets first class and the number of subjects failed is >3, then no grace marks are awarded. If the number of subjects failed is less than or equal to '3' then the grace is 5 marks per subject.

ii. If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in less than or equal to '3' then the grace is 4 marks per subject.

iii. If the student gets third class and the number of subjects failed in is >1, then no grace marks are awarded. If the number of subjects failed in is equal to '1' then the grace is 5 marks per subject.

6. a. Write a program to find the sum of individual digits of a positive integer.

b. A Fibonacci sequence is defined as follows:

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

Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

7. a. Write a program to find the largest and smallest number in a given list of integers.

b. Write a program to perform the following:

i. Addition of two matrices.

ii. Multiplication of two matrices.

8. a. Write a program that uses functions to perform the following operations:
   i. To insert a sub-string in main string at a specified position.
   ii. To delete N characters from a given string from a specified position.
   b. Write a program to determine whether the given string is palindrome or not.
   c. Write a program to display the position or index in the main string S where the sub string T begins. Display -1 if S does not contain T.
   d. Write a program to count the number of lines, words and characters in a given text.
9. a. Write a program to read list of student names and perform the following operations using functions.
   i. to print list of names
   ii. to sort them in ascending order
   iii. to print the list after sorting.
   b. Write a menu driven program to read list of student names and perform the following operations using array of character pointers.
   i. to insert a student name
   ii. to delete a name
   iii. to print the name
10. Write a program that uses functions to perform the following operations:
   i. Reading a complex number
   ii. Writing a complex number
   iii. Addition of two complex numbers
   iv. Multiplication of two complex numbers
   (**Note:** Represent complex number using a structure.)
11. a. Write a program to accept the elements of the structure as:
   Employee-name,Basic pay
   Display the same structure along with the DA, CCA and Gross salary for 5 employees.
   Note: DA=51% of Basic pay, CCA=Rs.100.consolidated.
   b. Define a structure to store employee's data with the following specifications:
   Employee-Number, Employee-Name, Basic pay, Date of Joining
   i. Write a function to store 10 employee details.
   ii. Write a function to implement the following rules while revising the basic pay.

If Basic pay<=Rs.5000 then increase it by 15%.
If Basic pay> Rs.5000 and <=Rs.25000 then it increase by 10%.
If Basic pay>Rs.25000 then there is no change in basic pay.
Write a function to print the details of employees who have completed 20 years of service from the date of joining.

12. a. Write a program which copies one 'text file' to another 'text file'.
    b. Write a program to reverse the first N characters of a given text file.

    Note: The file name and N are specified through command line.

13. Write a program to print the output by giving the Customer_ID as an input.

REFERENCE BOOKS:

1. Byron Gottfried and Jitender Kumar C, *Programming with C,* 3rd Edition, McGraw Hill Education(India) Pvt. ltd, 2016.
2. Pradip Dey and Manas Ghosh, *Programming in C,* 2nd Edition, Oxford University Press, 2007.

I B.Tech. - II Semester

(16BT1BS02) ENGINEERING PHYSICS

(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Intermediate / senior secondary Physics

COURSE DESCRIPTION: Lasers; optical fibers; principles of quantum mechanics; band theory of solids; semiconductors; dielectric properties of materials; acoustics of buildings; superconductors; crystallography and nanomaterials.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Acquire basic knowledge of lasers, optical fibers, quantum mechanics, dielectrics, semiconductors, and superconductors, acoustic of buildings, crystallography and nanomaterials.
2. Analyze the construction and working of various laser systems, semiconductor devices, various types of optical fibers and its communication system and nano materials properties.
3. Gain skills in designing lasers, optical fiber cable, semiconductor devices, acoustically good halls and nanomaterials.
4. Develop problem solving skills in engineering context.
5. Use relevant techniques for assessing ball milling, pulsed laser deposition, p-n junction and Laser.

DETAILED SYLLABUS:

UNIT-I: LASERS AND FIBER OPTICS

Lasers: Introduction, characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein's coefficients – condition for amplification, population inversion, Nd: YAG laser, Helium-Neon laser, semiconductor laser and applications of lasers.

Fiber optics: Introduction, principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, classification of optical fibers, optical fiber communication system and applications of optical fibers.

UNIT-II:PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

Principles of Quantum Mechanics: Introduction, de-Broglie's hypothesis, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment).

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy bands formation in solids, distinction between conductors, semiconductors and insulators based on band theory.

UNIT-III: SEMICONDUCTORS AND DIELECTRIC PROPERTIES OF MATERIALS

Semiconductors: Introduction, types of semiconductors, intrinsic carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect and its applications, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, LED, photo diode and Solar cell.

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, frequency dependence of polarizability (qualitative treatment), ferroelectricity.

UNIT-IV: ACOUSTICS OF BUILDINGS AND SUPERCONDUCTIVITY

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Superconductivity: Introduction, General properties - Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory (qualitative treatment), applications of superconductors.

UNIT-V: CRYSTALLOGRAPHY AND NANOMATERIALS

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law-powder method.

Nanomaterials: Introduction, principles of nanomaterials, properties of nanomaterials, synthesis of nanomaterials by ball milling and pulsed laser deposition and applications of nanomaterials.

TEXT BOOK:

1. P. K. Palaniswamy, *Engineering Physics*, Scitech Publications India Private Limited, 2nd Edition, 2009.

REFERENCE BOOKS:

1. Dr. S. Mani Naidu*, Engineering Physics*, Pearson Education, 1st Edition, 2013.
2. M.N. Avadhanulu,P.G.Kshirsagar, *A textbook ofEngineering Physics*, S.Chand & Company Ltd. Revised Edition 2014.
3. K. Thyagarajan*, Engineering Physics-I*, McGraw-Hill Education (India) Pvt.Ltd. 2015.

I B.Tech. - II Semester

(16BT2BS01) TRANSFORMATION TECHNIQUES AND PARTIAL DIFFERENTIAL EQUATIONS

(Common to all Branches)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITE: Intermediate /Senior secondary mathematics

COURSE DESCRIPTION: Fourier series; Fourier integrals and transforms; Laplace transforms; z –transforms; partial differential equations.

COURSE OUTCOMES:

After completion of the course a successful student is able to

CO1: Acquire basic knowledge in
- (a) Fourier series and Fourier transforms
- (b) Fourier integrals
- (c) Laplace transforms and their applications
- (d) z- transforms and their applications
- (e) solving partial differential equations

CO2: Develop skills in analyzing the
- (a) Properties of Fourier series for a given function
- (b) Partial differential equations through different evaluation methods
- (c) Difference equations through z – transforms
- (d) Engineering systems and processes involving wave forms and heat transfer

CO3: Develop skills in designing mathematical models for
- (a) Problems involving heat transfer and wave forms
- (b) Engineering concepts involving, Fourier transforms, Fourier integrals, Laplace transforms, z-transforms and difference equations

CO4: Develop analytical skills in solving the problems involving
- (a) Fourier series and Fourier transforms
- (b) Laplace transforms
- (c) Z-transforms and difference equations
- (d) Heat transfer and wave motion

CO5: Use relevant transformation techniques for
- (a) Obtaining Fourier transforms for different types of functions
- (b) Laplace transforms
- (c) Z- transforms
- (d) Partial differential equations

DETAILED SYLLABUS

UNIT- I: FOURIER SERIES (7 periods)

Fourier series: Determination of Fourier coefficients, convergence of Fourier series (Dirichlet's conditions), Fourier series of even and odd functions, Half-range Fourier sine and cosine expansions.

UNIT- II: FOURIER INTEGRALS AND FOURIER TRANSFORMS (8 periods)

Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms –properties, Inverse transform and finite Fourier transforms.

UNIT-III: LAPLACE TRANSFORMS (12 periods)

Laplace transforms of standard functions. Properties of Laplace transforms. First and second shifting Theorems. Laplace transforms of derivatives and integrals. Inverse transforms. Convolution theorem (without proof), inverse Laplace transforms by convolution theorem. Laplace transform of periodic functions, Applications of Laplace transforms to ordinary differential equations of first and second order with constant coefficients.

UNIT-IV: Z- TRANSFORMS (9 periods)

Z – transforms, inverse Z– transforms, damping rule, shifting rule, initial and final value theorems. Convolution theorem (without proof), solution of difference equations by Z– transforms.

UNIT – V: PARTIAL DIFFERENTIAL EQUATIONS (9 periods)

Formation of Partial differential equations – Solutions of first order linear equations by method of grouping. First and second order equations by method of separation of variables – Solutions of one dimensional Wave equation, Heat equation.

Total no. of periods: 45

TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi,S.Ranganadham and M.V.S.S.N. Prasad,***Engineering Mathematics, vol-1***, S. Chand &Company 13/e,2014.
2. T.K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N.Prasad, ***Mathematical Methods***,S.Chand and Company, 8/e,2013.

REFERENCE BOOKS:

1. Grewal, B.S., ***Higher Engineering Mathematics***,Khanna publishers, Delhi,42/e,2012.
2. Kreyszig, E., ***Advanced Engineering Mathematics***,John Wiley and Sons, Inc.,9/e,2013.

I B.Tech. - II Semester

(16BT20441) BASIC ELECTRONIC DEVICES AND CIRCUITS

(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on Engineering Physics.

COURSE DESCRIPTION:

Characteristics of general and special purpose electronic devices; Rectifiers; Biasing of BJT; FET, Feedback Amplifiers, Oscillator.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Gain in-depth knowledge in

- *p-n* junction diode and its characteristics
- Zener diode and its characteristics
- Rectifiers and Filters
- Characteristics of BJT, FET, MOSFET and special purpose electronic devices.
- FET amplifiers
- Feedback amplifiers and Oscillators

CO2: Analyze numerical and analytical problems in

- Rectifiers using Filters
- Transistor biasing circuits
- FET biasing circuits and amplifiers
- Feedback amplifiers and oscillators

CO3: Design electronic circuits such as

- Rectifiers with and without filters
- BJT and FET biasing circuits
- FET amplifiers
- Feedback amplifiers and oscillators

CO4: Solve engineering problems and arrive at solutions pertaining to electronic circuits.

CO5: Select appropriate technique for transistor biasing.

DETAILED SYLLABUS

UNIT-I: *P-N JUNCTION DIODE AND RECTIFIERS*
(10 Periods)

P-N JUNCTION DIODE

P- N Junction Diode Equation, Volt-Ampere (V-I) Characteristics, Temperature Dependence of V-I Characteristics, Ideal Versus Practical, Static and Dynamic Resistances, Diode Equivalent circuits, Junction capacitances, Break down mechanisms in semiconductor Diodes, Zener Diode Characteristics.

RECTIFIERS

Halfwave rectifier and Fullwave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, ð - section filter, Problems on rectifier circuits.

UNIT-II: *BIPOLAR JUNCTION TRANSISTOR AND BIASING*
(11 Periods)

CHARACTERISTICS:

Transistor construction, BJT Operation, Transistor as an amplifier, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications, transistor hybrid model for CE configuration – analytical expressions for transistor characteristics.

BIASING:

Transistor biasing, Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias.

UNIT-III: *FIELD EFFECT TRANSISTOR* **(10 Periods)**

Construction, Principle of Operation and Characteristics of JFET and MOSFET (Enhancement & Depletion), Biasing of FET, Small Signal Model of JFET & MOSFET. Common Source and Common Drain Amplifiers using FET, Generalized FET Amplifier, FET as Voltage Variable Resistor, Comparison between BJT and FET.

UNIT-IV: *FEEDBACK AMPLIFIERS AND OSCILLATORS*
(8 Periods)

Feedback Concepts, Types of Feedback Circuits (block diagram representation), General characteristics of negative feedback amplifier, Effect of Feedback on Amplifier characteristics. Barkhausen criterion, Hartley & Colpitts oscillators, Phase Shift Oscillators and Crystal Oscillator.

UNIT-V: *SPECIAL PURPOSE ELECTRONIC DEVICES*

(6 Periods)

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR). Principle of operation of Schottky Barrier Diode.

Total Periods: 45

TEXT BOOKS:

1. J. Millman, Christos C. Halkias and Satyabrata Jit, *Electronic Devices and Circuits,* 3rd Edition, TMH, 2010.

REFERENCE BOOKS:

1. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits,* 10th Edition, PHI, 2009.
2. S. Salivahana, N. Suresh Kumar, *Electronic Devices and Circuits*, 3rd Edition, Mc-Graw Hill, 2013.
3. David A. Bell, *Electronic Devices and Circuits,* 5th Edition, Oxford University press, 2014.

I B.Tech. - II Semester

(16BT21201) OBJECT ORIENTED PROGRAMMING THROUGH C++

(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on "Programming in C".

COURSE DESCRIPTION:

Introduction to Object Oriented concepts and Fundamental Concepts of C++; Decision Making Statements, Looping Statements and Functions; Arrays, Pointers & References and Strings; Classes & Objects and Overloading Operators; Composition & Inheritance, Templates, Iterators & Generics and File Handling;

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

- **CO1:** Demonstrate knowledge on object oriented programming concepts - Object, Class, Inheritance, Polymorphism, Encapsulation, Abstraction and Message passing.
- **CO2:** Identify object oriented concepts for code reusability and optimization.
- **CO3:** Design and develop solutions for given specifications.
- **CO4:** Demonstrate problem solving skills to provide software solutions to real world problems.
- **CO5:** Develop C++ programming to provide solutions to complex engineering problems using object oriented concepts.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND FUNDAMENTAL CONCEPTS (Periods: 10)

An introduction to object technology: Objects and methods, Object: A practical example, Classes, Declaring classes and objects.

Key Object Orientation concepts and Elementary C++ programming: Abstraction, Encapsulation, Aggregation/ composition, Inheritance, Some simple programs, The output operator, Characters and literals, Variables and their declarations, Program tokens, Initializing variables, Objects, variables and constants, The input operator.

Fundamental types: Numeric data types, The Boolean types, Enumeration types, Character types, Integer types, Arithmetic operators, The increment and decrement operators, composite Assignment operators, Floating –point types, Type conversions, Numeric overflow, Round-off error, The format for floating –

point values, Scope.

UNIT-II: DECISION MAKING STATEMENTS, LOOPING STATEMENTS AND FUNCTIONS (Periods:10)

Decision making statements: The if statement, The if-else statement, Keywords, Comparison operators, Statement blocks, Compound Conditions, Short- circuiting, Boolean expressions, Nested selection statements, The else-if statement, The switch statement, The conditional expression operator.

Looping Statements: The while statements, Terminating a loop, the do-while statement, the for statement, the break statement, the continue statement, the goto statement, Generating pseudo-random numbers

Functions: Introduction, Standard c++ library functions, User-defined functions, Test drivers, function declarations and definitions, Local variables and functions, void functions, Boolean functions, I/O functions, passing by reference, passing by constant reference, Inline functions, Scope, Overloading, The main () function, Default arguments

UNIT-III: ARRAYS, POINTERS & REFERENCES AND STRINGS (Periods: 12)

Arrays: Introduction, processing arrays, initializing an array, Array index out of bounds, passing an array to a function, the linear search algorithm, the bubble sort algorithm, the binary search algorithm, Using arrays with enumeration types, Type definitions, Multidimensional arrays.

Pointers and References: The reference operator, References, Pointers, the dereference operator, Derived types, Objects and lvalues, Returning a reference.

C++ Strings: Introduction, working with strings in C++, String manipulation, Strings and arrays, miscellaneous string functions, String streams

UNIT-IV: CLASSES & OBJECTS AND OVERLOADING OPERATORS (Periods: 12)

Classes and objects: Introduction, Class declarations, Constructors, Constructor initialization lists, Access functions, Private member functions, The copy constructor, The class destructor, Constant Objects, Structures, Pointers to object, Static data members, static function members, predefined classes, Data hiding and encapsulation, Exception handling

Overloading Operators: Introduction, Overloading the assignment operator, The this operator, Overloading Arithmetic operator, Overloading the arithmetic assignment operator, Overloading the relational patterns, Overloading the stream operators, Conversion operators, Overloading the increment and decrement operators, Overloading the subscript operator

UNIT-V: COMPOSITION & INHERITANCE, TEMPLATES, ITERATORS & GENERICS AND FILE HANDLING (Periods: 11)

Composition and inheritance: Introduction, Composition, Inheritance, protected class members, Overriding and dominating

inherited members, private access versus protected access, virtual functions and polymorphism, virtual destructors, Virtual functions, pure virtual functions, Abstract classes, object-oriented programming.

Templates, iterators and Generics: Introduction, Function templates, Class templates, Container classes, Subclass templates, passing template classes to template parameters, Iterator classes, Generic programming

C++ File Handling: File I/O

(Total Periods: 55)

TEXT BOOKS:

1. John R Hubbard, *Programming with C*$^{++}$, 3rd Edition, Tata McGraw-Hill, 2010.
2. P. B. Mahapatra, "Thinking in C^{++}", 1st Edition, Galgotia Publications Pvt. Ltd, 2005.

REFERENCE BOOKS:

1. Sourav Sahay, Object Oriented Programming with C^{++}, 2nd Edition, Oxford University Press, 2012.

I B.Tech. - II Semester

(16BT21501) DIGITAL LOGIC DESIGN

(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: -NIL-

COURSE DESCRIPTION: Introduction to number systems; logic gates; Boolean Algebra; simplification of Boolean functions; Design of combinational circuits; Design of sequential circuits, Memory and Programmable Logic

COURSE OUTCOMES:

On Successful completion of this course student will be able to:

CO1. Demonstrate knowledge on Boolean algebra, Minimization of Boolean functions using Map Reduce method.

CO2. Identify appropriate simplification techniques for Boolean functions.

CO3. Design combinational and sequential logic circuits, memory and programmable logic for digital systems.

CO4. Select and Apply Boolean algebra and gate level minimization techniques for designing combinational and sequential logic circuits.

CO5. Learn independently new concepts, new techniques and advanced subject knowledge in the area of combinational and sequential logic circuits.

DETAILED SYLLABUS:

UNIT I – BINARY SYSTEMS AND BOOLEAN ALGEBRA (10 periods)

Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, Signed binary numbers, other binary codes, complements. Boolean Algebra, Boolean functions, Canonical and standard forms, Digital logic gates

UNIT II – GATE LEVEL MINIMIZATION (9 periods)

The K-map method - Four-variable map, Five-Variable map, product of sums and sum of products simplification, Don't-care conditions, NAND and NOR implementations, other Two-level implementations, Exclusive – OR function

UNIT III – COMBINATIONAL LOGIC (9 p*eriods*)

Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor, BCD Adder, Carry- Look- ahead adder, Binary multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-Multiplexers.

UNIT IV – SEQUENTIAL LOGIC (9 periods)

Latches, Flip-Flops, Analysis of clocked sequential circuits,

Design of synchronous sequential circuits, registers, shift registers, Ripple counters, Synchronous counters, Ring Counter and Johnson Counter.

UNIT V–MEMORY AND PROGRAMMABLE LOGIC (8 p*eriods*)

Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-only memory, Programmable logic Array, programmable Array logic, Sequential Programmable Devices.

Total Periods: *45*

TEXT BOOK:

1. M. Morris Mano, "Digital Design", Third Edition, Pearson Education/PHI, 1999.

REFERENCE BOOKS:

1. David J Comer, "Digital Logic and State Machine Design", Third Edition, Oxford University Press, 2012.
2. Charles H.Roth Jr, "Fundamentals of Logic Design", Fifth edition, Cengage Learning, 2008.
3. A. Anand Kumar, "Switching Theory and Logic Design", Prentice-Hall of India Pvt. Limited, 2010.

I B.Tech. - II Semester

(16BT1BS32) ENGINEERING PHYSICS LAB

(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: Intermediate / senior secondary Physics.

COURSE DESCRIPTION:

Characteristics of p-n junction diode, Photodiode, LED, and semiconductor laser diode. Experimental determination of carrier concentration and energy gap of a semiconductor material, wave length of a laser source, size of fine particle, numerical aperture and acceptance angle of optical fiber. Determination of frequency of electrically vibrating tuning fork and A.C source using A.C sonometer, magnetic field along axial line of a current carrying coil and rigidity modulus of material of a wire using torsional pendulum.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

CO1: Acquire basic knowledge about semiconductor materials, magnetic materials and lasers.

CO2: Acquire analytical skills in the estimation of carrier concentration of semiconductor materials and characterization of p-n junction.

CO3: Develop skills in designing electronic circuits using semiconductor components.

CO4: Acquire skills to use instrumental techniques in A.C sonometer and Melde's experiment.

CO5: Apply diffraction techniques for determination of size of tiny particles and wave length of lasers.

ENGINEERING PHYSICS LAB

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using Diffraction Grating.
2. Determination of particle size by using a laser source.
3. Determination of Numerical aperture and acceptance angle of an optical fiber.
4. Melde's experiment - transverse & longitudinal modes.
5. Magnetic field along the axis of a current carrying coil-Stewart and Gee's method.
6. Calculation of A.C frequency using sonometer.
7. I-V Characteristics of a p-n Junction diode.
8. Energy gap of a material of a p-n Junction.
9. Characteristics of LED source.
10. Characteristics of Photo diode.
11. Hall Effect.
12. Determination of rigidity modulus of the material of the wire using torsional pendulum.

I B.Tech II semester

(16BT20451) ANALOG AND DIGITAL ELECTRONICS LAB

(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PREREQUISITES: Courses on "Basic Electronic Devices & Circuits and Digital Logic Design"

COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; BJT and FET characteristics; UJT and SCR characteristics; BJT Amplifiers; Realization of FFs, Combinational Circuits, sequential Circuits; Demonstration on VHDL Programme.

COURSE OUTCOMES: On successful completion of this course, the student will be able to:

CO1. Demonstrate knowledge in different electronic devices, analog and digital circuits

CO2. Analyze the characteristics of different electronic devices and circuits like

- Diodes p-n Junction Diodes, Zener Diodes, SCR
- Transistors-BJT,FET,UJT
- Flip Flops-JK FF, D FF
- Combinational Circuits-HA, FA
- Sequential Circuits -Counters

CO3. Design electronic circuits like FET Amplifiers, Feedback amplifiers, Oscillators, Combinational Circuits and Sequential Circuits.

CO4. Solve engineering problems by proposing potential solutions through Design of better electronic circuits.

CO5. Model an electronic circuit which fulfil the needs of the society.

CO6: Function effectively as an individual and as a member in a group

CO7: Communicate effectively in verbal and written form.

DETAILED SYLLABUS:

PART A

ELECTRONIC WORKSHOP PRACTICE (Only for Viva-Voce)

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, Low-power JFETs, MOSFETs, LEDs, LCDs, SCR, UJT, Linear and Digital ICs.

PART B

ANALOG DEVICES AND CIRCUITS (Minimum seven experiments to be conducted)

1. p-n Junction and Zener diodes characteristics
2. Ripple Factor and Load Regulations of Rectifier with and without filters (Full wave or Half wave)
3. Input and Output characteristics of Transistor in CE configuration
4. Drain and Transfer Characteristics of JFET
5. Gain and Frequency response of FET Amplifier
6. Gain and Frequency response of Feedback Amplifier (Voltage series or current series)
7. Frequency of oscillations of Hartley and Colpitts Oscillator
8. UJT relaxation oscillator
9. SCR characteristics

PART C

DIGITAL CIRCUITS

Realization of

1. Flip Flops using Logic Gates
2. Two Problems on Combinational Circuits
3. Asynchronous Counter
4. Synchronous Counter

Demonstration of

VHDL Programme

I B.Tech. - II Semester

(16BT21231) **ITWorkshop**

(Common to IT & CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PREREQUISITES: —Nil—

COURSE DESCRIPTION:

Practice sessions on PC hardware, Internet, World Wide Web, LibreOffice Suite. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Demonstrate analytical skills in:
   - Identification of functional parts of PC
   - Internet and World WideWeb.
   - Computer security issues and preventive measures.
   - Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Demonstrate effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

LIST OF EXERCISES:

1. PC Hardware

a. Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

b. Demonstrating assembling and disassembling of the Personal Computer.

c. Introduction to Operating Systems, components of OS, installation of Microsoft Windows-XP Operating System.

2. Operating System

a. Introduction to LINUX OS, installation of LINUX OS, Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc

b. Introduction to DOS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit.

3. Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software troubleshooting steps, PC diagnostic tools.

4. Libre Office:

a. Libre Writer

Introduction to Writer, importance of Writer as Word Processor, overview of toolbars , saving, accessing files, using help and resources.

i). Create a document using the features: Formatting fonts, drop cap, bullets and numbering, text effects, character spacing, borders and shading, tables, text direction, hyperlink, headers and footers, date and time.

ii). Create a document in using the features: picture effects, clipart, auto shapes & grouping, page setup, paragraph indentation, wrap text, footnote and equations.

5. Libre Calc

a. Introduction to Calc as a spreadsheet tool, overview of toolbars, accessing, saving Calc files, using help and resources.

i). Create a spreadsheet using the features: gridlines, format cells, auto fill, formatting text, formulae, table and charts.

ii). Create a spreadsheet using the features: split cells, text to columns, sorting,filter, conditional formatting, freeze panes, pivot tables, data validation.

6. Libre Impress:

a. Demonstration on Impress, utilities, overview of toolbars, PPT orientation, slide layouts, types of views.

i). Create a Presentation using the features: slide layouts, inserting text, formatting text, bullets and numbering, auto shapes, hyperlinks, pictures, clip art, audio, video, tables and charts.

ii). Create a Presentation using the features: slide design, slide hiding, slide transition, animation, rehearse timings and custom slideshow.

7. Libre Draw: Draw vector graphics and flowcharts using Libre draw tools.

8. LibreBase: Create a sample database using Libre Base(Ex: Student database).

9. Introduction LaTeX Tool. Create a document using the features: formatting fonts, applying text effects, insert

pictures and images, using date and time option.

10. Internet & Computer Security

Introduction to computer networking, demonstration on network components, drivers loading and configuration settings, mapping of IP addresses, configuration of Internet and Wi-Fi.

11. Search Engines and Cyber Hygiene:

Working of search engine, Awareness of various threats on Internet, types of attacks and how to overcome. Installation of antivirus software, configuration of personal firewall and Windows update on computers.

12. Students should implement exercises 6 to 9 using MS- Office tool.

REFERENCES:

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit,* 2nd Edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, *Introduction to Information Technology,* 2nd Edition, Pearson Education, New Delhi, 2005.
3. Leslie Lamport, *A Document preparation system LATEX users guide and reference manual,* 2rd Edition.
4. IT Workshop Laboratory Manual, 2014.
5. www.libreoffice.org.

I B.Tech. - II Semester

(16BT21232) OBJECT ORIENTED PROGRAMMING LAB

(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PREREQUISITES: A Course on "OOPS through C++".

COURSE DESCRIPTION:

Hands-on experience on creating Virtual machines on Windows and Linux platforms, Development of Service based web applications & their deployment and Mobile app development.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Demonstrate practical knowledge on Object oriented programming concepts - Object, Class, Inheritance, Polymorphism, encapsulation, Abstraction, message passing.
2. Apply object oriented programming concepts to develop real world applications.
3. Demonstrate Problem solving skills using basic and advanced concepts of C++.
4. Work individually and in teams collaboratively in implementing the applications.
5. Demonstrate communication skills both oral and written for preparing and presenting reports.

LIST OF EXERCISES:

1. a. Write a C++ program that takes length as input in feet and inches. The program should then convert the lengths in centimeters and display it on screen. Assume that the given lengths in feet and inches are integers.
   b. Write a C++ program to find the sum for the given variables using function with default arguments.
2. Implement the Number Guessing Game in C++ with the given instructions. In this game the computer chooses a random number between 1 and 100, and the player tries to guess the number in as few attempts as possible. Each time the player enters a guess, the computer tells him whether the guess is too high, too low, or right. Once the player guesses the number, the game is over.
3. Write a program to perform arithmetic operations on two numbers. The program must be menu driven, allowing to select the operation (+, -, *, or /) and input the numbers. Furthermore, the program must consist of following functions:

i) Function showChoice: This function shows the options and must explain how to enter data.
ii) Function add: This function accepts two number as arguments and returns sum.
iii) Function subtract: This function accepts two number as arguments and returns their difference.
iv) Function multiply: This function accepts two number as arguments and returns product.
v) Function divide: This function accepts two number as arguments and returns quotient.

4. Write a menu driven C++ program with following option
   a. Accept elements of an array
   b. Display elements of an array
   c. Sort the array using bubble sort method
   Write C++ functions for all options. The functions should have two parameters name of the array and number of elements in the array.
5. X. Y, Z are arrays of integers of size M, N, and M + N respectively. The numbers in array X and Y appear in descending order. Write a user-defined function in C++ to produce third array Z by merging arrays X and Y in descending order.
6. a. Write a program to enter any number and find its factorial using constructor.
   b. Write a program to generate a Fibonacci series using copy constructor.
7. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imaginary parts to equal values and third which takes two argument is used to initialized real and imaginary to two different values.
8. a. Write a program to overload unary increment (++) operator.
   b. Write a program to overload binary + operator.
9. a. Define a class TEST in C++ with following description:
   Private Members
   TestCode of type integer
   Description of type string
   NoCandidate of type integer
   CenterReqd (number of centers required) of type integer
   A member function CALCNTR() to calculate and return the number of centers as (NoCandidates/100+1)

   Public Members
   - A function SCHEDULE() to allow user to enter values

for TestCode, Description, NoCandidate & call function CALCNTR() to calculate the number of Centres
- A function DISPTEST() to allow user to view the content of all the data members
b. Define a class REPORT with the following specification:

Private members :

adno	4 digit admission number
name	20 characters
marks	an array of 5 floating point values
average	average marks obtained
GETAVG()	a function to compute the average obtained in five subject

Public members:

READINFO()	function to accept values for adno, name, marks. Invoke the function GETAVG()
DISPLAYINFO()	function to display all data members of report on the screen.

You should give function definitions.

10. a. Create a base class basic_info with data members name ,rollno, gender and two member functions getdata and display. Derive a class physical fit from basic_info which has data members height and weight and member functions getdata and display. Display all the information using object of derived class.
    b. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
11. a. Write a program to define the function template for swapping two items of the various data types such as integer, float, and characters.
    b. Write a program to define the class template for calculating the square of given numbers with different data types.
12. a. Write a C++ program to write number 1 to 100 in a data file NOTES.TXT.
    b. Write a program to read a set of lines from the keyboard and to store it on a specified file.

Any one of the following mini projects are to be implemented by a group of 4-5 students.

1. Mini Project : Banking System
   Develop an application on BANKING SYSTEM which has account class with data members like account number, name, deposit, withdraw amount and type of account. Customer data is stored in a binary file. A customer can deposit and withdraw amount in his account. Must support

the features of creation, modifying and deletion account any time.

2. Mini Project : Library Management System
   Develop an application on LIBRARY MANAGEMENT SYSTEM which has book and student class with data members like book no, bookname, authorname. Books records is stored in a binary file. A student can issue book and deposit it within 15 days. Student is allowed to issue only one book. Student Records are stored in binary file. Administrator can add, modify or delete record.
3. Mini Project : Supermarket Billing System
   Develop a simple console application for SUPERMARKET BILLING SYSTEM which has product class with data members like product no, product name, price, quantity, tax, discount. Product details is stored in a binary file. A customer can purchase product and his invoice generated. Administrator can create, modify, view and delete product record.

REFERENCE BOOKS:

1. John R Hubbard, *Programming with C++*, 3rd Edition, Tata McGraw-Hill, 2010.
2. Sourav Sahay, *Object Oriented Programming with C++,* 2nd Edition, Oxford University Press, 2012.

II B.Tech. - I Semester

(16BT3BS01) PROBABILITY DISTRIBUTIONS AND STATISTICAL METHODS

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Intermediate/senior secondary mathematics.

COURSE DESCRIPTION: Random variables; Mathematical expectations; Probability distributions; Correlation and regressions; Statistical quality control; Sampling distributions; Tests for small and large samples and their significances.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Acquire basic knowledge on:

- Probability distributions, correlation and regressions.
- Statistical quality control and testing of hypotheses.
- Simple linear regression.
- Tests of significance for small and large samples.

CO2. Develop skills for analyzing the data with:

- Mathematical expectations for realistic results.
- Probability distributions for practical situations.
- Control charts of statistical quality control.
- Correlation and regression concepts.
- Suitable tests of significance for practical situations.

CO3. Develop skills in designing:

- Probability distributions.
- Limitations of statistical quality control.
- Control charts.
- X, R, np, and c charts

CO4. Develop analytical skills for solving problems involving:

- Probability distributions, means, variances and standard deviations.
- Statistical techniques employed for quality.
- Sampling techniques for decision making.
- Tests of significances for small and large samples.

CO5. Use relevant probability and statistical techniques for:

- Mathematical expectations of desired results.
- Fitting probability distributions for experimental data.
- Quality control and testing of hypothesis.

DETAILED SYLLABUS:

UNIT I – RANDOM VARIABLE AND MATHEMATICAL EXPECTATIONS (10 periods)

Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical expectation, Properties of Mathematical expectation, Mean and Variance.

UNIT II – PROBABILITY DISTRIBUTIONS (9 periods)

Discrete Distributions: Binomial and Poisson Distributions, Mean, variance and standard deviations.

Continuous Distributions: Normal Distribution, Mean, Variance and properties.

UNIT III – CORRELATION, REGRESSION AND STATISTICAL QUALITY CONTROL (9 periods)

Definition of correlation, correlation coefficient, Rank correlation. Simple linear regression, regression lines and properties.

Introduction, advantages and limitations of statistical quality control, Control charts, specification limits, $\bar{X}$, R, np and c charts.

UNIT IV – SAMPLING DISTRIBUTIONS AND TEST OF SIGNIFICANCE FOR LARGE SAMPLES (9 periods)

Population and Sample, Parameter and Statistic, Sampling Distribution of Statistic, Standard Error of Statistic, Null and Alternative Hypothesis, Type I and II errors, Level of Significance, Critical region, Degrees of freedom. Tests of significance for proportions and means.

UNIT V–TEST OF SIGNIFICANCE FOR SMALL SAMPLES (9 periods)

Student's t-test: single mean, difference of means, F-test for equality of population variance, Chi-Square Test for Goodness of fit, contingency table, Chi-Square Test for Independence of Attributes.

Total Periods: 45

TEXT BOOKS:

1. T. K. V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M. V. S. S. N. Prasad, Probability and Statistics, S. Chand and Company, Fourth Edition,2013.
2. S. P. Gupta, Statistical Methods, Sultan and Chand, New Delhi,

Twenty Eighth Edition, 2005.

REFERENCE BOOKS:

1. S. C. Gupta and V. K. Kapoor, Fundamentals of Applied Statistics, Sultan and Chand, New Delhi, Eleventh Edition, 2004.

2. Shahnaz Bathul, A text book of Probability and Statistics, Ridge Publications, Second Edition, 2007.

II B.Tech. - I Semester

(16BT30501) COMPUTER ORGANIZATION

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Digital Logic Design".

COURSE DESCRIPTION: Basic structure and operation of a digital computer; Organization and functional principles of the arithmetic and logic unit, control unit, memory unit and I/O unit; Concepts of pipelining and parallel processing techniques.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Computer Arithmetic units
- Register Transfer and Computer Instructions
- Design of Control Unit
- Input Output Organization and Memory system
- Pipelining and Multiprocessing.

CO2. Analyze the functional units of a digital computer.

CO3. Design the functional modules in a digital computer - Arithmetic Units, Memory and I/O.

CO4. Investigate the performance of memory, I/O, and pipelined processors.

CO5. Select appropriate techniques of I/O, Pipelining and Multiprocessing to solve computing problems.

CO6. Apply contextual knowledge of computer systems development to societal applications.

DETAILED SYLLABUS:

UNIT-I: REGISTER TRANSFER and MICROOPERATIONS AND COMPUTER ARITHMETIC (9 Periods)

Register Transfer and Microoperations: Register transfer, Bus and memory transfers, Arithmetic microoperations, Logic microoperations, Shift microoperations, Arithmetic logic shift unit.

Computer Arithmetic: Fixed point representation, Floating point representation, Addition and subtraction, Binary multiplication algorithms, Binary division algorithms.

UNIT-II: BASICCOMPUTER ORGANIZATION AND DESIGN AND MICRO PROGRAMMED CONTROL (9 Periods)

Basic Computer Organization and Design: Instruction codes, Computer registers, Computer instructions, Instruction formats, Addressing modes, Timing and control, Instruction cycle, Memory reference instructions, Input - Output and Interrupt.

Micro Programmed Control: Control memory, Address sequencing, Design of control unit, Hardwired control, Microprogrammed control.

UNIT-III: INPUT-OUTPUT ORGANIZATION (8 Periods)

Peripheral devices, Input-Output interface, Modes of transfer, Priority interrupt, Direct Memory Access, Input-Output Processor (IOP).

UNIT-IV: THE MEMORY SYSTEM (10 Periods)

Semiconductor RAM memories - Internal organization, Static memories, Synchronous and Asynchronous DRAMs, Structure of larger memories; Read-Only memories, Cache memories - Mapping functions; Secondary Storage - Magnetic Disks, Optical Disks.

UNIT-V: PIPELINE and VECTOR PROCESSING AND MULTIPROCESSORS (9 Periods)

Pipeline and Vector Processing: Parallel processing, Pipelining, Arithmetic pipeline, Instruction pipeline, Vector processing, Array processors.

Multiprocessors: Characteristics of multiprocessors, Interconnection structures, Inter-processor arbitration, Inter-processor communication and synchronization.

Total Periods: 45

TEXT BOOKS:

1. Morris Mano, *Computer System Architecture,* Pearson Education, Third Edition, 2007.

2. Carl V. Hamacher, Zvonko G. Vranesic and Safwat G. Zaky, *Computer Organization,* McGraw-Hill, Fifth Edition, 2002.

REFERENCE BOOKS:

1. William Stallings, *Computer Organization and Architecture: Designing For Performance,* Pearson Education, Seventh Edition, 2007.

2. John P. Hayes, *Computer Architecture and Organization,* McGraw-Hill. Third Edition.

II B.Tech. - ISemester

(16BT30502) DATA STRUCTURES

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Programming in C".

COURSE DESCRIPTION: Linked Lists; Type of lists; Operations and Applications; Stacks and Queues; Operations and Applications; Trees, Search trees and Heaps; Multiway Trees and Graphs; Searching and Hashing.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Principles of Data Structures.
- Linear and Non-linear Data Structures.
- Sorting and hashing techniques.

CO2. Analyze and Identify suitable data structure for computational problem solving.

CO3. Design solutions for complex engineering problems using linear and non-linear data structures.

CO4. Develop solutions for Complex computational problems by conducting explorative analysis.

CO5. Apply appropriate data structure to provide solutions for real time problems by using C Language.

CO6. Apply contextual knowledge of data structures to design applications for societal applications like payroll systems, web applications, banking and financial systems.

DETAILED SYLLABUS:

UNIT-I: LINKED LISTS (8 Periods)

Pointers, Operations, Linked List definition, Single Linked Lists, Circular Linked List, Doubly Linked List, Circular Doubly Linked List, Application of Linked Lists.

UNIT-II: STACKS AND QUEUES (8 Periods)

Stacks: Stack operations, Stack Linked List, Implementation, Stack applications.

Queues: Queue operations, Queue Linked List design, Queue applications.

UNIT-III: TREES, SEARCH TREES AND HEAPS (10 Periods)

Trees: Tree concepts, Binary Trees.

Binary Search Trees (BST): Basic concepts, BST operations, BST applications.

AVL Search Trees: Basic concepts, AVL Tree implementations.

Heaps: Basic concepts, Heap implementation, Heap applications.

UNIT-IV: MULTIWAY TREES AND GRAPHS (10 Periods)

Multiway Trees: B-Trees, Simplified B-Trees, B-Tree variations.

Graphs: Basic concepts, Operations, Graph storage structures, Graph algorithms - Create graph, Insert vertex, Delete vertex, Retrieve vertex, Depth-first traversal, Breadth-first traversal.

UNIT-V: SORTING AND HASHING (9 Periods)

Internal Sorting: Quick Sort, Shell Sort, Merge Sort, Heap Sort.

External Sorting: Introduction, External storage device and sorting with tapes, Balanced Merge.

Hashing: Introduction, Hash Table structure, Hash functions, Linear Open Addressing, Chaining, Applications.

Total Periods: 45

TEXT BOOKS:

1. Richard Gileberg and Behrouz A. Forouzan, *Data Structures: A Pseudocode Approach with C,* Cengage Learning, Second Edition, 2007.
2. G.A.V. Pai, *Data Structures and Algorithms,* Tata McGraw Hill, Second Edition, 2009.

REFERENCE BOOKS:

1. Debasis Samanta, *Classic Data Structures,* PHI Learning, Second Edition, 2009.
2. Aaron M. Tenenbaum, Yedidyah Langsam, and Moshe J. Augenstein, *Data Structures Using C,* Pearson Education, 2005.

II B.Tech. - ISemester

(16BT31201) DISCRETE MATHEMATICAL STRUCTURES

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Multivariable Calculus and Differential Equations".

COURSE DESCRIPTION: Mathematical Logic; Predicates; Functions and Relations; Algebra Structures; Mathematical Reasoning; Recurrence Relations; Graphs; Graph Theory and its Applications.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on mathematical logic, algebraic structures, relations, recurrence relations and mathematical reasoning.

CO2. Analyze and prove given statement by contradiction and automatic theorem.

CO3. Design network applications using Prim's and Kruskal's algorithms.

CO4. Solve tree traversal problems using Graph Theory.

CO5. Apply permutation, combinations, counting principle, Lagrange's theorem and graph theory in solving real-time problems.

DETAILED SYLLABUS:

UNIT-I: MATHEMATICAL LOGICAND PREDICATES (9 Periods)

Mathematical Logic: Statements and notations, Connectives, Well formed formulae, Truth tables, Tautology, Equivalence of formulae, Normalforms.

P**redicates:** Predicate calculus, Free and bound variables, Rules of inference, Consistency, Proof of contradiction and automatic theorem proving.

UNIT-II: FUNCTIONS AND RELATIONS (8 Periods)

Relations: Properties of binary relations, Equivalence relations,Compatibility relations, Partial ordering relations, Hasse diagram and related applications.

Functions: Inverse functions, Composition of functions, Recursive functions, Lattice and its properties.

UNIT-III: ALGEBRAIC STRUCTURES (8 Periods)

Algebraic System: Examples and general properties, Semi groups and monoids, Groups, Subgroups, Homomorphism and isomorphism, Lagrange's theorem.

UNIT-IV: MATHEMATICAL REASONING AND RECURRENCE RELATIONS (10 Periods)

Mathematical Reasoning: Methods of proof, Mathematical induction, Basics of counting, The inclusion- exclusion principle, The pigeon hole principle, Permutations and combinations, Generalized permutations and combinations.

Recurrence Relations: Generating functions of sequences, Calculating coefficients of generating function, Recurrence relation, Solving recurrence relations by substitution and Generating functions, Methods of characteristic roots, Solutions of inhomogeneous recurrence relation.

UNIT-V: GRAPH THEORY AND ITS APPLICATIONS(10 Periods)

Graphs: Introduction to graphs, Types of graphs, Graph basic terminology and special types of simple graphs, Representation of graphs and graph isomorphism, Euler paths and circuits, Hamiltonian paths and circuits, Planar graphs, Euler's formula and graph coloring, 4-color theorem.

Trees: Introduction to trees, Properties of trees, Applications of trees, Spanning trees, Counting trees, Depth-first search, Breadth-first search, Minimum spanning trees, Kruskal's algorithm and prim's algorithm.

Total Periods: 45

TEXT BOOKS:

1. J.P. Trembly and R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science,* Tata McGraw Hill, Thirty Seventh Edition, 2008.
2. R. K. Bisht and H. S. Dhami, *Discrete Mathematics,* Oxford Higher Education, 2015.

REFERENCE BOOKS:

1. Joe L.Mott and Abraham Kandel, *Discrete Mathematics for Computer Scientists and Mathematicians,* Prentice Hall of India Private Limited, Second Edition, 2004.
2. Ralph P. Grimaldi and B.V.Ramana, *Discrete and Combinatorial Mathematics- an Applied Introduction,* Pearson Education, Fifth Edition, 2006.
3. Kenneth H. Rosen, *Discrete Mathematics and its Applications,* Tata McGraw Hill, Sixth Edition, 2007.

II B.Tech. - ISemester

(16BT50502) **LINUX PROGRAMMING**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Operating Systems".

COURSE DESCRIPTION: Concepts on Linux Programming; Shell Programming; Process, Signals and File System Structure; Inter process Communications and Socket Programming for Client-Server Interaction.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Shell programming
- File Structure and System Calls
- Processes management and handling signals,
- IPC and Sockets

CO2. Analyze shell scripts and system calls related to Linux Environment.

CO3. Design shell scripts and system calls for specified computational problems.

CO4. Use appropriate shell scripts and system calls for solving complex problems.

CO5. Provide appropriate Linux solutions for real time applications.

CO6. Apply contextual knowledge to solve problems related to societal issues.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TOLINUX ANDLINUX ENVIRONMENT (9 Periods)

The GNU Project and the Free Software Foundation, Linux Distributions, Programming Linux - Linux Programs, Text Editors, The C Compiler; Program Arguments - getopt, getopt_long. Environment Variables - Use of Environment Variables, The environ Variable, Time and Date, User Information, Host Information.

UNIT-II: SHELL PROGRAMMING (9 Periods)

Necessity of Shell Programming, Pipes and Redirection - Redirecting Output, Redirecting Input, Pipes, The Shell as a Programming Language - Interactive Programs, Creating a Script, Making a Script Executable, Shell Syntax - Variables, Conditions,

Control Structures, Functions, Commands, Command execution.

UNIT-III: FILE SYSTEM STRUCTURE AND SYSTEM CALLS (9 Periods)

Linux File Structure and Commands: File Structure - Directories, Files and Devices, System Calls and Device Drivers; Library Functions - Low-Level File Access, write, read and open commands, Initial Permissions, Other System Calls for Managing Files; File and Directory Maintenance Commands - chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd.

Input-Output Commands: The Standard I/O Library Commands - fopen, fread, fwrite, fclose, fflush, fseek, fgetc, getc, and getchar, fputc, putc and putchar, fgets and gets; Formatted Input and Output Commands - printf, fprintf, sprintf, scanf, fscanf, sscanf.

UNIT-IV: PROCESSAND SIGNALS (8 Periods)

Process Structure - The Process Table, Viewing Processes, System Processes, Process Scheduling; Starting New Processes - Waiting for a Process, Zombie Processes, Input and Output Redirection, Threads; Signals - Sending Signals, Signal Sets.

UNIT-V: INTER-PROCESS COMMUNICATION AND SOCKETS (10 Periods)

Inter-Process Communication: Pipe definition, Process pipes, Sending output to popen - Passing more data, popen, implementation, The pipe call; Parent and child processes - Reading closed pipes, pipes used as standard input and output; Named pipes - FIFOs, Accessing a FIFO, Client/Server using FIFOs.

Socket Connections: Socket attributes, Creating a socket, Socket addresses, Naming a socket, Creating a socket queue, Accepting connections, Requesting connections, Closing a socket, Socket communications, Host and network byte Ordering.

Total Periods: 45

TEXT BOOK:

1. Neil Matthew and Richard Stones, *Beginning Linux Programming,* Wiley Dreamtech, Fourth Edition, 2008.

REFERENCE BOOKS:

1. Richard Petersen, *Linux: The Complete Reference,* Tata McGraw-Hill, Sixth Edition, 2007.
2. Sumitabha Das, *Your UNIX: The Ultimate Guide, T*ata McGraw-Hill, 2007.

II B.Tech. - ISemester

(16BT31501) OPERATING SYSTEMS

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Operating systems operations, scheduling; Critical section problem, deadlocks; Paging, segmentation; File Concept, Disk scheduling; I/O interface; concepts of protection.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on Operating system operations, services, file management, disk management, I/O management and protection.

CO2. Identify the functionality involved in process management concepts like scheduling and synchronization.

CO3. Design models for handling deadlock and perform memory management.

CO4. Synthesize and apply programming API's to perform Process management.

CO5. Use appropriate protection tools to provide access control toOperating system users.

DETAILED SYLLABUS:

UNIT-I: OPERATING SYSTEMS OVERVIEW AND PROCESS MANAGEMENT (8 Periods)

Operating systems, operations, Distributed systems, Special purpose systems, Operating systems services, Systems calls, Operating system structure.

Process Management: Process scheduling, Process Control Block, Inter process communication, Signals, Forks, Multithreading models, Threading issues, Scheduling criteria, Scheduling algorithms, Multilevel queue, Multilevel feedback queue.

UNIT-II: SYNCHRONIZATION AND DEADLOCKS (10 Periods)

Synchronization: The critical-section problem, Peterson's

Solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Monitors.

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock detection, Deadlock avoidance, Deadlockrecovery.

UNIT-III: MEMORY MANAGEMENT (9 Periods)

Memory-Management Strategies: Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation.

Virtual Memory Management: Demand paging, Copy-on-Write, Page replacement Algorithms, Thrashing.

UNIT-IV: STORAGE MANAGEMENT (10 Periods)

File System: File Concept, Access methods, Directory structure, File system structure, i-node, File Descriptors, File system implementation, Directory implementation, Allocation methods.

Secondary Storage Structure: Disk structure, Disk attachment, Disk scheduling, Swap-space management, Stable-storage implementation, Tertiary storage structure.

UNIT-V: I/O SYSTEMS AND PROTECTION (8 Periods)

I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem.

Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights.

Total Periods: 45

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, *Operating System Principles,* Wiley India Edition, Seventh Edition, 2011.

REFERENCE BOOKS:

1. William Stallings, *Operating Systems, Internals and Design Principles,* Pearson Education, Seventh Edition, 2013.
2. Andrew S. Tanenbaum, *Modern Operating Systems,* PHI, Third Edition, 2009.

II B.Tech. - ISemester

(16BT30531) DATA STRUCTURES LAB

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Data Structures".

COURSE DESCRIPTION: Hands on practice on Linked Lists; Type of lists; Stacks and Queues; Trees and Search trees; Graphs; Searching and Hashing.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate practical knowledge on Stacks, Queues, Linked lists, Trees Sorting and Hashing Techniques.

CO2. Analyze suitable data structure to solve real world computing problems.

CO3. Design solutions for complex computational problems using linear and non-linear data structures.

CO4. Solve for Complex computational problems by conducting explorative analysis.

CO5. Use C language for implementing linear and non-linear data structures.

CO6. Apply contextual knowledge of data structures to design applications for societal requirements.

CO7. Communicate effectively using data structures with engineering community, being able to comprehend and write effective programs and Prepare Reports.

LIST OF EXERCISES:

1. Write program to implement the following data structures:
   (a) Single Linked List
   (b) Double Linked List
   (c) Circular Linked List
2. Write a program to implement Stack and Queue using Linked List.
3. Write a program to evaluate a given postfix expression using Stack.
4. Write a program to convert a given infix expression to postfix form using Stack.
5. Write a program to implement
   (a) Stack using two Queues
   (b) Queue using two Stacks
6. Write a program to implement In-order, pre-order, post-order

tree traversal of Binary Trees.

7. Write a program to perform operations on a Binary Search Tree (BST).
8. Write programs for implementation of graph traversals by applying:
   (a) Breadth First Search
   (b) Depth First Search
9. Implement the following sorting algorithms:
   (a) Merge Sort
   (b) Heap Sort
   (c) Quick Sort
10. Write a program to implement hashing with
   (a) Separate Chaining Method
   (b) Open Addressing Method

REFERENCE BOOKS:

1. Richard Gilberg and Behrouz A. Forouzan, Data Structures: A Pseudocode Approach with C, Cengage Learning, Second Edition, 2007.
2. G.A.V. Pai, Data Structures and Algorithms, Tata McGraw Hill, Second Edition, 2009.

II B.Tech. - ISemester

(16BT50532) **LINUX PROGRAMMING LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Linux Programming".

COURSE DESCRIPTION: Hands on Practice with - Shell Programs; System Calls; Environment Variables; Inter Process Communication; File System and Socket Programming.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate practical knowledge on
- Shell programming
- File Structure and System Calls
- Processes management and handling signals,
- IPC and Sockets

CO2. Analyze shell scripts and system calls in Linux operating system.

CO3. Design shell scripts for specified computational problems.

CO4. Use appropriate shell scripts and system calls for solving complex problems.

CO5. Create shell scripts and system calls for real time Linux applications.

CO6. Apply contextual knowledge to solve problems related to societal issues.

CO7. Communicate effectively using Linux with engineering community being able to comprehend and write effective programs and prepare reports.

LIST OF EXERCISES:

1. Create two files source.txt and dest.txt using vi editor which contains some text and practice the following commands on that files. cat, tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm., cmp, diff, cp, mv, ln, rm, unlink, tty, script, clear, date, cal, mkdir, rmdir, du, df, find, umask, ps,who.

2. a) Write a shell script that takes a command line argument and reports on whether it is directory, a file, or something else.

   b) Write a shell script that accepts one or more file names as arguments and converts all of them to uppercase, provided

they exist in the current directory.

1. a)Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.

b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

4. a)Write a shell script to list all of the directory files in a directory.

b) Write a shell script to find factorial of a given number.

5. a) Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.

b) Write a shell script that takes a login name and reports when that person logs in.

6. a) Simulate uniq command using C.

b) Simulate grep command using C.

7. Write a C program that takes one or more file or directory names as input and reports the following information on the file:

i) File type

ii) Number of links

iii) Read, write and execute permissions

iv) Time of last access

(Note: Use stat/fstat system calls)

8. a) Write a C Program to display Environment variables.

b) Write a C Program to implement Different types of exec functions.

9. a) Write a Program to create a Zombie Process.

b) Create a Process using fork() and display Child and Parent Process Id's.

10. Implement the Following IPC Forms a) FIFO b) PIPE

11. Perform client and server socket Programming for exchanging of data Using System calls.

12. a) Write a program user.c, which extracts some user information from the password database (Hint: Use getuid()

function to obtain the UID of the current user and use UID to obtain detailed password file information).

b) Write a program host.c, which extracts some host computer information (Hint: Use gethostname() function to obtain the network name of the host computer).

REFERENCE BOOK:

1. Neil Matthew and Richard Stones, *Beginning Linux Programming,* Wiley Dreamtech, Fourth Edition, 2008.

II B.Tech. - I Semester

(16BT31531) OPERATING SYSTEMS LAB

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Operating Systems".

COURSE DESCRIPTION: Hands on practice in simulating algorithms for CPU Scheduling, Memory Management, I/O Management, Deadlock Handling mechanisms; Implementing Synchronization problems; practice on UNIX commands.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate of the following algorithms to solve problems:
- CPU Scheduling
- Memory Management
- I/O Management

CO2. Formulate and analyze solutions to problems pertaining to Memory and I/O.

CO3. Designing models for deadlock handling mechanisms.

CO4. Develop skills in basic UNIX commands.

CO5. Use appropriate APIs' available in modern operating systems (such as threads, system calls, semaphores, etc.) for software development.

CO6. Communicate effectively on complex operating system problems with implication to User-friendliness.

CO7. Develop and demonstrate user defined libraries to communicate with the kernel for effective implementation of projects across multidisciplinary environments.

LIST OF EXERCISES:

1. Write a program to implement the following system calls:

   a) fork b) exec c) getpid d) wait

2. a) Write a program to demonstrate File Permissions.

   b) Write a program to implement named and unnamed pipes.

3. Implement the following CPU Scheduling Algorithms:

   a) FCFS b) SJF (Preemptive) c) Round Robin d) Priority.

   Use the following set of processes, compare the performance of above scheduling policies

Process Name	Arrival Time	Processing Time	Priorities
A	0	3	2
B	1	5	4
C	3	2	1
D	9	5	5
E	12	5	3

4. Implement the following synchronization problems:

   a) Producer Consumer Problem

   b) Dining Philosopher's Problem.

5. Implement Banker's Algorithm for Deadlock Avoidance and

Detection. Find the safe sequence. If Max. request of any one process is changed, detect whether deadlock is occurred or not. Consider number of resources are three and Jobs are five as shown in the table:

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3			
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2	3	3	2
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

6. Implement the following Algorithms:

   a) First Fit b) Best Fit c) Worst Fit

7. Implement multiprogramming with fixed number of tasks and variable number of tasks. The size of the memory is 1000K. Operating system size is 200K. Number of processes are P1, P2, P3 with sizes 150K, 100K and 70K.

8. Implement the following Page Replacement Algorithms:

   a) FIFO b) LFU c) LRU d) Optimal

   Consider number of frames are three and Reference string is 2 3 2 1 5 2 4 5 3 2 4 2 4 5

9. Develop user-defined libraries to implement input-output functionalities.

II B.Tech. - II Semester

(16BT3HS01) ENVIRONMENTAL STUDIES

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: A course on "Engineering Chemistry".

COURSE DESCRIPTION: Multidisciplinary nature of environment; Natural resources; Ecosystems; Biodiversity; Environment pollution and control; Social issues and environment; Human population and environment; Field studies.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Acquire knowledge on nature of environment, natural resources, ecosystems, biodiversity, environmental pollution and control, social issues and human population.

CO2. Analyze natural resources, ecosystems, biodiversity, environmental pollution and control, social issues and human population.

CO3. Develop strategies for environmental pollution control

and natural resource management.

CO4. Solve environmental problems through proper analysis and interpretation of environmental data.

CO5. Choose appropriate techniques in environmental pollution control and natural resource management.

CO6. Understand the impact of social issues and population on environment.

CO7. Provide solutions to individuals, industries and government for environmental sustainable development.

CO8. Follow environmental protection laws for sustainable development.

CO9. Communicate effectively on environmental issues in the form of reports.

DETAILED SYLLABUS:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAND NATURAL RESOURCES (11 Periods)

Multidisciplinary Nature of Environment: Multidisciplinary nature of environment, Segments of environment - Lithosphere, Hydrosphere, Atmosphere, Biosphere; Need for public awareness.

Natural Resources: Renewable and non-renewable resources and associated problems - (a) Forest resources: Use and over exploitation, Deforestation-causes, effects and remedies, Case studies, (b) Water resources: Use and over utilization of surface and groundwater, Conflicts over water, Benefits and problems of large dams, Case studies, (c) Mineral resources: Mining, Adverse effects, Case studies, (d) Food resources: World food problems, Changes caused by agriculture and overgrazing, Effects of modern agriculture, Water logging and salinity, Case studies, (e) Energy resources: Growing needs, Renewable energy resources - Solar, Wind, Hydropower, Hydrogen fuel; Non-renewable energy resources - Coal, Natural gas, Nuclear energy, Role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT-II: ECOSYSTEMS AND BIODIVERSITY (10 Periods)

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem - Producers, Consumers, Decomposers; Food chains, Food webs, Ecological pyramids - Types; Characteristic features, Structure and functions of forest ecosystem, Desert ecosystem, Aquatic ecosystem, Energy flow in the ecosystem, Ecological succession.

Biodiversity: Concept and value of biodiversity, Role of biodiversity in addressing new millennium challenges, Hot spots of biodiversity, Threats to biodiversity, Man-wild life conflicts, Endemic, Endangered and extinct species of India, Conservation of biodiversity - In-situ and ex-situ.

UNIT - III: ENVIRONMETAL POLLUTION ANDCONT(8 Periods)

Causes, Adverse effects and control measures of pollution - Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear pollution; Solid waste management - Causes, Effects and control measures of urban and industrial wastes; Hazards and disaster management - Floods, Earthquakes,

Tsunamis, Case studies.

UNIT - IV: SOCIAL ISSUES AND THE ENVIRONME(8 Periods)

Sustainable development, Urba n problems related to energy, Environmental ethics -Issues, Solutions; Global warming, Acid rain, Ozone layer depletion, Nuclear accidents and case studies, Wasteland reclamation, Consumerism and waste products, Concept of green technologies, Environment protection act, Air act, Water act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation, Public environmental awareness.

UNIT - V: HUMAN POPULATION AND THE ENVIRONMENT (8 Periods)

Population growth, Population characteristics and variation among nations, Population explosion, Family welfare programme, Environment and human health, Human rights, Value education, HIV/AIDS, Women and child welfare, Role of information technology in environment and human health, Case studies, Field Work/Assignment/Seminar: Environmental assets - Pond/ Forest/Grassland/Hill/ Mountain/Environment impact assessment procedures for local environmental issues.

Total Periods: 45

TEXT BOOKS:

1. A. Kaushik and C. P. Kaushik, *Environmental Studies,* New Age International (P) Ltd Publications, Fourth Edition, 2014.
2. Erach Barucha, *Environmental Studies,* Orient Blackswan, Second Edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, *Environmental Studies,* Oxford University Press, Second Edition, 2011.
2. Benny Joseph, *Environmental Studies,* Tata McGraw-Hill, Second Edition, 2009.
3. B. S. Chauhan, *Environmental Studies,* University Science Press, 2008.
4. M. Anji Reddy, T*ext Book of Environmental Sciences and Technology,* BS Publications, 2007.

II B.Tech. - II Semester

(16BT41204) THEORY OF COMPUTATION

(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Discrete Mathematical Structures".

COURSE DESCRIPTION: Fundamentals of Computation; Finite State Automaton; Regular Expressions; Grammars; Push Down Automaton; Turing Machine.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on Formal languages and automata.

CO2. Analyze the classification of languages, automata's and their computing power.

CO3. Design grammars and automata (recognizers) for regular expressions and formal languages.

CO4. Solve computational problems using automata.

CO5. Apply theorems to translate automata's and identify the class of languages.

DETAILED SYLLABUS:

UNIT-I: FINITE AUTOMATA (10 Periods)

Introduction to Finite automata, The central concepts of automata theory, Deterministic finite automata, Nondeterministic Finite automata, The equivalence of DFA and NDFA, Finite automata with epsilon-transitions, Conversion of epsilon-NFA to NFA and DFA, Mealy and Moore models.

UNIT-II: REGULAR EXPRESSIONS AND LANGUAGE (9 Periods)

Regular expressions, Identity rules, Finite automata and Regular expressions, Applications of regular expressions, Pumping lemma for regular languages, Applications of the pumping lemma, Closure properties of regular languages, Equivalence of two regular expressions, Equivalence of two finite automata and minimization of automata.

UNIT-III: CONTEXT-FREE GRAMMARS (9 Periods)

Context-free grammars, Parse trees, Applications of context-free grammars, Ambiguity in grammars and languages, Normal forms for context-free grammars, The pumping lemma for context-free languages.

UNIT-IV: PUSH DOWN AUTOMATA (7 Periods)

Definition of the pushdown automaton, The languages of a PDA, Equivalence of PDA's and CFG's, Deterministic pushdown automata, Chomsky hierarchy of languages, The model of linear bounded automaton.

UNIT-V: TURING MACHINES (10 Periods)

Turing machine model, Representation of turing machines, Language acceptability by turing machine, Design of turing machines, Programming techniques for turing machines, Turing machines with semi-infinite tapes, Multi stack machines and counter machines, Universal turing machines.

Total Periods: 45

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D Ullman, *Introduction to Automata Theory, Languages and Computation,* Pearson Education, Third Edition, 2011.
2. K.L.P. Mishra and N.Chandrasekaran, *Theory of Computer Science: Automata Languages and Computation,* PHI Learning, Third Edition, 2009.

REFERENCE BOOK:

1. John C Martin, *Introduction to Languages and the Theory of Computation,* TMH, Third Edition, 2009.

II B.Tech. - II Semester

(16BT40502) DATABASE MANAGEMENT SYSTEMS

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Database Systems; Database Design; Relational Model; SQL Queries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control; Overview of Storage and Indexing.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Data models and Database Languages
- Database design
- Normal forms
- Storage and Indexing

CO2. Analyze databases using normal forms to provide solutions for real time applications.

CO3. Design solutions for database problems using database design, view design and framing queries.

CO4. Use database techniques for designing databases, managing databases and its security.

CO5. Select SQL, Hash based Indexing and Tree based Indexing to manage data in databases.

CO6. Apply contextual knowledge to develop database applications related to societal applications like Information Retrieval Systems, Banking and Financial systems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO DATABASE SYSTEMS AND DATABASE DESIGN (9 Periods)

Database Systems: Database system applications, Purpose of database systems, View of data-Data abstraction, Instances and Schemas, Data models; Database languages - DDL, DML; Database architecture, Database users and administrators.

Database Design: ER diagrams, Beyond ER design, Entities, Attributes and entity sets, Relationships and relationship sets, Additional features of ER model, Conceptual design with ER model.

UNIT-II: THE RELATIONAL MODEL and RELATIONAL ALGEBRA AND CALCULUS (8 Periods)

Relational Model : Integrity constraints over relations, Enforcing integrity constraints, Querying relational data, Logical database design, Introduction to views, Destroying/altering tables and views.

Relational Algebra and Calculus: Preliminaries, Relational Algebra operators; Relational Calculus - Tuple and Domain Relational Calculus; Expressive power of Algebra and calculus.

UNIT-III: SQL AND SCHEMA REFINEMENT (10 Periods)

SQL: Form of basic SQL query- Examples of basic SQL queries; Nested queries- Introduction to nested queries, Correlated nested queries, Set-comparison operators; Aggregate operators, NULL values-Comparison using NULL values, Logical connectives AND, OR and NOT, Impact on SQL constructs, Outer joins, Disallowing NULL values; Complex integrity constraints in SQL ,Triggers and active databases.

Schema Refinement: Problems caused by redundancy, Decompositions, Problem related to decomposition, Functional dependencies, Reasoning about FDS, Normal forms - First, second and third normal forms, BCNF; Multi valued dependencies, Fourth normal form, Join dependencies, Fifth normal form.

UNIT-IV: TRANSACTIONS AND CONCURRENCY CONTROL (9 Periods)

Transactions: Transaction concept, Transaction state, Implementation of atomicity and durability, Concurrent executions, Serializability, Recoverability, Implementation of isolation, Testing for serializability.

Concurrency Control: Lock based protocols, Timestamp based protocols, Validation based protocols, Multiple granularity, Deadlock handling.

UNIT-V: STORAGE AND INDEXING (9 Periods)

Storage and Indexing: Data on external storage, File organization and indexing - Clustered indexes, Primary and secondary indexes;

Index data structures - Hash based indexing, Tree based indexing; Comparison of file organizations.

Tree Structured Indexing: Intuition for tree indexes, Indexed Sequential Access Method (ISAM), B+ Trees- A dynamic index structure; Search, Insert, Delete; B-Tree index files.

Total Periods: 45

TEXT BOOKS:

1. Raghu Ramakrishnan and Johannes Gehrke, *Database*

Management Systems, Tata McGraw Hill, Third Edition, 2014.

2. A. Silberschatz, H.F.Korth and S. Sudarshan, *Database System Concepts,* Tata McGraw Hill, Fifth Edition, 2006.

REFERENCE BOOKS:

1. Ramez Elmasri and Shamkant B. Navathe, *Database Systems,* Pearson Education, Sixth Edition, 2013.

2. Peter Rob and Carlos Coronel, *Database Systems Design, Implementation and Management,* Cengage Learing, Seventh Edition, 2009.

II B.Tech. - II Semester

(16BT41201) DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Data Structures".

COURSE DESCRIPTION: Introduction to Algorithms and Asymptotic Notations; Disjoint Sets and Graphs; Divide and Conquer, Greedy Method; Dynamic Programming, Back Tracking; Branch and Bound.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Algorithm Complexities and Asymptotic notations.
- Algorithm Design techniques-Divide and Conquer, Greedy Method, dynamic programming, Back tracking, Branch and Bound.

CO2. Analyze the performance of algorithms with respect to Time and Space complexities.

CO3. Design the algorithms for solving real world problems.

CO4. Solve sorting and searching problems using Divide and Conquer method.

CO5. Use dynamic programming and backtracking in finding shortest paths.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO ALGORITHMS (8 Periods)

Algorithm, Algorithm Specifications-Pseudocode conventions; Performance Analysis-Space complexity, Time complexity; Asymptotic Notations - Big Oh, Omega, Theta, Little oh, and Little omega; Recurrences.

UNIT-II: DISJOINT SETS AND GRAPHS (9 Periods)

Disjoint Sets: Operations, union and find algorithms.

Graphs: Breadth first search and Traversal, Depth first search and Traversal, Introduction to spanning trees, connected components and Bi-connected components.

UNIT-III: DIVIDE AND CONQUER AND GREEDY METHOD (10 Periods)

Divide and Conquer: General method, Applications - Analysis of binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

Greedy Method: General method, Applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest paths.

UNIT-IV: DYNAMIC PROGRAMMING AND BACK TRACKING (10 Periods)

Dynamic Programming: General Method, Applications - Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem.

Back Tracking: General Method, Applications - N Queen problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

UNIT-V: BRANCH AND BOUND TECHNIQUES (8 Periods)

General method, Applications - Travelling sales person problem, 0/ 1 knapsack problem; LC Branch and Bound solution, FIFO Branch and Bound solution.

Total Periods: 45

TEXT BOOK:

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, *Fundamentals of Computer Algorithms,* Galgotia Publications Pvt. Ltd, New Delhi, Second Edition, 2007.

REFERENCE BOOKS:

1. M. T. Goodrich and R. Tomassia, Algorithm Design: Foundations, *Analysis and Internet Examples,* John Wiley and Sons, 2002.
2. S. Sridhar, *Design and Analysis of Algorithms,* Oxford Press, 2015.
3. Harsh Bhasin, *Algorithms: Design and Analysis,* Oxford University Press, 2015.

II B.Tech. - II Semester

(16BT41202) **JAVA PROGRAMMING**

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Object Oriented Programming through C++".

COURSE DESCRIPTION: Introduction of Java, Classes and Objects; Inheritance, Packages, Interfaces; Exception handling, Multithreading; Event handling, AWT, Collection Classes; Applets, Servlets.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Object Oriented Programming concepts - classes, objects, inheritance, polymorphism, encapsulation and abstraction.
- Packages, interfaces, multithreading, exception handling, event handling.

CO2. Analyze complex engineering problems using object oriented concepts.

CO3. Design and develop reusable code to provide effective solutions for real world problems using inheritance and polymorphism.

CO4. Apply AWT and Applets to create interactive Graphical User Interfaces.

CO5. Use advanced programming languages to develop web applications.

CO6. Build Java Applications suitable for societal requirements.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (10 Periods)

Data types, Variables, Arrays, Operators, Control statements.

Classes and Objects: Concepts of Classes, Objects, Constructors, Methods, this keyword, Garbage collection, Overloading Methods and Constructors, Parameter passing, Access control, Recursion, String Class.

UNIT-II: INHERITANCE, PACKAGES AND INTERFACES (9 Periods)

Inheritance: Inheritance basics, Super keyword, Multi-level hierarchy, Abstract classes, final keyword with inheritance.

Packages: Definition, Creating and accessing a package,

Understanding CLASSPATH, Importing packages.

Interfaces: Definition, Implementing interfaces, Nested interfaces, Applying interfaces, Variables in interface and Extending interfaces.

UNIT-III: EXCEPTION HANDLING AND MULTITHREADING (8 Periods)

Exception Handling: Concepts of exception handling, Exception types, Usage of Try, Catch, Throw, Throws and Finally, Built in exceptions, Creating own exception sub classes.

Multithreading: Java thread model, Creating threads, Thread priority, Synchronizing threads, Inter-thread communication.

UNIT-IV: COLLECTION CLASSES, THE APPLET CLASS AND AWT (10 Periods)

Collection Classes: ArrayList Class, LinkedList Class, Hashset Class, LinkedHashSet Class, TreeSet Class, PriorityQueue Class, EnumSet Class.

The Applet Class: Types of applets, Applet basics, Applet architecture, Applet skeleton, Passing parameters to applets.

AWT Control Fundamentals: User interface components, Layout managers.

UNIT-V: EVENT HANDLING AND SERVLETS (8 Periods)

Delegation event model: Event classes, Event Listener Interfaces - Mouse and Key; Adapter classes.

Servlets: Life cycle of a servlet, Using Tomcat for Servlet development, Create and compile the servlet source code, Servlet API, Javax.Servlet package.

Total Periods: 45

TEXT BOOK:

1. Herbert Schildt, *Java the Complete Reference,* Oracle Press, Ninth Edition, 2014.

REFERENCE BOOK:

1. Sachin Malhotra and Saurab Choudhary, *Programming in Java,* Oxford University Press, Second Edition, 2014.

II B.Tech. - II Semester

(16BT41203) SOFTWARE ENGINEERING

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Concepts of Software Engineering; Software Process Models; Conventional and Agile Process Models; Software Requirements Engineering Process; System Analysis; Architectural Design; User Interface Design and Re-engineering; Software Testing; Risk and Quality Management.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Fundamental concepts of software engineering.
- Process models.
- Software development life cycle.

CO2. Analyze software requirements and process models required to develop asoftware system.

CO3. Design and develop a quality software product using design engineering principles.

CO4. Develop software product as per user and societal requirements.

CO5. Follow standards for software development and quality management.

CO6. Demonstrate skills in applying risk and quality management principles for effective management of software projects.

DETAILED SYLLABUS:

UNIT I: SOFTWARE ENGINEERING AND SOFTWARE PROCESS (11 Periods)

A Generic View of Process: The nature of software, Software engineering- Software engineering layers; The software process, Software engineering practice, Software myths.

Process Models: A Generic process model, Incremental process models, Evolutionary Process models; The unified process, Agile Development-Agility, Agile process, Scrum, Agile modeling (AM), Agile Unified Process (AUP), The Cleanroom strategy.

UNIT II: REQUIREMENTS ENGINEERING AND MODELING (7 Periods)

Requirements Engineering: Functional and non-functional requirements, The software requirements document, Requirements specifications, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management.

Requirements Modeling: Data modeling concepts, Flow-oriented modeling, Case study on requirements modeling for WebApps.

UNIT III: DESIGN ENGINEERING AND METRICS (8 Periods)

Design Engineering: Design within the context of software engineering, The Design process, Design concepts, Software architecture, Architectural styles, Architectural design.

Process and Project Metrics: Metrics in the process and project domains, Software measurement, Metrics for software quality.

UNIT IV: SOFTWARE TESTING STRATEGIES AND APPLICATIONS (9 Periods)

Testing Strategies: A strategic approach to software testing, Strategic issues, Test strategies for conventional software, Test strategies for object oriented software, Validation testing, System testing, The art of debugging.

Testing Conventional Applications: Software testing fundamentals, Basis path testing, White box and Black box testing, Object oriented testing methods.

UNIT V: RISK, QUALITY MANAGEMENT AND REENGINEERING

(10 Periods)

Risk and Quality Management: Reactive and proactive risk strategies, Software risks, Risk Mitigation Monitoring and Management (RMMM), RMMM plan, Software quality factors, Defect amplification Model, Formal Technical Reviews (FTR), Software Quality Assurance (SQA)-Tasks, Goals and metrics;

Software reliability.

Reengineering: Introduction, Business Process Reengineering (BPR), Software reengineering, Restructuring, Reverse engineering, Forward engineering.

Total Periods: 45

TEXT BOOKS:

1. Roger S. Pressman, *Software Engineering-A Practitioner's Approach,* McGraw-Hill International Edition, Seventh Edition, 2010.

2. Ian Sommerville, *Software Engineering,* Pearson Education, Ninth Edition, 2011.

REFERENCE BOOKS:

1. K. K. Aggarwal and Yogesh Singh, *Software Engineering, New Age International Publishers,* Third Edition, 2007.
2. Shely Cashman Rosenblatt, *Systems Analysis and Design, Thomson Publications,* Sixth Edition, 2006.

II B.Tech. - II Semester

(16BT40531) DATABASE MANAGEMENT SYSTEMS LAB

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Database Management Systems".

COURSE DESCRIPTION: Hands on experience on - DDL, DML commands; Query processing using operators; Joins, Views, Single Row functions, Group Functions and SET functions; PL/ SQL concepts - Basic Programs, Triggers, Functions, Cursors and Stored Procedures.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate practical knowledge on creation and alteration of tables, insertion and Querying of data.

CO2. Analyze and evaluate the databases using SQL DML/ DDL commands.

CO3. Design database schemas for the sales database, customer database and product database.

CO4. Develop solutions for database problems using stored procedures, stored functions, cursors and triggers.

CO5. Implement DDL and DML commands in SQL and PL/SQL, ORACLE to manage data in databases.

CO6. Apply contextual knowledge to develop database applications related to societal issues.

CO7. Demonstrate communication skills, both oral and written for preparing and presenting reports on databases.

DESCRIPTION OF SALES DATABASE:

ABC is a company operating in the country with a chain of shopping centers in various cities. Everyday large numbers of items are sold in different shopping centers. The Sales database comprises of various tables like CUST, PROD, SALES_DETAIL, STATE_NAME with the following schemas.

CUSTOMERS

Name	Type	Remark
CID	VARCHAR2(6)	PRIMARY KEY
CNAME	VARCHAR2(10)	

CCITY	VARCHAR2(8)

PRODUCTS

Name	Type	Remark
PID	VARCHAR2(6)	PRIMARY KEY
PNAME	VARCHAR2(6)	
PCOST	NUMBER(5,2)	
PROFIT	NUMBER(3)	

SALES DETAILS

Name	Type	Remark
CID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
PID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
SALE	NUMBER(3)	
SALEDT	DATE	COMPOSITE PRIMARY KEY

STATES

Name	Type	Remark
CCITY	VARCHAR2(8)	PRIMARY KEY
STATE	VARCHAR2(15)	

LIST OF EXERCISES:

1. Execute: Data Definition Language (DDL) commands

a. Create the tables in sales database.

b. View the structure of the each table.

c. Change the structure of the table like add new column, change the width of a data type, change the data type of a column, delete column from the table, rename the column name and table names.

d. Delete all records stored in a table, but the structure of the table is retained.

e. Remove a table from the database.

2. Execute: Data Manipulation Language (DML) commands

STATES

CCITY	STATE
Mysore	Karnataka
Kolkata	Westbengal

Pune	Maharashtra
Tirupathi	Andhrapradesh
Chennai	Tamilnadu

CUSTOMERS

CID	CNAME	CCITY
c1	Gopal	Mysore
c2	Haitvik	Kolkata
c3	Rohan	Pune
c4	Rajini	Chennai
c5	Mohan	Tirupathi
c6	Sanjay	Mysore
c7	samhita	Kolkata

SALES DETAILS

PID	PNAME	PCOST	PROFIT
p1	Pen	100.00	10
p2	Pencil	15.50	2
p3	pendrive	950.00	50
p4	DVD	35.00	5
p5	Mouse	500.50	Null

PRODUCTS

CID	PID	SALE	SALEDT
c1	p1	10	01-sep-2016
c2	p3	20	18-mar-2017
c5	p5	30	20-dec-2016
c3	p2	45	01-sep-2016
c4	p4	15	01-sep-2016
c7	p3	22	18-mar-2017
c1	p2	23	01-sep-2016
c2	p1	33	14-jul-2017
c3	p5	14	18-mar-2017
c6	p4	10	14-jul-2017
c1	p2	5	18-mar-2017
c4	p2	50	18-mar-2017
c5	p1	20	14-jul-2017

c3	p3	9	01-sep-2016
c6	p5	10	18-mar-2017
c3	p4	8	20-dec-2016
c7	p3	6	01-sep-2016
c1	p5	9	14-jul-2017

a) Write a query to display all customers.

b) Write a query to display pname of all products.

c) Write a query to display cname and ccity of all customers.

d) Write a query to display cname, ccity of all customers who lives in mysore.

e) Write a query to display cname and ccity of all customers who live in Kolkata or Chennai.

f) Find the cost of pencil.

g) Display CID as Customer_Id, CNAME as Name for all customers.

h) Change the name of the product p3 from 'pendrive' to 'modem'.

i) Find the product ids in sales detail table (eliminating duplicates).

j) Remove the record from sales detail table whose sale value is 5.

3. Implement table level and Column level constraints like NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK, DEFAULT.

4. Operators

a) Display the sum of pcost and profit of all products.

b) Display the column heading as "Selling Price" instead of PCOST+PROFIT.

c) Find out what percent of pcost is profit for all products.

d) List the cids of customers who purchased products on '14-jul-2017'.

e) List only the products whose cost is more than 50.00.

f) List all the customers who are not belongs to 'pune'.

g) Write a query to display the pname and pcost of all the products where pcost lies between 5 and 25.

h) Write a query to display distinct customer id where product id is p3 or sale date is '18-mar-2017'.

i) Write a query to display cname, ccity of those customers whose cid is in c1 or c2 or c4 or c5 (using IN operator).

j) List customers whose name starts with 'h'.

k) Write a query to display all records of prod table in which first and third character of pname is any character and second character is 'e'.

l) Write a query to display all cname which includes two 'a' in the name.

m) List the products with unknown profit.

n) Display the profit of products as zero if unknown.

5. Joins and Views

a) Write a query to display cname, pname, sale, saledt for all customers.

b) Write a query to display cname who have purchased Pen.

c) Write a query to display cname, pname, sale for all customers who sold after '01-sep-2016'.

d) Write a query to display cname,ccity,state of all customers.

e) Write a query to display cname,ccity of all customers who belongs to Karnataka.

f) Create a view on product table which includes pid, pname and pcost of products.

g) Insert a row into the view.

h) Update the rows in a view.

i) Delete the rows from view.

6. Order by, group by and having clauses.

a) Write a query to display pname of all records. Sort all records by pname. (use order by clause)

b) Write a query to display cname and ccity of all records. Sort by ccity in descending order.

c) Write a query to display saledt and total sale on the date.

d) Write a query to display saledt and total sale on the date labeled as sale of all items.

e) Write a query to display saledt and total sale on the date sold after 01-sep-2016.

f) Write a query to display saledt and total sale on the date labeled as sale of all items other than DVD.

g) Write a query to display total number of customers who purchase pen.

7. Single Row Functions: Date Function, Numeric and Character Function

a) Write a query to display system date

b) Write a query to display the system date by rounding it to next month.

c) Write a query to display the system date by rounding it to next year.

d) Write a query to display the last date of the system date.

e) Write a query to display the next date of system date which is Friday.

f) Write a query to display sale date and date after 02 months from sale date.

g) Write a query to display system date, sale date and months between two dates.

h) Write a query to display the greatest date between sale date and system date, name it as BIG, also display sale date and SYSDATE.

i) Write a query to display the least date between sale date and system date name it as SMALL, also display sale date and SYSDATE.

j) Write a query to display the product name along with the rounded value of product cost for product name is "Pencil".

k) Write a query to display product cost along with MOD value if divided by 5.

l) Write a query to display cname in uppercase, lowercase, titlecase from cust table where customer name is "rohan".

m) Write a query to display all concatenated value of cname, ccity by converting cname into titlecase and ccity into uppercase.

n) Write a query to display the first 3 characters of cname.

o) Write a query to display the position of 'm' in the cname of the customer whose name is "samhita".

p) Write a query to display the length of all customer names.

q) PAD # character in left of product cost to a total width of 5 character position.

8. Group Functions and Set Functions

a) Write a query to display the total count of customer.

b) Write a query to display the minimum cost of product.

c) Write a query to display average value of product cost rounded to 2nd decimal places.

d) Write a query to display product name with total sale detail in descending order.

e) Write a query to display product name, sale date and total amount collected for the product.

f) Write a query to display sale date and total sale date wise which was sold after "14-jul-2016".

g) Write a query to display the customer name who belongs to those places whose name is having 'i' or 'p'.

h) Write a query to display customer name who belongs to a city whose name contains characters 'c' and whose name contains character 'a'.

i) Write a query to display the customer name who does not belong to 'pune'.

9. PL/SQL basic programs

a) Write a PL/SQL program to find largest number among three. (Hint: Use Conditional Statement)

b) Write a PL/SQL program to display the sum of numbers from 1 to N using for loop, loop…end and while…loop.

10. SQL Cursor based programs

a) Write a PL/SQL program to display the costliest and cheapest product in PROD table.

b) Write a PL/SQL program which will accept PID and display PID and its total sale value i.e. sum.

11. Functions

a) Write a function that accepts two numbers A and B and performs the following operations.

i. Addition

ii. Subtraction

iii. Multiplication

iv. Division

b) Write a function that accepts to find the maximum PCOST in PROD table.

12. Procedures

a) Write a procedure that accepts two numbers A and B, add them and print.

b) Write procedures to demonstrate IN, IN OUT and OUT parameter.

13. Triggers

a) Develop a PL/SQL program using BEFORE and AFTER triggers.

b) Create a row level trigger for the PROD table that would fire for INSERT or PDATE or DELETE operations performed on the PROD table. This trigger will display the profit difference between the old values and new values.

REFERENCE BOOKS:

1. Satish Asnani, *Oracle Database 11g: Hands-on SQL and PL/SQL,* PHI Publishers, 2010.
2. Pranab Kumar Das Gupta, *Database Management System Oracle SQL and PL/SQL,* PHI Learning Private Limited, 2009.

II B.Tech. - II Semester

(16BT31231) **JAVA PROGRAMMING LAB**

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Java Programming".

COURSE DESCRIPTION: Hands-on experience on Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling; AWT; Applets; Servlets.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on basic concepts of Java programming.

CO2. Design and develop efficient programs with multitasking ability and handle exceptions.

CO3. Demonstrate independent problem solving skills in developing interactive applications.

CO4. Apply object oriented approach to develop user friendly interface and learn how to communicate with systems over the network.

CO5. Build Java applications suitable for societal requirements.

CO6. Work effectively as an individual and as a member in team for case studies implementation.

CO7. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXERCISES:

1. a. Write a Program to accept two integers through the command line arguments and print the sum of the two numbers.

   b. Write a Program to accept a String as a Command line argument and the program should print a Welcome message.

2. Write a program that displays a menu with options (i) Add (ii) Sub. Based on the options chosen, read 2 numbers and perform the relevant operation. After performing the operation, the program should ask the user if he wants to continue. If the user presses y or Y, then the program should continue displaying the menu else the program should terminate.[Use Scanner class]

3. a. Write a program to print the element of an array that has occurred highest number of time.

b. Write a program to find greatest number in a 3*3 array. The program is supposed to receive 9 integer numbers as command line arguments.

4. a. Create a class "AmountInWords" to convert the amount into words. (Consider the amount to be not more than 100000.)

   b. Write a Program to count tokens- number of words and characters in a string.

5. Implement any one of the case study with the specifications given below:

   a) Create classes, objects and their properties.

   b) Add methods to classes and implement them.

   c) Refine the objects by adding constructors and local variables.

   d) Show communication between the objects by calling instance of one object from another class.

   e) Handle Exceptions and Implement relationships like inheritance.

Case study 1: Banking Application:

The banking application consists of five divisions. They are customer details, creating a new account, withdrawing money, loan details and depositing money. The customer details consist of customer name, address, phone number, account number. To withdraw money checks the balance in the account and then get the money. The loan details consist of loan types like home loans, car loans, education loans etc. To deposit money enter the account number and give the account to be deposited.

Case study 2: Library Application:

The Library Application consists of Student, faculty and book

details, Issue book, and return book. The student and faculty details consist of name, ID, Branch and maximum number of books can be issued to them. The book details consist of ID, Book name and Author name. To Issue a book to members, the librarian checks the availability of book and if the book is not available, then an error message will be displayed. To return the book, the librarian verifies the validity and if the validity is expired then the fine amount message will be displayed. The student and faculty can view the book details issued to them and also can check the count of remaining books that can be taken for issue.

6. a. Write a program that correctly implements producer

consumer problem using the concept of inter-thread communication.

b. Write a program that demonstrates time slicing among equal priority threads, show that a lower priority thread's execution is deferred by the time slicing of higher-priority threads.

7. Develop an Applet that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named "Compute" is clicked.
8. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result.
9. Create a Servlet that recognizes first time visitor to web application and responds by saying "Welcome to new user" otherwise "welcome back".

REFERENCE BOOKS:

1. Herbert Schildt, *Java the Complete Reference,* Oracle Press, Ninth Edition, 2014.
2. Sachin Malhotra and Saurab Choudhary, *Programming in Java,* Oxford University Press, Second Edition, 2014.

II B.Tech. - II Semester

(16BT4HS31) SOFT SKILLS LAB

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: English Language Laboratory in I B.Tech.

COURSE DESCRIPTION: This course covers Body Language; Assertiveness; Goal Setting; Creative Thinking; Interpersonal Skills; Team Work; Conflict Management; Etiquette; Report Writing; Group Discussions; Interviewing Skills.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Acquire knowledge on
- Goal Setting
- Creative Thinking
- Leadership Skills and
- Team Work

CO2. Analyze the situations and develop skills for
- Body Language
- Personality Development and
- Stress Management

CO3. Apply the techniques of soft skills in a problem situation enhanced through multimedia software.

CO4. Function effectively as an individual and as a member in diverse teams.

CO5. Communicate effectively in public speaking in formal and informal forums.

LIST OF EXERCISES:

1. Body Language
2. Assertiveness
3. Goal Setting
4. Creative Thinking
5. Interpersonal Skills
6. Team Work
7. Conflict Management

8. Etiquette
9. Report Writing
10. Resume Writing
11. Group Discussions
12. Interviewing Skills

Total Lab Slots: 10

REFERENCE BOOKS:

1. R. C. Sharma and Krishna Mohan, *Business Correspondence and Report Writing,* Tata McGraw-Hill Publishing Company Limited, Third Edition, New Delhi, 2012.
2. Gopalswamy Ramesh and Mahadevan Ramesh, T*he Ace of Soft Skills,* Pearson, Noida, 2010.
3. Jeff Butterfeild, *Soft Skills for Everyone,* Cengage learning, Delhi, 2011.
4. Barun K. Mitra, P*ersonality Development and Soft Skills,* Oxford University Press, Noida, 2012.

SUGGESTED SOFTWARES:

1. ETNL Language Lab Software Version 4.0
2. GEMS - Globarena E- Mentoring System
3. Speech Solutions.
4. English Pronunciation Dictionary by Daniel Jones.
5. Learning to Speak English 8.1, The Learning Company - 4 CDs.
6. Mastering English: Grammar, Punctuation and Composition.
7. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
8. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
9. Language in Use 1, 2 and 3.
10. Cambridge Advanced Learner's Dictionary - 3rd Edition.
11. Centronix - Phonetics.
12. Let's Talk English, Regional Institute of English South India.
13. Ultimate English Tutor.

II B.Tech. - I Semester

(16BT51201) COMPUTER GRAPHICS AND MULTIMEDIA

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Matrices and Numerical Methods".

COURSE DESCRIPTION: Introduction to Computer Graphics, Output Primitives; 2D Geometric Transformations and Viewing; 3D object representation and Visible Surface Detection Methods; Introduction to Multimedia, Audio and Video; Multimedia Data Compression.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Graphical interactive devices
- Viewing transformations
- 3-D object representations
- Surface detection methods
- Image, audio, video representations and standards.

CO2. Analyze multimedia compression issues using image, audio and video compression techniques.

CO3. Design algorithms to generate points, lines, polygons for 2-D, 3-D objects.

CO4. Apply Transformations and Clipping algorithms for 2-D and 3-D objects, various lossy / lossless coding techniques on text and images for compression and decompression.

CO5. Build multimedia applications for societal requirements.

UNIT -I: INTRODUCTION TO GRAPHICS AND OUTPUT PRIMITIVES (9 Periods)

Introduction: Raster-Scan systems, Random Scan systems, Graphics monitors, Work stations and Input devices.

Output Primitives: Points and Lines, Line Drawing algorithms, Mid-point Circle and Ellipse algorithms.

Filled area primitives: Scan Line Polygon Fill algorithm, Boundary-fill algorithms and Flood-Fill algorithms.

UNIT -II: 2-D GEOMETRICAL TRANSFORMS AND 2-D VIEWING (9 Periods)

2-D Transforms: Translation, Scaling, Rotation, Reflection and

Shear transformations, Homogeneous coordinates, Composite Transforms, Transformations between coordinate systems.

2-D Viewing: The Viewing Pipeline, Viewing coordinate reference frame, Window to View-Port coordinate Transformation, Cohen-Sutherland line clipping algorithms.

UNIT -III: 3-D OBJECT REPRESENTATION AND VISIBLE SURFACE DETECTION METHODS (9 Periods)

3-D Object representation: Polygon Surfaces, Quadric surfaces, Spline Representation, Hermite Curve, Bezier Curve and B-Spline Curves, Bezier and B-Spline Surfaces.

Visible Surface Detection Methods: Classification, Back-Face detection, Depth-Buffer, Scan-Line, Depth Sorting, BSP-Tree methods, Area Sub-Division and Octree methods.

UNIT-IV: INTRODUCTION TO MULTIMEDIA, AUDIO AND VIDEO (9 Periods)

Introduction: Definition of Multimedia, Multimedia and Hypermedia, Multimedia Software tools, Graphics and Image Data representations-Graphics and Image Data types, File Formats, Color models in images, Color models in video.

Audio and Video: Definition of sound, Digitization, Nyquist Theorem, Signal to Noise ratio, Signal to Quantization-Noise ratio; Types of video signals, Analog video, Digital video.

UNIT-V: MULTIMEDIA DATA COMPRESSION (9 Periods)

Lossless compression algorithms- Introduction, Basics of Information Theory, Run Length Coding, Variable Length coding, Dictionary Based coding, Arithmetic coding; Lossy Compression algorithms- Quantization; Introduction to Transform Coding-DCT, DFT; Image compression techniques-JPEG standard, JPEG 2000; Introduction to video compression- Video compression based on Motion Compensation, MPEG-1, MPEG-2.

Total Periods: 45

TEXT BOOKS:

1. Donald Hearn and M. Pauline Baker, Computer *Graphics C version,* Pearson Education, Second Edition, 2006.
2. Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia,* Pearson Education, Second Edition, 2008.

REFERENCE BOOKS:

1. James D. Foley, Andries van Dam, Steven K. Feiner and John F. Hughes, *Computer Graphics: Principles and Practice in C,* Addison Wesley Professional, Second Edition, 2013.
2. Nigel Chapman and Jenny Chapman, *Digital Multimedia,* Wiley Dreamtech, Second Edition, 2004.

III B.Tech. - I Semester
(16BT50501) COMPUTER NETWORKS

(Common to ECE, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A Course on "Operating Systems".

COURSE DESCRIPTION: Introduction to Computer Networks; The Physical Layer; The Data Link Layer; The Medium Access Control Sublayer; The Network Layer; The Transport Layer; The Application Layer.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Functionalities of Various OSI and TCP/IP layers
- 3G Mobile phone networks, 802.11
- TCP,UDP and SMTP

CO2. Analyze the issues related to data link, medium access and transport layers by using channel allocation and connection management schemes.

CO3. Design and compute subnet masks and addresses for networking requirements.

CO4. Solve problems related to Flow control, Error control, congestion control and Network Routing.

CO5. Apply Network Standards - 802.3 and 802.11 for developing computer Networks.

CO6. Assess the impact of wired and wireless Networks in the context of societal applications like VoIP, Multi-user Network Games, Internet of Things.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND PHYSICAL LAYER (9 Periods)

Introduction: Network hardware, Network software, Reference models - OSI, TCP/IP; Example networks - Internet; Wireless LANs - 802.11.

Physical Layer: Guided transmission media, Wireless transmission.

UNIT-II: DATA LINK LAYER AND MEDIUM ACCESS CONTROL SUBLAYER (10 Periods)

Data Link Layer: Data link layer design issues, Error detection and correction-CRC, Hamming codes, Elementary data link protocols, Sliding window protocols.

Medium Access Control Sublayer: ALOHA, Carrier sense multiple access protocols, Collision-free protocols, Ethernet, Data link layer switching-Repeaters, Hubs, Switches, Routers, and Gateways.

UNIT-III: NETWORK LAYER (10 Periods)

Network layer design issues, Routing algorithms - Shortest path, Flooding, Distance vector, Link state routing, Hierarchical, Broadcast, Multicast, Anycast; Congestion control algorithms, Network layer in the internet - The IP version 4 protocol, IP addresses, IP version 6, Internet control protocols.

UNIT-IV: TRANSPORT LAYER (9 Periods)

UDP - Segment header, Remote procedure call, Real-time transport protocols; TCP - service model, Protocol, Segment header, Connection establishment, Connection release, Sliding window, Timer management, Congestion control.

UNIT-V: APPLICATION LAYER (7 Periods)

Domain Name System (DNS)-Name space, Domain resource records, Name servers; Electronic mail-Architecture and services, User agent, Message formats, Message transfer, Final delivery; The World Wide Web- Architectural overview, HTTP.

Total Periods: 45

TEXT BOOK:

1. Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks,* Pearson Education, Fifth Edition, 2015.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *Data Communication and Networking,* Tata McGraw-Hill, Fourth Edition, 2010.

2. James F. Kurose and Keith W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet,* Pearson Education, Second Edition, 2012.

III B.Tech. - I Semester

(16BT51501) COMPILER DESIGN

(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Theory of Computation".

COURSE DESCRIPTION: Lexical analysis; Parsers; Run Time Environments; Syntax Directed Translation; Type checking; Code Optimization; Code Generation and Compiler tools.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on the phases involved in design of compilers.

CO2. Analyze code optimization Techniques.

CO3. Design experiments for implementing parsing techniques.

CO4. Synthesize rules in compiler to demonstrate semantic attribution during Parsing.

CO5. Use compiler construction tools such as LEX and YACC for designing a Parser.

CO6. Apply ethical principles for usage of stack and other storage memory.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO COMPILER AND LEXICAL ANALYSIS (9 Periods)

Structure of a compiler, Interpretation- Interpreters, Recursive interpreters, Iterative interpreters**.**

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Specification of Tokens, The Lexical-Analyzer Generator LEX.

UNIT-II: SYNTAX ANALYSIS (9 Periods)

The Role of the Parser, Eliminating Ambiguity, Eliminating of Left Recursion and Left Factoring.

Top-Down Parsing: Recursive descent parsing, Non Recursive Predictive parsing, LL (1) Grammars, A traditional top-down parser generator-YACC

Bottom-Up Parsing: Shift reduce parsing, LR parsers - Simple LR parser, Canonical LR parser, LALR parser, Using Ambiguous Grammars.

UNIT-III: SYNTAX DIRECTED TRANSLATION AND TYPE CHECKING (9 Periods)

Syntax directed definition, S-attributed and L-attributed definitions, Construction of syntax trees.

Type Checking: Type Expressions, Type Equivalence, Rules for Type Checking, Type Conversions, Overloading of Functions and Operators.

UNIT-IV: INTERMEDIATE CODE GENERATOR AND RUN TIME ENVIRONMENTS (9 Periods)

Preprocessing the intermediate code, Preprocessing of expressions, Preprocessing of if-statements and goto statements, Preprocessing of routines, Variants of Syntax Trees, Three Address Code, Boolean expressions, Flow-of-Control Statements, Control- Flow Translation of Boolean Expressions.

Run time Environments: Storage organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack.

UNIT-V: CODE OPTIMIZATION AND CODE GENERATION

(9 Periods)

Basic Blocks and Flow Graphs, Optimization of Basic Blocks, The principal sources of optimization, Introduction to data flow analysis.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Simple Code Generator, Peephole optimization, Register allocation and assignment.

Total Periods: 45

TEXT BOOK:

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi and Jeffrey D. Ullman, *Compilers-Principles, Techniques and Tools,* Pearson Education, Second Edition, 2012.

REFERENCE BOOKS:

1. Dick GruneKees van Reeuwijk Henri, *Modern Compiler Design,* Springer, Second Edition, 2012.

2. David Galles, *Modern Compiler Design,* Pearson Education Asia, 2007.

III B.Tech. - I Semester

(16BT51202) OBJECT ORIENTED ANALYSIS AND DESIGN

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Software Engineering" and "Object Oriented Programming through C++".

COURSE DESCRIPTION: Introduction to UML, Basic structural modeling; Advanced structural modeling, Class and object diagrams; Basic behavioral modeling; Advanced behavioral modeling; Architectural modeling.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on principles of object oriented analysis and design through UML Diagrams.

CO2. Analyze user requirements and identify suitable structural and behavioral modeling components.

CO3. Design and develop UML models for real time software applications.

CO4. Solve real world problems by applying structural and behavioral modeling techniques.

CO5. Use unified modeling language in preparing blue prints for software solutions.

CO6. Design and develop UML models to solve societal problems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO UML AND BASIC STRUCTURAL MODELING (11 Periods)

Introduction to UML: Importance of modeling, Principles of modeling, Object oriented modeling, An overview of UML, Conceptual model of the UML, Architecture, Software development life cycle.

Basic Structural Modeling: Classes-Terms and concepts, Common modeling techniques; Relationships-Modeling simple dependencies, Single inheritance and structural relationships; Common mechanisms, Diagrams.

UNIT-II: ADVANCED STRUCTURAL MODELING, CLASS AND OBJECT DIAGRAMS (7 Periods)

Advanced Structural Modeling: Advanced classes, Advanced relationships, Interfaces, Types and roles, Packages, Instances.

Class and Object Diagrams: Terms and concepts, Modeling

techniques for class diagram-Modeling simple collaboration, Logical database schema, Forward and reverse engineering; Introduction to object diagrams.

UNIT-III: BASIC BEHAVIORAL MODELING (9 Periods)

Basic Behavioral Modeling-I: Interactions-Terms and concepts, Modeling a flow of control; Interaction diagrams-Terms and concepts, Modeling flows of control by time ordering and control by organization, Forward and reverse engineering.

Basic Behavioral Modeling-II: Use cases-Terms and concepts, Modeling the behavior of the element; Use case Diagrams-Terms and concepts, Modeling the context of a system, Requirement of a system, Forward and reverse engineering; Activity Diagrams-Terms and concepts, Modeling a workflow, modeling an operation, Forward and reverse engineering.

UNIT -IV: ADVANCED BEHAVIORAL MODELING (7 Periods)

Events and signals-Modeling a family of signals, exceptions; State machines-Modeling the lifetime of an object; Introduction to processes and threads, Time and space-Modeling timing constraints, Distribution of objects and objects that migrate; State chart diagrams-Modeling reactive objects, Forward and reverse engineering.

Unit-V: ARCHITECTURAL MODELING (11 Periods)

Component-Terms and concepts, Modeling executables and libraries, Modeling tables, Files and documents, Modeling an API; Deployment-Modeling processors and devices, Modeling the distribution of components; Component diagrams-Modeling source code, Executable release, Physical database, Adaptable systems, Forward and reverse engineering; Deployment diagrams-Modeling an embedded systems, Client/Server system, Fully distributed systems, Forward and reverse engineering.

Case Studies: Online student course registration system for university, Hospital Management.

Total Periods: 45

TEXT BOOK:

1. Grady Booch, James Rumbaugh and Ivar Jacobson, *The Unified Modeling Language User Guide,* Pearson Education, Second Edition, 2009.

REFERENCE BOOKS:

1. Magnus Penker, Brian Lyons, David Fado and Hans-Erik Eriksson, *UML 2 Toolkit,* WILEY-Dreamtech India Pvt. Ltd., 2006.

2. Pascal Roques, *Modeling Software Systems Using UML2,* WILEY-Dreamtech India Pvt. Ltd, 2004.

III B.Tech. - I Semester
(16BT51203) WEB TECHNOLOGIES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Java Programming".

COURSE DESCRIPTION: Hyper Text Markup Language (HTML); Features of HTML5; Cascading Style Sheets (CSS); JavaScript; JQuery; Bootstrap; Hypertext Preprocessor (PHP); MySQL.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on web page design elements, dynamic content and database interaction.

CO2. Analyze user requirements to develop web applications.

CO3. Design client-server applications using web technologies.

CO4. Demonstrate problem solving skills to develop enterprise web applications.

CO5. Use HTML, CSS, JavaScript, JQuery, Bootstrap and PHP technologies for device independent web application development.

CO6. Apply Web Technologies to develop interactive, dynamic and scalable web applications for societal needs.

DETAILED SYLLABUS:

UNIT-I: HTML (11 Periods)

Introduction: Fundamentals of HTML, Working with text, Organizing text in HTML, Working with links and URLs, Creating tables, Working with images, Canvas, Forms, Frames and Multimedia.

HTML5: Introduction, HTML5 document structure, Creating editable content, Checking spelling mistakes, Exploring custom data attributes, Client-Side storage, Drag and drop feature, Offline web applications, Web communications, Cross-Document messaging and desktop notifications.

UNIT-II: CSS AND JAVASCRIPT (8 Periods)

CSS: Introduction, CSS selectors, Inserting CSS in an HTML document, Backgrounds, Fonts, and Text styles, Creating boxes,

Displaying, Positioning and floating elements, Features of CSS3, Media queries.

Javascript: Overview of JavaScript, JavaScript functions, Events, Image maps and animations, JavaScript objects, Working with browser and document objects.

UNIT-III: JQUERY and BOOTSTRAP (9 Peirods)

JQuery: Introduction, JQuery selectors, Events, Methods to access HTML elements and attributes, Introduction to AJAX.

Bootstrap: Getting started with Bootstrap, Creating responsive layouts using Bootstrap CSS - Basic HTML structure for Bootstrap, Responsive classes, Rendering images, the grid system, Constructing data entry forms.

UNIT-IV: INTRODUCTION TO PHP (9 Periods)

Introduction, Data types, Variables, Constants, Expressions, String interpolation, Control structures, Functions, Arrays,

Embedding PHP code in web pages, Object Oriented PHP.

UNIT-V: PHP WEB FORMS AND MYSQL (8 Periods)

PHP Web forms: PHP and web forms, Sending form data to a server, Working with cookies and session handlers

PHP with MySQL: Interacting with the database, Prepared statement, Database transactions.

Total Periods: 45

TEXT BOOKS:

1. Kogent Learning Solutions Inc, *HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery,* Dreamtech Press, Second Edition, 2016.
2. W. Jason Gilmore, B*eginning PHP and MySQL,* APress, Fourth Edition, 2011.

REFERENCE BOOKS:

1. Snig Bahumik, *Bootstrap Essentials,* PACKT Publishing, 2015 (e-book).
2. Thomas A. Powell, T*he Complete Reference: HTML and CSS,* Tata McGraw Hill, Fifth Edition, 2010.
3. Andrea Tarr, *PHP and MySQL,* Willy India, 2012.

III B.Tech. - I Semester

(16BT50341) OPTIMIZATION TECHNIQUES

(Interdisciplinary Elective-1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Multi Variable Calculus and Differential Equations".

COURSE DESCRIPTION: Introduction to optimization; classical optimization techniques; classification of optimization problems; linear programming; transportation and assignment problem; non-linear programming; un-constrained non-linear programming; constrained non-linear programming; dynamic programming.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate the knowledge on Optimization techniques for Linear, Non linear and Dynamic programming problems.

CO2. Analyze and quantify a system architecture or product design problem for selecting appropriate objective function, design variables, parameters and constraints.

CO3. Develop mathematical models for real time optimization problems.

CO4. Conduct investigations on complex problems and make recommendations based on solutions, analysis and limitations of models.

CO5. Use optimization techniques for solving complex problems of real time applications.

CO6. Optimize the resources in organizations for sustainable development.

DETAILED SYLLABUS:

UNIT -I: CLASSICAL OPTIMIZATION TECHNIQUES (9 Periods)

Introduction, Engineering applications of optimization, tatement of an optimization problem, Design vector, Design constraints, Constraint surface, Objective function, lassification of optimization problems, Single variable optimization, Multi variable optimization without constraints, Multi variable optimization with equality constraints - Lagrange multipliers method; Multi variable optimization with inequality constraint - Kuhn Tucker conditions.

UNIT -II: LINEAR PROGRAMMING (9 Periods)

Introduction, Formulation, Graphical solution, Simplex method, Big M-method, Two-phase method, Duality principle, Dual simplex method.

UNIT -III: TRANSPORTATION AND ASSIGNMENT PROBLEMS

(9 Periods)

Transportation problems: Formulation, Initial basic feasible solution - North-West corner rule, Least cost method, and Vogel's approximation method; Optimal solution using Modified distribution method - Unbalanced transportation problem, Degeneracy.

Assignment problems: Formulation, Solution of assignment problem and its variants, Traveling salesman problem.

UNIT -IV: NON-LINEAR PROGRAMMING (9 Periods)

One dimensional minimization methods, classification - Fibonacci method, quadratic interpolation method; classification of unconstrained minimization methods - Powell's method, steepest descent method (Cauchy's method); classification of constrained optimization techniques - interior and exterior penalty function methods.

UNIT -V: DYNAMIC PROGRAMMING (9 Periods)

Multistage decision processes, Concept of sub optimization and Principle of optimality, Computational procedure in dynamic programming - calculus method, Tabular method; Linear Programming problem by dynamic programming approach, Applications - reliability problem, shortest path problem, and capital budgeting problem.

Total Periods: 45

TEXT BOOKS:

1. Singiresu S Rao, *Engineering Optimization: Theory and Practice,* New Age International, Third Edition, 2010.
2. A.Ravindran, K.M.Ragsdell, G.V.Reklaitis, *Engineering Optimization: Methods and applications,* Wiley India Pvt. Ltd., Second Edition2006.

REFERENCE BOOKS:

1. C Mohan and Kusum Deep, *Optimization Techniques,* New Age International Publishers, 2010.
2. Hamdy A. Taha, *Introduction to Operations Research,* PHI, Ninth Edition, 2013.

III B.Tech. - I Semester

(16BT50442) MICROPROCESSORS AND INTERFACING

(Interdisciplinary Elective-1)
(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Digital Logic Design" and "Computer Organization".

COURSE DESCRIPTION: INTEL 8086 and 8051- Architectures; Instruction set; Programmable Interfacing Concepts; ADC, DAC, 8255, 8257,8259 ,8279,8251, Advanced peripheral Interfacing; Applications.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on

- Internal Hardware details of Intel 8086, 8051 and programming devices like 8255, 8257, 8259, 8279 and 8251.
- Interfacing various peripherals to build standalone systems.

CO2: Analyze various peripherals and interfacing techniques.

CO3: Design application based Microcomputer system using 8086 and 8051.

CO4: Solve problems by providing microcomputer-based real time solutions.

CO5: Apply programming tools, appropriate techniques and resources to complex engineering activities for microprocessor and microcontroller based systems with understanding of limitations.

C06: Solving societal problems by applying concepts of microprocessors and microcontrollers.

DETAILED SYLLABUS:

UNIT I - INTEL 8086 ARCHITECTURE AND PROGRAMMING (9 Periods)

Evolution of Microprocessors, Architecture of 8086 microprocessor, Register organization, Physical Memory

Organization, Signal description of 8086, General Bus Operation Minimum and Maximum mode operation of 8086, Timing diagram, Addressing modes.

UNIT II - ASSEMBLY LANGUAGE PROGRAMMING WITH 8086 AND INTERRUPTS (10 Periods)

Instruction set of 8086, Assembler directives and Operators; Interrupts and Interrupt service routines, Interrupt Cycle of 8086, Non Maskable interrupt, Maskable interrupt (INTR), Interrupt Programming, Passing Parameters to procedures, MACROS.

UNIT III-BASIC PERIPHERALS AND THEIR INTERFACING WITH 8086 (8 Periods)

Semiconductor memory Interfacing, Dynamic RAM interfacing, Interfacing I/O ports, Programmable Input-Output Port (PIO) 8255, Modes of operations of 8255, Interfacing analog to digital and digital to analog converters, stepper motor interfacing.

UNIT IV - SPECIAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES (9 Periods)

Programmable Interrupt Controller 8259A; The keyboard/Display Controller 8279-Architecture, Signal Description, Modes of operations; Programmable Communication Interface 8251 USART; DMA Controller 8257, DMA Transfers and Operations.

UNIT V - INTRODUCTION TO 8051 MICROCONTROLLER

(9 Periods)

Microprocessors Vs Microcontrollers, The 8051 Architecture: Introduction, 8051 Microcontroller Hardware, input/output pins, Ports and circuits, External Memory, Counters and Timers, Serial Data Input / Output, Interrupts; Addressing Modes, Instruction set of 8051, simple programs on arithmetic operations using 8051.

Total Periods: 45

TEXT BOOKS:

1. A.K. Ray and K.M.Bhurchandi, *Advanced Microprocessors and Peripherals- Architecture, Programming and Interfacing,* TMH, 2002.
2. Kenneth J. Ayala, *The 8051 Microcontroller-Architecture, Programming and Applications,* Third Edition, Cengage learning, 2004.

REFERENCE BOOKS:

1. Douglas V.Hall, *Microprocessors and Interfacing: Programming and Hardware,* Revised Second Edition, TMH.
2. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086/8088 Family Architecture, Programming and Design, P*HI, 2006.
3. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems,* PHI, 2000.

III B.Tech. - I Semester

(16BT60404) IMAGE PROCESSING

(Interdisciplinary Elective-1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Fundamentals of image processing; Image transforms; Image enhancement techniques in spatial and frequency domains; Restoration techniques; Image segmentation techniques; Image compression techniques.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on
- Image Fundamentals
- Image Enhancement and Restoration Techniques
- Image Segmentation and Compression Techniques
- Color image processing

CO2. Analyze different images using various processing techniques.

CO3. Design and Develop various image processing algorithms to process the images in various Real Time Applications.

CO4. Solve problems related to images for feasible and optimal solutions in the core area of Image Processing.

CO5. Apply appropriate techniques to complex engineering activities in the field of image processing.

CO6. Understand the impact of the image processing for societal needs.

DETAILED SYLLABUS:

UNIT-I: IMAGE FUNDAMENTALS (10 Periods)

Fundamental steps in Image Processing, Image sampling and quantization, some basic relationships between pixels, Arithmetic operations, Logical operations, Spatial operations.

IMAGE TRANSFORMS: 2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar-Transform, Slant Transform, Hotelling Transform.

UNIT-II: IMAGE ENHANCEMENT (11 Periods)

Basic Intensity transformation functions, Histogram processing, Fundamentals of Spatial Filtering, Smoothing spatial filters, Sharpening spatial filters, Combining spatial Enhancement methods.

Basics of filtering in frequency domain, Correspondence between filtering in the spatial and frequency domains, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Homomorphic filtering.

UNIT-III: IMAGE RESTORATION (7 Periods)

Image degradation/Restoration model, Noise models, Restoration in the presence of Noise only-spatial filtering - mean, order-statistic and adaptive filters. Estimating the degradation function, Inverse filtering, Weiner filtering, Constrained least squares filtering.

UNIT-IV: IMAGE COMPRESSION (8 Periods)

Classification of redundancy in Images, Image Compression models, Run length coding, Arithmetic coding, Dictionary based compression, bit-plane coding, Transform based coding, Fidelity Criteria, Image compression standards.

UNIT-V: IMAGE SEGMENTATION AND COLOR IMAGE PROCESSING (9 Periods)

Detection of discontinuities- Point, line and edge Detection. Thresholding- global thresholding, adaptive thresholding. Region based Segmentation. Color image fundamentals - RGB, HSI models, conversions, Pseudo Color Image Processing, Color transformations.

Total Periods: 45

TEXT BOOKS:

1. Rafael C. Gonzalez and Richard E. Woods, *Digital Image Processing,* Pearson Education, Third Edition, 2008
2. S.Sridhar, *Digital Image Processing,* Oxford University, Second Edition, 2016

REFERENCE BOOKS:

1. William K. Pratt, *Digital Image Processing,* John Wiley and Sons, Third Edition, 2002.
2. Anil K.Jain, *Fundamentals of Digital Image processing,* Prentice Hall, 2007.

III B.Tech. - I Semester

(16BT60503) WIRELESS NETWORKS

(Interdisciplinary Elective-1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Networks".

COURSE DESCRIPTION: Generations of Wireless Networks; Voice and Data Processing; Wireless Network Topology; GSM; TDMA; CDMA; Wireless LANs; Wireless WANs; Wireless PAN.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on
- Wireless Medium Access methods.
- Network Topology
- Wireless LAN, HIPERLAN
- GSM, CDMA, GPRS

CO2. Analyze the network topologies in Wireless Networks.

CO3. Design solutions for network communications at physical and transport layers.

CO4. Solve complex problems related to network communications and wireless networks.

CO5. Apply GSM, CDMA, GPRS and Bluetooth to create Home Access Networks and wireless Personal Area Network.

CO6. Apply contextual knowledge to solve problems using societal applications like health care devices, Internet of Things.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF WIRELESS NETWORKS AND WIRELESS MEDIUM ACCESS ALTERNATIVES (9 Periods)

Overview of Wireless Networks: Different generations of wireless networks.

Wireless Medium Access Alternatives: Fixed assignment access for voice-oriented networks - Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA); Random access for data-oriented networks - Access methods for wireless LANs; Integration of voice and data traffic.

UNIT-II: NETWORK PLANNING AND WIRELESS NETWORK OPERATIONS (9 Periods)

Network Planning: Wireless network topologies - Infrastructure

of network topology, Ad hoc network topology; Cellular topology, Cellular concept, Cellular hierarchy; Cell fundamentals.

Wireless Network Operations: Mobility management - Location management, Handoff management, Mobile IP; Security in wireless networks - Security requirements for wireless networks, Overview of network security, Identification schemes.

UNIT-III: INTRODUCTION TO WIRELESS LANS AND IEEE 802.11 Wireless LANS (9 Periods)

Introduction to Wireless LANs: Historical overview of the LAN industry, Wireless home networking-Home Access Networks (HAN), Needs of HAN, HAN technologies**.**

IEEE 802.11 WLANs: IEEE 802.11 - Overview of IEEE 802.11, Reference architecture, Layered protocol architecture; The PHY Layer - FHSS, DSSS, DFIR, IEEE 802.11a, IEEE 802.11b; MAC sublayer - General MAC frame format; MAC management sublayer - Registration, Handoff, Security.

UNIT-IV: GSM TECHNOLOGY, CDMA TECHNOLOGY AND MOBILE DATA NETWORKS (10 Periods)

GSM Technology: GSM - Reference architecture; Mechanisms to support a mobile environment - Registration, Call establishment, Handoff, Security.

CDMA Technology: CDMA - IS-95 CDMA forward channel, IS-95 CDMA reverse channel, Packet and frame formats in IS-95.

Mobile Data Networks: GPRS - Reference architecture in GPRS, Mobility support in GPRS, Protocol layers in GPRS; SMS - Overview of SMS Operation; Mobile application protocols - Wireless application protocol, i-Mode.

UNIT-V: WIRELESS ATM, HIPERLAN AND WIRELESS PAN (8 Periods)

Wireless ATM and HIPERLAN: Wireless ATM - Reference model, Protocol entities, PHY and MAC layer alternatives, Mobility support; HIPERLAN - HIPERLAN-1, Requirements and architecture,

PHY and MAC layers; HIPERLAN-2 - Architecture and reference model, PHY layer, DLC layer, Convergence layer, Security, Overall comparison with 802.11.

Wireless PAN: IEEE 802-15 WPAN, Home RF - Architecture; Bluetooth - Overall architecture, Protocol stack, Physical connection, Security.

Total Periods: 45

TEXT BOOK:

1. Kaveh Pahlavan and Prashant Krishna Murthy, *Principles of Wireless Networks,* PHI Learning Pvt. Ltd., 2009.

REFERENCE BOOKS:

1. William Stallings, *Wireless Communications and Networks,* Pearson Education, Second Edition, 2012.

2. C. Sivaram Murthy and B.S. Manoj, A*d-hoc Wireless Networks Architectures and Protocols,* Pearson Education, Second Edition, 2007.

III B.Tech. - I Semester

(16BT51231) CASE TOOLS AND COMPUTER NETWORKS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: Courses on "Object Oriented Analysis and Design", "Computer Networks" and "Java Programming".

COURSE DESCRIPTION: Modeling case studies -Online Ticket Reservation system; Point of sales; Hands-on Experience on data link Framing methods; CRC; Routing algorithms; Congestion Control Algorithms; Substitution Techniques and Network Simulation using NS-2.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- UML architecture
- Routing algorithms
- Error detection and correction techniques.

CO2. Analyze real world problems and study the applicability of UML design.

CO3. Apply Unified Modeling Language to design software and design routing algorithms Shortest path using Dijkstra's, and Distance vector.

CO4. Demonstrate independent problem solving skills in designing and developing software solutions.

CO5. Use NS-2 tool for simulating computer network processes.

CO6. Build network models and UML models suitable for societal needs.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

CO8. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXERCISES:

Case studies given below should be Modeled using Visual Modeling tools in different views i.e. Use case view, logical view, component view, Deployment view.

1. Case Study : Online Ticket Reservation for Railways

Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized

so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

2. Case Study : A Point of Sale (PoS) System

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client - side terminals and interfaces such as browser, PDA's, touch - screens.

3. Case Study : Recruitment Procedure for Software Industry

Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company. The technical skill and the experience of the candidates are reviewed and the short listed candidates are called for the interview. There may be different rounds for interview like the written test, technical interview, and HR interview. After the successful completion of all rounds of interview, the selected candidates' names are displayed. Meanwhile HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

4. Case Study : Online Auction Sales

Problem Statement:

The online auction system is a design about a website where sellers collect and prepare a list of items they want to sell and place it on the website for visualizing. To accomplish this purpose the user has to access the site. Incase it's a new user he has to register. Purchaser's login and select items they want to buy and keep bidding for it. Interacting with the purchasers and sellers through messages does this. There is no need for customer to interact with the sellers because every time the purchasers bid, the details will be updated in the database. The purchaser making the highest bid for an item before the close of the auction is declared as the owner of the item. If the auctioneer or the purchaser doesn't want to bid for the product then there is fixed cutoff price mentioned for every product. He can pay that amount directly and own the product. The purchaser gets a confirmation of his purchase as an acknowledgement from the website. After the transition by going back to the main menu where he can view other items.

5. Case Study : Two Floor Elevator Simulator

Problem Statement:

The elevator has the basic function that all elevator systems have, such as moving up and down, open and close doors, and of course, pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to MaxFloor, where the first floor is the lobby. There are car call buttons in the car corresponding to each floor. For every floor except for the top floor and the lobby, there are two hall call buttons for the passengers to call for going up and down. There is only one down hall call button at the top floor and one up hall call button in the lobby. When the car stops at a floor, the doors are opened

and the car lantern indicating the current direction the car is going is illuminated so that the passengers can get to know the current moving direction of the car. The car moves fast between floors, but it should be able to slow down early enough to stop at a desired floor. When an elevator has no requests, it remains at its current floor with its doors closed.

In order to certificate system safety, emergency brake will be triggered and the car will be forced to stop under any unsafe conditions.

6. Case Study : Home Appliance Control System

Problem Statement:

A home appliance control system (HACS) is a system which provides various services to remotely operate on home appliances, such as microwave oven, TV, and garage door etc through remote devices such as mobile phone, desktop and palm-top. A home appliance control system (HACS) is a system

which is controlled by a remote system such as a mobile phone or a palm-top, and at the same time controls, monitors and coordinates home appliances such as air conditioner, microwave oven, garage doors, TV set, VCR, audio controller, indoor/outdoor lights, water sprinkler, home security system, bath tub controller, etc. In order to activate home appliances and to allow for different ways of cooking, the HACS needs mechanisms for communication between the different devices in the system, and for coordination among the various processes running on such devices. The system administrator of the HACS system has the ability to add a new appliance or delete an existing one. The system administrator has the ability to add a new remote device and configure it with HACS or delete an existing one when it is not used. Also the system administrator can create an account for a new user or delete existing account if it is no longer used.

7. Implement the following data link layer framing methods:

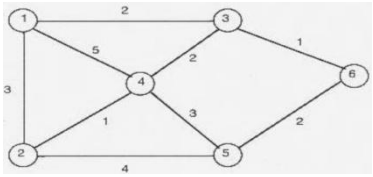
a. Character Count.

b. Character stuffing.

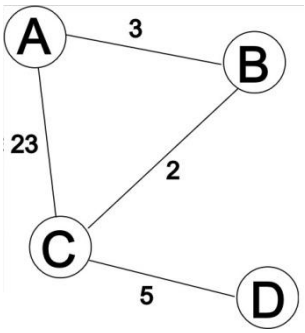
c. Bit stuffing.

8. Design a program to compute checksum for the given frame 1101011011 with the generator Polynomial of CRC 12, CRC 16 and CRC CCIP. Display the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receivers end.

9. Implement Dijkstra's algorithm to compute the Shortest path through the following graph.



10. Design a program to obtain routing table for each node using distance vector routing algorithm by considering the given subnet with weights indicating delay between nodes.



11. Write a java program to implement RPC (remote procedure call).
12. a. Explain the Installation procedure of NS-2 on Windows using VMware.

    b. Creation of Link between nodes and transmission of data between nodes using NS-2.
13. Mini project-1:Implement Dijkstra's algorithm to compute the Shortest path using NS-2.
14. Mini project-2: A program to obtain Routing table for each node using Distance vector routing Algorithm using NS-2.

REFERENCE BOOKS:

1. Grady Booch, James Rum Baugh and Ivar Jacobson, *The Unified Modeling Language User Guide,* Pearson Education, Second Edition, 2009.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons and David Fado, *UML 2 Toolkit,* WILEY-Dreamtech India Pvt. Ltd., 2003.
3. Andrew S.Tanenbaum and David J.Wetherall, *Computer Networks,* Pearson Education, Fifth Edition, 2012.
4. Behrouz A. Forouzan, D*ata communication and Networking,* Tata McGraw-Hill, Fourth Edition, 2006.

III B.Tech. - I Semester

(16BT51232) COMPUTER GRAPHICS AND MULTIMEDIA LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: Courses on "Computer Graphics and Multimedia" and "Java Programming".

COURSE DESCRIPTION: Hands on experience in developing graphics, Animating Flash Movies and Developing Applications using a Flash Tool.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on creation of 2D, 3D objects and compression techniques.

CO2. Analyze real world problems and identify solutions based on computer graphics and multimedia concepts.

CO3. Design and develop various algorithms for graphics, user authoring applications and animation movies.

CO4. Demonstrate independent problem solving in developing multimedia applications.

CO5. Apply various programming principles to implement graphics and to animate interactive flash movies for presenting multimedia content.

CO6. Build multimedia applications suitable for societal requirements.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

CO8. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXERCISES:

1. Write a program for the implementation of Bresenham's line drawing algorithm.
2. Write a program to implement Bresenham's circle drawing algorithm.
3. Write a program to implement Bresenham's ellipse drawing algorithm.

4. Write a program to implement DDA line drawing algorithm.
5. Write a program to implement 2D Transformation.
6. Write a program to implement Window Viewport Mapping.
7. Write a program to implement Cohen-Sutherland 2D Clipping.
8. Write a program to convert between color models.
9. Write a program to implement text compression algorithm
10. Write a program to implement image compression algorithm
11. Case study1: Create an animation using flash tool.
12. Case study2: Apply basic operations on image using Adobe Photoshop.

Note: 1 to 10 programs can be implemented using C

REFERENCE BOOKS:

1. Herbert Schildt, *Java the complete reference,* TMH, Seventh Edition, 2007.
2. Macromedia Flash8 tutorial, http://www.teacherclick.com/flash8.
3. Donald Hearn and M. Pauline Baker, *Computer Graphics C version,* Prentice-Hall, Second Edition, 2006.

III B.Tech. - I Semester

(16BT51233) WEB TECHNOLOGIES LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Web Technologies".

COURSE DESCRIPTION: Hands-on experience on HTML, HTML5, CSS, JavaScript, JQuery, Bootstrap, PHP and MySQL.

COURSE OUTCOMES:

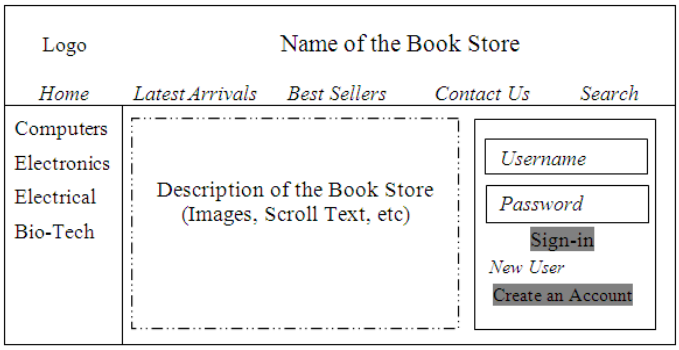
On Successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on web page design elements, dynamic content and database Interaction.
CO2. Analyze user requirements to develop web applications.
CO3. Design client-server applications using webtechnologies.
CO4. Demonstrate problem solving skills to develop enterprise web applications.
CO5. Use HTML, CSS, JavaScript, JQuery, Bootstrap and PHP technologies for device independent web application development.
CO6. Apply web technologies to develop interactive, dynamic and scalable web applications forsocietal needs.
CO7. Work effectively as an individual and as a member in team for mini-project implementation.
CO8. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OFEXERCISES:

1. Design the following static web pages of an online book store web application.

a. Home Page:

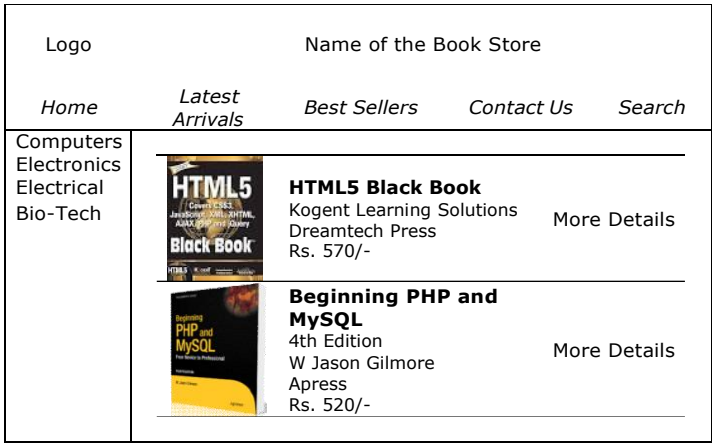


b. Catalogue Page:

The catalogue page should display the following details of available books.

i. Snap shot of cover page ii. Title of the text book

iii. Author name
iv. Publisher
v. Price
vi. More details link.



c. Registration Page:

Design the Registration page with the following fields and navigate it with create an account link.

i. First Name
ii. Last Name
iii. Gender
iv. Date of Birth
v. Username
vi. Password
vii. Confirm Password
viii. Address
ix. Postal Code
x. Mobile No.
xi. Email-Id

2. a. Design a web page to store username and password information using the local storage concept.

   b. Design a web page to store employee information including Name, Emp. Id, Department, Salary and Address on a client's machine using a real SQL database.

3. Apply the following styles to all web pages of online book store web application.

   a. Fonts and Styles: font-family, font-style, font-weight and font-size.

   b. Backgrounds and colors: color, background-color, background-image and background-repeat.

   c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align

   d. Borders: border, border-width, border-color and border-style

   e. Styles for links: A: link, A: visited, A:active, A:hover

   f. Selectors, Classes, Layers and Positioning elements.

4. Write a JavaScript/JQuery code to validate the following fields of the Registration web page.

a. First Name/Last Name - should contain only alphabets and the length should not be less than 8 characters.

b. Username - It should contain combination of alphabets, numbers and underscore. It should not allow spaces and special symbols.

c. Password - It should not less than 8 characters in length and it contains one uppercase letter and one special symbol.

d. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.

e. Postal Code: It must allow only 6 digit valid number.

f. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.

g. e-mail id - It should allow the mail id with the following format: Ex. mailid@domainname.com

5. Design a web page with the following features using HTML5, JavaScript and JQuery

   a. Displaying of images with Custom animated effects

   b. Playing of selected video from the list of videos

   c. Showing the animated text in increasing and decreasing font size

   d. Changing the size of the area in a web page using DIV tag

   e. Hiding and Showing elements in a web page.

6. Design a web page with the following features using Bootstrap and Media Query.

   a. Components

   b. Responsive tables

c. Responsive images and videos

7. a. Deploy and navigate web pages of online book store using WAMP/XAMPP web server.

b. Write a PHP program to read user name and favorite color from the HTML form. Display the name of the user in green color and sets user favorite color as a background for the web page.

8. Write a PHP code to read the username and password entered in the Login form of the online book store and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.

9. Write a PHP code to read user details entered through the registration web page and store the same into MySQL database.

10. Write a PHP code for storing books details like Name of the book, author, publisher, edition, price, etc into MySQL database. Embed a PHP code in catalogue page of the online book store to extract books details from the database.
11. a. Mini Project - 1: Design a web application for selling products online with the following features.

Mobile website option - The online store should be built on a responsive design template and its features need to be available to all users, at any time, from anywhere and in any device.

Image options - The photos should also be taken from different points of view to give you a clearer idea of the product. Image options should include viewing angles, zoom, multiple images, and more.

Detailed product description - The description should often include the important details, such as the expiration date, size dimensions, weight, manufacturers date, and practical uses must be included in a good product description.

Order Tracking - The customers should be able to track their ordered products by logging into an account created upon registration.

Payment Options - An online website should allow credit card/ debit card/net banking for payment.

b. Mini Project - 2: Design a social website with the following features

Build Profile - Members allow to build their profiles.

Upload content - The Social Networking Sites allow members to upload text messages, photographs, audio and video files. All posts are arranged in descending order with the last post coming first.

Build conversations - Content posted by members can be browsed and commented upon by all members who form part of the community. Content can also be tagged from third party sites on subjects that interest the group.

REFERENCE BOOKS:

1. Kogent Learning Solutions Inc, *HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery,* Dreamtech Press, Second Edition, 2016.
2. W. Jason Gilmore, *Beginning PHP and MySQL,* APress, Fourth Edition, 2011.
3. Snig Bahumik, *Bootstrap Essentials,* PACKT Publishing, 2015. (e-book).

III B.Tech. - II Semester

(16BT3HS02) MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY

(Common to ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Production Functions; Markets and Pricing Policies; Basic concepts of Accounting (Journal, Ledger and Trial balance); Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Acquire knowledge on:

- Tools and concepts of Micro Economics.
- Basic Principles and concepts of Accountancy.
- Provides life skills for effective utilization of scarce resources.
- Financial Accounting.
- Significance of Economics and Accountancy

CO2. Develop skills in managerial decision making of an organization.

CO3. Apply the Economic theories i.e., Demand, Production, Cost, Markets and Price.

CO4. Develop effective communication in Business and Accounting transactions.

CO5. Ascertain the profitability and soundness of an organization.

CO6. Practice Financial Accounting.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND ANALYSIS (9 Periods)

Definition, Nature and Scope of Managerial Economics. Demand: Determinants of demand - Demand function - Law of demand,

assumptions and exceptions - Elasticity of demand - Types of elasticity of demand - Demand forecasting and methods of demand forecasting.

UNIT - II: THEORY OF PRODUCTION AND COST ANALYSIS (9 Periods)

Production Function: Isoquants and Isocosts - Input-output relationship - Law of returns. Cost Concepts: Total, Average and Marginal Cost - Fixed vs. Variable costs - Opportunity Costs Vs Outlay Costs- Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs- Avoidable Costs Vs Unavoidable Costs - Break Even Analysis (BEA) - Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT - III: INTRODUCTION TO MARKETS AND PRICING (9 Periods)

Market Structure: Types of Markets - Features of perfect competition - Monopoly and monopolistic competition - Price and Output determination in perfect competition, monopoly and monopolistic Markets.

Pricing : Objectives and policies of pricing - Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - penetration Pricing -skimming Pricing - Block pricing - Peak load pricing - Cross subsidization.

UNIT - IV: INTRODUCTION TO PRINCIPLES OF ACCOUNTING AND CAPITAL (9 Periods)

Accountancy: Introduction - Concepts - Conventions - Double Entry Book Keeping - Journal -

Ledger - Trial Balance (Simple problems).

Capital : Significance - Types of capital - Sources of Capital.

UNIT - V: FINAL ACCOUNTS - COMPUTERIZATION OF ACCOUNTING SYSTEM (9 Periods)

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems).

Computerization of Accounting System: Manual Accounting Vs Computerized Accounting - Advantages and Disadvantages of Computerized Accounting.

Total Periods: 45

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis,* Tata Mc- Graw Hill, New Delhi, Third Edition, 2007.

2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, *Managerial Economics,* S. Chand and Company, New Delhi, Second Edition, 2010.

REFERENCE BOOKS:

1. Varshaney and Maheswari, *Managerial Economics,* Sultan

Chand and Sons, New Delhi, Nineteenth Edition, 2005.

2. Ms. Samba Lalita, *Computer Accounting Lab Work,* Kalyani Publishers, Ludhiana, 2009.
3. S.P. Jain and K.L. Narang, *Financial Accounting,* Kalyani Publishers, Ludhiana, Sixth Edition, 2002.

III B.Tech. - II Semester

(16BT61501) DATA WAREHOUSING AND DATA MINING

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Database Management Systems".

COURSE DESCRIPTION: Data Mining Fundamentals; Data Preprocessing; Operational Database Systems and Data Warehouses; Mining Frequent Patterns; Classification and Prediction; Clustering; New Trends and Research Frontiers.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate Concepts of knowledge in data warehousing and data mining.

CO2. Analyze using data mining techniques to find useful and potential Knowledge.

CO3. Design Data Warehouse for OLAP applications for deployment.

CO4. Evaluate the usage of association mining techniques on complex data objects.

CO5. Select appropriate techniques to measure the interesting patterns from heterogeneous databases.

CO6. Apply appropriate evolutionary data mining algorithms to find solutions of Real time Applications.

DETAILED SYLLABUS:

UNIT I: DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING (9 Periods)

Data Warehouse, Operational Database Systems versus Data Warehouses, A Multi tired Architecture, A Multidimensional Data Model, Stars, Snowflakes and Fact Constellations: Schemas, Role of Concept hierarchies, Measures, OLAP Operations, From online Analytical processing to Multidimensional Data Mining, Indexing OLAP Data.

UNIT II: DATA MINING AND DATA PREPROCESSING (8 Periods)

Introduction to Data Mining, kinds of data, kinds of patterns, major issues in Data Mining, Data Pre-processing, Data Cleaning,

Data Integration , Data Reduction, Data Transformation and Discretization.

UNIT III: ASSOCIATIONS AND CLASSIFICATION

(10 Periods)

Basic Concepts , Frequent itemset Mining Methods, pattern evaluation methods- From Association Mining to Correlation Analysis ,Classification, Decision Tree Introduction, Bayesian Classification Methods, Rule Based Classification, Prediction: Linear Regression.

UNIT IV:CLUSTER ANALYSIS (9 Periods)

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods -k-Means and K-Medoids , Hierarchical methods-Agglomerative and divisive method, Density-Based Method-DBSCAN, Grid-Based Method-STING, Outlier Analysis.

UNIT V: DATA MINING TRENDS (9 Periods)

Mining Complex Data Types: Mining sequence data, Mining other kinds of data: Spatial, Text, Multimedia and Web data, Data Mining Trends.

Total Periods: 45

TEXT BOOK:

1. Jiawei Han, Micheline Kamber and Jian Pei, *Data Mining: Concepts and Techniques,* Elsevier, Third Edition, 2013.

REFERENCE BOOKS:

1. K.P. Soman, Shyam Diwakar and V. Ajay, *Insight into Data mining Theory and Practice,* Easter Economy Edition, Prentice Hall of India, 2006.
2. G. K. Gupta, *Introduction to Data Mining with Case Studies,* Easter Economy Edition, Prentice Hall of India, 2006.
3. Tan P.N, Steinbach M.and Kumar V., I*ntroduction to Data Mining,* Addision-Weseley, 2006.

III B.Tech. - II Semester

(16BT61201) CLOUD COMPUTING

(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Computer Networks" and "Operating Systems".

COURSE DESCRIPTION: Virtualization, Virtualization Technologies; Cloud Computing Fundamentals, Deployment Models; Cloud Computing Architecture; Cloud Computing Mechanisms; Cloud Security, Cloud Disaster Recovery; Working with Clouds; and Case Studies.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on services, architecture, types of infrastructural models, disaster recovery and virtualization.

CO2. Analyze the issues in cloud computing Data, Network and Host security.

CO3. Apply API development skills in web applications for Cloud deployment.

CO4. Use research based knowledge to build cloud applications.

CO5. Use advanced programming languages to access cloud services.

CO6. Build cloud environment suitable for societal requirements.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO VIRTUALIZATION AND TECHNOLOGIES (9 periods)

Introduction to Virtualization: Definition, Objectives, Characteristics, Benefits of virtualization, Taxonomy of virtualization technologies, Pros and cons of virtualization.

Virtualization Technologies: VMware, Hyper-V, Zen and virtual iron.

UNIT II: FUNDAMENTAL CLOUD COMPUTING AND MODELS (9 Periods)

Cloud Computing: Origin and influences, Basic concepts and terminology, Goals and benefits, Risks and challenges.

Cloud Models: Roles and boundaries, Cloud characteristics,

Cloud delivery models, Cloud deployment models.

UNIT III: CLOUD COMPUTING MECHANISMS AND ARCHITECTURE (9 Periods)

Cloud-Enabling Technology: Broadband networks and internet architecture, Data center technology, Virtualization technology, Web technology, Multitenant technology, Service technology.

Cloud Architectures: Architecture - Workload distribution, Resource pooling, Dynamic scalability, Elastic resource capacity, Service load balancing, Cloud bursting, Elastic disk provisioning, Redundant storage.

UNIT IV: CLOUD SECURITY AND DISASTER RECOVERY

(9 Periods)

Cloud Security: Data, Network and host security, Cloud security services and cloud security possible solutions.

Cloud Disaster Recovery: Disaster recovery planning, Disasters in the cloud, Disaster management, Capacity planning and cloud scale.

UNIT V: CLOUD CASE STUDIES (9 Periods)

Case Studies: Software-as-a-Service (SaaS) - Salesforce.com, Facebook; Platform-as-a-Service (PaaS) - Google App Engine, MS-Azure and IBM Bluemix; Infrastructure-as-a- Service (IaaS) - Amazon EC2, Amazon S3 and Netflix.

Total Periods: 45

TEXT BOOKS:

1. Thomas Erl and RicardoPuttini, *Cloud Computing- Concepts, Technology and Architecture,* Pearson, 2013.
2. Ivanka Menken and Gerard Blokdijk, *Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book,* Lightning Source, 2009.

REFERENCE BOOKS:

1. Barrie Sosinsky, *Cloud Computing Bible,* Wiley India Pvt Ltd, 2011.
2. Rajkumar Buyya, James Broberg and Andrzej Goscinski, *Cloud Computing Principles and Paradigms,* John Wiley and Sons, 2011.
3. John W. Rittinghouse and James F. Ransome, *Cloud Computing Implementation, Management and Security,* CRC Press, Taylor and Francis Group, 2010.

III B.Tech. - II Semester

(16BT60441) PATTERN RECOGNITION

(Interdisciplinary Elective-2)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Importance of pattern recognition; Baye's Decision Theory; Linear and non linear classifiers; Feature selection based on statistical hypothesis testing; Feature Generation; KL Transform; SVD; ICA; Clustering of features and clustering algorithms.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Apply the knowledge of engineering fundamentals on:
- Classifying the features and patterns.
- Feature selection and generation.
- Clustering patterns of objects.

CO2. Analyze numerical and analytical problems of features and patterns of object using pattern recognition algorithms.

CO3. Design and develop algorithms to optimize classification of patterns, feature selection and generation and clustering of objects.

CO4. Interpretation and synthesis the features of objects to validate the performances of pattern recognition algorithms.

CO5. Apply appropriate techniques and algorithms to identify patters of objects with an understanding of limitations.

CO6. Use pattern recognition techniques for societal needs.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO PATTERN RECOGNITION **(10 Periods)**

Importance of pattern recognition, Features, Feature Vectors and Classifiers, Supervised, Unsupervised and Semi Supervised Learning, Classifiers based on Baye's Decision Theory - Baye's decision theory, Discriminant Functions and decision surfaces, Bayesian classification for Normal Distributions, Estimation of Unknown probability density functions, The Nearest Neighbor Rule.

UNIT - II: LINEAR CLASSIFIERS **(9 Periods)**

Linear Discriminant functions and Decision Hyperplanes, The perceptron Algorithm, Least Squares Method- Mean Square Error Estimation, Stochastic Approximation and the LMS Algorithm, Sum of Error Squares Estimation Least Squares Method; Mean Square Estimation Revisited- Mean Square Error Regression; Support Vector Machine- Separable classes, Nonseparable classes.

UNIT - III: NON LINEAR CLASSIFIERS (9 Periods)

The XOR problem, The two layer perceptron, Three layer perceptrons, The Back propagation Algorithm, The cost function choice, choice of the network size, A simulation example, Networks with weight sharing, generalized linear classifiers, polynomial classifiers, Radial basis Function Networks.

UNIT - IV: FEATURE SELECTION AND GENERATION (9 Periods)

Feature Selection- Pre processing, The peaking phenomenon, Feature selection based on statistical hypothesis testing, ROC curve, class separability measures, feature subset selection; Feature Generation - Basis Vectors and Images, The KL Transform, The Singular Value Decomposition, Independent Component Analysis, Non negative Matrix Factorization, Regional features, Features for shape and size characterization.

UNIT-V: CLUSTERING (8 Periods)

Introduction, Types of Features, Definitions of Clustering, Proximity Measures-Proximity Measures between Two Points, Proximity Functions between a Point and a Set, Proximity Functions between Two Sets; Categories of Clustering Algorithms, Sequential Clustering Algorithms, A Modification of BSAS, A Two-Threshold Sequential Scheme Refinement Stages

Total Periods: 45

TEXT BOOK:

1. Sergios Theodoridis, Konstantinos Koutroumbas, *Pattern Recognition,* Academic Press, Second Edition, 2009.

REFERENCE BOOKS:

1. Richard Duda, Peter E Hart, David G Stork, *Pattern Classification,* John Wiley and Sons, Second Edition, 2001.
2. Christopher M.Bishop, *Pattern Recognition and Machine Learning,* Springer Publications 2006.

III B.Tech. - II Semester

(16BT70402) EMBEDDED SYSTEMS

(Interdisciplinary Elective - 2)
(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Digital Logic Design" and "Computer Organization".

COURSE DESCRIPTION: Embedded system design approaches; MSP430 Architecture; Instruction Set; On-Chip Resources; Programming; Communication with peripherals; Internet of Things related Issues.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Apply knowledge on:
- MSP430 Architecture, Pin out, Instruction set
- High level programming
- Usage of On-chip resources like ADC, DAC, Timers
- Internet of Things related issues

CO2. Analyze various designing issues regarding:
- Usage of on chip resources
- Low power modes
- Communication support

CO3. Design embedded systems using MSP430 series microcontrollers to suit market requirements.

CO4. Solve engineering problems and arrive at solutions in designing embedded systems to support interconnectivity.

CO5. Apply techniques, program skills, On-Chip resources to design networked embedded systems with an understanding of limitations.

CO6. Reason out and practice professional engineering to deliver efficient and cost effective embedded based products to society.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO EMBEDDED SYSTEMS **(9 Periods)**

Embedded Systems - Definition, Approaches, Applications,

Anatomy of microcontroller, Memory, Software; MSP430 Introduction- Pin out, Functional Block diagram, Memory, CPU, Memory mapped input and output, Clock generator; Exceptions- Interrupts and Resets.

UNIT - II: ARCHITECTURE OF MSP430 (9 Periods)

CPU, Addressing Modes, Constant Generator and Emulated Instructions, Instruction Set, Example programs, Reflections on CPU and Instruction set, Resets, Clock System.

UNIT - III: FUNDAMENTALS FOR PROGRAMMING (9 Periods)

Development Environment, C Programming Language, Assembly Language, Programming and Debugging, Sample programs- Light LEDs in C, Read input from a switch; Automatic Control-Flashing light by delay, use of subroutines, using Timer_A; Header files and issues, Functions, Interrupts and Low power modes.

UNIT - IV: TIMERS, MIXED SIGNAL SYSTEMS AND COMMUNICATION (9 Periods)

Timers - Watchdog Timer, RTC, Measurement in capture mode; Mixed-Signal Systems- Comparator_A, ADC10 Architecture and operation, ADC12, Sigma-Delta ADC Architecture and operation, DAC; Communication- Communication Peripherals in MSP430, SPI, Inter-integrated Circuit Bus, Asynchronous communication with the USCI_A.

UNIT - V: HARDWARE SOFTWARE CO-DESIGN AND INTERNET OF THINGS (9 Periods)

CO- Design Issues: Co-design Models, Architectures, Languages, a Generic Co-design Methodology**.**

IOT: Introduction, Origins, Drivers and Applications, IoT

Communication Models - Device to Device, Device to Cloud, Device to Gateway, Back end Data Sharing Model; IPV6 and IOTs', IOT Issues, Security Issues-challenges; Privacy Considerations, Interoperability/Standards.

Total Periods: 45

TEXT BOOKS:

1. John H. Davies, *MSP430 Microcontroller Basics,* Newnes Publications, 2008.
2. Karen Rose, Scott Eldridge, Lyman Chapin, T*he Internet of*

Things: An Overview: Understanding the Issues and Challenges of a More Connected World, Internet Society, Oct. 2015.

3. Jorgen Staunstrup, Wayne Wolf, *Hardware / Software co-design Principles and Practice,* Springer, 2009.

REFERENCE BOOKS:

1. Chris Nagy, *Embedded Systems Design using the TI MSP30 Series,* Newnes Publications, 2003.

III B.Tech. - II Semester

(16BT60502) SOFT COMPUTING

(Interdisciplinary Elective - 2)
(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Concepts on Soft Computing Techniques; Artificial Neural Networks; Supervised Learning; Unsupervised Learning; Fuzzy logic; Genetic Algorithms.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Artificial Neural Networks
- Supervised Learning Networks
- Unsupervised Learning Networks
- Fuzzy sets, relations and measures
- Genetic Operators

CO2. Analyze neural network architectures, Fuzzy systems and Genetic algorithms.

CO3. Design soft computing solutions for real life computational problems.

CO4. Use soft computing techniques to solve complex computational problems.

CO5. Create algorithms using soft computing techniques.

CO6. Apply contextual knowledge to solve problems related to societal issues like Business Intelligence, Forecasting.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO SOFT COMPUTING AND ARTIFICIAL NEURAL NETWORKS (8 Periods)

Soft Computing: Neural Networks, Application Scope of Neural Networks, Hybrid Systems, Soft Computing, Applications of Soft Computing.

Artificial Neural Networks: Fundamentals, Evolution, Basic Models, Terminologies, Hebb Network.

UNIT-II: SUPERVISED LERANING NETWORKS (10 Periods)

Perceptron Networks: Theory, Perceptron Learning Rule,

Architecture, Flowchart for Training Process, Perceptron Training Algorithm for Single and Multiple Output Classes, Perceptron Network Testing Algorithm.

Back-Propagation Networks: Theory, Architecture, Flowchart for Training Process, Training Algorithm, Learning Factors of Back-Propagation Networks, Testing Algorithm for Back-Propagation Networks.

UNIT-III: UNSUPERVISED LEARNING NETWORKS

(9 Periods)

Unsupervised Learning Networks: Fixed Weight Competitive Nets, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter-propagation Networks, Adaptive Response Theory Network.

UNIT-IV: FUZZY LOGIC (10 Periods)

Classical Sets and Fuzzy Sets: Classical Sets- Operations, Properties, Function Mapping; Fuzzy Sets- Operations, Properties.

Classical Relations and Fuzzy Relations: Cartesian Product of Relation, Classical Relations, Fuzzy Relations, Tolerance and Equivalence Relations, Non-interactive Fuzzy Sets.

UNIT-V: FUZZY SYSTEMS AND GENETIC ALGORITHMS

(8 Periods)

Fuzzy Arithmetic and Fuzzy Measures: Fuzzy Arithmetic, Extension Principle, Fuzzy Measures, Measures of Fuzziness.

Genetic Algorithms: Genetic Operators, Working Principle, Fitness Function, Reproduction.

Total Periods: 45

TEXT BOOK:

1. S. N. Sivanandan and S. N. Deepa, *Principles of Soft Computing,* Wiley India, Second Edition, 2011.

REFERENCE BOOKS:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun and Eiji Mizutani, *Neuro-Fuzzy and Soft Computing,* Prentice-Hall India, 2003.
2. S. Rajasekaran and G. A. Vijayalakshmi Pai, *Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications,* PHI Learning Private Ltd, 2011.

III B.Tech. - II Semester

(16BT61202) AD-HOC AND WIRELESS SENSOR NETWORKS

(Interdisciplinary Elective - 2)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Networks".

COURSE DESCRIPTION: Ad-hoc Wireless Networks, MAC Protocols; Routing Protocols; Transport Layer Protocols; Quality of Service and Energy Management; Wireless Sensor Networks.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Ad-hoc and sensor networks
- MAC Protocols and Routing Protocols
- TCP over Ad-hoc wireless networks
- QoS in Ad-hoc wireless networks.
- Sensor networks.

CO2. Analyze the issues in MAC, Routing and Transport Layer in Ad-hoc and wireless sensor networks.

CO3. Apply routing and energy management techniques in Ad-hoc wireless networks.

CO4. Demonstrate problem solving skills in the implementation of secured and optimum QoS wireless networks.

CO5. Use routing algorithms in ad-hoc wireless networks.

DETAILED SYLLABUS:

UNIT I- AD-HOC WIRELESS NETWORKS AND MAC PROTOCOLS (9 Periods)

Ad-hoc Wireless Networks: Introduction to ad-hoc wireless networks, Issues in ad-hoc wireless networks, ad-hoc wireless Internet.

MAC Protocols for Ad-hoc Wireless Networks: Introduction, Design issues, Design goals, Classification of MAC protocols,

Contention-based protocols-MACAW (A Media Access Protocol for Wireless LANs), Busy tone multiple access protocols, Distributed packet reservation multiple access protocol, Distributed priority scheduling and medium access in ad-hoc Networks.

UNIT II - ROUTING PROTOCOLS FOR AD-HOC WIRELESS NETWORKS (10 Periods)

Routing in Ad-hoc Wireless Networks: Introduction, Design issues, Classification of routing protocols, Table driven routing Protocols-DSDV; On-Demand routing protocols-DSR, AODV; Hybrid routing protocols-ZRP; Hierarchical routing protocols-Hierarchical state routing protocol; Power-Aware routing protocols.

Multicast Routing in Ad-hoc Wireless Networks: Introduction, Design issues, Operation, Classification of multicast routing protocols, Tree-Based multicast routing Protocols-Bandwidth-efficient multicast routing protocol, Multicast routing protocol based on Zone routing; Mesh-Based multicast routing protocols-On-demand multicast routing protocol.

UNIT III -TRANSPORT LAYER PROTOCOLS FOR AD-HOC WIRELESS NETWORKS (8 Periods)

Introduction, Design issues, Design goals of a transport layer protocol for ad-hoc wireless networks, TCP over ad-hoc wireless networks- Traditional TCP, Feedback-based TCP; Security in ad-hoc wireless networks, network security requirements, Issues and challenges in security provisioning, Network security attacks, Key management, Secure routing in Ad hoc wireless networks.

UNIT IV - QUALITY OF SERVICE AND ENERGY MANAGEMENT IN AD-HOC WIRELESS NETWORKS (10 Periods)

Quality of Service in Ad-hoc Wireless Networks: Introduction, Issues and challenges in providing QoS in ad-hoc wireless networks, classification of QoS solutions.

Energy Management in Ad-hoc Wireless Networks: Introduction, Need for energy Management in ad-hoc **wir**eless networks, Classification of energy management Schemes, Battery management schemes, Transmission power management schemes, System power management schemes.

UNIT V - WIRELESS SENSOR NETWORKS (8 Periods)

Introduction, Sensor network architecture, Data dissemination, Data gathering, MAC protocols for sensor networks, Location discovery, Quality of a sensor network.

Total Periods: 45

TEXT BOOK:

1. C. Siva Ram Murthy and B.S.Manoj, *Ad-hoc Wireless Networks - Architectures and Protocols,* Pearson Education, 2011.

REFERENCE BOOKS:

1. C. K. Toh, *Ad-hoc Mobile Wireless Networks: Protocols and Systems,* Pearson Education, 2007.
2. Charles E. Perkins, *Ad-hoc Networking,* Pearson Education, 2008.

III B.Tech. - II Semester

(16BT30503) PYTHON PROGRAMMING

(Program Elective - 1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Object Oriented Programming through C++"

COURSE DESCRIPTION: Data types and Expressions; Control Statements; Strings; Text Files; Lists; Dictionaries; Functions; Objects and their use; Exception Handling; Design with Classes; Graphical User Interface.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Data Types, Variables, Expressions
- Control statements, Strings and Textfiles.
- Lists, Dictionaries and Functions.
- Objects and Design with classes
- Exception Handling and GUI

CO2. Analyzecomplex computational problems.

CO3. Design solutions for real life computational problems.

CO4. Solve complex problems using python scripting constructs.

CO5. Implement python scripts using Integrated Development Environment.

CO6. Apply Python programming knowledge to solve problems related to societal applications like Medical and Weather Forecasting.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION, DATA TYPES AND EXPRESSIONS (8 Periods)

Introduction: Computer science, Computer algorithms, Computer software, The Python programming language, First program in Python.

Data Types and Expressions: Literals, Variables and Identifiers, Operators, Expressions and Data types.

UNIT- II: CONTROL STRUCTURES, LISTS, DICTIONARIES AND SETS (8 Periods)

Control Structures: Control structures, Boolean expressions,

Selection control and Iterative control.

Lists: List structures, Lists in Python, Iterations over lists, Assigning and copying lists, List comprehensions.

Dictionaries, Tuples and Sets: Dictionary types in Python, Implementation of Dictionary, Tuples, Set data type - the Set data type in Python, Implementation of sets.

UNIT-III: DESIGN WITH FUNCTIONS, STRINGS AND TEXT FILES (9 Periods)

Program routines, Functions, Recursion-Recursive functions, Recursive problem solving, Iteration Vs Recursion, A case study of Towers of Hanoi using recursion; Using text files, String processing, Exception handling, A Case study on cigarette Use/ Lung cancer Correlation program.

UNIT-IV: OBJECTS AND THEIR USE, OBJECT ORIENTED PROGRAMMING (9 Periods)

Objects and Their Use: Software objects, Turtle graphics-Creating a turtle graphics window, The default turtle, Fundamental turtle attributes and behavior, Additional turtle attributes, Creating multiple turtles.

Object Oriented Programming: Encapsulation, Inheritance, and Polymorphism.

UNIT-V: GUI PROGRAMMING (11 Periods)

Tkinter Overview - tkinter pragmatics, Documentation, Extensions, structure; tkinter coding alternatives, adding buttons and callbacks-lambda, bound method, callable class object, Binding events; adding multiple widgets, Reusable GUI Components with classes, Dialogs, Entry, check buttons and Radio buttons, Scales, Menus.

Total Periods: 45

TEXT BOOKS:

1. Charles Dierbach, *Introduction to Computer Science using Python: A Computational Problem-Solving Focus,* Wiley India Edition, 2016.
2. Mark Lutz, *Programming Python,* O'Reilly Publications, Fourth Edition, 2011.

REFERENCE BOOK:

1. Kenneth Lambert and B.L. Juneja, *Fundamentals of Python,* Cengage Learning, Third Edition, 2012.

III B.Tech. - II Semester

(16BT61203) ADVANCED DATABASES

(Program Elective - 1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Database Management Systems" and "Computer Networks".

COURSE DESCRIPTION: Parallel Databases; Object based Databases; Distributed Databases; Distributed Transaction Management; Emerging Database Technologies and Applications.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Parallel databases.
- Object based and Object Relational databases.
  - Distributed databases, horizontal and vertical data fragmentations.
  - Mobile databases, Geographic Information Systems, Genome Data Management, Multimedia Database and NoSQL.

CO2. Demonstrate skills in Query optimization, Data Fragmentation, Transaction Management and Concurrency Control for Distributed Transactions.

CO3. Design Parallel, Object-Oriented, Object-Relational and NoSQL databases.

CO4. Solve Concurrency Problems in Distributed Transactions.

CO5. Use database techniques for Mobile, Geographic Information Systems, Genome Data Management, and Multimedia Data.

CO6. Create databases as per societal needs.

DETAILED SYLLABUS:

UNIT-I: PARALLEL DATABASES (9 Periods)

Introduction, I/O Parallelism, Inter query parallelism, Intra query parallelism, Intra operation parallelism, Interoperation parallelism,

Query optimization, Design of parallel systems, Parallelism on multi-core processors.

UNIT-II: OBJECT-BASED DATABASES (9 Periods)

Overview, Complex data types, Structured types and inheritance

in SQL, Table inheritance, Array and multi set types in SQL, Object-identity and reference types in SQL, Implementing O-R features, Persistent programming languages, Object-Relational mapping, Object-Oriented versus Object-Relational.

UNIT-III: DISTRIBUTED DATABASES (9 Periods)

Features of distributed versus centralized databases, Reference architecture for distributed databases, Types of data fragmentation, Integrity constraints in distributed databases, Distributed database design.

UNIT-IV: DISTRIBUTED TRANSACTION MANAGEMENT AND CONCURRENCY CONTROL (9 Periods)

Distributed Transaction Management: Framework for transaction management, Supporting atomicity of distributed transactions, Concurrency control for distributed transactions, Architectural aspects of distributed transactions; Concurrency Control: Foundation of distributed concurrency control, Distributed deadlocks, Concurrency control Based on timestamps.

UNIT-V: EMERGING DATABASE TECHNOLOGIES AND APPLICATION (9 Periods)

Mobile database, Geographic information systems, Genome data management, Multimedia database; NoSQL-An overview of NoSQL, Characteristics of NoSQL, NoSQL storage types.

Total Periods: 45

TEXT BOOKS:

1. A. Silberschatz, H. F. Korth and S. Sudarshan, *Database System Concepts,* Tata McGraw hill, Sixth Edition, 2010.
2. Stefand Ceri and Giuseppe Pelagatti, *Distributed Databases Principles and Systems,* McGraw hill, 2008.

REFERENCE BOOKS:

1. Ramea Elmasri and Shamkant B.Navathe, *Fundamentals of Database Systems,* Pearson Education, Fifth Edition, 2007.
2. Gaurav Vaish, *Getting Started with NoSQL,* Packt Publishing, 2013 (e-book).

III B.Tech. - II Semester

(16BT61204) **SEMANTIC WEB**

(Program Elective - 1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Web Technologies"**.**

COURSE DESCRIPTION: Semantic web fundamentals; Semantic web technology; Ontology web language; Swoogle; Semantic web services.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- Semantic web search
- RDF and SWOOGLE
- Semantic web services
- RDFS and OWL

CO2. Analyze layers of web architecture for describing web content.

CO3. Design semantic web search engine for capturing information on the current web.

CO4. Select RDF and SWOOGLE for search engine usage.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO SEMANTIC WEB (9 Periods)

The world of the semantic web: WWW, Internet usage, Meta data, Search engine for traditional web and semantic web.

UNIT-II: SEMANTICWEB TECHNOLOGY (9 Periods)

Resource Description Framework (RDF), Rules of RDF, Aggregation-Distributed information, core elements of RDFS, Ontology and taxonomy, Inferencing based on RDF schema, RDF tools.

UNIT-III: WEB ONTOLOGY LANGUAGE -OWL (8 Periods)

Web ontology language (OWL), Define Classes: Localize global properties, Set operators and enumeration, Define properties; Ontology matching and distributed information, OWL ontology Header, Camera ontology in OWL, Three faces of OWL.

UNIT-IV: SWOOGLE (10 Periods)

Swoogle Architecture, FOAF, Semantic markup, Issues, Prototype system, Design of semantic web search engine, Discovery and indexation strategy, Need for Semantic Web services.

UNIT-V: SEMANTICWEB SERVICES (9 Periods)

Semantic web services and applications, OWL-S: Upper ontology, WSDL-S, OWL-S to UDDI mapping, Design of the search engine and implementations.

Total Periods: 45

TEXT BOOK:

1. Liyang Yu, I*ntroduction to the Semantic Web and Semantic web services,* Chapman and Hall/CRC, Taylor and Francis group, 2007.

REFERENCE BOOKS:

1. Johan Hjelm, *Creating the Semantic Web with RDF,* Wiley, 2001
2. Grigoris Antoniou and Frank van Harmelen, *A Semantic Web Primer,* MIT Press, 2004.

III B.Tech. - II Semester

(16BT61503) SOFTWARE PROJECT MANAGEMENT

(Program Elective - 1)
(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Software Engineering".

COURSE DESCRIPTION: Conventional Software Management;Evolution of Software Economics; Improving Software Economics; Lifecycle Phases; Artifacts of the Process; Workflow of the Process; Checkpoints of the Process; Software Economics; Iterative Process Planning; Project Organization and Responsibilities; Project Control and Project Instrumentation; Agile Overview.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on software effort estimation techniques, Agile life cycle, project control and instrumentation.

CO2. Analyze the major and minor milestones, artifacts, metrics from management and technical perspectives.

CO3. Design and develop software products using conventional and modern principles of software project management.

CO4. Effectively implement project management through appropriate planning of Work flows and Work Breakdown Structures of the process.

CO5. Select appropriate techniques to evaluate progress of software project in terms of milestones and check points.

CO6. Apply appropriate ethical principles to be followed in management of software economics.

DETAILED SYLLABUS:

UNIT - I: SOFTWARE MANAGEMENT (9 Periods)

Software management: The Waterfall Model, Conventional Software Management Performance. Evolution of Software **Economics:** Software Economics, Pragmatic Software Cost Estimation.

Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality.

UNIT - II: LIFE CYCLE PHASES (9 Periods)

Conventional and Modern Software Management: Principles of Modern Software Engineering, Principles of Modern Software Management, Transitioning to an Iterative Process.

Life Cycle Phases: Engineering and Production Stages, Inception, Elaboration, Construction, Transition Phases.

UNIT - III: ARTIFACTS, ARCHITECTURES AND WORKFLOWS (9 Periods)

Artifacts of The Process: The Artifact Sets, Management Artifacts, Engineering Artifacts.**Model Based Software Architectures:** Architecture- Management Perspective, Technical Perspective.**Workflows of the Process:** Software Process Workflows, Iteration Workflows.

UNIT - IV: CHECKPOINTS, PROCESS PLANNING AND PROJECT ORGANIZATION (9 Periods)

Checkpoints of a process: Major Milestones, Minor Milestones, Periodic Status Assessments.

Iterative Process Planning: Work Breakdown Structures, Planning Guidelines, The Cost and Schedule Estimating Process

Project Organizations and Responsibilities: Line of Business Organizations, Project organizations, Evolution of Organizations.

UNIT - V: PROJECT CONTROL AND AGILE MANAGEMENT (9 Periods)

Project control and process Instrumentation: The Seven Core Metrics, Management Indicators, Quality Indicators.

Agile Management: An Agile Overview, Role of a project manager, Benefits of Agile.

Total Periods: 45

TEXT BOOK:

1. Walker Royce, *Software Project Management,* Pearson Education, Third Edition, 1998.

REFERENCE BOOKS:

1. Michele Sliger and Stacia Broderick, *The Software Project Manager's Bridge to Agility,* Addison-Wesley, 2008.
2. Bob Hughes and Mike Cotterell, *Software Project Management,* Tata McGraw- Hill Edition, 2006.

III B.Tech. - II Semester

(16BT6HS01) BANKING AND INSURANCE

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Origin of Banking; Functions of Banking; Role & Functions of RBI; Bank-Customer Relationship; Deposit and Loan Services of Banks; Banking Procedures; Electronic Payment Mechanisms; Business Models; Concepts of Risk and Uncertainty; Fundamentals of Insurance; Principles of Insurance; Essentials of Insurance Contracts; Insurance players in India.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate Knowledge in
- Tools and concepts of Banking and Insurance.
- Basic Principles and concepts of Insurance and Banking.
- e-fund transfers, e-payments and e-business models.

CO2. Develop skills in providing solutions for
- Online banking and e – payments...
- Risk Management through insurance benefits the society at large.
- Money management by leveraging on technology, banking and insurance services.

CO3. Exhibit conceptual soundness about banking and insurance, this would contribute to More employment opportunities.

CO4. Provide life skills for effective utilization of Banking and Insurance facilities.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTIONTO BANKING (9 Periods)

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT-II:BANK-CUSTOMER RELATIONSHIP (9 Periods)

Debtor-creditor relationship, anti-money laundering, deposit products or services, payment and collection of cheques. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans.

UNIT-III:BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM (9 Periods)

Features, types of e-payment system, e-cash,NEFT, RTGS, Credit cards, Electronic purses and Debit cards.Business models-B2B, B2C, C2C, and B2G.

UNIT-IV:INTRODUCTION TO RISK AND INSURANCE (9 Periods)

Concept of risk, risk *Vs* uncertainty. Insurance definition, Insurance as risk mitigation mechanism, elements of insurance.

UNIT-V:INSURANCE OVERVIEW (9 periods)

Principles of insurance, insurance types, LIC & GIC insurance contract- nature, elements, functions, IRDA, Insurance Players in India.

Total Periods: 45

TEXT BOOKS:

1. A.V. Ranganadha Chary, R.R. Paul,*Banking and Financial system*, Kalyani Publisher, New Delhi, 2ndedition.
2. P.K.Gupta,*Insurance and Risk Management*, Himalaya Publishing House, New Delhi.

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma, *Electronic Commerce-A Manager' s Guide to E-Business* , Vanity Books International, Delhi,2002.
2. Kalakota Ravi and Whinston Andrew B, *Frontiers of Electronic Commerce*, Pearson Education India, New Delhi, 1996.
3. Schneider, Grey P, *Electronic Commerce, Course Technology*, Cengage Learning, 8th edition, New Delhi, 2008.

III B.Tech. - II Semester

(16BT6HS02) BUSINESS COMMUNICATION AND CAREER SKILLS

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —
COURSE DESCRIPTION: Nature and scope of communication; Corporate communication; Writing business documents; Careers and resumes; Interviews.
COURSE OUTCOMES: On successful completion of this course, students will be able to:
CO1. Demonstrate knowledge in
- · Corporate Communication
- · Main Stages of Writing Messages
- · Career Building

CO2. Analyze the possibilities and limitations of language in
- · Communication Networks
- · Crisis Management/Communication

CO3. Design and develop the functional skills for professional practice inBusiness Presentations & Speeches
CO4. Applywritten and oral communicationtechniques in preparing and presenting various documents in technical writing.
CO5. Function effectively as an individual and as a member in diverse teams.
CO6. Communicate effectively with the engineering community and society in formal and informal situations.

DETAILED SYLLABUS:

UNIT-I: NATURE AND SCOPE OF COMMUNICATION (9 Periods)

Introduction: Functions of Communication – Roles of a Manager – Communication Basics –Communication Networks – Informal Communication – Interpersonal Communication –Communication Barriers.

UNIT-II: CORPORATE COMMUNICATION (9 Periods)

Introduction: What is Corporate Communication? – Corporate Citizenship and Social Responsibility – Corporate Communication Strategy – Crisis Management/Communication – Cross-Cultural Communication.

UNIT-III: WRITING BUSINESS DOCUMENTS (9 Periods)

Introduction: Importance of Written Business Communication, Types of Business Messages – Five Main Stages of Writing Business Messages – Business Letter Writing – Effective Business

Correspondence – Common Components of Business Letters – Strategies for Writing the Body of a Letter.

UNIT-IV: CAREERS AND RESUMES (9 Periods)

Introduction – Career Building – Business Presentations and Speeches – Resume Formats – Traditional, Electronic and Video Resumes – Sending Resumes – Follow-up Letters – Online Recruitment Process.

UNIT-V: INTERVIEWS (9 Periods)

Introduction – Fundamental Principles of Interviewing – General Preparation for an Interview – Success in an Interview – Types of Interviewing Questions – Important Non-verbal Aspects – Types of Interviews – Styles of Interviewing.

Total Periods: 45

TEXT BOOK:

1. Meenakshi Raman and Prakash Singh, *Business Communication*, Oxford University Press, New Delhi, Second Edition, 2012.

REFERENCE BOOKS:

1. Neera Jain and Sharma Mukherji, *Effective Business Communication*, Tata Mc Graw-Hill Education, Pvt. Ltd., New Delhi, 2012.
2. Courtland L.Bovee et al., *Business Communication Today*, Pearson, New Delhi, 2011.
3. Krizan, *Effective Business Communication*, Cengage Learning, New Delhi, 2010.
4. R.K. Madhukar, *Business Communication*, Vikas Publishing House Pvt. Ltd., New Delhi, 2005.

III B.Tech. – II Semester

(16BT6HS03) COST ACCOUNTING AND FINANCIAL MANAGEMENT

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Scope, Objectives and Elements ofcost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Return on Investment.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Acquire Knowledge in
- Elements of Costing.
- Basic concepts of Financial Management.
- Risk and Return
- Significance of Cost Accountancy
- Behavioral Finance

CO2. Develop skills in
- Material, Labor, Overheads control.
- Excellence and ability to minimize the cost of the organization

CO3. Develop effective Communication in Cost control and Financial Management.

CO4. Providesolutions for effective investment decisions.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO COST AND COST ACCOUNTING (9 Periods)

Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages – Cost Accounting vs. Management Accounting – Elements of Costing – Installation of costing system – Material Control, Labour Control, Overhead Control.

UNIT-II: COST SHEET AND PREPARATION OF COST SHEET (9 Periods)

Analysis of Cost – Preparation of cost sheet, estimate, tender and quotation (Simple problems) – Importance of Costing while pricing the products.

UNIT-III: STANDARD COSTING AND VARIANCE ANALYSIS (9 Periods)

Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labour variances (Simple Problems).

UNIT-IV: INTRODUCTION TO FINANCIAL MANAGEMENT AND

RATIO ANALYSIS (9 Periods)

Financial Management-Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

UNIT-V: INTRODUCTION TO INVESTMENT AND BEHAVIORAL FINANCE (9 Periods)

Investment-Meaning and Definition- concept of risk and returns-Investment Alternatives- Introduction to Behavioral Finance – Anomalies –Key Concepts –Anchoring – Mental Anchoring-Confirmation and Hindsight Bias-Gambler's Fallacy-Herd Behavior-Over Confidence-Overreaction and Availability Bias-Prospect Theory.

Total Periods: 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang,*Cost Accounting*, Kalyani Publishers, Ludhiana, Sixth Edition, 2002.
2. I.M. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd., Tenth Edition, 2010.

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, *Cost and Management Study Material*, New Delhi.
2. James C Van Horne, *Financial Management and Policy*, Prentice-Hall of India/Pearson, Twelveth Edition, 2001.

III B.Tech. – II Semester

(16BT6HS04) ENTREPRENEURSHIP FOR MICRO, SMALL AND MEDIUM ENTERPRISES

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Acquire Knowledge in
- Schemes and institutions encouraging entrepreneurship.
- Basic Principles and concepts of Accountancy.
- Significance of entrepreneurship.

CO2. Develop skills in providing solutions for
- Personal excellence through financial and professional freedom.
- Women entrepreneurship serving as contrivance in societal development

CO3. Develop critical thinking and evaluation ability.

CO4. Widens knowledge and build up attitude towards trouble shooting.

CO5. Demonstrate business acumen.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (9 Periods)

Concept ofEntrepreneurship – Growth of Entrepreneurship in India - Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur – Functions of Entrepreneur – Need for an Entrepreneur – Entrepreneurial Decision Process – Types of Entrepreneurs – Distinction between an Entrepreneur and a manager.

UNIT-II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS (9 Periods)

Sources of Ideas – Methods of idea generation – Steps in Setting up of a Small Business Enterprise – Formulation of Business Plan – Contents of Business Plan – Significance – Common Errors in Business Plan Formulation, The role of

incubation centers for promoting Entrepreneurship, Start-up – New Guidelines.

UNIT-III: MICRO AND SMALL ENTERPRISES (9 Periods)

Meaning and Definition – Micro and Macro units – Essentials – Features – Characteristics– Scope of Micro and Small Enterprises – Objectives of Micro Enterprises – relationship between Micro and Macro Enterprises- Problems of Micro and Small Enterprises.

UNIT-IV: INSTITUTIONAL FINANCE (9 Periods)

Institutional Finance **–** Need-Scope-Services - Various Institutions offering Institutional support: – Small Industries Development of Bank of India (SIDBI), State Industrial Development Corporations (SIDCs)– Small Industries Development Organisation (SIDO) – Small Industries Service Institutes (SISIs) – District Industries Centres (DICs) – National Institute of Entrepreneurship and Small Business Development (NIESBUD) – Technical Consultancy Organizations (TCOS). Micro Units Development and Refinance Agency Bank (MUDRA).

UNIT-V:WOMEN AND RURAL ENTREPRENEURSHIP (9 Periods)

Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship – Rural Entrepreneurship – Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs, Role of BharatiyaMahila Bank for encouraging WomenEntrepreneurs.

Total Periods: 45

TEXT BOOKS:

1. Dr.S.S.Khanka*, Entrepreneurial Development*, S. Chand and Company Ltd, Revised edition, 2012.
2. MadhurimaLall&ShikhaSahai, *Entrepreneurship*, Excel Books India, 2ndedition 2008.

REFERENCE BOOKS:

1. Nandan, H., *Fundamentals of Entrepreneurship*, PHI Learning Pvt. Ltd., 2013, New Delhi, Third Edition 2013.
2. Vasanth Desai, *The Dynamics of Entrepreneurial Development and Management*, Himalaya Publishing House, Fourth Edition,2009.
3. BholanathDutta, *Entrepreneurship Management* – Text and Cases, Excel Books, First Edition 2009.

III B. Tech. – II Semester

(16BT6HS05) FRENCH LANGUAGE (La Langue Francais)

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	0	3

PRE-REQUISITES:—

COURSE DESCRIPTION: Oral communications; Basic grammar; advancedgrammar;basic writing; Business French (La Francais Commercial)

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge in
- Process of communication
- Modes of listening
- Paralinguistic features
- Skimming and Scanning
- Elements of style in writing

CO2. Analyze the possibilities and limitations of language, understanding
- Barriers to Communication
- Barriers to Effective Listening
- Barriers to Speaking
- Formal and metaphorical language

CO3. Design and develop language skills for professional practice.

CO4. Apply basic writing skills in writing Emails and understanding wide range of technical terminologies.

CO5. Understand French culture and civilization.

CO6. Communicate effectively with the native French in day to day situation.

DETAILED SYLLABUS:

UNIT-I: ORAL COMMUNICATION (9 Periods)

Introduction - Language as a Tool of Communication, French alphabets, Phonetics and pronunciation, making contacts, giving information, Arranging things, Expression of feelings.

UNIT-II: BASIC GRAMMAR (9 Periods)

Introduction –Articles, -Er ending Verbs, Nouns, Numbers, Gender, Pronouns, Sentence structure – Casestudy.

UNIT-III: ADVANCED GRAMMAR (9 Periods)

Introduction -Adjectives, Prepositions, Introduction to tenses

– Present tense, past tense and future tense, Active and Passive voice.

UNIT-IV: BASIC WRITING (9 Periods)

Introduction -Introduction to written communication, Pre-writing, Creating context for writing and Data collection, fill in forms, Write greeting cards, Invitations and Short personal announcements, Short text to describe photos and pictures.

UNIT-V: BUSINESS FRENCH (La Francais Commercial)

(9 Periods)

Introduction - E-mail writing, Letter writing, Learning technical vocabulary and its application.

Case study of influential French companies, Learning computer/ desktop/new age- media vocabulary, Introduction to how to present a topic, Fixing an Appointment.

Total Periods: 45

TEXT BOOK:

1. Annie Berther, *Alter Ego*, Hachette Publications, 2012.

REFERENCE BOOKS:

1. RegineMerieux, Yves Loiseau, *Connexions*, Goyall Publishers, 2011.
2. DelphineRipaud, *Saison*, French and Euroean Inc., 2015.

III B.Tech. - II Semester

(16BT6HS06) GERMAN LANGUAGE (Deutsch alsFremdsprache)

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:—

COURSE DESCRIPTION: Oral communication;Basic grammar; Advanced grammar; Basic writing; Berufsdeutcsch (Business German)

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge in
- Process of communication
- Modes of listening
- Paralinguistic features
- Skimming and Scanning
- Elements of style in writing

CO2. Analyze the possibilities and limitations of language, understanding
- Barriers to Communication
- Barriers to Effective Listening
- Barriers to Speaking
- Formal and metaphorical language

CO3. Design and develop language skills for professional practice.

CO4. Apply basic writing skills in writing Emails and understanding wide range of technical terminologies.

CO5. UnderstandGerman culture and civilization.

CO6. Communicate effectively with the native German in day to day situation.

DETAILED SYLLABUS:

UNIT-I: ORAL COMMUNICATION (9 Periods)

Introduction - Language as a Tool of Communication, German alphabets, Phonetics and pronunciation, making contacts, giving information, Arranging things, Expression of feelings.

UNIT-II: BASIC GRAMMAR (9 Periods)

Introduction –Articles, Verbs, Nouns, Numbers, Gender, Pronouns, Sentence structure – Case study.

UNIT-III: ADVANCED GRAMMAR (9 Periods)

Introduction -Adjectives, Prepositions, Introduction to tenses – Present tense, past tense and future tense, Active and

Passive voice, Introduction to Case- Akkusativ, Nominativ, Dativ&Genetiv Case.

UNIT-IV: BASIC WRITING (9 Periods)

Introduction -Introduction to written communication, Pre-writing, Creating context for writing and Data collection, fill in forms, Write greeting cards, Invitations and Short personal announcements, Short text to describe photos and pictures.

UNIT-V: BERUFSDEUTCSCH (BUSINESS GERMAN) (9 Periods)

Introduction - E-mail writing, Letter writing, Learning technical vocabulary and its application.

Case studies of influential German companies, Learning computer/desktop/new age- media vocabulary, Introduction to how to present a topic, Fixing an Appointment.

Total Periods: 45

TEXT BOOK:

1. Heuber,*Tangram Aktuelleins*, HeuberVerlagPublications, 2011.

REFERENCE BOOKS:

1. Anta Kursisa, Gerhard Newner,Sara vicenta, *Fir fuer Deutsch 1 und Deutsch 2,*HeuberVerlag Publications, 2005.
2. Herman Funk,*Studio D A1*, Cornelsen GOYAL SAAB Publication, 2011.

III B.Tech. - II Semester

(16BT6HS07) INDIAN CONSTITUTION

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Elements, functions and functionaries according to Indian Constitution, understanding forbetter professional practice and good citizenry.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Gain knowledge in

- Parliamentary proceedings, laws, legislature, administration and its philosophy Federal system and judiciary of India.
- Socials problems and public services like central civil services and state civil services
- Indian and international political aspects and dynamics.

CO2. Develop etiquette and professional behavior in line with the constitution of India for becoming a responsible citizen.

DETAILED SYLLABUS:

UNIT-I: PREAMBLE AND ITS PHILOSOPHY (8 Periods)

Introduction and Evolution of Indian Constitution, preamble and its Philosophy.

UNIT-II: UNION GOVERNMENT (8 Periods)

Powers, Functions and Position of President, Vice-President and Council of Ministers, Composition of parliament, Constitution Amendment Procedure, Financial Legislation in Parliament.

UNIT-III:FEDERAL SYSTEM (14 Periods)

Centre-State relations, Directive Principles of State Policy, Fundamental Rights and Duties, Centre-State Relations, Features of Federal System, Administrative Relationship between Union and States, Powers, Functions and Position of Governors, Function of Chief Ministers, Council of Ministers, Composition and powers of the State Legislature.

UNIT-IV:JUDICIARY AND PUBLIC SERVICES (10 Periods)

The Union Judiciary - Supreme Court and High Court, All India Services, Central Civil Services, State Services, Local Services and Training of Civil Services.

UNIT-V: INTERNATIONAL POLITICS (5 Periods)

Foreign Policy of India, International Institutions like UNO, WTO,

SAARC and Environmentalism.

Total Periods: 45

TEXT BOOK:

1. Briji Kishore Sharma, *Introduction to the Constitution of India*, Prentice Hall of India, 2005.

REFERENCE BOOKS:

1. Mahendra Pal Singh,V. N. Shukla's, *Constitution of India*, Eastern Book Company, 2011.
2. Pandey J. N, *Constitutional Law of India* - Central Law Agency, 1998.

III B.Tech. - II Semester

(16BT6HS08) INDIAN ECONOMY

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Introduction; Time Value of Money; Elementary Economic Analysis; Value analysis, Value Engineering; Economic Planning.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Acquire the knowledgein
- Micro and Macro Economics.
- Traditional and Modern methods of Capital Budgeting.
- Five year plans and NITI Aayog.

CO2. Analyze
- Capital Budgeting.
- Value Analysis and Value Engineering.
- Economic analysis
- Law of supply and demand

CO3. Understand the nuances of project management and finance

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (9 Periods)

Economics- Flow in an Economy, Law of Supply and Demand; Micro and Macro Economics; Relationship between Science, Engineering, Technology, and Economic Development;Concept of Engineering Economics-Types of Efficiency, Definition and Scope of Engineering Economics.

UNIT-II: TIME VALUE OF MONEY (12 Periods)

Concepts and Application; Capital Budgeting-Traditional and Modern Methods; Simple and Compound Interest, Cash Flow Diagram, Principle of Economic Equivalence; Evaluation of Engineering Projects – Present Worth Method, Future Worth Method, Annual Worth Method, Internal Rate of Return Method, Cost-benefit Analysis in Public Projects; Depreciation Policy-Depreciation of Capital Assets, Causes of Depreciation, Straight Line Method and Declining Balance Method.

UNIT-III: ELEMENTARY ECONOMIC ANALYSIS (9 Periods)

Economic Analysis – Meaning, Significance, Simple Economic Analysis; Material Selection for a Product, Substitution of Raw Material; Design Selection for a Product;Material Selection-Process Planning, Process Modification.

UNIT-IV: VALUE ENGINEERING (6 Periods)

Introduction- Value Analysis, Value Engineering,Functions, Aims; Value Analysis vs. Value Engineering; Value Engineering Procedure- Advantages, Application Areas.

UNIT-V: ECONOMICPLANNING (9 Periods)

Introduction- Need For Planningin India,Five year plans(1951-2012), NITI Aayog(from 2014 onwards); Inclusive Growth-Meaning, Significance, Need for inclusive growth in India, Strategy for more inclusive growth, Challenges and Prospects; Employment and Inclusive Growth in India, Role of engineers in sustaining inclusive growth.

Total Periods: 45

TEXT BOOKS:

1. PanneerselvamR ,*Engineering Economics*, PHI Learning Private Limited, Delhi, Second Edition,2013.
2. Jain T.R., V. K.Ohri, O. P. Khanna. *Economics for Engineers*, VK Publication, First Edition, 2015.

REFERENCE BOOKS:

1. DuttRudar&Sundhram K. P. M., *Indian Economy*, S. Chand, New Delhi, Sixty Second revised Edition, 2010.
2. Misra, S.K. & V. K. Puri., *Indian Economy: Its Development Experience*, Himalaya Publishing House, Mumbai Thirty Second Edition, 2010.

III B.Tech. - II Semester

(16BT6HS09) INDIAN HERITAGE AND CULTURE

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION:

Basic traits of Indian Culture; Humanistic Reforms under Jainism and Buddhism; Culture in the medieval period; Socio Religious reforms in Indian Culture; Reform movements for harmonious relations.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Acquaint knowledge in
- Human aspirations and values in Vedic culture.
- Cultural aspects of Buddhism and Jainism
- Unification of our country under Mourya's and Gupta's administrations
- Socio Religious aspects of Indian culture
- Reform movements and harmonious relations.

CO2. Apply ethical principles and reforms as models for the upliftment of the societal status in the present cultural contexts

DETAILED SYLLABUS:

UNIT-I: BASIC TRAITS OF INDIAN CULTURE (9 Periods)

Meaning and definition and various interpretations of culture.Culture and its features.The Vedic and Upanishadic culture and society.Human aspirations and values in these societies.Chaturvidhapurushardhas, Chaturashrma and Chaturvarna theory.

UNIT-II: HUMANISTIC REFORMS UNDER JAINISM AND BUDDHISM (9 Periods)

Salient features of Jainism - contributions of Jainism to Indian culture. Contributions of Aachaarya and Mahaapragya.Buddhism as a humanistic culture. The four noble truths of Buddhism.Contributions of Buddhism to Indian culture.

UNIT-III: CULTURE IN THE MEDIEVAL PERIOD (9 Periods)

Unifications of India under Mouryas and Guptas and their cultural achievements. Cultural conditions under satavahanas. Contributions to pallavas and cholas to art and cultural achievements of vijayanagara rulers.

UNIT-IV: SOCIO RELIGIOUS REFORMS IN INDIAN CULTURE

(9 Periods)

Western impact on India, Introduction of western education, social and cultural awakening and social reform movements of Rajaramohan Roy – DayanandhaSaraswathi- Anne Besant. (theosophical society)

UNIT-V: REFORM MOVEMENTS FOR HARMONIOUS RELATIONS (9 Periods)

Vivekananda, Eswar Chandra vidyasagar and Veeresalingam-emancipation of women and struggle against caste. Rise of Indian nationalism. Mahatma Gandhi- Nonviolence and satyagraha and eradication of untouchability.

Total Periods: *45*

TEXT BOOK:

1. ValluruPrabhakaraiah, *Indian Heritage and Culture*, Neelkamal Publications Pvt. Ltd. Delhi, First Edition, 2015.

REFERENCE BOOKS:

1. L. P. Sharma, *History of Ancient India*, Konark Publishers, Pvt. Ltd., New Delhi, 2010.
2. L. P. Sharma, *History of Medieval India*, Konark Publisher, Pvt. Ltd., New Delhi, 2010.
3. L. P. Sharma, *History of Modern India*, Konark Publishers, Pvt. Ltd., New Delhi, 2010.
4. The Cultural Heritage of India Vol-I, II, III, IV, V, *The Ramakrishna Mission Institute of Culture*, Calcutta.

III B.Tech. - II Semester

(16BT6HS10) INDIAN HISTORY

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Introduction; Ancient India; Classical and Medieval era; Modern India; India after independence.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Gain knowledge on evolution and history of India as a nation

CO2. Analyze social and political situations of past and current periods

CO3. Practice in career or at other social institutions morally and ethically

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (8 Periods)

Elements of Indian History; History Sources: Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography; sociological concepts-structure, system, organization, social institutions, Culture and social stratification (caste, class, gender, power), State& Civil Society.

UNIT-II: ANCIENT INDIA (9 Periods)

Mohenjo-Daro civilization; Harappa civilization; Mauryan Empire.

UNIT-III: CLASSICAL AND MEDIEVAL ERA (12 Periods)

Classic Era (200 BC - 1200 AD); Hindu - Islamic Era (1200 - 1800 AD).

UNIT-IV: MODERN INDIA (6 Periods)

Age of Colonialism (17th - 19th centuries); First war of Indian Independence;Freedom Struggle (1857-1947).

UNIT-V:INDIA AFTER INDEPENDENCE (1947-) (10 Periods)

The Evolution of the Constitution and Main Provisions; Consolidation of India as a Nation; Politics in the States; Indian economy; Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing, Nature of work and organization.

Total Periods: 45

TEXT BOOK:

1. K. Krishna Reddy, *Indian History*, Tata McGraw-Hill, Twenty First reprint,2017.

REFERENCE BOOKS:

1. Guha, Ramachandra, *India after Gandhi* , Pan Macmillan,2007.
2. Thapar, Romila, *Early India*, Penguin, 2002.

III B.Tech. - II Semester

(16BT6HS11) PERSONALITY DEVELOPMENT

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Self-esteem & Self-Management; Developing Positive Attitudes; Self-Motivation & Self-Management; Getting Along with the Supervisor; Workplace Success.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge in
· Self-Management
· Planning Career

CO2. Analyze the situations based on
· Attitudes
· Thinking strategies

CO3. Design and develop the functional skills for professional practice in

CO4. Function effectively as an individual and as a member in diverse teams.

CO5. Communicate effectively in public speaking in formal and informal situations.

DETAILED SYLLABUS:

UNIT-I: SELF-ESTEEM AND SELF-IMPROVEMENT (9 Periods)

Know Yourself – Accept Yourself; Self-Improvement: Plan to Improve - Actively Working to Improve Yourself.

Case study: 1

UNIT-II: DEVELOPING POSITIVE ATTITUDES (9 Periods)

How Attitudes Develop – Attitudes are Catching – Improve Your Attitudes.

Case study: 2

UNIT-III: SELF-MOTIVATION AND SELF-MANAGEMENT (9 Periods)

Show Initiative – Be Responsible Self-Management; Efficient Work Habits – Stress Management – Employers Want People Who can Think – Thinking Strategies.

Case study: 3

UNIT-IV: GETTING ALONG WITH THE SUPERVISOR (9 Periods)

Know your Supervisor – Communicating with Your Supervisor – Special Communications With Your Supervisor – What Should You Expect of Your Supervisor? – What Your Supervisor Expects of You - Moving Ahead Getting Along with Your Supervisor.
Case study: 4

UNIT-V: WORKPLACE SUCCESS (9 Periods)

First Day on the Job – Keeping Your Job – Planning Your Career – Moving ahead.
Case study: 5

Total Periods: 45

TEXT BOOK:

1. Harold R. Wallace and L. Ann Masters, *Personality Development*, Cengage Learning, Delhi, Sixth Indian Reprint 2011.

REFERENCE BOOKS:

1. Barun K. Mitra, *Personality Development and Soft Skills,* Oxford University Press, New Delhi, 2011.
2. Stephen R. Covey, *The 7 Habits of Highly Effective People*, Free Press, New York, 1989.
3. K. Alex, *Soft Skills*, S. Chand & Company Ltd, New Delhi, Second Revised Edition 2011.
4. Stephen P. Robbins and Timothy A. Judge*, Organizational Behaviour*, Prentice Hall, Delhi, Sixteenth Edition 2014.

III B.Tech. - II Semester

(16BT6HS12) PHILOSOPHY OF EDUCATION

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Introduction to Philosophy and Engineering Education; Philosophical methods and their implications in engineering; Philosophical education in India; Values and Engineering education; Outcome based education.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Acquire knowledge in
- Philosophy of Engineering education.
- Philosophical Methods.
- Knowledge acquiring methods.
- Engineering education and responsibilities.

CO2. Understand the impact of Outcome Based Education for effective educational outcomes

CO3. Apply reasoning to assess societal issues with the contextual knowledge of engineering education and responsibilities.

DETAILED SYLLABUS:

UNIT-I:INTRODUCTION TOPHILOSOPHY AND ENGINNERING EDUCATION (9Periods)

Concept , Significance, and Scope of Philosophy in Engineering – Aims of Engineering Education – relationship between philosophy and engineering education – speculative, normative and critical approaches of philosophy in engineering.

UNIT- II: PHILOSOPHICAL METHODS AND THEIR IMPLICATIONS INENGINEERING (9Periods)

Introduction to Philosophical approaches: Idealism, Naturalism, Pragmatism, Realism and Existentialism; Significance and Scope in Engineering Education.

UNIT-III: PHILOSOPHICAL EDUCATION IN INDIA (9 Periods)

Different branches of philosophy- meaning, Epistemology: nature and scope; Knowledge acquiring methods;Kinds and instruments of knowledge; Re-shapingof educational thoughts by Indian thinkers: Rabindranath Tagore, Sri Aurobindo Gosh, Mahatma Gandhi,Jiddu Krishnamurthy and Swamy Vivekananda.

UNIT-IV:VALUES AND ENGINEERING EDUCATION

(9 Periods)

Introduction; Engineering educationand responsibilities: health,social, moral, ethics aesthetic;Value: crisis and strategies forinculcation;

Case study: Engineering Solutions given by Mokshagundam Visvesvaraya.

UNIT-V:OUTCOME-BASED EDUCATION (9 Periods)

Institutional visioning;educational objectives; programme outcomes, curriculum,stakeholders, infrastructure and learning resources; governance and management, quality in education.

Total periods: 45

TEXT BOOKS:

1. Ganta Ramesh, *Philosophical Foundations of Education*, Neelkamal Publications, First Edition,2013.
2. CarlMicham,*Thinking through technology(The Paths between Engineering and Philosophy)*, University of Chicago Press, FirstEdition,1994.
3. Louis L Bucciarelli,*Engineering Philosophy,*Delft University Press,First Edition, 2003.
4. NBA/ABET Manuals.

REFERENCE BOOKS:

1. Louis L Bucciarelli, *Philosophy of Technology and Engineering Sciences*, North Holland, First Edition, 2009 (e-book).
2. Samuel Florman, *Existential pleasures of education*, Martins's Griffin S.T. publication, First Edition, 1992.

III B.Tech. - II Semester

(16BT6HS13) PUBLIC ADMINISTRATION

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Introduction; Public Policy; Good Governance; E-Governance; Development Administration.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Acquireknowledge in
- Public Policy.
- Good Governance.
- E-governance.
- Development Administration.

CO2. Analyze the possibilities and limitations ofexisting policies through Good Governance perspective.

CO3. Design and develop solutions in e-governance modelsto find and provide opportunities in e-governance.

CO4. Adopt principles ofe-governance in addressing the existing issues and challenges in e-governance sector.

CO5. Understand the significance of Administrative Development in finding professional engineering solutions by probing
- Bureaucracy.
- Role of civil society.

DETAILEDSYLLABUS:

UNIT-I: INTRODUCTION (9 Periods)

Public and Private Administration- Differences and Similarities, Meaning, Scope; Importance of Public Administration in Modern Era; Public Administration and its implications in the field of Engineering.

Case Study: Unique Identification Authority of India (UIDAI):Aadhaar Project: Challenges Ahead.

UNIT-II: PUBLIC POLICY (9 Periods)

Meaning and Scope; Policy Formulation in India; Policy making process; Policy Implementation.

Engineering and Public Policy**,**Social, ethical, Monetary and fiscal policies; policy implications of engineering;The engineer's role in Public Policy.

Case Study:NITI Aayog: Demonetization and Aftermath of Demonetization – Cashlesstransactions.

UNIT-III: GOOD GOVERNANCE (9 Periods)

Significance; Objectives;Concepts;Reforms;Organization and its basic problemsAdministrative and Governance reforms in India; Sustainable and Inclusive growth in India;Engineering and Sustainable Environment-Role of Engineers; Right to information Act.

Case Study: Strategies in Good Governance: A Case Study of Karnataka, Kerala and Orissa.

UNIT-IV: E-GOVERNANCE (9 Periods)

Meaning, Significance, Issues in E-governance; E-governance Models, Problems and Opportunities; Application of DataWarehousing and Data Mining in Governance; Engineers role in re-engineering E-governance.

Case Study: e-Housing System for Bhavana Nirman Dhanasahayam Online disbursement of housing assistance in Kerala.

UNIT-V: DEVELOPMENT ADMINISTRATION (9 Periods)

Introduction; Development Administration-Administrative Development- Sustainable Development -Significance-Objectives; Bureaucracy - Personnel administration and human resources development; Role of civil society-Citizens and administration;Development and Engineering: Issues Challenges and Opportunities.

Case Study: Neeru-Chettu (Water-Tree) of Andhra Pradesh.
Case Study: TPDDL of Delhi and Odisha.

Total Periods: 45

TEXT BOOKS:

1. M.P. Sharma, B.L. Sadana, HarpreetKaur, *Public Administration in Theory and Practice,* KitabMahal, Mumbai, First Edition,2014.
2. CSR Prabhu, *E., Governance – concepts and case studies*, PHI, New Delhi, Second Edition, 2012.

REFERENCE BOOKS:

1. SurendraMunshi, Bijupaul Abraham, *Good Governance, Democratic societies and Globalization,* Sage publications, New Delhi, First Edition, 2004.
2. R.K.Sapru, *Public Policy,* Sterling Publishers Pvt. Ltd., New Delhi, First Edition, 2001.

III B.Tech. - II Semester

(16BT60112) BUILDING MAINTENANCE AND REPAIR

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Durability of buildings, Failure and repair of buildings, Material Techniques for repair, Maintenance of buildings, Conservation and recycling.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Acquire basic knowledge on durability and serviceability, failures, repair and rehabilitation of buildings.
CO2. Analyzefailures, repair and rehabilitation techniques.
CO3. Solve complexbuilding maintenance problems through proper investigations andinterpretation.
CO4. Use modern tools and techniques for various repairs and rehabilitation ofstructures.
CO5. Provide solutions for building maintenance and repair problems considering health and safety.
CO6. Consider environmental sustainability in building maintenance and repair.
CO7. Maintain ethical standards for quality in repairs and rehabilitation of structures.
CO8. Evaluate specifications and perform cost analysis of building components while repair and rehabilitation.

DETAILED SYLLABUS:

UNIT-I: DURABILITY AND SERVICEABILITY OF BUILDINGS (10 Periods)

Life expectancy of different types of buildings; Effect of environmental elements such as heat, dampness, frost and precipitation on buildings; Effect ofchemical agents on building materials, Effect of pollution on buildings, Effect of fire onbuilding; Damage by biological agents like plants, trees, algae, fungus, moss, insects, etc.; Preventive measures on various aspects, Inspection, Assessment procedure for evaluating for damaged structures, Causes of deterioration, Testing techniques.

UNIT-II:FAILURE AND REPAIR OF BUILDINGS (10 Periods)

Building failure – Types, Methodology for investigation; Diagnostictesting methodsandequipment, Repair of cracks inconcrete and masonry, Materials for Repair,Methods of repair, Repair and strengthening of concrete buildings, Foundationrepair

and strengthening, Underpinning, Leakage of roofs and repair methods.

UNIT-III: TECHNIQUES FOR REPAIR (8 Periods)

Rust eliminators and polymers coating for rebars during repair, Foamed concrete, Mortar and dry pack, Vacuum concrete, Gunite and shotcrete, Epoxy injection, Mortar repairs for cracks, Shoring and underpinning.

UNIT-IV: MAINTENANCE OF BUILDINGS (9 Periods)

Reliability principles and its applications in selection of systems for building, Routine maintenance of building, Maintenance cost, Specifications for maintenance works, Dampness-Damp proof courses, Construction details for prevention of dampness; Termite proofing, Fire protection, Corrosion protection.

UNIT-V: CONSERVATION AND RECYCLING (8 Periods)

Performance of construction materials and components in service, Rehabilitation of constructed facilities, Conservation movement, Materials and methods for conservation work, Recycling of old buildings and its advantages, Examples.

Total Periods: 45

TEXT BOOKS:

1. Dennison Campbell, Allen and Harold Roper, *Concrete Structures – Materials, Maintenance and Repair*, Longman Scientific and Technical, UK, 1991.
2. Allen, R.T. L., Edwards, S.C. and J. D. N. Shaw, *The Repair of Concrete Structures*, Blackie Academic & Professional, UK, 1993.

REFERENCE BOOKS:

1. Peter H. Emmons, *Concrete Repair and Maintenance*, John Wiley and Sons Publications, 2002.
2. Building Constructionunder Seismic Conditions in the Balkan Region, UNDP/UNIDO Project Rer/79/015, Volume 5, *Repair and Strengthening of Reinforced Concrete, Stone and Brick Masonry Buildings*, United Nations Industrial Development Organisation, Vienna.
3. Shetty, M. S., *Concrete Technology*, S. Chand and Company.
4. Smith, P. and Julian, W., *Building Services*, Applied Science Publications, London, 1976.
5. SP: 25, BIS; *Causes and Prevention of Cracks in Buildings*.

6. Champion, S., *Failure and Repair of Concrete Structures*, John Wiley and Sons Publications, 1961.

7. Perkins, P. H., Repair, Protection and Water Proofing of Concrete Structures, E& FN Spon, UK, 3rdEdition, 1997.

III B.Tech. - II Semester

(16BT60113) CONTRACT LAWS AND REGULATIONS

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Construction contracts; Tenders; Arbitration; Legal requirements; Labour regulations.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate basic Knowledge on construction contracts, tenders, arbitration, legalrequirements and labour regulations.
CO2. Analyze contracts and tenders.
CO3. Address the legal issues in contracts andtenders.
CO4. Follow laws and regulations in the preparation of contracts and tenders.
CO5. Prepare contract and tender documents as per the standards.
CO6. Consider project schedule, cost, quality and risk in the preparation of contracts and tenders.

DETAILED SYLLABUS:

UNIT-I:CONSTRUCTION CONTRACTS (9 Periods)

Indian contracts act, Elements of contracts, Types of contracts, Features, Suitability, Design of contract documents, International contract document and laws, Standard contract document, Law of torts.

UNIT-II: TENDERS (9 Periods)

Prequalification, Bidding, Accepting; Evaluation of tender from technical, contractual and financial points of view; Two cover system, Preparation of the documentation, Contract formation and interpretation, Potential contractual problems, Price variation clause, Comparison of actions and laws, Subject matter, Violations.

UNIT-III: ARBITRATION (9 Periods)

Arbitration, Comparison of actions and laws, Agreements, Appointment of arbitrators, Conditions of arbitration, Powers and duties of arbitrator, Rules of evidence, Enforcement of award, Arbitration disputes, Dispute review board.

UNIT-IV: LEGAL REQUIREMENTS (9 Periods)

Legal requirements for planning, Property law, Agency law, Tax

laws – Income tax, Sales tax, Excise and custom duties, Local government approval, Statutory regulations, Insurance and bonding, Laws governing purchase and sale, Use of urban and rural land, Land revenue codes, EMD, Security deposits, Liquidated damages.

UNIT-V:LABOUR REGULATIONS (9 Periods)

Social security, Welfare legislation; Laws relating to wages, bonus and industrial disputes; Labour administration, Insurance and safety regulations, Workmen's compensation act, Maternity benefit act, Child labour act, Other labour laws.

Total Periods: 45

TEXT BOOKS:

1. SubbaRao,G.C.V., *Law of Contracts I & II*, S. Gogia& Co., Eleventh Edition,2011.
2. Jimmie Hinze, *Construction Contracts,*McGraw Hill, Third Edition, 2011.

REFERENCE BOOKS:

1. Kishore Gajaria, *GT Gajaria's Law Relating to Building and Engineering Contracts in India* , Lexis Nexis Butterworths India, Fourth Edition, 2000.
2. Patil, B. S,*Civil Engineering Contracts and Estimates*, University Press (India) Private Ltd., Fourth Edition, 2015.
3. Joseph T. Bockrath, *Contracts and the Legal Environment for Engineers and Architects*, McGraw Hill Education, Seventh Edition, 2010.
4. AkhileshwarPathak, *Contract Law*, Oxford University Press, 2011.

III B.Tech. - II Semester

(16BT60114) DISASTER MITIGATION AND MANAGEMENT

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: —

COURSE DESCRIPTION: Disasters; Earthquakes; Floods; Cyclones; Droughts; Landslides; Disaster management.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrateknowledge on disasters, their vulnerability and mitigation measures.
CO2. Analyze disasters and their vulnerability.
CO3. Design strategies for effective disaster mitigation.
CO4. Address pre and post disaster issues for better preparedness and mitigation measures, through proper analysis and interpretation.
CO5. Use appropriate methods in disaster mitigation and management.
CO6. Use historical data of disasters to inform the people over preparedness and mitigation measures.
CO7. Solve disaster related issues considering environment.
CO8. Consider economical issues in disastermanagement.

DETAILED SYLLABUS:

UNIT-I: DISASTERS (09 Periods)

Types of disasters - Natural disasters; Impact of disasters on environment, infrastructure and development; Concepts of hazards and vulnerability analysis, Hazard Assessment, Guidelines for hazard assessment and vulnerability analysis, Basic principles and elements of disaster mitigation.

UNIT-II: EARTHQUAKES (09 Periods)

Introduction to earthquake, Intensity scale (MSK–64), Seismic activity in India, Seismic zones of India, Earthquakes in A.P., Action plan for earthquake disaster preparedness, Elements at risk, Recovery and rehabilitation after earthquake, Earthquake resistant design and construction of buildings; Tsunami – Onset, Types and causes,Warning, Elements at risk, Typical effects, Specific preparedness and mitigation strategies.

UNIT-III: FLOODS, CYCLONES AND DROUGHTS (11 Periods)

Floods and Cyclones: Onset, Types, Warnings; Elements at risk, Typical effects, Indian floods and cyclones, Hazard zones, Potential for reducing hazards, Mitigation strategies and community based mitigation.

Droughts: Onset, Types and warning; Causes, Impact, Early warning and response mechanisms, Mitigation strategies, Droughts in India.

UNIT-IV: LANDSLIDES (08 Periods)

Onset, Types and warning; Causes, Elements at risk, Indian landslides, Hazards zones, Typical effects, Mitigation strategies and community based mitigation.

UNIT-V: DISASTER MANAGEMENT (08 Periods)

Disaster management organization and methodology, Disaster management cycle, Disaster management in India – Typical cases; Cost–benefit analysis with respect to

various disaster management programs implemented by NGOs and Government of India.

Total Periods: 45

TEXT BOOKS:

1. V. K. Sharma, *Disaster Management, Medtech Publishing,* Second Edition, 2013.

2. Anand S. Arya, AnupKaranth, and AnkushAgarwal, *Hazards, Disasters and Your Community: A Primer for Parliamentarians*, GOI–UNDP Disaster Risk Management Programme, Government of India, National Disaster Management Division, Ministry of Home Affairs, New Delhi, Version 1.0, 2005.

REFERENCE BOOKS:

1. Donald Hyndman and David Hyndman, *Natural Hazardsand Disasters*, Cengage Learning, Third Edition, 2011.

2. *Disaster Management in India,*AStatus Report, Ministry of Home Affairs, Govt. of India, May, 2011.

3. Rajendra Kumar Bhandari, *Disaster Education and Management: A Joyride for Students, Teachers, and Disaster Managers*, Springer India, 2014.

4. R. B. Singh, *Natural Hazards and Disaster Management*, Rawat Publications, 2009.

III B.Tech - II Semester

(16BT60115) ENVIRONMENTAL POLLUTION AND CONTROL

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Fundamentals ofair pollution;Dispersion of pollutants; Effects and control of air pollution; Water pollution;Soil pollution and control; Municipal solid waste management.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrateknowledge on air, water, soil pollution and their control and solid waste management.
CO2. Analyze causes and effects of air, water and soilpollution and their remedial measures.
CO3. Recommend suitable solutionsto complex environmental pollution problems.
CO4. Use appropriate remedial technique to solve environmental pollution problems.
CO5. Understand the effects of environmental pollutionon human health andvegetation.
CO6. Encourage sustainable development through implementation of pollution control measures.
CO7. Maintain IS Codes for environmental quality control.

DETAILED SYLLABUS:

UNIT-I: AIR AND NOISE POLLUTION (8 Periods)

Air Pollution: Scope, Significance, Classification, Sources – Line, Area, Stationary, Mobile; Effects of air pollutants on man, material and vegetation; Global effects of air pollution; Air pollution meteorology - Lapse rate, Inversion, Plume pattern;Dispersion of air pollutants - Dispersion models and applications; Ambient air quality standards.

Noise Pollution: Sound pressure, Power and intensity,Impacts of noise, permissible limits of noise pollution, measurement of noise.

UNIT-II: AIR AND NOISE POLLUTIONCONTROL (10 Periods)

Self-cleansing properties of the environment,Dilution method, Control at source, Process changes and equipment modifications, Control of particulates–Types of equipment, Design and operation –Settlingchambers,Centrifugal separators, Bag house filters, Wet scrubbers, Electrostatic precipitators; Control of gaseouspollutants – Adsorption, Absorption, Condensation, Combustion; Control of air pollution from automobiles, Control

of noise pollution.

UNIT-III: WATER POLLUTIONAND CONTROL (10 Periods)

Water pollution – Sources, Causes, Effects; Surface and groundwater quality – Physical, Chemical, Biological; Drinking water quality standards, Water purification – Processes, Engineered systems – Aeration, Solids separation, Settling operations, Coagulation, Softening, Filtration, Disinfection; Wastewater – Sources, Causes, Effects, Treatment and disposal – Primary, Secondary, Tertiary; Case studies.

UNIT-IV: SOIL POLLUTION AND CONTROL (8 Periods)

Soil pollutants, Sources of soil pollution, Causes, Effectsand control of soil pollution, Diseases caused by soil pollution, Methods to minimize soil pollution, Effective measures to control soil pollution, Case studies.

UNIT-V: MUNICIPAL SOLID WASTE MANAGEMENT (9 Periods)

Types of solid waste, Composition of solid waste, Collection and transportation of solid waste, Methods of disposal – Opendumping, Sanitary landfill, Composting, Incineration, Utilization - Recovery and recycling, Energy Recovery.

Total Periods: 45

TEXT BOOKS:

1. Peavy, H. S, Rowe, D. R., and Tchobanoglous, G., *Environmental Engineering*, McGraw Hill Inc., 1985.
2. C.S.Rao, *Environmental Pollution Control Engineering*, New Age International Pvt. Ltd., Second Edition, 2007.
3. Ibrahim A. Mirsa, *Soil Pollution: Origin, Monitoring & Remediation*, Springer, UK, Second Edition, 2008.

REFERENCE BOOKS:

1. M.N. Rao and H.V.N. Rao, *Air Pollution,* Tata McGraw–Hill Education Pvt. Ltd., Ninteenth Edition, 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution,* Academic Press (Elsevier), Fifth Edition, 2014.
3. S.M.Khopkar,*Environmental Pollution Monitoring and Control,* New Age International Pvt. Ltd., Second Edition, 2007.
4. V. M. Domkundwar, Environmental Engineering, DhanpatRai & Co. Pvt. Ltd., New Delhi, 2014.

III B.Tech - II Semester

(16BT60116) PLANNING FOR SUSTAINABLE DEVELOPMENT

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Sustainable development; Environmental impact;Sustainable Policies; Governance; Theories and strategies; Media and education for sustainability.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate the knowledge on sustainable development, environmental impact, sustainable policies, governance, systems and strategies, media and education for sustainability.
CO2. Analyze theories, environmental impact, policies, systems and strategies for sustainable development.
CO3. Develop suitable methods and systems for sustainable development.
CO4. Use appropriate techniquesin solving issues related to sustainable development.
CO5. Provide solutions to problems associated with sustainable development considering society.
CO6. Consider environment while planning sustainable development.
CO7. Communicate effectively on sustainable development issues through media and education.
CO8. Consider economical issues while planning for sustainable development.

DETAILED SYLLABUS:

UNIT-I: SUSTAINABLE DEVELOPMENT (9 Periods)

Definition and concepts of sustainable development, Capitalization of sustainability - National and global context;Millennium development goals, Emergence and evolution of sustainability and sustainable development, Theories of sustainability, Case studies.

UNIT-II: ENVIRONMENTAL IMPACT (9 Periods)

Climate change – Science, Knowledge and sustainability; Unforeseen environmental impacts on development, Challenges of sustainable development, Centrality of resources in sustainable development, Case studies.

UNIT-III: SUSTAINABLE POLICIES AND GOVERNANCE (9 Periods)

Governance - Democracy and Eco–welfare; Global civil society and world civil politics, Civic environmentalism, Policy responses to sustainable development, Economics of sustainability, Social responsibility in sustainability, National action, ISO 14001: Environmental management system.

UNIT-IV: SUSTAINABLE SYSTEMS AND STRATAGIES (9 Periods)

Need for system innovation, Transition and co–evolution, Theories and methods for sustainable development, Strategies for eco–innovation, Ecological foot print analysis, Socio ecological indicators – Eco labels; Policy programmes for system innovation, Case studies.

UNIT-V: MEDIA AND EDUCATION FOR SUSTAINABILITY (9 Periods)

Role of emerging media, Remarkable design and communication art, Activism and the public interest, Education for sustainability, Participation in decision making, Critical thinking and reflection, Case studies.

Total Periods: 45

TEXT BOOKS:

1. John Blewitt, *Understanding Sustainable Development*, Earth Scan Publications Ltd., 2ndEdition, 2008.
2. Jennifer A. Elliot, *An Introduction to Sustainable Development*, Earth Scan Publications Ltd., 4thEdition, 2006.

REFERENCE BOOKS:

1. Peter Rogers, Kazi F Jalal and John A Boyd, *An Introduction to Sustainable Development*, Earth Scan Publications Ltd., 2006.
2. Simon Dresner, *The Principles of Sustainability*, Earth Scan Publications Ltd., Second Edition, 2008.
3. Peter Bartelmus, *Environment Growth and Development: The Concepts and Strategies of Sustainability*, Routledge, Third Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, MiriliaBonnes, Jose Antonio Corraliza and Maria Vittoria Giuliani, *People Places and Sustainability*, Hogrefe& Huber Publishers, Second Edition, 2003.

III B.Tech. - II Semester

(16BT60117) PROFESSIONAL ETHICS

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Engineering ethics; Professional ideals and virtues; Engineering as social experimentation; Responsibilities and rights; Global issues.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate the principles of ethics, importance of professional values and social responsibility.
CO2. Analyze the problems in the implementation of moral autonomy and use ethical theories in resolving moral dilemmas.
CO3. Develop suitable strategies to resolve problems arise in practicing professional ethics.
CO4. Provide solutions to complex problems associated with professional ethics by proper analysis and interpretation.
CO5. Use appropriate theories in resolving issues pertain to professional ethics.
CO6. Understand the impact of professional ethics on society and address the limitations of codes of ethics.
CO7. Practice engineering with professionalism, accountability and ethics.
CO8. Function as a member, consultant, manager, advisor and leader in multi-disciplinary teams.
CO9. Write reports without bias and give instructions to follow ethics.

DETAILED SYLLABUS:

UNIT-I: ENGINEERING ETHICS (9 Periods)

Scope and aim of engineering ethics, Senses of engineering ethics, Variety of moral issues, Types of inquiry, Moral dilemmas, Moral autonomy-Kohlberg's theory, Gilligan's theory, Consensus and controversy.

UNIT-II:PROFESSIONAL IDEALS AND VIRTUES (8 Periods)

Theories about virtues, Professions, Professionalism, Characteristics, Expectations, Professional responsibility, Integrity, Self-respect, Sense of responsibility, Self-interest, Customs and religion, Self-interest and ethical egoism, Customs and ethical relativism, Religion and divine command ethics, Use of ethical theories, Resolving moral dilemmas and moral

leadership.

UNIT-III:ENGINEERING AS SOCIAL EXPERIMENTATION (10 Periods)

Engineering as experimentation, Similarities to standard experiments, Learning from the past and knowledge gained, Engineers as responsible experimenters, Conscientiousness, Moral autonomy and accountability, The challenger case, Codes of ethics and limitations, Industrial standards, Problems with the law ofengineering.

UNIT-IV: RESPONSIBILITIESAND RIGHTS (9 Periods)

Collegiality and loyalty, Respect for authority, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, Rights of engineers, Professional rights, Whistle-blowing, The BART case, Employee rights and discrimination.

UNIT-V: GLOBAL ISSUES (9 Periods)

Multinational corporations, Professional ethics, Environmental ethics, Computer ethics, Engineers as consultants, Witnesses, Advisors and Leaders, Engineers as Managers, Managerial ethics applied to Engineering Profession, moral leadership.

Total Periods: 45

TEXT BOOKS:

1. Mike W. Martin and Roland Schinzinger, *Ethics in Engineering*, Tata McGraw-Hill, Third Edition, 2007.
2. Govindarajan, M., NataGovindarajan, M., Natarajan, S. and Senthilkumar, V. S., *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. S. Kannan and K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, *Fundamental of Ethics for Scientists and Engineers*, Oxford University Press, 2001.
3. Charles F. Fledderman, *Engineering Ethics*, Pearson Education, Second Edition, 2004.

III B.Tech. - II Semester

(16BT60118) RURAL TECHNOLOGY

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION:

Rural technology; Non conventionalenergy; Community development; IT in rural development.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate the knowledge on technologies for rural development.

CO2. Analyze various technologies available which are appropriate for rural development.

CO3. Carryout feasibility study on the public and private partnership for rural development.

CO4. Develop and use latest technologies for rural development.

CO5. Address health and safety issues while choosing technologies for rural development.

CO6. Educate the rural populace on the positive impacts of bio-fertilisers and usage of agro machinery in agriculture.

DETAILED SYLLABUS:

UNIT-I:RURAL TECHNOLOGY (9 Periods)

India - Technology and rural development, Pre and post-independence period,Rural India Life, Indian farmer, Role of science and technology in rural development, Rural technology and poverty eradication, Rural business hubs, Technology in improving rural infrastructure,Various organizations related to innovation, Issues of technology transfer - CAPART, NABARD, CSIR, NIF.

UNIT-II: NONCONVENTIONAL ENERGY (9 Periods)

Definition of energy, Types of alternative sources of energy, Sources of non-conventional energy – Solar energy: Solar cooker,Solar heater; Biogas, Recycling and management,Wastes conservation, Assessment and production of biomass products and their utilization.

UNIT-III: TECHNOLOGIES FOR RURAL DEVELOPMENT (9 Periods)

Food and agro based technologies, Tissue culture, Nursery,Building and construction technologies, Cultivation and processing of economic plants, Cottage and social industries.

UNIT-IV: COMMUNITY DEVELOPMENT (9 Periods)

Water conservation, Rain water Harvesting, Drinking water, Environment and Sanitation, Bio fertilizers, Medical and aromatic plants, Employment generating technologies–Apiculture, Pisciculture and Aquaculture.

UNIT-V:IT INRURAL DEVELOPMENT (9 Periods)

Role of information technology (IT) in rural areas, Impact of IT in rural development, Need and necessity of technology, Corporate social responsibilities, Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and service sectors) and SaansadAdarsh Gram Yojana (SAGY), Villageadoptionschemes.

Total Periods: 45

TEXT BOOKS:

1. M. S. Virdi, *Sustainable Rural Technologies* , Daya Publishing House, 2009.
2. S.V. Prabhathand, P. Ch. Sita Devi, *Technology and Rural India*, Serials Publications, 2012.

REFERENCE BOOKS:

1. R. Chakravarthy and P. R. S. Murthy, *Information Technology and Rural Development,* Pacific Book International,2012.
2. Shivakanth Singh, *Rural Development Policies and Programmes,* Northern Book Centre, 2002.
3. L.M.Prasad, *Principles and Practice of Management*, S. Chand & Sons, Eighth edition, 2014.
4. Venkata Reddy, K., *Agriculture and Rural Development - Gandhian Perspective*, Himalaya Publishing House, 2001.

III B.Tech - II Semester

(16BT60308) GLOBAL STRATEGY AND TECHNOLOGY

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Introduction to strategic management; Strategic management process; Principles of good strategy; Globalization strategies; Research and Development strategies; Technology Management and Transfer; Elements of Transfer Process; Corporate Governance in the Indian scenario.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate the knowledge on Strategic management, Research & development strategies, Technology management and transfer, Globalization and Corporate governance.
CO2. Identify and analyze crucial problems in strategic management to improve performance of the organizations.
CO3. Develop the products and production process by using research and development strategies.
CO4. Conduct investigations on the impact of globalization in current scenario in the context of corporate governance.
CO5. Appraise the resources and capabilities of the firm in terms of their ability to confer sustainable development.
CO6. Apply ethics in strategic decision making.

DETAILED SYLLABUS:

UNIT-I: STRATEGIC MANAGEMENT (9 Periods)

Introduction, Classes of decisions, Levels of strategy, Core competence, Strategic intent and stretch, Approaches to strategy making, Roles of different strategists, Strategic management- Process, Benefits, Limitations; Ethics in strategic decision making, Principles of good strategy, Strategic Management in India.

UNIT-II: RESEARCH & DEVELOPMENT STRATEGIES (9 Periods)

Concept, Evolution of R&D Management, R&D as a business, R&D as competitive advantage, Elements of R & D strategies, Integration of R & D, Selection and implementation of R & D strategies, R & D trends.

UNIT-III: TECHNOLOGY MANAGEMENT AND TRANSFER (9 Periods)

Technology Management: Introduction, Technology - Definition, Components, Classification Features; Technology Management- Concept, Nature; Drivers of Management of Technology-Significance, Scope, Responding to technology challenges.

Technology Transfer: Introduction, Definition, Classification, Significance, Elements of process, Types of Technology Transfer, Package, Modes of Transfer, Routes, Channels and Effectiveness of Technology Transfer.

UNIT-IV: GLOBALISATION (9 Periods)

Definition, Stages, Essential conditions for globalization, Globalization strategies, Competitive advantage of Nations, Factors affecting Globalization, Globalization of Indian business.

UNIT-V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO (9 Periods)

Emergence of corporate governance in India- Landmarks, Models, Codes and status in India, Role and Responsibilities of Regulators, The Board of Directors; Corporate Governance-Specific issues in India, Family owned Business, Corporate Governance and the Indian ethos.

Total periods: 45

TEXT BOOKS:

1. Francis Cherunilam, *Strategic Management*, Himalaya Publishing House, Third Edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan, *Management of Technology*, Himalaya Publishing House, Second Edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, *The Management of Technology and Innovation: A Strategic Approach*, Cengage Learning, First Edition, 2007.
2. S.K.Mandak, *Ethics in Business and Corporate Governance*, TMH, Second Edition, 2012.

III B.Tech - II Semester

(16BT60309) INTELLECTUAL PROPERTY RIGHTS AND MANAGEMENT

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Protection of ideas; innovation and artistic endeavors; Acts and procedure related to patents, trademarks, copy right, design registration, trade secrets and cyber laws; Infringement; Commercialization of intellectual property rights; Case studies in each.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on intellectual property rights, patents, trademarks, copyrights, trade secrets and commercialization of intellectual property.

CO2. Analyse the commercial significance of discoveries and developments and to assist in bringing these into public use.

CO3. Investigate and ensure smooth transition from concept to final product by following National & International Laws of Intellectual Property.

CO4. Utilize the various policies and procedures related to patents, trademarks and copyrights relating to IPR.

CO5. Safeguard, review and manage the intellectual property so that it may receive adequate and appropriate legal protection against unauthorized use.

CO6. Follow ethical standards in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of intellectual property and knowledge.

CO7. Prepare documents and fill applications needed for filing a patent, design, copyright and trade mark.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF INTELLECTUALPROPERTY RIGHTS (9 Periods)

Introduction, Intellectual Property vs. Conventional Property, and importance of intellectual property rights (IPRs), types of intellectual property, International Treaties for protection of IPR-Paris Convention, World Intellectual Property Organization (WIPO), World Trade Organization (WTO), Trade Related

Aspects of Intellectual Property Rights (TRIP) Agreement, General Agreement on Tariffs and Trade(GATT).

UNIT-II: TRADEMARKS (9 Periods)

Introduction, Functions and kinds of trademarks, Trade Mark Registration Process, Post registration procedures, Trade Mark maintenance, Transfer of rights, Inter parties Proceedings, Infringement and Dilution of Ownership of Trade Mark, Trade Mark claims, International Trade Mark Law.

UNIT-III: PATENTS (9 Periods)

Introduction, Rights under Patent Law, Patent Application Process, Terms and Maintenance of Patents Requirements, Patent Ownership and Transfer, Licensing of Patent Rights, Sole and Joint Inventors, Disputes over Inventorship, Patent Infringement, International Patent Law, Patent Cooperation Treaty (PCT), Patent Law Treaty (PLT), Substantive Patent Law Treaty (SPLT).

UNIT-IV: COPY RIGHTS, TRADE SECRETS, CYBER LAWS (9 Periods)

Copy Rights: Introduction, nature and scope, subject matter, Rights afforded by copyright law, Copyrights ownership, transfers and duration, Copyright registration process.

Trade Secrets: Introduction, Determination of Trade Secret Status, Employer-Employee Relationships, Protection of submissions.

Cyber laws: E-commerce and cyber laws, cybercrime and legislation- need, objective and scope; IT Act 2000, Information Technology and Information Security.

UNIT-V: INDUSTRIAL DESIGN AND COMMERCIALIZATION OF INTELLECTUAL PROPERTY RIGHTS (9 Periods)

Industrial Design: Introduction, Indian Law related to registration of Industrial Designs, Essential requirements for registration of a design in India, International Agreements – Hague System; Conflicts related to registration of design.

Commercialization of Intellectual Property Rights: Competition and Confidentiality Issues, Antitrust Laws, Assignment of Intellectual Property Rights, Technology, Transfer Agreements, Intellectual Property Issues in the Sale of Business, Legal Auditing of Intellectual Property, Due Diligence of Intellectual Property Rights in a Corporate Transaction.

Total Periods: 45

TEXT BOOKS:

1. Deborah E. Bouchoux, *Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets*, Cengage Learning, Fourth Edition, 2016.
2. KompalBansal and ParikshitBansal, *Fundamentals of Intellectual Property for Engineers*, BS Publications, First Edition, 2013.

REFERENCE BOOKS:

1. Prabuddha Ganguli, *Intellectual Property Rights-Unleashing the Knowledge Economy*, McGraw Hill Education, Sisth reprint, 2015.
2. P. Narayanan, *Intellectual Property Law*, Eastern Book Company, Third Edition, 2013.
3. R.Radha Krishnan, S. Balasubramanian, *Intellectual Property Rights: Text and Cases*, Excel Books, First Edition, 2008.

III B.Tech. - II Semester

(16BT60310) MANAGING INNOVATION AND ENTREPRENEURSHIP

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:—

COURSE DESCRIPTION: Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts of Shifting Composition of the Economy Purposeful Innovation & Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate the principles of business innovation and entrepreneurship for establishing industrial ventures.
CO2. Analyze business plans for potential investors and stakeholders and effectively answer probabilistic questions on the substance of plan.
CO3. Develop a comprehensive and well planned business structure for a new venture.
CO4. Conduct investigation on complex problems, towards the development of Project.
CO5. Apply modern statistical and mathematical tools to design projects and subsequent work procedures.
CO6. Apply ethics in constructive innovation framework.
CO7. Exhibit professionalism by employing modern project management and financial tools.

DETAILED SYLLABUS:

UNIT-I: CREATIVITY AND INNOVATION (7 Periods)

Introduction, Levels of innovation, Purposeful innovation and the sources of innovative opportunity, The innovation process, Innovative strategies, Strategies that aim at introducing and innovation, Dynamics of ideation and creativity – Inbound, Outbound; Context and process of new product development, Theories of outsourcing.

UNIT-II: PARADIGMSOF INNOVATION (11Periods)

Systems approach to innovation, Innovation in the context of developed economies and Emerging economies, Examining reverse innovation and its application, Performance gap, Infrastructure gap, Sustainability gap, Regulatory gap, Preference gap, organizational factors effecting innovation at firm level.

UNIT-III: SOURCES OF FINANCE AND VENTURE CAPITAL (7 Periods)

Importance of finance, Comparison of venture capital with conventional development capital, Strategies of venture funding, Investment phases, Investment process, Advantages and disadvantages of venture capital, Venture capital developments in India.

UNIT-IV: INTELLECTUAL PROPERTY INNOVATION AND ENTREPRENEURSHIP (11 Periods)

Introduction to Entrepreneurship, Evolution of entrepreneurship from economic theory, Managerial and entrepreneurial competencies, Entrepreneurial growth and development, Concepts, Ethics and Nature of International Entrepreneurship, Intellectual property – forms of IP, Patents, Trademarks, Design registration, Copy rights, Geographical indications, Patent process in India.

UNIT-V: OPEN INNOVATION FRAMEWORK AND PROBLEM SOLVING (9 Periods)

Concept of open innovation approach, Difference between open innovations and Cloud innovation approaches, Limitations and Opportunities of open innovation framework, Global context of strategic alliance, Role of strategic alliance, Problem Identification and Problem Solving, Innovation and Diversification.

Total Periods: 45

TEXT BOOKS:

1. Vinnie Jauhari, SudhanshuBhushan, *Innovation Management*, Oxford University Press, First Edition, 2014.
2. Drucker, P. F., *Innovation and Entrepreneurship*, Taylor & Francis, Second Edition, 2007.

REFERENCE BOOKS:

1. Robert D Hisrich, Claudine Kearney, *Managing Innovation and Entrepreneurship,* Sage Publications, First Edition, 2014.
2. V.K.Narayanan, *Managing Technology and Innovation for Competitive Advantage*, Pearson India, First Edition, 2002.

III B.Tech. - II Semester

(16BT60311) MATERIALS SCIENCE

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES:—

COURSE DESCRIPTION: Structure and Bonding in metals; Steels, Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semiconductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering; Material Selection and manufacturing of Optical fibers.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate the knowledge on concepts of fundamental science and engineering principles relevant to materials.
CO2. Analyze the structures of various types of Ferrous, Non-ferrous alloys influencing various engineering applications.
CO3. Conduct investigations to select suitable materials with desired properties for engineering applications.
CO4. Use phase diagrams to interpret the data regarding microstructure of materials.
CO5. Consider health and safety issues while providing materials to real time applications.
CO6. Use composite materials that reduce material waste in design and manufacturing for sustainability.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO MATERIAL SCIENCE (07 Periods)

Structure of metals: Bonds in Solids, Crystallization of metals, Grain and grain boundaries, Effect of grain boundaries on the properties of metals / alloys, Determination of grain size measurement.

Constitution of alloys: Necessity of alloying, Types of solid solutions, Hume rothery rules, Intermediate alloy phases.

UNIT-II: CAST IRONS, STEELS AND NON-FERROUS METALS (12 Periods)

Structure and properties of Grey cast iron, Spheroidal cast iron, White Cast iron, Malleable Cast iron, Alloy cast irons, Classification of steels, structure and properties of plain carbon steels, Structure and properties of Copper and its alloys,

Aluminum and its alloys.

UNIT-III: ELECTRIC CONDUCTORS AND INSULATORS
(12 Periods)

Type of materials selected for conductors, Insulators and semiconductors, Introduction to ceramics - Bonding and microstructure, DC properties of ceramic materials, AC properties of ceramic materials, mechanical properties, Ceramics as Conductors, Insulators and capacitors; Introduction to Plastics - DC properties, AC properties, Mechanical properties.

UNIT-IV: SEMICONDUCTORS AND MAGNETIC MATERIALS
(09 Periods)

Fabrication of Semiconductors, Producing a silicon wafer-Lithography and Deposition packaging of semiconductors materials; Types of magnetic materials, Measuring magnetic properties, Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT-V: ADVANCED MATERIALS AND APPLICATIONS
(05 Periods)

Composites - Fiber reinforced metal matrix, Ceramic matrix, Polymer matrix, Properties and applications of composites; Ceramics - Alumina, Zirconia, Silicon Carbide, SiAlONs, Reaction Bonded Silicon Nitride (RBSN); Glasses- properties and applications, manufacturing of optical fibers.

Total Periods: 45

TEXT BOOKS:

1. Kodgire V D, *Material Science and Metallurgy*, Everest Publishing House, Pune, Thirty First Edition, 2011.
2. Ian. P.Jones, *Material Science for Electrical and Electronic Engineers*, Oxford University Press, First Edition, 2000.

REFERENCE BOOKS:

1. V. Raghavan, *Physical Metallurgy: Principles and Practices*, PHI, New Delhi, Second Edition, 2006.
2. William. D. Callister, *Materials Science & Engineering-An Introduction*, John Wiley and Sons, New Delhi, Sixth Edition, 2002.

III B.Tech. - II Semester

(16BT70412) GREEN TECHNOLOGIES

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Principles of green engineering; Green communications; Green energy; Green computing; Green construction; Green manufacturing.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Deploy conceptual knowledge in green technologies pertaining toengineering practice.
CO2. Analyze various green technologies for engineering practice.
CO3. Provide green solutions to engineering problems.
CO4. Apply various green techniques in the engineering practice.
CO5. Consider health and safety issues while providing green solutions to the society.
CO6. Understand issues related to environment sustainability.
CO7. Apply ethical standards for environmental sustainability in the engineering practice.

DETAILED SYLLABUS:

UNIT-I: PRINCIPLES OF GREEN ENGINEERING AND GREEN COMMUNICATIONS (9 Periods)

Principles of Green Engineering:

Introduction, Definition of green engineering, Principles of green engineering.

Green Communications:

Introduction, Origin of Green Communications, Energy Efficiency in Telecommunication systems, Telecommunication system model and energy Efficiency, Energy saving concepts, Quantifying energy efficiency in ICT, Energy efficiency metrics of green wireless networks, Embodied energy of communication devices- Introduction, The extended energy model, Embodied/Operating Energy of a BS in Cellular network- A Case study; Energy efficient standards for wireline communications.

UNIT-II: GREEN ENERGY (9 Periods)

Introduction, adverse impacts of carbon emission, control of carbon emission– methods, greenhouse gas reduction – methods, Energy sources and their availability, Green energy for sustainable development. Green energy sources – Solar energy, Wind

energy, Fuel cells, Biofuels, Wave and Geothermal energy (Principle of generation only).

UNIT-III: GREEN IT (9 Periods)

The importance of Green Information technologies, Strategizing Green Initiatives, Implementation of Green IT, Information Assurance, Communication and Social Media, Regulating Green IT- Laws, Standards and Protocols; RoHS, REACh, WEEE, Legislating for GHG Emissions and Energy Use of IT Equipment, Non-regulatory Government Initiatives, Industry Associations and Standard Bodies, Green Building Standards, Green Data Centres, Social Movements and Greenpeace, Conclusions.

UNIT-IV: GREEN CONSTRUCTION (9 Periods)

Green Building: Definition, Typical features, Benefits, Requisites for green building construction, Sustainability, Concept of REDUCE, REUSE, RECYCLE, RETHINK, REPLENISH AND REFUSE (6 R's), Sustainable construction focus point – Site selection, Planning, Water, Energy, Material, Indoor air quality, Construction procedures.

Indian Green Building Council: Introduction to IGBC green homes, Benefits of IGBC, IGBC green home rating system, Introduction to USGBC, LEED rating system, Procedure to get IGBC certification, GRIHA Rating.

UNIT-V: GREEN MANUFACTURING (9 Periods)

Introduction, background, definition, motivation and barriers to green manufacturing, Impact of manufacturing in environmental ecology, Need for green manufacturing, Advantages and Limitations, green manufacturing strategies, Green manufacturing and sustainability, Sustainability tools; Waste stream mapping and application, Green manufacturing through clean energy supply, green lean manufacturing, green packaging and supply chain.

Total Periods: 45

TEXT BOOKS:

1. KonstantinosSamdanis, Peter Rost, Andreas Maeder, MichelaMeo, Christos Verikoukis, *Green Communications: Principles, Concepts and Practice,* John Wiley & Sons, 2015.
2. Soli J. Arceivala, *Green Technologies for a better future,* McGraw Hill Education (India) Pvt. Ltd, 2014.
3. San Murugesan, G.R. Gangadharan, *Harnessing Green IT – Principles and Practices,* John Wiley & Sons Ltd., 2008.

4. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison, *Green Building Handbook*, *Volume 1*, E & FN Spon, an imprint of Thomson Science & Professional.

5. *IGBC Green Homes Rating System Version 1.0* – A bridged reference guide.

6. J Paulo Davim, Green Manufacturing: Processes and Systems, Springer, 2012.

7. David A Dornfeld, Green Manufacturing: Fundamentals and Applications, Springer, 2013.

REFERENCE BOOKS:

1. Athanasios V Alavanidis, ThomaisVlachogianni, *Green Chemistry and Green Engineering*, SynchronaThemata, 2012.

2. G.D. Rai, *Non-conventional Energy Sources*, Khanna Publishers, Delhi, Fifth Edition, 2011.

3. Marty Poniatowski, *Foundation of Green Information Technology, Prentice Hall, 2009.*

4. R. K. Gautham, *Green Homes*, BS publications, 2009.

III B.Tech. - II Semester

(16BT70413) INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:—

COURSE DESCRIPTION: Introduction to the concept ofnano; Description of nanomaterial; Nanostructure characterization tools;Classification of nanomaterials;Fabrication of nanomaterial;Different applications of nanostructures and nanomaterials.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge in
- Nanoscale technology.
- Difference between micro and nanotechnology
- Classification of Nanostructure and Nanomaterial
- Fabrication of various nanomaterials and nanostructures.

CO2. Analyze numerical and analytical problems in
- Nanomaterial size by using Scanning Electron Microscope and X-Ray diffraction

CO3. Design and fabricate devices based on nanostructures like
- Nano solar cell
- Nano cantilever
- Nano bio-sensor

CO4. Synthesize nano particle of different materials to solve the problems related to fabrication of nanostructures.

CO5. Select appropriate technique for fabrication ofnanostructures and Nano composites.

CO6. Apply ethical standards and legal issues while using chemical substances infabrication of new nanostructures.

DETAILED SYLLABUS:

UNIT-I: FUNDAMENTALS OF NANOTECHNOLOGY **(8 Periods)**

Introduction – Scientific revolutions, Time and length scale in structures, Definition of a nanosystem; Dimensionality and size dependent phenomena - Surface to volume ratio Fraction of

surface atoms, Surface energy and surface stress, surface defects, Properties at nanoscale (optical, mechanical, electronic, and magnetic).

UNIT-II:IDENTIFICATION AND CHARACTERIZATION TOOLS FOR NANOMATERIALS AND NANOSTRUCTURE (10 Periods)

Field Emission Scanning Electron Microscopy (FESEM), Environmental Scanning ElectronMicroscopy (ESEM) High Resolution, Transmission Electron Microscope (HRTEM), Scanning Tunneling Microscope(STM), Surface enhanced Raman spectroscopy (SERS), Secondary Ion Mass Spectroscopy, Focused Ion Beam Photoelectron Spectroscopy, X-ray Photoelectron Spectroscopy (XPS), Auger electron spectroscopy (AES), Rutherford backscattering spectroscopy (RBS), X-Ray Diffraction, Intensities in X-Ray Scattering Particle Size Effect.

UNIT-III:CLASSIFICATION OF NANOMATERIALS(10 Periods)

Classification based on dimensionality, Quantum Dots,Wells and Wires- III- V Nanoparticles, Electronic Structure of Nanosemiconductor, Carbon based nanomaterials (buckyballs, nanotubes, graphene), Metal based nano materials (nanogold, nanosilver and metal oxides), Nanocomposites, Nanopolymers, Nanoglasses, Nano ceramics, Biological nanomaterials, Fulrene-discovery and early years,.

UNIT- IV: SOME FABRICATION TECHNIQUES OF NANOMATERIALS AND NANOSTRUCTURES (9 Periods)

Chemical Methods: Metal Nanocrystals by Reduction, Solvothermal Synthesis, Photochemical Synthesis,Sonochemical Routes, Chemical Vapor Deposition (CVD), Metal Oxide Chemical Vapor Deposition (MOCVD), Plasma Enhanced Chemical Vapour Deposition Technique(PECVD), Hydrothermal Method, Sol-Gel.
PhysicalMethods: Ball Milling, Electrodeposition, Spray Pyrolysis, Flame Pyrolysis, DC/RF Magnetron Sputtering, Molecular Beam Epitaxy (MBE) Thermal Evaporation Method.

UNIT-V:APPLICATIONS (8 Periods)

Solar energy harvesting, Catalysis,Molecular electronics and printed electronics Nanoelectronics, Polymers with a special

architecture, Liquid crystalline systems, Linear and nonlinear optical and electro-optical properties, Applications in displays and other devices, Nanomaterials for data storage, Photonics, Plasmonics, Chemical and biosensors, Nanomedicine and Nanobiotechnology, MESFET.

Total Periods: 45

TEXT BOOKS:

1. Pradeep T., *A Textbook of Nanoscience and Nanotechnology*, Tata McGraw Hill Education Pvt. Ltd., 2012.
2. Hari Singh Nalwa, *Nanostructured Materials and*

Nanotechnology, Academic Press, 2002.

REFERENCE BOOKS:

1. Nabok A., *Organic and Inorganic Nanostructures*, Artech House, 2005.
2. Dupas C., Houdy P., Lahmani M*, Nanoscience: Nanotechnologies and Nanophysics*, Springer - Verlag Berlin Heidelberg, 2007.
3. S.M. Sze, Physics of Semiconductor Devices, Second Edition, 2001.

III B.Tech. - II Semester

(16BT60505) ENGINEERING SYSTEM ANALYSIS AND DESIGN

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:—

COURSE DESCRIPTION: Systems Process; Technologies for Systems; System Development Life Cycle; System Analysis and Modeling; Levels of Management; Project Management; Systems Implementation and Importance of UML Prototyping; Maintaining and Managing the Systems Output Process.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge in
- Systems Process and System Design
- Systems Analysis and Modeling
- System Development Life Cycle
- Design Management and Maintenance Tools.

CO2. Analyzesystem Process and estimate the given models by using case tools.

CO3. Design and develop a model to the organizational systems.

CO4. Solve complex problems related to engineering systems and produce accurate results

CO5. Apply object oriented techniques for modeling dynamic systems.

CO6. Contribute towards societal issues and responsibilities in designing, modeling and developing of organizational systems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (9 Periods)

Systems, Types of systems, Integrating technologies for systems, Need for system analysis and design, Role of the systems analyst, System development life cycle, CASE tools for analysis and design

UNIT-II: ANALYSIS AND MODELING ORGANIZATIONAL SYSTEM (9 Periods)

Organization as system, System analysis, Depicting systems graphically, Use case modeling, Levels of management, Organizational culture.

UNIT-III: PROJECT MANAGEMENT (10 periods)

Project initiation, Problem in organization, Determining feasibilities, Ascertaining hardware and software needs, Identifying, Forecasting, Comparing costs and benefits, Activity planning and control, Managing the project.

UNIT-IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (8 Periods)

Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT-V: DESIGNING EFFECTIVE OUTPUT (9 Periods)

Output design objectives, Relating output content to output method, Realizing how output bias affects users, Designing output for display, Case studies-Designing a web site management, Online exam management, Online portal design.

Total Periods:45

TEXT BOOK:

1. Kenneth E. Kendall and Julie E. Kendall,*System Analysis and Design*, Pearson Education, Ninth Edition, 2011.

REFERENCE BOOKS:

1. Dennis, Wixom and Roth,*Systems Analysis and Design*, John Wiley, Fifth Edition, 2012.
2. Shelly and Rosenblatt,*Systems Analysis and Design*, Cengage Learning, Ninth Edition, 2012.

III B.Tech.- II Semester

(16BT71011) MICRO-ELECTRO-MECHANICAL SYSTEMS

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:—

COURSE DESCRIPTION: Overview of Micro Electro Mechanical Systems (MEMS); scaling laws; working principles of microsensors and microactuators; materials; microfabrication processes; packaging of Microsystems.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators
CO2. Analyze the properties of materials and identify its suitability for MEMS devices.
CO3. Design MEMS devices that meet desired specifications and requirements.
CO4. Analyze and synthesize the information to provide effective solution to engineering problems with MEMS devices.
CO5. Use modern techniques in micro manufacturing process.
CO6. Develop efficient and cost effective MEMS based products for society.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF MEMS AND SCALING LAWS **(9 periods)**

MEMS and Microsystems, Microsystems and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid- body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT-II: WORKING PRINCIPLES OF MICROSYSTEMS **(9 periods)**

Microsensors,acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with

microactuators, microgrippers, micromotors, microvalves, micropumps.Microaccelerometers, microfludics.

UNIT-III:MATERIALS FOR MEMS AND MICROSYSTEMS (9 periods)

Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

UNIT- IV: MEMS FABRICATION PROCESS AND MICROMANUFACTURING (9 periods)

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

UNIT-V: MEMS PACKAGING (9 periods)

Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

Total Periods: 45

TEXT BOOK:

1. Tai-Ran Hsu, *MEMS & Microsystems, Design and Manufacture*, McGraw Hill Education (India) Pvt. Ltd., 2002.

REFERENCES BOOKS:

1. G.K.Ananthasuresh, K.J.Vinoy,*Micro and Smart Systems*, Wiley India,2010.
2. NitaigourPremchand Mahalik, *MEMS*, McGraw Hill Education (India)Pvt. Ltd., 2007.

III B.Tech. – II Semester

(16BT61205)CYBER SECURITY AND LAWS

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:—

COURSE DESCRIPTION:

Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge in Cyber security, Cybercrimes and its related laws in Indian and Global Act.

CO2. Analyze the legal perspectives and laws related to cybercrimes in Indian context.

CO3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cybercrimes.

CO4. Solve Cyber security issues using privacy policies.

CO5. Use antivirus tools to minimize the impact of cyber threats.

CO6. Follow security standards for the implementation of Cyber Security and laws.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO CYBER CRIMES AND OFFENSES (9 Periods)

Cyber Crimes: Introduction, Definition, Origin, Cybercrime and information security, Cyber criminals, Classifications of cybercrimes, The legal perspectives and Indian perspective, Cybercrime and Indian ITA 2000, Global perspective on cybercrimes.

Cyber Offenses: Introduction, Criminals planning on attacks, Social engineering, Cyber stalking, Cyber cafe and crimes, Botnets.

UNIT-II: TOOLS AND METHODS USED IN CYBER CRIME AND PHISHING AND IDENTITY THEFT (9 Periods)

Introduction, Proxy servers and Anonymizers, Phishing, Password cracking, Key loggers and Spywares, Virus, Worms and Ransomware, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT-III: CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES (8 Periods)

Introduction, Cyber laws in Indian context, The Indian IT act, Challenges to Indian law and Cybercrime scenario in India, Consequences of not addressing the weakness in IT act, Digital signatures and the Indian IT Act, Cyber Crime and Punishment, Cyber law, Technology and Students in India scenario.

UNIT-IV: CYBER SECURITY- ORGANIZATIONAL IMPLICATIONS (10 Periods)

Introduction, Web threats for organizations – evils and perils, Security and privacy implications from cloud computing, Social Media Marketing-Security risks and Perils for organizations, Social computing and associated challenges for organizations, Protecting people's privacy in organization, Organizational guidelines for internet usage, Safe computing and Usage policy, Incident handling and Best practices.

UNIT-V: CYBER CRIME AND TERRORISMAND ILLUSTRATIONS (9 Periods)

Cyber Crime & Terrorism: Introduction, Intellectual property in the cyber space, The ethical dimension of cybercrimes, The psychology, Mindset and skills of hackers and cyber criminals, Sociology of cyber criminals, Information warfare.

Cyber Crime Illustrations: Indian banks lose millions of rupees, Justice vs. Justice, Parliament attack, The Indian case of online gambling, Bank and credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

Total Periods: 45

TEXT BOOK:

1. Nina Gobole and SunitBelapure, *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,* Wiley India, 2011.

REFERENCE BOOK:

1. Prashant Mali, *Cyber Law and Cyber Crimes,* Snow White Publications Pvt. Ltd., 2013.

III B.Tech. - II Semester

(16BT61505) BIO-INFORMATICS

(Open Elective)
(Common to CE, ME, CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION:
Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Biological Database; Homology Modeling; Structure Prediction; Molecular Dynamics.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.
CO2. Analyze biological sequences for Homology Modeling.
CO3. Apply clustering methods for Phylogenetic trees.
CO4. Solve bio sequencing problems using dynamic programming.
CO5. Select and apply appropriate techniques and tools to structure Prediction.

DETAILED SYLLABUS:

UNIT-I: NUCLEIC ACIDS, PROTEINS AND AMINO ACIDS (8 periods)

Bioinformatics - Definition, Nucleic acid structure, Protein structure, the central dogma, Physico-chemical properties of the amino acids and their importance in protein folding, Polymerase chain reaction (PCR)

UNIT-II: INFORMATION RESOURCES FOR GENES AND PROTEIN (10 periods)

Database file formats, Nucleic acid sequence databases, Protein sequence databases.

Sequence Alignment Algorithm

Pair wise sequence alignment – The problem, Pair wise sequence alignment – Dynamic programming methods, The effect of scoring parameters on the alignment, Multiple sequence alignment.

UNIT-III: PREDICTION OF THE THREE-DIMENSIONAL STRUCTURE OF A PROTEIN AND HOMOLOGY MODELING (9 Periods)

Secondary Structure Prediction, Basic Principles, The Steps of Comparative Modeling, Accuracy of Homology Models, Manual

versus Automatic Models, SNPs, Motifs**.**

UNIT-IV: PHYLOGENETIC METHODS (10 periods)

Phylogenetic trees, choosing sequences, Distance matrices and clustering methods, Calculation of distances in the neighbor-joining method, Bootstrapping, Tree optimization criteria and tree search methods, The maximum-likelihood criterion, Calculating the likelihood of the data on a given tree, The parsimony criterion.

UNIT-V: NEW FOLD MODELING (8 periods)

Estimating the Energy of a Protein Conformation, Energy Minimization, Molecular Dynamics, The "Omics" Universe-Transcriptomics, Proteomics, Interactomics, Structural Genomics, Pharmacogenomics.

Total Periods:45

TEXTBOOKS:

1. Paul G. Higgs and Teresa K. Attwood, *Bioinformatics and Molecular Evolution* Blackwell Publishing, 2005.
2. Anna Tramontano, *Introduction to Bioinformatics* Chapman and Hall/CRC, 2006.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, *Bioinformatics Basics, Applications in Biological Science and Medicine*, CRC Press, Taylor & Francis Group, Second Edition, 2005.
2. Rastogi S. C., NamitaMendiratta and ParagRastogi, *Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery*, PHI Learning Pvt. Ltd., Third Edition, 2011.

III B.Tech. - II semester

(16BT61231) CLOUD COMPUTING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Cloud Computing".

COURSE DESCRIPTION: Hands-on experience on creating virtual machines on Windows and Linux platforms; Development of service based web applications and their deployment.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate hands-on experience on Virtualization models and Cloud Environment.

CO2. Analyze the given experiment and relate to existing cloud architectures.

CO3. Apply API development skills in web applications for cloud deployment.

CO4. Demonstrate independent problem solving skills in developing dynamic webapplications.

CO5. Use advanced programming languages to access cloud services.

CO6. Build suitable cloud environment for societal requirements.

CO7. Work effectively as an individual and as a member in team for mini-projectimplementation.

CO8. Demonstrate communication skills, both oral andwritten for preparing and presenting reports.

LIST OF EXPERIMENTS:

1. Create VM's with given set of configuration on Hyper-V Ubuntu 14LTs files with 2GB RAM and 200GB Hard Disk through Infrastructure Services (IaaS).
2. Create Virtualization on VMware Windows 7 OS with 4GB RAM and 500GB Hard Disk" through Infrastructure as a Service (IaaS).
3. Develop a simple web application for student details and operative using Salesforce.com in Cloud Platform under Software as Service (SaaS).
4. Develop a simple web application for personal Homepage, Attributes, Controllers, GUI, Visual Page, Forms, and

Templates under Software as Service (SaaS).

5. Develop a web application for performing calculator operations. Deploy this application on Salesforce.com Cloud Platform under Software as Service (SaaS).
6. Develop a web application on IBM Bluemix Cloud Platform for executing application using Eclipse under Platform as a Service.
7. Create virtual machine instance with given set of configuration on Amazon web Services (AWS) under Infrastructure as a Service (IaaS).
8. Create virtual machine instance with set of configuration on Amazon S3 (Simple Storage Service) in Amazon Web Service (AWS) under Infrastructure as a Service (IaaS).
9. Develop a web application on IBM Bluemix Cloud Platform for implementing IoT application.
10. Develop a calculator web based application on MS-Azure Platform i.e. Platform as a Service (PaaS).
11. Develop a student home page web based application on MS-Azure Platform i.e. Platform as a Service (PaaS) Cloud.
12. Develop a mobile app on Google App Engine for uploading a resume into a website, collaborated with Drop box. The resume should be encrypted. (PaaS)
13. Develop a service call to run on Drop box resumes for picking the resumes of given skill set. (PaaS)

i. 6+ years of Exp in Java Development.

ii. 10 years of experience in Automation Testing.

iii. 15+ years of Managerial experience with technical background.

iv. 5-7 years of on-site experience in .NET support and programming.

REFERENCE BOOKS:

1. Barrie Sosinsky, *Cloud Computing Bible,* Wiley India Pvt Ltd, 2011.
2. Rajkumar Buyya, James Broberg and Andrzej Goscinski, *Cloud computing principles and paradigms,* John Wiley and Sons, 2011.

3. Thomas Erl and RicardoPuttini, *Cloud Computing-Concepts,* Technology and Architecture, Pearson, 2013.

4. John W. Rittinghouse and James F. Ransome, Cloud *Computing implementation, Management and Security,* CRC Press, Taylor and Francis group, 2010.

III B.Tech. - II semester

(16BT61232) KNOWLEDGE ENGINEERING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A course on "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Hands-on experience on Data preprocessing techniques; Mining frequent patterns; classification and clustering techniques using Weka and R Studio tools.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on: preprocessing techniques, Descriptive and predictive mining tasks.
CO2. Identify suitable algorithms to mine knowledge from real-time databases.
CO3. Classify and predict the information for forecasting applications.
CO4. Demonstrate independent decision making skills for business analysis applications.
CO5. Apply Weka and R tools to extract interesting patterns from large databases.
CO6. Prepare analytical reports suitable for societal requirements.
CO7. Work effectively as an individual and member of a team to implement mini-project.
CO8. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXPERIMENTS:

I. Experiments on Weka:

1. Create a dataset using ARFF and CSV formats and load into the Weka Explorer.
2. Perform the following preprocessing filters on 'Weather' dataset.
   (i) Add (ii) Remove (iii) Discretize
   (iv) Replace Missing values (v) Normalize
3. List all the categorical attributes and the real-valued attributes separately in 'German credit' data set.
4. Generate strong Association rules by using Apriori algorithm on 'German_credit' dataset with Min_Sup=60% and Min_Conf=80%.
5. (i) Implement the Classification using Decision Tree

algorithm on 'Weather' dataset.

Draw the confusion matrix and report the model with accuracy.

(ii) Implement Bayesian Classification and analyze the results on 'iris' Dataset.

6. (i) Implement Simple Linear Regression on an 'Employee' dataset.

(ii) Demonstrate the simple k-Means clustering algorithm on 'iris' dataset.

7. (i) Rank the performance of j48, PART and oneR Algorithms on 'Weather' dataset using Experimenter.

(ii) Perform an experiment using 'Knowledge Flow' in Weka 3.8.1 tool.

II. Experiments using R Studio

8. Create an EMP Dataset in R studio and perform the following functions

(i) Display the EMP dataset with all rows and columns

(ii) Perform few manipulations and display the updated dataset

9. Perform an exploratory data analysis using R Studio.

10. (i) Perform Association rule mining by using Apriori Algorithm on Sales Dataset.

(ii) Train the Decision Tree on 'Weather' Dataset and report the Decision Tree and cross-validation results. Convert the Decision Trees into "if-then-else rules".

11. Implement simple linear regression using R Studio.

12. Mini-project: Implement all data mining functionalities on the following real datasets after performing data preprocessing filters.

(i) Supermarket (ii) Weather (iii) Airlines

(iv) Breast Cancer (v) Forest fires

REFERENCE BOOKS:

1. Ian. H. Witten and Eibe Frank, *Data Mining: Practical Machine Learning Tools and Techniques,* Elsevier Publication, Second Edition, 2005.

2. Joseph Adler, *R in a Nutshell,* O'Reily Publishers, 2010.

3. Pang-Ning Tan, Vipin Kumar and Michael Steinbach, *Introduction to Data Mining,* Pearson Education, 2006.

4. Jiawei Han and Micheline Kamber, *Data Mining: Concepts and Techniques,* Morgan Kaufmann Publishers, Second Edition,2006

III B.Tech. - II semester

(16BT61233) **SEMINAR**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	100	100	-	-	-	2

PRE-REQUISITES: All the courses of the program up to III B. Tech. – I Semester.

COURSE DESCRIPTION: Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES:

Completion of the seminar work enables a successful student to demonstrate:

CO1. Demonstrate in-depth knowledge on the seminar topic.

CO2. Analyze critically, the concepts relevant to the seminar topic.

CO3. Understand methodology relevant to seminar topic.

CO4. Undertake investigation of issues related to seminar topic providing valid conclusions.

CO5. Use techniques and tools to consolidate the solutions relevant to the seminartopic.

CO6. Comprehend societal issues in the context of seminar topic.

CO7. Understand ethical issues in the context of seminar topic.

CO8. Function effectively as individual on the chosen seminar topic.

CO9. Develop communication skills, both in oral and written form, for preparing and presenting seminar report.

CO10. Engage in lifelong learning to improve knowledge and competence in the chosen area of seminar.

III B.Tech. - I semester

(16BT5HS01) **MANAGEMENT SCIENCE**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Concepts of Management; Environmental Scanning; Concepts Related to Organization; Operations Management; Work Study; Statistical Quality Control; Inventory Management; Marketing; Human Resource Management; Project Management; Project Crashing; Entrepreneurship; Contemporary Management Practices.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1: Demonstrate the concepts of operations management, human resources management, project management and contemporary management practices in managerial context.

CO2: Identify and analyse management problems in the business organizations reaching substantiated conclusions using principles of management.

CO3: Design appropriate organization structure for meeting the needs of the organization with consideration of the employees of the organization.

CO4: Competently employ broad based analytical tools for decision making, system design, analysis and performance.

CO5: Provide solution to organizations for sustainable development.

CO6: Apply knowledge of engineering and management principles to manage the projects in multidisciplinary environments.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION TO MANAGEMENT AND ORGANIZATION (9 Periods)

Concepts of management and Administration, Nature and Importance of management, Evolution of management thought, Functions of management, Contributions of F.W. Taylorand

Henry Fayol to the management, Systems approach to management, Managerial skills, Elements of corporate planning process, Environmental scanning, SWOT Analysis, Social responsibilities of management.

Basic concepts related to organization, Objectives and Principles, Types of organizations- Line Organization, Line and Staff

Organization, Functional Organization, Matrix Organization, Network organization.

UNIT- II: OPERATIONS MANAGEMENT (12 Periods)

Plant location- Factors and Principles; Plant Layout- Principles and Types; Methods of production, Work study- Basic procedure involved in method study and work measurement; Statistical Quality Control- Factors affecting quality, Control charts for variables and attributes, Acceptance sampling; Materials management- objectives, Inventory- Types of inventory, Classical EOQ model, ABC analysis; Purchase procedure, Stores management, Marketing- Functions, Channels of distribution.

UNIT-III: HUMAN RESOURCE MANAGEMENT (HRM) (6 Periods)

Nature and scope of HRM, Functions of HRM, Role of HR Manager in an organization, Job evaluation, Merit rating, Maslow's hierarchy of human needs, McGregor's theory X and theory Y, Herzberg's two-factor theory of motivation.

UNIT-IV: PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (9 Periods)

Network analysis - Critical path method (CPM), Program evaluation and review technique (PERT); Project cost analysis - Project crashing.

Introduction to Entrepreneurship, Entrepreneurial Traits, Entrepreneur vs Manager, Role of Entrepreneurship in Economic Development, Women as an Entrepreneur.

UNIT-V: CONTEMPORARY MANAGEMENT PRACTICES (9 Periods)

Basic concepts of Material Requirements Planning, Enterprise resource planning (ERP), Just In Time (JIT) system, Total Quality Management (TQM), Value Chain Analysis, Business Process Outsourcing (BPO), Globalization, Management Challenges, Supply Chain Management (SCM), Role of Information Technology in managerial decision making, Six Sigma Concept, Maintenance Strategies- Preventive, Periodic and Breakdown Maintenance.

Total Periods: 45

TEXT BOOK:

1. O.P. Khanna, Industrial Engineering and Management, Dhanpat Rai and Sons, 2010.
2. Martand T.Telsang, Industrial Engineering and Production Management, S. Chand, Second Edition, 2006.

REFERENCE BOOKS:

1. Koontz and Weihrich, Essentials of Management, TMH, Sixth Edition, New Delhi, 2007.
2. N.D. Vohra, Quantitative Techniques in Management, TMH, Second Edition, New Delhi.

IV B.Tech. - I semester

(16BT71201) BIG DATATECHNOLOGIES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Introduction to Big Data, Hadoop; Hadoop Distributed File Systems; Hadoop I/O; MapReduce; Hive; Pig; HBase; Zookeeper; Sqoop and Case studies.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on Big Data characteristics, storage, processing, querying and reporting.

CO2. Analyze large dataset issues and solve using data analytic techniques.

CO3. Design and Develop classification and clustering models for dataset analysis.

CO4. Use research knowledge to manage large datasets.

CO5. Apply MapReduce, Hive, Pig, Sqoop, HBase, and Zookeeper tools for data analytics.

CO6. Use data analytics tools to solve societal problems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BIG DATA AND HADOOP (9 Periods)

Introduction to Big Data: Evolution and definition of Big Data, Structure of Big Data, Characteristics, Advantages, Applications and Tools.

Hadoop: Data storage and analysis, Comparison with other systems, History of Hadoop, Apache Hadoop and the Hadoop ecosystem, Hadoop releases.

UNIT-II: HADOOP DISTRIBUTED FILE SYSTEM AND HADOOP I/O (9 Periods)

Hadoop Distributed File system: HDFS concepts, Command-Line Interface, Hadoop file systems, Java interface, Data flow, Hadoop archives.

Hadoop I/O: Data integrity, Compression, Serialization, File-based

data structures.

UNIT-III: MAPREDUCE, TYPES and FORMATS AND FEATURES (9 Periods)

MapReduce: Analyzing the data with Hadoop, Scaling out, Hadoop streaming, Hadoop pipes.

Types and Formats: MapReduce types, Input formats, Output formats.

Features: Counters, Sorting, Joins, Side data distribution and MapReduce library classes.

UNIT-IV: HIVE, PIG AND HBASE (9 Periods)

Hive: Comparison with traditional databases, HiveQL, Tables, Querying data, and User-defined functions.

Pig: Comparison with databases, Pig latin, User-defined functions, Data processing operators.

HBase: HBasics, Concepts, Clients, HBase vs. RDBMS, Praxis.

UNIT-V: ZOOKEEPER, SQOOP AND CASE STUDIES (9 Periods)

Zookeeper: Zookeeper service, Building applications with Zookeeper, Zookeeper in production.

Sqoop: Database imports, Working with imported data, Importing large objects, Performing an export.

Case Studies: Mahout, Healthcare, Facebook and Twitter.

Total Periods: 45

TEXT BOOK:

1. Tom White, *Hadoop: The Definitive Guide,* O'REILLY Publications, Third Edition, 2012.
2. Anil Maheswari, *Big Data,* Tata McGraw Hill, 2017.

REFERENCE BOOKS:

1. Bart Baesens, *Analytics in a Big Data World: The Essential Guide to Data Science and its Applications,* Wiley Publications, 2014.
2. Paul Zikopoulos, IBM, *Chris Eaton and Paul Zikopoulos, Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data,* The McGraw-Hill Companies, 2012.
3. Chuck Lam, *Hadoop in action,* Manning Publications, 2011.

IV B.Tech. - I semester

(16BT71202) MOBILEAPPLICATION DEVELOPMENT

(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Java Programming" and "Web Technologies".

COURSE DESCRIPTION: Mobile platforms; Mobile User Interface and tools; Introduction to Android; Activities; Views; Menus; Database Storage; SMS; e-mail; Displaying Maps; Building a Location Tracker Web Services Using HTTP; Sockets Programming; Communication between a Service and an Activity; Introduction to iOS.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Mobile platforms and Mobile User Interface
- Android Activities and Intents
- Messaging, Networking, Location based Services, Android Services
- Basics of iOS

CO2. Analyze the context of complex problems and identify user interface design requirements.

CO3. Design and develop solutions for real world problems withandroid mobile applications.

CO4. Demonstrate problem solving skills to create applications for mobile devices.

CO5. Apply Android studio and iOS tools to develop mobile applications.

CO6. Create mobile applications as per societal needs.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION AND MOBILE USER INTERFACE DESIGN (8 Periods)

Mobile web presence, Mobile applications, Marketing, App as a mobile web app; User interface design - Effective use of screen real estate, Mobile application users, Mobile information design,

Mobile platforms, Tools of mobile interface design.

Android versions, Features and architecture, Required tools, Android application launching.

UNIT - II: ACTIVITIES, INTENTS AND ANDROID USER INTERFACE (9 Periods)

Activities, Linking activities using intents, Displaying notifications, Components of a screen, Adapting to display orientation, Managing changes to screen orientation, Utilizing the action bar, Listening for UI notifications.

UNIT - III: ADVANCED USER INTERFACE AND DATA PERSISTENCE (10 Periods)

Basic views, Picker views, List view, Image view, Menus with views, Web view, Saving and loading user preferences, Persisting data to files, Creating and using databases.

UNIT - IV: MESSAGING, LOCATION-BASED SERVICES, AND NETWORKING (9 Periods)

SMS messaging, Sending e-mail, Displaying maps, Getting location data, Monitoring a location, Consuming web services using HTTP.

UNIT - V: ANDROID SERVICES AND IOS (9 Periods)

Services, Communication between a service and an activity, Binding activities to services, Threading.

iOS tools, iOS project, Debugging iOS apps, Objective-C basics, Hello world app, Building the derby app in iOS.

Total Periods: 45

TEXT BOOKS:

1. J. F. DiMarzio, Beginning Android Programming with Android Studio, Wiley India, Fourth Edition, 2017.
2. Jeff McWherter and Scott Gowell, Professional Mobile Application Development, Wiley India, 2012.

REFERENCE BOOKS:

1. Neils Smyth, Android Studio Development Essentials, Creative Space Independent publishing platform, Seventh Edition, 2016.
2. Paul Deital and Harvey Deital, Android How to Program, Detial associates publishers, 2013.

IV B.Tech. - I semester

(16BT71203) INFORMATION RETRIEVAL SYSTEMS

(Program Elective - 2)

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Data Structures" and "Database Management Systems".

COURSE DESCRIPTION: Architecture of Information Retrieval Systems; Functional Capabilities; Data Structures; Mathematical Algorithms; Indexing; Similarity and Clustering; Human Perception and Presentation; Text Search Techniques and Evaluation Measures.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Information Retrieval System Architecture
- Functional capabilities
- Indexing and data presentation methods.
- Evaluation measures of Information Retrieval Systems.

CO2. Analyze indexing methods and clustering algorithms to group similar data items for efficient search.

CO3. Design and develop data structures used to store and retrieve data items.

CO4. Demonstrate problem solving skills in the usage of mathematical algorithms for information retrieval.

CO5. Use text search algorithms and collaborative filtering techniques for information retrieval and visualization methods for information presentation.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION (9 Periods)

Primary information retrieval problems, Objectives of information retrieval system, Functional overview, Understanding the search functions, Relationship to DBMS, Digital libraries and data warehouses, Data structures and mathematical algorithms.

UNIT II: INGEST AND INDEXING (9 Periods)

Ingest: Introduction, Item receipt, Duplicate detection, Item normalization, Zoning and creation of processing tokens, Stemming, Entity processing, Categorization, Citational metadata.

Indexing: Manual indexing process, Automatic indexing of text

and multimedia.

UNIT III: SEARCH AND CLUSTERING (12 Periods)

Search: Similarity measures and ranking, Hidden markov models, Ranking algorithms, Relevance feedback, Selective dissemination of information search, Weighted searches for boolean systems, Multimedia searching.

Clustering: Introduction to clustering, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT IV: INFORMATION PRESENTATION (7 Periods)

Introduction, Presentation of the hits, Display of the item, Collaborative filtering, Multimedia presentation, Human perception and presentation.

UNIT V: SEARCH ARCHITECTURE AND EVALUATION

(8 Periods)

Search Architecture: Index search optimization, Text search optimization, GOOGLE Scalable multiprocessor architecture.

Evaluation: Information system evaluation, Measures used in system evaluation.

Total Periods: 45

TEXT BOOK:

1. Gerald Kowalski, *Information Retrieval Architecture and Algorithms,* Springer, 2013.

REFERENCE BOOKS:

1. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, *An Introduction to Information Retrieval,* Cambridge University Press, 2012.
2. Ricardo Baeza-Yates and Berthier Ribiero-Neto, *Modern Information Retrieval the Concepts and Technology behind Search,* Addison Wesley, Second Edition, 2010.

IV B.Tech. - I semester

(16BT71204) MOBILE COMPUTING

(Program Elective - 2)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Networks".

COURSE DESCRIPTION: Introduction to Mobile Computing, GSM; Medium Access Control, Wireless LAN; Mobile Network and Transport Layers; Data Dissemination; Mobile Ad-Hoc Networks (MANETs), Wireless Application Protocol (WAP).

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:
- GSM, GPRS, 3G, 4G, Wireless LAN, MANETs.
- Protocols in Data Link, Network, Transport and Application layer.

CO2. Analyze the issues related to database design and data retrieval in mobile applications.

CO3. Apply routing algorithms for finding shortest path in MANETs.

CO4. Use protocols of Wireless Technologies for security implementation in mobile computing.

CO5. Follow standards in the usage of mobile communications.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF MOBILE COMPUTING AND GSM (9 Periods)

Introduction: Introduction to mobile computing, Novel applications, Limitations, and Mobile computing architecture.

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services, Introduction to 3G and 4G Communications Standards: WCDMA, LTE, WiMAX

UNIT-II: MEDIUM ACCESS CONTROL AND WIRELESS LAN (9 Periods)

Medium Access Control: Motivation for a specialized MAC - Hidden and exposed terminals, Near and far terminals, SDMA, FDMA, TDMA, CDMA.

Wireless LAN: IEEE 802.11 - System architecture, Protocol architecture, Physical layer, Medium access control layer, MAC management; Bluetooth - User scenarios, Architecture, Radio layer, Baseband layer, Link manager protocol, L2CAP, Security.

UNIT-III: MOBILE NETWORK AND TRANSPORT LAYERS

(9 Periods)

Mobile IP: Goals, Assumptions, Entities and terminology, IP packet delivery, Tunneling and encapsulation, Optimizations; IPv6; Dynamic Host Configuration Protocol (DHCP).

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission/ time-out freezing, Selective retransmission, Transaction oriented TCP; TCP over 2.5G/3G wireless networks.

UNIT-IV: DATABASE ISSUES AND DATA DISSEMINATION

(9 Periods)

Database Issues: Hoarding techniques, Caching invalidation mechanisms, Client server computing with adaptation, Power-aware and context aware computing, Database transactional models, Query processing and recovery.

Data Dissemination: Communications asymmetry, Classification of data delivery mechanisms, Push-based mechanisms, Pull-based mechanisms, Hybrid mechanisms, Selective tuning (indexing) techniques.

UNIT-V: MOBILE AD HOC NETWORKS (MANETs) AND WAP
(9 Periods)

Mobile Ad Hoc Networks: Properties of a MANET, Spectrum of MANET, Applications, routing and routing algorithms, Security in MANETs.

Wireless Application Protocol: Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment.

Total Periods: 45

TEXT BOOKS:

1. Rajkamal, *Mobile Computing,* OXFORD University Press, Second Edition, 2012.
2. Jochen Schiller, *Mobile Communications,* Pearson Education, Second Edition, 2009.

REFERENCE BOOKS:

1. Gordon A. Gow and Richard K. Smith, *Mobile and Wireless Communication,* Mc Graw Hill, 2006.
2. Hansmann, Merk, Nicklous and Stober, *Principles of Mobile Computing,* Springer, Second Edition, 2003.

IV B.Tech. - I semester

(16BT71505) NETWORK PROGRAMMING

(Program Elective - 2)

(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Networks".

COURSE DESCRIPTION: OSI model, Unix standards; Normal startup, terminate and signal handling server process termination; lost datagram, summary of UDP example, Lack of flow control with UDP; Function and IPV6 support, uname function ,IPv4 Client- IPv6 Server ;FIFO's, streams and messages, RPC.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on concepts of sockets, inter process communication and remote login.

CO2. Identify appropriate TCP Echo server functions and Socket options used in Network based systems.

CO3. Analyze networking protocols such as TCP and UDP for connection establishment between client and server.

CO4. Design appropriate solutions for network applications based on UNIX.

CO5. Apply modern tools to create cooperating processes in network based Systems.

CO6. Relate suitable ethical principles to design and develop applications related to Network Traffic Monitoring.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO NETWORK PROGRAMMING AND SOCKETS (9 Periods)

OSI model, Unix standards, TCP and UDP and TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application, Address structures, Value Result Arguments, Byte ordering and manipulation function and related functions.

Elementary TCP sockets: Socket, connect, bind, listen, accept, fork and exec function, concurrent servers, Close function.

UNIT-II: TCP CLIENT SERVER AND SOCKET OPTIONS (9 Periods)

TCP Echo server functions, Normal startup, terminate and signal handling, Server process termination, Crashing and Rebooting

of server host, Shutdown of server host.

Socket Options:I/O Models, select function, Batch input, shutdown function, poll function, getsockopt and setsockopt functions, Socket states, Generic socket option, IPV6 socket

options.

UNIT-III: ELEMENTARY UDP SOCKETS (8 Periods)

Introduction, UDP Echo server functions, UDP Echo client functions, lost datagram, summary of UDP example, Lack of flow control with UDP, Determining outgoing interface with UDP.

UNIT IV: DOMAIN NAME SERVER AND IPv4 AND IPv6 INTEROPERABILITY (9 Periods)

DNS, gethostbyName function, gethostbyAddr Function, Resolver option, Function and IPv6 support, uname function and other networking Information.

IPv4 and IPv6 Interoperability: Introduction, IPv4 Client- IPv6 Server, IPv6 Client-IPv4 Server, IPv6 Address-Testing Macros, Source Code Portability.

UNIT-V: INTERPROCESS COMMUNICATION AND REMOTE LOGIN (11 Periods)

Introduction, Pipes, popen and pclose functions, FIFO's, streams and messages, System V IPC: IPC_Perm Structure, IPC Permissions, Creating and Opening IPC Channels, Message queues (msgget, msgsnd, msgrcv, msgctl Functions), Shared Memory (shmget, shmat, shmdt, shmctlFunctions).

Remote Login: rlogin Overview, RPC.

TEXT BOOKS:

1. W.Richard Stevens, *UNIX Network Programming,* Vol. I, Sockets API, PHI, Third Edition, 2010.
2. W.Richard Stevens, *UNIX Network Programming IPC,* Vol. II, Pearson Education, Second Edition , 2015.

REFERENCE BOOKS:

1. T Chan, *UNIX SYSTEMS PROGRAMMING USING C++,* PHI, Third Edition, 2012.
2. Graham Glass, King Ables, *UNIX for programmers and Users,* Pearson Education, Third Edition, 2003.

IV B.Tech. - I semester

(16BT60501) SOFTWARE TESTING

(Program Elective - 2)

(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Software Engineering".

COURSE DESCRIPTION: Software Testing Basics: Goals, Defects, Terminology, Methodology, STLC in SDLC, Verification and Validation; Software Testing Techniques: White box testing, Black Box Testing, Regression testing; Test Management: Test Planning, Design and Specifications; Test Automation: Tool selection and Guidelines.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Software Testing Life Cycle.
- Testing Techniques.
- Test Management and Metrics.
- Regression Testing
- Test Automation

CO2. Analyze testing circumstances and their resultants in software development.

CO3. Design and develop the appropriate test cases in accordance to the software development model.

CO4. Use problem solving skills to control and monitor the testing process.

CO5. Apply testing tools for testing the software quality.

CO6. Apply contextual knowledge to perform testing on software related to societal applications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO SOFTWARE TESTING (9 Periods)

Evolution of Software Testing, Software Testing-Myths and Facts, Goals of Software Testing, Psychology for Software Testing, Software Testing Definitions, Model for Software Testing, Effective Software Testing vs. Exhaustive Software Testing. Effective Testing is Hard, Software Testing as a Process.

Terminology and Methodology: Software Testing Terminology,

Software Testing Life Cycle (STLC), Software Testing Methodology.

UNIT-II: WHITEBOX TESTING (9 Periods)

Need of White-Box Testing, Logic Coverage Criteria, Basis Path Testing, Graph Matrices, Loop Testing, Data Flow Testing,

Mutation Testing.

UNIT-III: BLACKBOX TESTING (8 Periods)

Boundary Value Analysis (BVA), Equivalence Class Testing, State Table-Based Testing, Decision Table-Based Testing, Cause-Effect Graphing Based Testing, Error Guessing.

UNIT-IV: SOFTWARE TEST MANAGEMENT AND METRICS (10 Periods)

Test Management: Test Organization, Structure of Testing Group, Test Planning, Detailed Test Design, Test Specifications.

Software Metrics: Definition of Software Metrics, Classification of Software Metrics, Size Metrics.

UNIT-V: REGRESSIONAND AUTOMATION (9 Periods)

Regression Testing: Progressive vs. Regressive Testing, Regression Testing Produces Quality Software, Regression Testability, Objectives of Regression Testing, Regression Testing Types, Defining Regression Test Problem, Regression Testing Techniques.

Automation and Testing Tools: Need for Automation, Categorization of Testing Tools, Selection of Testing Tools, Costs Incurred in Testing Tools, Guidelines for Automated Testing, Overview of Some Commercial Testing Tools.

Total Periods: 45

TEXT BOOK:

1. Naresh Chauhan, *Software Testing: Principles and Practices,* Oxford University Press, Second Edition, 2016.

REFERENCE BOOKS:

1. Boris Beizer, *Software Testing Techniques,* Dream Tech Press, Second Edition, 2004.
2. Dr. K. V. K. K. Prasad, *Software Testing Tools,* Dreamtech, 2004.

IV B.Tech. - I semester

(16BT71205) CRYPTOGRAPHY AND NETWORK SECURITY

(Program Elective - 3)

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Networks".

COURSE DESCRIPTION: Principles and Practice of Cryptography and Network Security; Classical Systems; Symmetric Block Ciphers; Public- key Cryptography; Hash Functions; Authentication; Key Management; Key Exchange; Signature Schemes; E-mail; Web Security; Malicious Software; Intrusion Detection; Phishing and Identity Theft.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Cryptographic algorithms and their mathematical models
- Message Authentication
- Digital Signatures
- Malicious Software
- Intrusion Detection
- Phishing and Identity Theft

CO2. Analyze vulnerabilities and threats on information systems based on various security parameters.

CO3. Apply security and privacy methods to protect and prevent cyber crimes.

CO4. Solve information privacy issues using encryption and digital signatures.

CO5. Use firewall and PGP to protect network and e-mail respectively.

CO6. Follow standards in implementation of network security.

DETAILED SYLLABUS:

UNIT-I: CLASSICAL ENCRYPTION TECHNIQUES **(6 Periods)**

Introduction: Services, Mechanisms, and Attacks concepts, The OSI security Architecture, Model for network security.

Classical Encryption Techniques: Symmetric cipher model, Substitution techniques- Ceaser cipher, Hill cipher, Poly and mono alphabetic cipher, Transposition techniques.

UNIT-II: BLOCK CIPHERS AND PUBLIC-KEY CRYPTOGRAPHY **(8 Periods)**

Block Ciphers: Block cipher principles, The data encryption standard (DES), The Strength of DES, Block cipher design principles, Block cipher modes of operation.

Public- Key Cryptography: Principles of public- Key cryptosystems, the RSA algorithm, Diffie-Hellman key exchange.

UNIT-III: MESSAGE AUTHENTICATION CODES, HASH FUNCTIONS, AND DIGITAL SIGNATURES (10 Periods)

Message Authentication Codes: Message authentication requirements, Message authentication functions, Message authentication codes.

Hash Functions: Security of hash functions and MACs, Hash algorithms-SHA, HMAC.

Digital Signatures: Digital Signatures and The Indian IT Act, Digital signature standard (DSS), Authentication applications-Kerberos.

UNIT-IV: ELECTRONIC MAIL SECURITY, IP SECURITY AND WEB SECURITY (11 Periods)

Electronic Mail Security: Pretty good privacy (PGP).

IP Security: IP security overview, Architecture, Authentication header, Encapsulating security payload, Combining security associations.

Web Security: Web security Considerations, Secure sockets layer (SSL), Transport layer security (TLS), Secure electronic transaction.

UNIT-V: MALICIOUS SOFTWARE, INTRUSION DETECTION, PHISHING AND IDENTITY THEFT (10 Periods)

Malicious Software: Spywares, Viruses and worms, DoS and DDoS attacks.

Intrusion Detection: Key loggers, Intrusion detection, Password management-Password protection, Password selection; Firewall design principles, Trusted systems.

Phishing and Identity Theft: Proxy servers, Anonymizers, Phishing and identity theft (ID Theft).

Total Periods: 45

TEXT BOOKS:

1. William Stallings, *Cryptography and Network Security Principles and Practice,* Pearson Education, Fourth Edition, 2010.
2. Nina Gobole and Sunit Belapure, *Cyber Security:*

Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley India, 2011.

REFERENCE BOOK:

1. Behrouz A Forouzan and Debdeed Mukhopadhyay, *Cryptography and Network Security,* McGraw Hill Education, Second Edition, 2010.

IV B.Tech. - I semester

(16BT71206) .NET TECHNOLOGIES

(Program Elective - 3)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Web Technologies".

COURSE DESCRIPTION: Introduction to .NET Framework and C# Programming;Object-oriented concepts with C#, Exception handling; Interfaces, Generics, Delegates and Events in C#; Database access with ADO.NET; Web application development using ASP.NET Web forms and Web controls.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Basics of .NET platform.
- Building C# applications, designing ASP.NET websites, perform Data access, building ASP.NET applications.

CO2. Analyze complex problems and identify .NET components for client-server environment.

CO3. Design and develop Graphical User Interface and Web applications using .NET technologies.

CO4. Demonstrate problem solving skills for developing interactive web applications.

CO5. Use C#, ADO.NET and ASP.NET technologies for website design.

CO6. Create websites as per societal needs.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO C# AND .NET PLATFORM (9 Periods)

The Philosophy of .NET: Benefits of .NET platform, Building blocks of .NET platform, Overview of .NET assemblies, Common type system, Common language specification, Common language runtime, Platform-independent nature of .NET.

Building C# Applications: Building C# applications on windows OS, Building .NET applications Beyond windows OS, Anatomy of a simple c# program, System. Console class, System data types and corresponding C# keywords, Working with string data, C# iteration constructs; Decision constructs and Relational/equality operators, Understanding C# arrays.

UNIT-II: OBJECT ORIENTED PROGRAMMING WITH C# AND EXCEPTION HANDLING (11 Periods)

Object Oriented Programming with C#: Introduction to C# class type, Constructors, The role of the this keyword, The static keyword, Pillars of OOP, C# access modifiers, C# encapsulation services, Understanding automatic properties, The basic mechanics of inheritance, The details of inheritance, C#'s polymorphic support.

Understanding Structured Exception Handling: The role of .NET exception handling, The simplest possible example, System-level exceptions, Application level exceptions, Processing multiple exceptions.

UNIT-III: INTERFACES, GENERICS, DELEGATES AND EVENTS

(7 Periods)

Interfaces: Understanding interface types, Defining custom interfaces, Implementing an interface, Implementing interfaces using visual studio.

Generics: Role of generic type parameters, Creating custom generic methods, Creating custom generic structures and classes.

Delegates: Understanding the .NET delegate type, Delegate example, Generic delegate.

Events: C# events, Understanding operator overloading.

UNIT-IV: ADO.NET (9 Periods)

Definition of ADO.NET, ADO.NET data provider, ADO.NET namespaces, Connected layer of ADO.NET, Data readers, Database transactions, Disconnected layer of ADO.NET, Role of the dataset, Working with DataColumns, DataRows, DataTable, DataAdapters, Binding DataTable objects to windows forms GUIs.

UNIT-V: ASP.NET WEB FORMS, WEB CONTROLS AND STATE MANAGEMENT TECHNIQUES (9 Periods)

ASP.NET Web Forms: The role of HTTP, Web Applications and

Web Servers, Role of client side scripting, Posting back to the web server, Overview of ASP.NET API, Building a single file ASP.NET web page, Building an ASP.NET webpage using code files, ASP.NET web sites vs. ASP.NET web applications, ASP.NET web site directory structure, The life cycle of an ASP.NET web page, Role of the web.config file.

ASP.NET Web Controls: Understanding the nature of web controls, Major categories of ASP.NET web control, The Role of validation controls, Application cache, The control and WebControl Base Classes

ASP.NET State Management Techniques: Maintaining session

data, Understanding Cookies.

Total Periods: 45

TEXT BOOK:

1. Andrew Troelsen and Philip Japikse, *Pro C# 5.0 and the .NET 4.5 Framework,* Apress, Sixth Edition, 2012.

REFERENCE BOOKS:

1. Christian Nagel, Jay Glynn and Morgan Skinner, *Professional C# 5.0 and .NET 4.5.1,* WROX Publications, 2014.

2. Mathew Mac Donald, *The Complete Reference ASP.NET,* Tata McGraw Hill, 2010.

IV B.Tech. - I semester

(16BT71207) E - COMMERCE

(Program Elective - 3)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Networks".

COURSE DESCRIPTION: Electronic Commerce Framework; Consumer Oriented Electronic Commerce; Electronic Payment Systems; Inter and Intra Organizational Commerce; Corporate Digital Library; Advertising and Marketing on Internet; Consumer Search and Resource Discovery; Multimedia and Digital Video.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- The basic concepts and technologies used in the field of E-Commerce.
- E-Payment systems
- Inter and Intra Organizational E-Commerce
- Advertising and Marketing on Internet
- Key Multimedia Concepts

CO2. Analyze the Mercantile Process Models in different views.

CO3. Apply compression and decompression techniques and codec required for Video Conferencing.

CO4. Solve security issues in E-Commerce using encryption mechanisms.

CO5. Follow ethics in the usage of E-Commerce.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND NETWORK SECURITY (9 Periods)

Introduction: Electronic commerce frame work, Electronic commerce and media convergence, The anatomy of E-commerce applications, E-Commerce consumer applications, E-Commerce organization applications.

Network Security: Client-Server network security, Emerging client-server security threats, Firewalls and network security, Data and message security, Encrypted documents and electronic mail - Security and the web.

UNIT-II: CONSUMER ORIENTED ELECTRONIC COMMERCE AND ELECTRONIC PAYMENT SYSTEMS (10 Periods)

Consumer Oriented Electronic Commerce: Consumer oriented applications, Mercantile process models from the consumer's perspective, Mercantile process models from the merchant's

perspective.

Electronic Payment Systems: Types of electronic payment systems, Digital token-based, Smart cards, Credit cards, Risks in electronic payment systems.

UNIT-III: INTER ORGANIZATIONAL COMMERCE AND INTRA ORGANIZATIONAL COMMERCE (9 Periods)

Inter Organizational Commerce: EDI, EDI implementation, MIME and value added networks.

Intra Organizational Commerce: Work flow automation and coordination, Customization and internal commerce, Supply chain management.

UNIT-IV: CORPORATE DIGITAL LIBRARY and ADVERTISING AND MARKETING ON THE INTERNET (9 Periods)

Corporate Digital Library: Making a business case for a document library, Types of digital documents, Issues behind document infrastructure, Corporate data warehouses.

Advertising and Marketing on the Internet: Advertising and marketing - Information based marketing, Advertising on internet, On-line marketing process, Market research.

UNIT-V: CONSUMER SEARCH and RESOURCE DISCOVERY AND MULTIMEDIA AND DIGITAL VIDEO (8 Periods)

Consumer Search and Resource Discovery: Information search and retrieval, Electronic commerce catalogs or directories, Information filtering.

Multimedia and Digital Video: Key multimedia concepts, Digital video and electronic commerce, Desktop video processing, Desktop video conferencing.

Total Periods: 45

TEXT BOOK:

1. Ravi Kalakota and Andrew B. Whinston, *Frontiers of Electronic Commerce,* Pearson Education, Seventh Edition, 2009.

REFERENCE BOOKS:

1. Hendry Chan, Raymond Lee, Tharam Dillon and Ellizabeth Chang, *E-Commerce Fundamentals and Applications,* John Wiley, Third Edition, 2007.

2. S.Jaiswal, *E-Commerce,* Galgotia,2008

3. Efrain Turbon, Jae Lee, David King and H.Michael Chang, *E-Commerce,* Pearson Education Asia, 2001.

4. Gary P. Schneider and James T. Perry, *Electronic Commerce,* Thomson Learning, 2001.

IV B.Tech. - I semester

(16BT71207) SERVICE ORIENTED ARCHITECTURE

(Program Elective-3)

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Software Engineering".

COURSE DESCRIPTION: Web Services; Principles of SOA; Service Layers; Simple Object Access Protocol (SOAP); Web Services Description Language (WSDL).

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Principles, services and policies of service orientation.
- Fundamentals of web services.
- XML, WSDL related to SOA.

CO2. Analyze complex business process critically in identifying appropriate service model logic.

CO3. Design service oriented architecture suitable for different environments.

CO4. Use XML, SOAP and service interface design tools for building service oriented architecture.

DETAILED SYLLABUS:

UNIT - I: SOA AND EVOLUTION (10 Periods)

Introducing SOA: Fundamental SOA, Common characteristics of contemporary SOA, Common pitfalls of adopting SOA.

The Evolution of SOA: An SOA timeline, The continuing evolution of SOA, The roots of SOA.

Web Services and Primitive SOA: The web services framework, Services, Service descriptions, Messaging.

UNIT - II: SOA AND WS-* EXTENSIONS (8 Periods)

WS-* and Contemporary SOA (Part I): Message Exchange DDPatterns (MEP), Service activity, Coordination, Atomic transactions, Business activities.

WS-* and Contemporary SOA (Part-II): Addressing, Reliable messaging, Correlation, Policies, Metadata exchange.

UNIT - III: PRINCIPLES, SERVICE LAYERS AND PLANNING

(9 Periods)

Principles of Service-Orientation: Service-orientation and the enterprise, Anatomy of SOA, Common principles of service orientation, Inter relationship of service orientation principles, Service orientation and Object orientation.

Service Layers: Service-orientation and contemporary SOA, Service layer abstraction, Application service layer, Business service layer, Orchestration service layer, Agnostic services, Service layer configuration scenarios.

SOA Delivery Strategies: SOA delivery lifecycle phases, The Top-down strategy, the bottom-up strategy, the agile strategy.

UNIT - IV: SERVICE ORIENTED ANALYSIS AND SERVICE MODELING (8 Periods)

Service Oriented Analysis: Objectives and service oriented analysis process, Benefits of a business centric SOA and Deriving business services.

Service Modeling: Service modeling, Service modeling guidelines, Classifying service model logic, Contrasting service modeling approaches.

UNIT - V: SERVICE ORIENTED DESIGN AND SERVICE DESIGN

(10 Periods)

Service-Oriented Design: Objectives and Service oriented design process, WSDL related XML schema language basics, WSDL language basics, SOAP language basics, Service interface design tools.

Service Design: Service design overview, Entity-centric business service design, Application service design, Task-centric business service design, Service design guidelines.

Total Periods: 45

TEXT BOOK:

1. Thomas Erl, *Service-Oriented Architecture - Concepts, Technology, and Design,* Pearson Education, 2011.

REFERENCE BOOKS:

1. Eric Newcomer, *Understanding SOA with Web Services,* Pearson Education, Second Edition, 2005.

2. Shankar Kambhampaty, *Service Oriented Architecture for Enterprise and Cloud Applications,* Wiley-India, Second Edition, 2010.

IV B.Tech. - I semester

(16BT71209) MACHINE LEARNING

(Program Elective - 4)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Probability and Statistics" and "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Introduction to Machine Learning; Planning for Machine Learning; Bayesian Techniques; Decision Trees; Bayesian Networks; Artificial Neural Networks; Association Rules Learning; Support Vector Machines; Clustering; Machine Learning as a Batch Process; Case Studies, Data Science Fundamentals.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Decision Trees and Bayesian Networks
- Artificial Neural Networks and Association Rules
- Support Vector Machines, Data Science fundamentals.

CO2. Analyze complex datasets and identify suitable machine learning algorithms.

CO3. Design decision making algorithms using supervised and unsupervised approaches.

CO4. Solve complex data analytical problems using machine learning and data science techniques.

CO5. Use Apache Spark and R tools for real-time and batch processing applications.

CO6. Develop machine learning based solutions as per societal needs.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION AND PLANNING FOR MACHINE LEARNING (9 Periods)

Introduction to Machine Learning: History of machine learning, Algorithm types for machine learning, Uses for machine learning, Languages for machine learning, Software used for machine learning, Data repositories.

Planning for Machine Learning: Machine learning cycle, Defining the process, Building a data team, Data processing, Data storage, Data privacy, Data quality and cleaning, Thinking about input data and output data.

UNIT - II: DECISION TREES, BAYESIAN NETWORKS AND ARTIFICIAL NEURAL NETWORKS (9 Periods)

Decision trees, Bayesian networks, Association rule mining concepts and algorithms

Artificial Neural Networks: Usage and breaking down the artificial neural network, Artificial neural networks with weka, Implementing a neural network in java.

UNIT-III: SUPPORT VECTOR MACHINES AND CLUSTERING (9 Periods)

Support Vector Machines using Weka: Usage of support vector machines, Basic classification principles, Support vector machines approach classification.

Clustering using Weka: Usage of clustering, Clustering models, k-means clustering.

UNIT-IV: MACHINE LEARNING AS A BATCH PROCESS AND CASE STUDIES (9 Periods)

Machine Learning as a Batch Process: Considerations for batch processing data, Practical examples of batch processes, Using the hadoop framework, Mining the hashtags mining sales data, Scheduling batch jobs.

Case Studies: Apache Spark and R.

UNIT-V: DATA SCIENCE FUNDAMENTALS (9 Periods)

Deep learning, Semi-supervised learning, Active learning, Multi-task learning, k-nearest neighbors, Recommender systems, SimFple and multiple linear regression.

Total Periods: 45

TEXT BOOKS:

1. Jason Bell, *Machine Learning for Big Data,* Wiley Big Data Series, 2016.
2. Avrim Blum, John Hopcroft and Ravindran Kannan, *Foundations of Data Science,* 2016.

REFERENCE BOOKS:

1. Tom M. Mitchell, *Machine Learning,* McGraw-Hill, 2013
2. Ethem Alpaydin, *Introduction to Machine Learning,* MIT Press, Second Edition, 2009.
3. Joel Grus, *Data Science from scratch,* O'Reilly Publication, 2015.

IV B.Tech. - I semester

(16BT71508) INTERNET OF THINGS

(Program Elective - 4)

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Networks".

COURSE DESCRIPTION: Internet of Things Components; Communication models; Prototyping; Hardware; Design models; Analytics for IoT.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on Protocols, functional blocks and communication models of Internet of things.

CO2. Identify appropriate sensors and communication modes used in IoT based systems.

CO3. Design appropriate solutions for IoT applications using Raspberry Pi and Arduino kits.

CO4. Appropriately synthesize the models and applications for usage in Home automation and cities.

CO5. Apply evolutionary techniques to perform analytics on the data integrated from IoT based systems.

CO6. Use advances in IoT technology to design and develop applications.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION TO INTERNET OFTHINGS(8 Periods)

Definition, Characteristics, Things, Protocols, Logical Design, Functional Blocks, Communication models, APIs, Enabling Technologies, Levels and Deployment templates.

UNIT- II: DEVICES AND END POINTS (10 Periods)

IoT Devices-Examples-Raspbe rry PI interfaces, Arduino interfaces, Programming Raspberry PI with Python, Other IOT devices, Domain Specific IoTs.

UNIT-III: SENSORSand CONNECTIVITY (8 Periods)

Sensors-Types of Sensor Nodes; Internet Communications, IP Addresses, MAC Address, TCP and UDP ports, Application Layer Protocols.

UNIT-IV: DESIGN METHODOLOGY AND CASE STUDIES

(10 Periods)

Design Methodology: Purpose and Requirements specifications, Process Specifications, Domain Model specifications, Information Model specifications, Service specification, Level Specifications, Functional View specifications, Operational View specifications, Device and Component integration, Application development.

Case Studies: Home Automation, Cities.

UNIT-V: DATA ANALYTICS FOR IoT (9 Periods)

Analytics, Apache Hadoop, Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Chef and Case studies.

Total Periods: 45

TEXT BOOK:

1. Arshdeep Bahga, Vijay Madisetti, *Internet of Things - A Hands-on Approach,* University Press, 2015.

REFERENCE BOOKS:

1. Adrian McEwen and Hakim Cassimally, *Designing the Internet of Things,* Wiley Publishing, 2013.
2. CharlesBell, *Beginning Sensor Networks with Arduino and Raspberry Pi*, Apress, 2013.
3. Marco Schwartz, *Internet of Things with the Arduino Yun,* Packt Publishing, 2014.
4. Matt Richardson, Shawn Wallace, *Getting Started with Raspberry Pi,* Maker Media, Inc, 2012.

IV B.Tech. - I semester

(16BT71210) HIGH PERFORMANCE COMPUTING

(Program Elective - 4)

(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Organization".

COURSE DESCRIPTION: Cache-based Microprocessor Architecture; Memory Hierarchies; Multithreaded Processors; Common Sense Optimizations; The Role of Compilers; Data Access Optimization; Shared-memory Computers; Parallel Scalability; Introduction to OpenMP; Parallel Jacobi Algorithm; Introduction to MPI; MPI Performance Tools; MPI Parallelization of Jacobi Solver.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Modern Processors and code Optimization.
- Parallel computing paradigms.

CO2. Analyze computation problems and identify the suitable parallel processing approaches to achieve optimum computation.

CO3. Design Parallel processing algorithms for achieving high performance computing.

CO4. Solve shared memory problems using Parallel Programming.

CO5. Use OpenMP and MPI tools in Parallel Programming.

DETAILED SYLLABUS:

UNIT-I: MODERN PROCESSORS (8 Periods)

Stored-program computer architecture, General-purpose cache-based microprocessor architecture, Memory hierarchies, Multicore processors, Multi-threaded processors, Vector processors.

UNIT-II: BASICOPTIMIZATION TECHNIQUES FOR SERIAL CODE (10 Periods)

Scalar profiling, Common sense optimizations, Simple measures,

Large impact, The role of compilers, C++ optimizations, Data access optimization-balance analysis and light speed estimates, Storage order.

Case study: The Jacobi algorithm and Dense matrix transpose.

UNIT-III: PARALLEL COMPUTERS (9 Periods)

Taxonomy of parallel computing paradigms, Shared-memory computers, Distributed-memory computers, Hierarchical systems, Networks. Basics of parallelization, Data Parallelism, Function parallelism, Parallel scalability.

UNIT-IV: SHARED-MEMORY PARALLEL PROGRAMMING WITH OpenMP (9 Periods)

Introduction to OpenMP - Parallel execution, Data scoping, OpenMP work sharing for loops, Synchronization, Reductions, Loop scheduling and tasking.

Case study: OpenMP-parallel Jacobi algorithm, Efficient OpenMP programming-profiling OpenMP programs, Performance pitfalls.

Case study: Parallel sparse matrix-vector multiply.

UNIT- V: DISTRIBUTED-MEMORY PARALLEL PROGRAMMING WITH MPI (9 Periods)

Message passing, Introduction to MPI, Examples - MPI parallelization of Jacobi solver; Efficient MPI Programming - MPI performance tools, communication parameters, Synchronization, Serialization, Contention, Reducing communication overheads, Understanding intranode point-to-point communication.

Total Periods: 45

TEXT BOOK:

1. Georg Hager and Gerhard Wellein, *Introduction to High Performance Computing for Scientists and Engineers,* Chapman and Hall / CRC Computational Science Series, 2012.

REFERNCE BOOKS:

1. Charles Severance and Kevin Dowd, H*igh Performance Computing,* O'Reilly Media, Second Edition , 1998.
2. Kai Hwang and Faye Alaye Briggs, *Computer Architecture and Parallel Processing,* McGraw Hill, 1984.

IV B.Tech. - I semester

(16BT70505) HUMAN COMPUTER INTERACTION

(Program Elective - 4)

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Computer Graphics".

COURSE DESCRIPTION: Graphical User Interface; Design Process; Screen Designing; Windows; Components; Software Tools; Interaction Devices.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on principles, characteristics, tools and devices of Human Computer Interaction.

CO2. Analyze the user requirements, technological and physical characteristics of users for better interface design.

CO3. Design appropriate user interface for desktop and web applications.

CO4. Conduct investigations on User requirements to provide an effective user interface.

CO5. Utilize user interface mockup tools and input, output and pointing devices for designing user interfaces.

CO6. Apply Contextual knowledge to develop interfaces for differently abled people.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (9 Periods)

Importance of user Interface: Definition, Importance of good design, Benefits of good design, A brief history of screen design.

Characteristics of Graphical and Web User Interfaces: The graphical user interface - popularity of graphics, The concept of direct manipulation, Graphical systems, Characteristics; Web user Interface -Popularity, Characteristics; Principles of user interface design.

UNIT-II: CONTROL DESIGN PROCESS (8 Periods)

Design Process: Human interaction with computers, Importance of human characteristics, human considerations in design, Human interaction speeds, and understanding business functions.

UNIT-III: SCREEN DESIGN (10 Periods)

Design goals: Screen meaning and purpose, Organizing screen elements, Ordering of screen data and content, Screen navigation and flow, Visually pleasing composition, Amount of information, Focus and emphasis, Presenting information simply and meaningfully, Information retrieval on web, Statistical graphics, Technological considerations in interface design.

UNIT-IV: WINDOWS AND MULTIMEDIA (8 Periods)

Windows Menus and Navigation schemes: Selection of window, selection of device based and screen based controls.

Components: Text and messages, Icons and images, Multimedia, Color uses, Problems with colors, choosing colors.

UNIT-V: SOFTWARE TOOLS AND DEVICES (10 Periods)

Software tools: Specification methods, Interface building tools, Interaction devices - Keyboards and keypads,Pointing devices,Speech and auditory interfaces; Image and video displays, drivers.

Total Periods: 45

TEXT BOOKS:

1. Wilbert O. Galitz, *The Essential Guide to User Interface Design,* Wiley India Education, Second Edition, 2008.
2. Ben Schneiderman and Catherine Plaisant, *Designing the User Interface,* Pearson Education, Fourth Edition, 2009.

REFERENCE BOOKS:

1. A Dix, Janet Finlay, G. D. Abowd and R. Beale, *Human-Computer Interaction,* Pearson Publishers, Third Edition, 2008.
2. Jonathan Wolpaw and Elizabeth Winter Wolpaw, *Brain-Computer Interfaces: Principles and Practice,* Oxford Publishers, 2012.

IV B.Tech. - I semester

(16BT71231) BIG DATA TECHNOLOGIES LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: Courses on "Big Data Technologies" and "Java Programming".

COURSE DESCRIPTION: Hands-on experience in Big data storage, processing, querying, reporting, predictive analytics, classification, clustering, recommendation system using Data-parallel programming model of Hadoop, MapReduce, HDFS, Hive, Pig, HBase, Zookeeper and Sqoop Big Data Tools.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on Big Data characteristics, storage, processing, querying and reporting.

CO2. Analyze large dataset issues and solve using data analytic techniques.

CO3. Design and Develop classification and clustering models for dataset analysis.

CO4. Solve large data analysis problems using Big data techniques.

CO5. Apply Big Data Tools: Sqoop, HBase, Hive, Pig, MapReduce and Zookeeper for large data management and knowledge extraction.

CO6. Build Hadoop environment suitable for societal requirements.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

CO8. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXPERIMENTS:

1. Practice on Hadoop:
   i. Hadoop installation and Cluster Configuration.
   ii. Create Name node, Secondary Name node in Safe mode.
   iii. Create Hadoop File system Shell and Read and write Data.
2. Practice on MapReduce:
   i. Create file to count the number of words and display the

same.

ii. Apply MapReduce for Video Streaming file.

3. Count number of Objects in a given video file using Pig programming Tool.
4. Practice on Hive:
   i. Table Creation and Deletion.
   ii. Querying and reporting.
5. Import and Export data from RDBMS database using Sqoop tool.
6. Practice on HBase:
   i. Table Creation and Deletion.
   ii. Querying and reporting.
7. Create Workflow, Deploy and Run using Oozie Tool.
8. Perform data storage and management using Zookeeper tool.
9. Case study 1: Insurance Domain

   i) Perform Classification Technique on Insurance Dataset

   ii) Perform Clustering Technique on Insurance Dataset
10. Case study 2: Healthcare Domain

    i) Perform Classification Technique on Healthcare Dataset

    ii) Perform Clustering Technique on Healthcare Dataset
11. Case study 3: Retail Store data

    i) Perform Recommendation Engine on Retail Store Dataset

    ii. Perform Association rule mining on Retail Store Dataset.

REFERENCE BOOKS:

1. Tom White, *Hadoop: The Definitive Guide,* O'reilly and Yahoo Press, Third Edition, 2012.
2. Frank J. Ohlhorst, *Big Data Analytics: Turning Big Data into Big Money,* Wiley Publication, December, 2012.
3. Kevin Roebuck, *Big Data: High-Impact Strategies - What You Need to Know: Definitions, Adoptions, Impact, Benefits, Maturity, Vendors,* Tebbo Publisher, 2011.
4. Alex Holmes, *Hadoop in Practice,* Manning Publications Publisher, 2012.

IV B.Tech. - I semester

(16BT71232) MOBILEAPPLICATION DEVELOPMENT LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PRE-REQUISITES: A Course on " Mobile Application Development".

COURSE DESCRIPTION: Hands-on experience on development of Android Mobile applications with Submenus; Context menus; Layouts; Buttons; Date Picker and database access with Android SQLite.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on:

- Mobile platforms and Mobile User Interface
- Android Activities and Intents
- Messaging, Networking, Location based Services, Android Services
- Basics of iOS

CO2. Analyze the context of complex problems and identify user interface design requirements.

CO3. Design and develop solutions for real world problems with android mobile applications.

CO4. Demonstrate problem solving skills to create applications for mobile devices.

CO5. Apply Android studio and iOS tools to develop mobile applications.

CO6. Create mobile applications as per societal needs.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

CO8. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXPERIMENTS:

1. Test the android development environment by performing the following operations.

a. Add the sample application to a project in Android studio.

b. Create an Android Virtual Device (AVD) for sample project.

c. Create a launch configuration for sample project.

d. Run a sample application in Android Emulator.

2. Develop a program which will implement Sub menu in android application.

3. Develop a program to implement Context menu (Floating List of Menu Items) in android application.

4. Develop a program to demonstrate the use of Relative Layout Views with different attributes.

5. Develop a program to demonstrate the use of Linear Layout Views with different attributes.

6. Develop a program to implement a Custom Button and handle the displayed message on button press.

7. Develop a program to implement the Table layout in View Group that displays child View elements in rows and columns.

8. Develop a program to implement the List View in android application.

9. Develop a program to show how to use Date picker control of ADK in android applications.

10. Develop a program to insert, delete, display, and update the employee details using Android SQLite.

11. Design and develop a program to create sign-up and sign-in pages and maintain the user details with SQLite

12. Mini project:-Develop the following applications using Android.

a. Alarm	b. Audio player
c. Audio Recorder	d.Video Player

REFERENCE BOOKS:

1. J. F. DiMarzio, *Beginning Android Programming with Android Studio,* Wiley India, Fourth Edition, 2017.

2. Paul Deital and Harvey Deital, *Android How to Program,* Detial associates publishers, 2013.

3. Neils Smyth, *Android Stduio Development Essentials,* Creative Space Independent Publishing Platform, Seventh Edition, 2016.

4. Jeff McWherter and Scott Gowell, *Professional Mobile Application Development,* Wiley India, 2012.

IV B.Tech. - I semester

(16BT71233) **COMPREHENSIVE ASSESSMENT**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	100	100	-	-	-	2

PRE-REQUISITES: All the technical courses of the program upto IV B. Tech. - I Semester.

COURSE DESCRIPTION: Assessment of student learning outcomes in the courses of the program.

COURSE OUTCOMES: Comprehensive Assessment enables successful students to demonstrate:

CO1. Knowledge in the courses of the program.

CO2. Analytical ability in the courses of the program.

CO3. Design skills in the courses of the program.

CO4. Ability to investigate and solve complex engineering problems in the courses of the program.

CO5. Ability to apply tools and techniques to complex engineering activities with an understanding of limitations in the courses of the program.

CO6. Ability to provide solutions as per societal needs with consideration to health, safety, legal and cultural issues in the courses of the program.

CO7. Understanding of the impact of the professional engineering solutions in environmental context and need for sustainable development in the courses of the program.

CO8. Ability to apply ethics and norms of the engineering practice in the courses of the program.

CO9. Ability to function effectively as an individual in the courses of the program.

CO10. Ability to present views cogently and precisely in the courses of the program.

CO11. Ability to engage in life-long leaning in the courses of the program.

IV B.Tech. - II semester

(16BT81231) **PROJECT WORK**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
100	100	200	-	-	-	12

PRE-REQUISITES: All technical courses of the program up to IV B. Tech. - I Semester.

COURSE DESCRIPTION: Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: Completion of the project work enables successful students to:

CO1. Demonstrate knowledge on the topic of project work.

CO2. Demonstrate analytical ability exercised in the project work.

CO3. Apply design skills for the project implementation.

CO4. Investigate and solve chosen project problem with optimum solution.

CO5. Use techniques and modern engineering tools for the development of projectwork.

CO6. Provide solutions as per societal needs with consideration to health, safety, legal and cultural issues in the project work.

CO7. Understand environmental issues while executing the project work

CO8. Understand professional and ethical responsibilities while executing the project work.

CO9. Function effectively as an individual and a member in the project team.

CO10. Present views cogently and precisely on the project work.

CO11. Demonstrate project management skills and estimate time and cost required for carrying out the project work.

CO12. Engage lifelong learning to improve knowledge and competence in the chosen area of the project work.