VIDYA JYOTHI INSTITUTE OF TECHNOLOGY

An Autonomous Institution

Aziznagar Gate, C.B. Post, Hyderabad – 500075, Telangana, India.

B.Tech Syllabus (R-18)

Department of

Computer Science and Engineering

COURSE STRUCTURE FOR B.TECH I YEAR

B. Tech. I Year I Semester

S.No	Course Category	Course Title	L	T	P	Credits
1	BS-1	Mathematics-I	3	1	0	4.0
2	BS-2	Applied Physics	3	1	0	4.0
3	BS-Lab 1	Applied Physics Lab	0	0	3	1.5
4	ES-1	Basic Electrical Engineering	3	0	0	3.0
5	ES-Lab 1	Basic Electrical Engineering Lab	0	0	2	1.0
6	ES-2	Engineering Graphics & Modeling	1	0	3	2.5
7	H&S-Lab 1	English Language Skills Lab (ELSL)	0	0	2	1.0
8	ES-3	Programming for Problem Solving-I	2	0	0	2.0
9	ES-Lab 2	Programming for Problem Solving Lab-I	0	0	2	1.0
Total			12	2	12	20

B. Tech. I Year II Semester

S.No	Course Category	Course Title	L	T	P	Credits
1	BS-3	Mathematics-II	3	1	0	4.0
2	BS-4	Chemistry	3	1	0	4.0
3	BS-Lab 2	Chemistry Lab	0	0	3	1.5
4	H&S-1	English	2	0	0	2.0
5	H&S-Lab 2	English Communication Skills Lab(ECSL)	0	0	2	1.0
6	ES-4	Programming for Problem Solving-II	2	0	0	2.0
7	ES-Lab 3	Programming for Problem Solving Lab-II	0	0	2	1.0
8	ES -Lab 4	Engineering Workshop	0	1	3	2.5
Total			10	3	10	18

COURSE STRUCTURE FOR B.TECH II YEAR

B. Tech. II Year I Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	BS-5	Probability and Statistics	3	0	0	3
2	ES	Digital Logic Design	3	0	0	3
3	ES	Electronic Devices Circuits	3	0	0	3
4	PC-1	Data Structures	3	0	0	3
5	PC-2	Mathematical Foundations of Computer Science	3	0	0	3
6	PC-3	Python Programming	3	0	0	3
7	PC Lab	Data Structures & Python Programming lab	0	0	2	1
8	ES Lab	Digital Logic Design & Electronic Devices Circuits Lab	0	0	2	1
9	MC-1	Environmental Science/ Gender Sensitization/Cyber Laws	2	0	0	0
		Total	**20**	**0**	**4**	**20**

B. Tech. II Year II Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	PC-4	Design & Analysis of Algorithms	3	1	0	4
2	PC-5	Computer Organization	3	0	0	3
3	PC-6	Java Programming	3	0	0	3
4.	PC-7	Software Engineering	3	0	0	3
5	PC-8	Database Management Systems	3	0	0	3
6	H&S-2	Professional Communication	1	0	2	2
7	PC Lab	Java Programming Lab	0	0	2	1
8	PC Lab	Database Management Systems Lab	0	0	2	1
9	MC-2	Environmental Science/ Gender Sensitization/Cyber Laws	2	0	0	0
Total			**21**	**0**	**6**	**20**

COURSE STRUCTURE FOR B.TECHIII YEAR

B. Tech. III Year I Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	PC-9	Formal Languages and Automata Theory	3	0	0	3
2	PC-10	Computer Networks	3	0	0	3
3	PC-11	Operating Systems	3	0	0	3
4	PC-12	Web Technologies	3	0	0	3
5	PE-1	Human Computer Interaction Linux Programming Software Project Management Computer Graphics	3	0	0	3
6	OE – 1	Open Elective –I	3	0	0	3
7	PC Lab	Computer Networks & Operating Systems Lab	0	0	2	1
8	PC Lab	Web Technologies Lab	0	0	2	1
9	Value added course -1	Quantitative Methods & Logical Reasoning/ Personality Development & Behavioural Skills	2	0	0	1
Total			**20**		**4**	**21**

B. Tech. III Year I Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	H&S-3	Managerial Economics and Financial Analysis	3	0	0	3
2	PC-13	Compiler Design	3	0	0	3
3	PC-14	Data Warehousing & Data Mining	3	0	0	3
4	PC-15	Artificial Intelligence	3	0	0	3
5	PE -2	Object Oriented Analysis & Design Information Security Software Testing Methodologies Principles of Programming Languages	3	0	0	3
6	OE – 2	Open Elective –II	3	0	0	3
7	PC Lab	Data mining & Case Tools Lab	0	0	2	1
8	H & S - Lab 3	Advanced Communication Skills Lab	0	0	2	1
9	Value added course -2	Quantitative Methods & Logical Reasoning/ Personality Development & Behavioural Skills	2	0	0	1
Total			**20**	**0**	**4**	**21**

III Year – I Semester (Fast Track Curriculum Scheme)

S. No.	Category	Course Title	L	T	P	Credits
1	PC-9	Formal Languages and Automata Theory	3	0	0	3
2	PC-10	Computer Networks	3	0	0	3
3	PC-11	Operating Systems	3	0	0	3
4	PC-12	Web Technologies	3	0	0	3
5	PE-1	Human Computer Interaction Linux Programming Software Project Management Computer Graphics	3	0	0	3
6	OE – 1	Open Elective –I	3	0	0	3
7	PC Lab	Computer Networks & Operating Systems Lab	0	0	2	1
8	PC Lab	Web Technologies Lab	0	0	2	1
9	Value added course -1	Quantitative Methods & Logical Reasoning/ Personality Development & Behavioural Skills	2	0	0	1
Total			**20**		**4**	**21**

III Year – II Semester (Fast Track Curriculum Scheme)

S. No.	Category	Course Title	L	T	P	Credits
1	H&S-3	Managerial Economics and Financial Analysis	3	0	0	3
2	PC-13	Compiler Design	3	0	0	3
3	PC-14	Data Warehousing & Data Mining	3	0	0	3
4	PC-15	Artificial Intelligence	3	0	0	3
5	PE -2	Object Oriented Analysis & Design Information Security Software Testing Methodologies Principles of Programming Languages	3	0	0	3
6	OE – 2	Open Elective –II	3	0	0	3
7	PC Lab	Data mining & Case Tools Lab	0	0	2	1
8	H & S-Lab 3	Advanced Communication Skills Lab	0	0	2	1
9	Value added course -2	Quantitative Methods & Logical Reasoning/ Personality Development & Behavioural Skills	2	0	0	1
10	PC-18	Semantic Web & Social Networks	3	0	0	3

Total	23	0	4	24

COURSE STRUCTURE FOR B.TECHIV YEAR

B. Tech. IV Year I Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	PC-16	Mobile Application Development	3	0	0	3
2	PC-17	Cloud Computing	3	0	0	3
3	PE -3	Big Data Analytics Internet of Things R Programming Image Processing	3	0	0	3
4	PE-4	Advanced Databases Block-Chain Technologies Information Retrieval Systems Machine Learning	3	0	0	3
6	PC Lab	Mobile Application Development Lab	0	0	2	1
7	PE-3 Lab	Big Data Analytics Lab Internet of Things Lab R Programming Lab Image Processing Lab	0	0	2	1
8	PW	Mini Project	0	0	6	3
Total			**18**	**0**	**10**	**20**

B. Tech. IV Year II Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	PC-18	E-Commerce	3	0	0	3
2	PC-19	Semantic Web and Social Networks	3	0	0	3
3	PW	Technical Seminar	0	0	4	2
4	PW	Comprehensive Viva Voce	0	0	4	2
5	PW	Major Project	0	0	20	10
		Total	**6**	**0**	**28**	**20**

IV Year I Semester (Fast Track Curriculum Scheme)

S. No.	Category	Course Title	L	T	P	Credits
1	PC-16	Mobile Application Development	3	0	0	3
2	PC-17	Cloud Computing	3	0	0	3
3	PE -3	Big Data Analytics Internet of Things R Programming Image Processing	3	0	0	3
4	PE-4	Advanced Databases Block-Chain Technologies Information Retrieval Systems Machine Learning	3	0	0	3
6	PC Lab	Mobile Application Development Lab	0	0	2	1
7	PE-3 Lab	Big Data Analytics Lab Internet of Things Lab R Programming Lab Image Processing Lab	0	0	2	1
8	PW	Mini Project	0	0	6	3
1	PC-18	E-Commerce	3	0	0	3
		Total	**21**	**0**	**10**	**23**

IV Year II Semester (Fast Track Curriculum Scheme)

S. No.	Category	Course Title	L	T	P	Credits
1	PW	Technical Seminar	0	0	4	2
2	PW	Comprehensive Viva Voce	0	0	4	2
3	PW	Major Project	0	0	20	10
		Total	**0**	**0**	**28**	**14**

Mathematics I
(Matrices and Calculus)

I Year I Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Write the matrix representation of system of linear equations and identify the consistency of the system of equations.
2. Find the Eigen values and Eigen vectors of the matrix and discuss the nature of the quadratic form.
3. Analyze the convergence of sequence and series.
4. Discuss the applications of mean value theorems to the mathematical problems, Evaluation of improper integrals using Beta and Gamma functions.
5. Examine the extrema of functions of two variables with/ without constraints.

UNIT-I:

Matrices and Linear System of Equations:

Matrices and Linear system of equations: Real matrices – Symmetric, skew - symmetric, Orthogonal. Complex matrices: Hermitian, Skew – Hermitian and Unitary. Rank-Echelon form, Normal form. Solution of Linear Systems – Gauss Elimination, Gauss Jordan & LU Decomposition methods.

UNIT-II:

Eigen Values and Eigen Vectors:

Eigen values, Eigen vectors – properties, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalization of matrix- Quadratic forms: Reduction to Canonical form, Nature, Index, Signature.

UNIT-III:

Sequences & Series:

Basic definitions of Sequences and series, Convergence and divergence, Ratio test, Comparison test, Cauchy's root test, Raabe's test, Integral test, Absolute and conditional convergence.

UNIT-IV:

Beta & Gamma Functions and Mean Value Theorems:

Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Generalized Mean Value theorem (all theorems without proof) – Geometrical interpretation of Mean value theorems.

UNIT-V:

Functions of Several Variables:
Partial Differentiation and total differentiation, Functional dependence, Jacobian Determinant-Maxima and Minima of functions of two variables with constraints and without constraints, Method of Lagrange Multipliers.

Textbooks:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 36th Edition, 2010.
2. Advanced Engineering Mathematics, Jain &Iyengar, Narosa Publications.

Reference Books:

1. Calculus and Analytic Geometry, G.B. Thomas and R.L. Finney, 9th Edition, Pearson, Reprint, 2002.
2. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons,2006.
3. Advanced Engineering Mathematics (2nd Edition), Michael D. Greenberg.

Applied Physics

L	T	P	C
3	1	0	4

I Yearl Semester

Course Outcomes:

1. Identify various optical phenomena of light.
2. Discuss the basic principles of quantum mechanics.
3. Classify solids based on the band theory.
4. Elucidate the characteristics of semiconductors and semiconductor devices.
5. Explain the working principle of lasers and optical fibers.

UNIT – I:

Wave Optics:

Principle of Superposition, coherence and methods to produce coherent sources, Interference - Interference in thin films by reflection, Newton's Rings.Diffraction – Fraunhofer and Fresnel Diffraction, Farunhofer diffraction due to single slit, Plane Diffraction Grating, resolving power of Grating.Polarization – Polarization of light waves, Plane of vibration, plane of polarization, Double refraction, Nicol's Prism, Applications of Polarization.

UNIT-II:

Introduction to Quantum Mechanics and Free Electron Theory:

Classical free electron Theory, Electrical Conductivity and Ohm's Law – Drawbacks, Sommerfeld theory (Qualitative).Introduction to quantum physics: Black body radiation and Planck's Law(Qualitative), wave-particle duality, de-Broglie hypothesis of matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle, time independent Schrodinger equation, Born interpretation of wave function, particle in an infinite potential well (one dimension).

UNIT-III:

Band Theory of Solids and Semiconductors:

Kronig-Penny model(Qualitative), E-k diagram, Energy bands in solids, classification of materials into metals, semiconductors, and insulators, Effective mass, Density of States, Fermi distribution function, Fermi level and its importance. Intrinsic semiconductors, carrier concentration in intrinsic semiconductors, energy band diagram and position of Fermi level in intrinsic semiconductors, equation for electrical conductivity of semiconductors, extrinsic semiconductors.

UNIT-IV:

Semiconductor Devices:

Direct and indirect band-gap semiconductors, Formation of p-n junction, energy diagram of PN junction, I-V characteristics of PN junction diode, Photo diode, solar cell-efficiency, light emitting diode and their characteristics, semiconductor laser: device structure and characteristics, Hall effect and its applications.

UNIT-V:

Fiber Optics and Lasers:

Introduction, total internal reflection, acceptance angle and numerical aperture, losses associated with optical fibers, step and graded index fibers, applications of optical fibers.Introduction to interaction of radiation with matter: stimulated absorption, spontaneous emission and stimulated emission, Einstein's coefficients and their relations, characteristics of a laser, important components of a laser: active medium, pumping source, optical resonator. population inversion, Ruby laser, He-Ne laser, applications of lasers.

Textbooks:

1. Engineering Physics, P K Palanisamy, Scietech publication.
2. Engineering Physics, V Rajendran, McGraw Hill Education.

Reference Books:

1. Engineering Physics, S O Pillai, Sivakami, New Age International (P) Limited.
2. Physics Volume I & II, Resnick and Halliday, John Wiley and sons, Inc.

Applied Physics Lab

I Yearl Semester

L	T	P	C
0	0	3	1.5

Course Outcomes:

1. Apply optical phenomena to characterize optical sources and components.
2. Determine the energy gap of a semiconductor diode and time constant of RC circuit
3. Describe the electrical characteristics of PN junction diode, photodiode, LED and solar cell.
4. Demonstrate the resonance in mechanical and electrical waves.
5. Identify the magnetic Induction along the axis of current carrying coil.

List of Experiments

1. Newton's rings: Determination of the radius of curvature of the lens by forming Newton's rings.
2. Diffraction grating: To determine the number of lines per inch of the grating.
3. Dispersive power: To determine the dispersive power of prism by using spectrometer.
4. Single Slit Diffraction using Lasers- Determination of wavelength of a Monochromatic Source (LASER).
5. Energy gap of P-N junction diode: Determination of the energy gap of a semiconductor diode.
6. Photo diode: Study the V-I Characteristics of Photo diode.
7. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.
8. Solar cell: Study the V-I Characteristics of Solar cell.
9. Stewart & Gee's experiment - Determination of magnetic Induction along the axis of current carrying coil.
10. LCR Circuit- Determination of the Resonance frequency of forced electrical oscillator.
11. RC- Circuit – Determination of the time constant of RC-circuit.
12. Optical fiber: Determination of the Numerical aperture of Optical fiber.

Note: Any 10 experiments are to be performed.

Basic Electrical Engineering

L	T	P	C

3	0	0	3

I Year I Semester

Course Outcomes:

1. Understand the fundamentals of basic circuit components and their characteristics.
2. Analyze basic electrical circuits with A.C excitation.
3. Understand the concepts of magnetic circuits and transformers.
4. Acquire the basic concepts of electrical motors.
5. Understand the concept of A.C generator and low voltage electrical installations.

UNIT- I:

Introduction to Electrical Engineering and DC Circuits:

Basic definitions, types of elements, types of sources, Kirchhoff's Laws, resistive networks, inductive networks, series, parallel circuits, Star- Delta and Delta- Star transformation, Network theorems- Superposition, Thevenin's - simple problems.

UNIT- II:

AC Circuits:

Representation of sinusoidal waveforms, peak, RMS and average values **-** Elementary treatment of single-phase AC circuits consisting of R, R-L, R-C, R-L-C combinations (series and parallel) **-** Phase representation, real power, reactive power, apparent power, resonance concept. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT -III:

Magnetic Circuits &Transformers:

Magnetic circuits: Magnetic materials, Faraday's laws of Electromagnetic Induction, BH characteristics, Magnetic Circuits - concept of Self & Mutual Inductance.

Transformers: Ideal and practical single phase transformer, OC-SC tests, equivalent circuit, losses in transformer, regulation and efficiency - simple problems.

UNTI -IV:

DC Machines and Induction Motors:

DC Machines: Construction, Principle and Operation of DC Motor, Voltage- torque equations - simple problems.

Three Phase Induction Motor: Construction, Principle and working of three phase Induction Motor, torque slip characteristics, - simple problems.

Single Phase Induction Motor: Single phase Induction Motor construction and working principle, capacitor start – applications.

UNIT -V:

AC Generator & Electrical Installation:

AC Generator: Construction, Principle of operation of Synchronous Generator, Pitch Factor- Distribution Factor (or winding factor) - EMF equation – simple problems.

Electrical Installation: Fuse, Circuit breakers, difference between fuse and circuit breaker, Types of Batteries, battery backup.

Textbooks:

1. Basic Electrical Engineering, D.P Kothari & I.J Nagrath, Tata McGraw Hill Publishing Company Limited, 2nd Edition.
2. Basic Electrical Engineering, T.K. Nagsarkar and M.S. Sukhija, Oxford University Press, 3rd Edition.

Reference Books:

1. Circuits and Networks, A.Sudhakar&ShyamMohan.S, Tata McGraw Hill Publishing Company limited, 5th Edition.
2. Basic Electrical Engineering, K.Uma Rao and A.Jayalakshmi, Pearson Publications.
3. Basic Electrical Engineering, D C Kulshreshtha,McGraw Hill Education Private limited, 1st Edition.

Basic Electrical Engineering Lab

L	T	P	C
0	0	2	1

I Year I Semester

Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters.
4. Understand the performance characteristics of D.C electrical machines.
5. Understand the performance characteristics of A.C electrical machines.

List of experiments/ demonstrations:

Any 5 experiments from Part-A and Part-B should be conducted (Total 10 Experiments)

Part A

1. Verification of Ohms law.
2. Verification of KVL and KCL.
3. Verification of Thevenin's Theorem.
4. Verification of Superposition Theorem.
5. Transient Response of Series R- L and R - C circuits using DC excitation.
6. Determination and Verification of Impedance and Current of RL and RC series circuits.

Part B

1. Transient Response of R-L-C Series circuit using DC excitation.
2. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation).
3. OC & SC Test on Single phase transformer.
4. Brake test on DC shunt motor.
5. Brake test on Three Phase Squirrel cage induction motor.
6. OCC of Three phase alternator.

Reference Books:

1. Circuits and Networks, A. Sudhakar &Shyam Mohan.S, Tata McGraw Hill Publishing Company Limited, 5th Edition.
2. BasicElectrical Engineering, T.K. Nagsarkar and M.S. Sukhija, Oxford University Press, 3rd Edition.
3. Basic Electrical Engineering, D.P Kothari & I.J Nagrath, Tata McGraw Hill Publishing Company Limited, 2nd Edition.

Engineering Graphics & Modeling

I Year I Semester

L	T	P	C
1	0	3	2.5

Course Outcomes:

1. Understand the concepts of engineering drawing of planes, solids and the CAD drawing software.
2. Applying the principles of engineering graphics while drawing the engineering components.
3. Analyze the sectional views for their configurations.
4. Evaluate the surfaces of solids developed for further processing in the engineering applications.

UNIT– I:

Introduction to Engineering Drawing: Principles of engineering graphics and their significance, usage of drawing instruments, conic sections, including the rectangular hyperbola- General method only. Cycloid, Epicycloid, Hypocycloid. Scales – Plain & Diagonal only.

Introduction to CAD: Introduction to CAD software and its importance, standard toolbar/menus and navigation tools used in the software, using basic commands limits ,units, grid,test ,move, offset ,mirror,rotate, trim, extend, fillet etc. drawing lines using line command. Drawing spline, ellipse, circle, rectangle etc.. Concept of layers and dimensioning.

UNIT-II:

Principles of Orthographic Projections:Conventions, projections of points, projections of lines (first angle projection) inclined to both planes (traces and midpoint problem to be excluded).

Implementation of CAD: Drawing orthographic projections of points and lines using a CAD package.

UNIT – III:

Projections of the Planes: Projections of regular planes inclined to both the planes.

Projections of Solids: Projections of regular solids inclined to both the planes (prisms, pyramids, cones and cylinders, change of potion method only).

Implementation in CAD: Drawing orthographic projection of planes and regular solids using a CAD package.

UNIT – IV:

Sections and Sectional Views of Right Angular Solids: Prism, Cylinder, Pyramid, Cone. Development of surfaces of right regular solids - Prism, Pyramid, Cylinder and Cone.

Implementation in CAD: Concept of hatching, drawing sectional views of solids and the development of right regular solids using a CAD package.

UNIT-V:

Principles of Isometric projection: Isometric scale, isometric views, conventions, isometric views of lines, planes, simple solids, conversion of isometric views to orthographic views and vice-versa, conventions.

Implementation in CAD: Drawing isometric views of simple solids. Drawing isometric views from giving orthographic views and vice-versa using a CAD package.

Note: Implementation in CAD (For Internal Evaluation Weightage Only)

Textbooks:

1. Engineering Drawing, Bhatt N.D., Panchal V.M. & Ingle P.R., (2014),Charotar Publishing House.

Reference Books:

1. Engineering Graphics, Agrawal B. & Agrawal C. M. (2012), TMH Publication, Text book on Engineering Drawing, Narayana, K.L. & P Kannaiah (2008), Scitech Publishers.
2. Engineering Drawing and Computer Graphics, Shah, M.B. & Rana B.C. (2008), Pearson Education.
3. http://docs.autodesk.com/ACDMAC/2013/ENU/PDFs/acdmac_2013_users_guide.pdf

English Language Skills Lab

I Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

1. Reproduce speech sounds and improve fluency in language.
2. Understand syllables and consonant clusters for appropriate pronunciation.
3. Exhibit effective professional skills with rhetoric eloquence.
4. Deliver enthusiastic and well-practiced presentation.
5. Learn Task-Based Language Learning (TBLL) through various language learning activities effectively.

Exercise- I:

CALL Lab:

Introduction to Pronunciation- Speech Sounds, Vowels and Consonants- Practice for Listening.

ICS Lab:

Ice-Breaking activity and JAM session.

Exercise-II:

CALL Lab:

Silent Letters, Consonant Clusters, Homographs.

ICS Lab:

Common Everyday Situations: Conversations and Dialogues.

Exercise-III:

CALL Lab:

Syllables.

ICS Lab:

Communication at Workplace, Social and Professional Etiquette.

Exercise-IV:

CALL Lab:

Word Accent and Stress Shifts.

ICS Lab:

Formal Presentations, Visual Aids in Presentations.

Exercise-V:

CALL Lab:

Intonation, Situational dialogues for practice.

ICS Lab:

Interviews, Types of Interviews.

Reference Books:

1. A textbook of English Phonetics for Indian Students, T. Balasubramanian, Macmillan Publishers,2010.
2. Speaking English Effectively, Mohan, Macmillan Publishers, 2010.

Programming for Problem Solving-I

L	T	P	C

2	0	0	2

I Year I Semester

Course Outcomes:

1. Design Algorithms and Flowcharts for real world applications using 'C'.
2. Know the usage of various operators in Program development.
3. Design programs involving decision and iteration structures.
4. Apply the concepts code reusability using Functions.
5. Analyze various searching and sorting techniques using Arrays.

UNIT-I:

Problem Solving Using Computers: Introduction, Algorithms, Flowcharts and Pseudo code, Applications of C language.

Overview of C Language: Introduction, Salient Features of C Language, Structure of a "C" Program.

C Language Preliminaries: Keywords and Identifiers, Constants, Variables, Data Types, and Input / Output Statements with suitable illustrative "C" Programs.

UNIT-II:

Operators: Assignment Operators, Relational and Logical Operators, Increment and Decrement Operators, Bitwise Operators, Ternary Operator, Type Conversion, Precedence and Associativity with suitable illustrative "C" Programs.

UNIT-III:

Statements in C:

Conditional/Decision Statements: if, if-else, Nested if-else, else-if ladder, and Switch-Statement with suitable illustrative "C" Programs.

Loop Control Statements: while, do-while and for with suitable illustrative "C" Programs.

UNIT-IV:

Functions: Introduction to Functions, benefits of functions, types of functions, Function calls, return vs exit( ), Parameter Passing mechanism: Call-by-Value, Recursion, Storage Classes.

UNIT-V:

Arrays: Introduction to Arrays, One-Dimensional Arrays, Two-Dimensional Arrays, Arrays and Functions.

Searching and Sorting: Linear Search, Binary Search, Bubble Sort, Insertion Sort.

Textbooks:

1. COMPUTER SCIENCE: A Structured Programming Approach Using C, B.A.Forouzon and R.F. Gilberg, Third edition, 2016.
2. C and Data Structures, Ashok N. Kamthane, Pearson Education.

Reference Books:

1. Problem Solving Using C, M.T. Somashekara, PHI, 2nd Edition 2009.
2. Computer Fundamentals and Programming in C, A.K.Sharma, 2nd Edition,

University Press.
3. Programming in C 2/e,PradipDey and Manas Ghosh, Oxford University Press, 2nd Edition 2011.
4. The Fundamentals of Computers, Rajaraman V., 4th Edition, Prentice Hall of India, 2006.
5. Programming in C, R S Bichker, University Press, 2012.

Programming for Problem Solving Lab – I

I Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

1. Apply the specification of syntax rules for numerical constants and variables, data types.
2. Know the Usage of various operators and other C constructs.
3. Design programs on decision and control constructs.
4. Develop programs on code reusability using functions.
5. Implement various searching and sorting techniques using arrays.

Week 1
Ubuntu and Linux Commands.

Week 2
Designing of flowcharts and algorithms using raptor tool.
1. Areas of Polygons.
2. Calculation of Simple and Compound Interest.
3. Swapping of Two numbers with and without temporary variable.
4. Checking whether a number is even or odd.
5. Sum of first 'n' natural numbers.
6. Checking a number whether it is divisible by any given number.
7. Evaluation of mathematical expressions.
8. Programs using scanf( ) and printf( ) statements.

Week 3
Programs on operators. (Minimum 4 Programs)

Week 4, 5 & 6
Programs on Conditional Statements. (Minimum 12 Programs)

Week 7,8 & 9
Programs on Control Statements. (Minimum 12 Programs)

Week 10 &11
Programs on Functions. (Minimum 6 Programs)

Week 12
Programs on One Dimensional Arrays. (Minimum 3 Programs)

Week 13
Programs on Two Dimensional Arrays. (Minimum 2 Programs)

Week 14
Implementation of Linear Search and Binary Search.

Week 15
Implementation of Bubble Sort and Insertion Sort.

Week 16
Review

(Ordinary Differential Equations and Vector Calculus)

I YearII Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Classify the various types of differential equations of first order and first degree and apply the concepts of differential equations to the real-world problems.
2. Solve higher order differential equations and apply the concepts of differential equations to the real-world problems.
3. Find the Laplace Transform of various functions and apply to find the solutions of differential equations.
4. Evaluate the multiple integrals and identify the vector differential operators physically in engineering problems.
5. Evaluate the line, surface and volume integrals and converting them from one to another by using vector integral theorems.

UNIT-I:

First order Ordinary Differential Equations and their Applications:

Formation of Differential equations, Differential equations of first order and first degree: exact, linear and Bernoulli, Applications of ODE: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-II:

Higher Order Linear Differential Equations:

Linear differential equations of second and higher order with constant coefficients, RHS term of the type f(X) $= e^{ax}, \sin ax, \cos ax \text{ and } x^k, e^{ax}V(x), x^kV(x)$. Method of variation of parameters

UNIT-III:

Laplace Transforms:

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms – Application of Laplace transforms to ordinary differential equations.

UNIT-IV:

Multiple Integrals & Vector Differentiation:

Multiple integrals - double and triple integrals – change of order of integration (Only Cartesian form)- change of variables (Cartesian to Polar for double integral, Cartesian to Spherical for triple integral). Gradient- Divergence- Curl and their related properties - Potential function - Laplacian and second order operators.

UNIT-V:

Vector Integration:

Line integral, work done, Surface and Volume integrals. Vector integrals theorems: Green's, Stoke's and Gauss Divergence Theorems (Only Statements & their Verifications).

Textbooks:

1. Higher Engineering Mathematics,B.S. Grewal, Khanna Publishers, 36th Edition,2010.
2. Advanced Engineering Mathematics, Jain &Iyengar, Narosa Publications.

Reference Books:

1. Calculus and Analytic Geometry, G.B. Thomas and R.L. Finney, 9th Edition, Pearson, Reprint, 2002.
2. Advanced Engineering Mathematics,Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
3. Advanced Engineering Mathematics (2nd Edition), Michael D. Greenberg.

Chemistry

I Year II Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Acquire knowledge of atomic, molecular and electronic changes related to conductivity.
2. Apply the various processes of treatment of water for both domestic and industrial purpose.
3. Apply the knowledge of electrode potentials for the protection of metals from corrosion.
4. Analyze the major chemical reactions that are used in the synthesis of compounds.
5. Apply the knowledge of polymers in every day's life.

UNIT- I:

Atomic and Molecular Structure:

Introduction, Concept of atomic and molecular orbitals, LCAO, Molecular orbitals of di-atomicmolecules, Molecular orbital energy level diagrams of diatomic molecules (N_2, O2 & F_2). Pi-molecular orbitals of butadiene and benzene.

Crystal field theory (CFT): Crystal field theory, Crystal field splitting patterns of transition metal ion d- orbital- tetrahedral, octahedral and square planar geometries.

UNIT- II:

Water Technology:

Hardness of water, expression of hardness ($CaCO_3$ equivalent), units and types of hardness. Estimation of temporary and permanent hardness of water by EDTA method. Numerical problems based on hardness of water. Potable water: characteristics, treatment of water for domestic supply. Desalination of brackish water: reverse osmosis. Alkalinity of water and its determination. Boiler feed water and its treatment: Internal treatment (colloidal, phosphate calgon conditioning of water). External treatment (ion –exchange process).

UNIT- III:

Electrochemistry and Corrosion:

Electrode, electrode potential, galvanic cell, cell reactions and cell notation, cell EMF, types of electrodes (Calomel electrode and Quinhydrone electrode) , Determination of P^H using quinhydrone electrode. Nernst equation, Numerical problems.

Batteries: Introduction to cell and battery, Primary (lithium cell) and secondary cells, (lead-Acid cell, and Lithium ion cells). Fuel cells – Hydrogen – Oxygen fuel cell, advantages and engineering applications of fuel cells.

Corrosion: Introduction, types of corrosion: chemical and electrochemical corrosion, factors affecting the rate of corrosion: nature of the metal, position of metal in galvanic series, purity of metal, nature of corrosion product, nature of environment : effect of temperature, effect of pH, humidity. Corrosion control methods: Cathodic protection: sacrificial anode method and impressed current cathode method. Protectivecoatings: metallic coatings (anodic and cathodic),

methods of application on metals, electroplating (of copper), electroless plating (of Ni) , organic coatings- paints.

UNIT-IV:

Stereochemistry:

Structural isomers and stereoisomers, configurations, symmetry and chirality, enantiomers, diastereomers, optical activity. Conformations of cyclic (cyclohexane) and acyclic systems (Ethane).

Organic Reactions and Synthesis of a Drug Molecule:

Introduction to reactions involving substitution (SN1 & SN2), addition(addition of HBr to propene, Markownikoff and Anti Markownikoff addition), elimination, oxidation(oxidation of alcoholsusing $KMnO_4$& CrO_3), reduction(reduction of carbonyl compounds by $LiAlH_4$& $NaBH_4$). Synthesis of a commonly used drug molecule- paracetamol and Asprin.

UNIT-V:

Polymer Chemistry:

Introduction, classification of polymers, types of polymerization (addition and condensation, mechanisms not included). Plastics- types of plastics -thermoplastics and thermosetting plastics. Preparation, properties and engineering applications of PVC, Teflon and Bakelite. Fibers: Nylon 6, 6 and Terelene (Dacron). Elastomers: natural rubber, structure, vulcanization. Synthetic rubbers: Buna-S, Butyl rubber &Thikol rubber. Conducting polymers: classification and applications.

Biodegradable polymers:Types, examples: Polyhydroxy butyrate (PHB) ,Poly-Hydroxybutyrate-co-b-Hydroxy valerate (PHBV) ,Polyglycolic acid (PGA) , Polylactic acid (PLA) ,Poly (Î-caprolactone) (PCL). Applications of biodegradable polymers.

Textbooks:

1. Engineering Chemistry, P.C Jain & Monica Jain, Dhanpat Rai Publications,2017.
2. Engineering Chemistry, Bharathi Kumari. Y, VGS Publications,2018.

Reference Books:

1. March's Advanced Organic Chemistry, Smith,Wiley publications,2017.
2. Engineering Chemistry, Shiva Sankar, TMH Publications, 2010.

Chemistry Lab

I Year II Semester

L	T	P	C
0	0	3	1.5

Course Outcomes:

1. Determination of parameters like hardness, alkalinity and chloride content in water.
2. Estimation of rate constant of a reaction from concentration-time relationships.
3. Determination of physical properties like adsorption, surface tension and viscosity.
4. Synthesize a small drug molecule and analyze a salt sample.
5. Calculation of strength of compound using instrumentation techniques.

Choice of 10-12 experiments from the following:

1. Estimation of total hardness of water by EDTA method.
2. Determination of alkalinity of water.
3. Determination of chloride content of water.
4. Estimation of HCl by conductometric titration.
5. Estimation of mixture of acids by conductometric titration.
6. Estimation of HCl by potentiometric titration.
7. Estimation of Fe^{2+} by potentiometry using $KMnO_4$.
8. Determination of the rate constant of a reaction.
9. Determination of surface tension.
10. Determination of viscosity of a lubricant.
11. Chemical analysis of a salt.
12. Synthesis of a polymer/drug.
13. Adsorption of acetic acid by charcoal.
14. Determination of Saponification /acid value of an oil.

Reference Books:

1. Practical Engineering Chemistry, Mukkanti, B.S. Publications, 2010.
2. Volga's Qualitative Inorganic Chemistry, PEAR Publications 2010.

English

I Year II Semester

L	T	P	C
2	0	0	2

Course Outcomes:

1. Infer the importance of scientific discoveries in promoting social responsibilities.
2. Comprehend the given texts and respond appropriately for technical and professional purposes.
3. Communicate confidently and transfer information into various forms of writing.
4. Understand the importance of health and nutrition for a better society.
5. Present various forms of business writing skills for successful careers.

UNIT-I:

'The Raman Effect' from the prescribed textbook **'English for Engineers'**

Grammar : Articles & Prepositions

Reading : Reading and Its Importance- Techniques for Effective Reading.

Writing : Organizing principles of paragraphs in documents.

Vocabulary: The concept of word Formation, synonyms, antonyms, and standard abbreviations.

UNIT-II:

'Ancient Architecture in India' from the prescribed textbook **'English for Engineers'**

Reading : Improving Comprehension Skills – Techniques for good comprehension

Writing : Sentence Structures, Use of phrases and clauses in sentences

Writing Formal Letters-Eg. Letter of Complaint, Letter of Requisition,

Job Application with Resume.

Vocabulary: Root words and acquaintance with prefixes and suffixes from foreign languages in English, to form derivatives

UNIT-III:

'Blue Jeans' from the prescribed textbook **'English for Engineers'**

Grammar: Tenses: Types and uses.

Reading : Sub-skills of Reading- Skimming and Scanning

Writing :Identifying Common Errors in Writing

Subject-Verb agreement in number, gender and person

Information Transfer-Process writing

UNIT-IV:

'What Should You Be Eating' from the prescribed textbook **'English for Engineers'**

Reading : Intensive Reading and Extensive Reading

Writing : Nature and Style of Sensible Writing

Describing & Defining

Identifying common errors in writing

UNIT-V:

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook **'English for Engineers'**

Vocabulary : Technical Vocabulary and their usage

Reading : Reading Comprehension-Exercises for Practice

Writing : Cohesive Devices

Précis Writing

Technical Reports-Introduction, Characteristics of a Report – Categories of Reports, Formats- Structure of Reports (Manuscript Format) –Types of Reports - Writing a Report.

Textbooks:

1. English for Engineers,Sudarshana, N.P. and Savitha, C. Cambridge University Press, 2018.

Reference Books:

1. Effective Technical communication, Muhammed Rizvi, TMH, 2008.
2. Advanced English Grammar, Hewings, Cambridge University Press, 2010.

English Communication Skills Lab

L	T	P	C
0	0	2	1

I Year II Semester

Course Outcomes:

1. Understand the variants in pronunciation.
2. Identify the diverse purposes of listening and speaking.
3. Discuss ideas in diverse communicative settings.
4. Exhibit increased confidence in public speaking.
5. Display critical thinking, problem solving and decision making skills through GD's

Exercise-I:

CALL Lab:

Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

ICS Lab:

Spoken vs. Written language-Formal and Informal English- Introducing Oneself and Others.

Exercise-II:

CALL Lab:

Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

ICS Lab:

Features of Good Conversation – Strategies for Effective Communication Role-Play- Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise-III:

CALL Lab:

Information Transfer.

ICS Lab:

Descriptions-Narrations-Giving Directions and Guidelines-Giving Instructions-Seeking Clarifications-Asking for and Giving Directions-Thanking and Responding-Agreeing and Disagreeing-Seeking and Giving Advice-Making Suggestions.

Exercise-IV:

CALL Lab:

Past Tense Marker and Plural Marker.

ICS Lab:

Public Speaking- Exposure to Structured Talks - Non-verbal Communication- Making a Short Speech – Extempore.

Exercise-V:

CALL Lab:

Intonation- Sentence Stress -Weak Forms and Strong Forms.

ICS Lab:

GroupDiscussion, Mock Group Discussion sessions

Reference Books:

1. A Textbook of English Phonetics for Indian Students, T. Balasubramanian, Macmillan Publishers,2010.
2. Speaking English Effectively, Mohan, Macmillan Publishers, 2010.

Programming for Problem Solving-II

L	T	P	C
2	0	0	2

I Year II Semester

Course Outcomes:

1. Identify various string handling functions in 'C'.
2. Develop programs with user defined data types.
3. Use Dynamic memory allocation functions with pointers.
4. Distinguish between Stacks and Queues.
5. Analyze various Dynamic Data Structures.

UNIT – I:
Overview of Arrays and Functions.
Strings: Introduction to Strings, String I/O, String Operations with and without built-in functions (strlen( ), strcmp( ), strcat( ),strcpy( ) and strrev( )).

UNIT -II:
Structures: Definition and Initialization of Structures, Accessing structure members, Nested Structures, Array of Structures, Structures and Functions, Unions, typedef, Enumerated Data types.

UNIT-III:
Pointers: Introduction to Pointers, Pointer Arithmetic, Pointers and Arrays, Pointer to Structure, Pointers and Strings, Parameter passing mechanism: Call by Reference, Pointer to Pointer, Dynamic Memory Allocation.

UNIT-IV:
Introduction to Data Structures: Lists and Operations, Linear and Non linear Data structures.
Stacks- Introduction to Stacks, Operations, Implementation of Stack using Arrays.
Queues- Introduction to Queues, Operations, Implementation of Queue using Arrays.

UNIT-V:
Linked Lists: Introduction to Linked List, Operations on Single Linked List(search, Insertion & Deletion).
Files: Introduction to Files, File Operations (Open, Close, read & Write).

Textbooks:

1. COMPUTER SCIENCE: A Structured Programming Approach Using C, B.A.Forouzon and R.F. Gilberg, Third edition, 2016.
2. C and Data Structures, Ashok N. Kamthane, Pearson Education.

Reference Books:

1. Problem Solving Using C, M.T. Somashekara, PHI, 2nd Edition 2009.
2. Computer Fundamentals and Programming in C, A.K.Sharma, 2nd Edition, University Press.
3. Programming in C 2/e,PradipDey and Manas Ghosh, Oxford University Press, 2nd Edition 2011.
4. The Fundamentals of Computers, Rajaraman V., 4th Edition, Prentice Hall of India, 2006.
5. Programming in C, R S Bichker, University Press, 2012.

Programming for Problem Solving Lab – II

L	T	P	C
0	0	2	1

I Year II Semester

Course Outcomes:

1. Build programs on various string handling functions.
2. Develop applications on user defined data types.
3. Apply dynamic memory allocation through pointers.
4. Implement linear data structures through stacks and queues.
5. Create linked list dynamically through stacks and queues.

Week 1:
Programs on Arrays and Functions. (Minimum 3 Programs)

Week 2 & 3:
Programs on Strings with and without string built-in Functions. (Minimum 6 Programs)

Week 4:
Programs on Accessing Structures and Nested Structures. (Minimum 3 Programs)

Week 5 &6 :
Programs on Array of Structures, Structures and Functions. (Minimum 5 Programs)

Week 7:
Programs on Unions, typedef and enum. (Minimum 4 Programs)

Week 8:
Programs on Pointers, pointer arithmetic, pointer expression, One Dimensional and Two dimensional arrays. (Minimum 4 Programs)

Week 9:
Programs on Pointer to structure, Call by Reference, Pointer to Pointer. (Minimum 3 Programs)

Week 10:
Programs on Dynamic Memory Allocation Functions. (Minimum 3 Programs)

Week 11:
Programs on Stacks and Queues using Arrays.

Week 12 & 13:
Programs on Single Linked List.

Week 14 & 15:
Programs on File Operations. (Minimum 6 Programs)

Week 16:
Review.

Engineering Workshop

I Year II Semester

L	T	P	C
0	1	3	2.5

Course Outcomes:

1. Understanding the tools and methods of using to fabricate engineering components
2. Applying the measuring techniques to verify the dimensional accuracy
3. Evaluating various methods and trades of workshop in the component building

(i) Lectures & videos:

Detailed contents

1. Manufacturing Methods- Metal Forming, Machining, Advanced manufacturing methods (2 lectures)
2. CNC machining, Additive manufacturing (2 lectures)
3. Fitting operations & power tools (1 lecture)
4. House wiring (1 lecture)
5. Carpentry (1 lecture)
6. Plastic moulding(1 lecture)
7. Metal casting (1 lecture)
8. Welding (1 Lecture)

(ii) Workshop Practice:

Detailed contents:

1. Machine shop (Lathe machine)
2. Fitting shop
3. Carpentry
4. House Wiring
5. Welding shop (Arc welding)
6. Tin Smithy

Reference Books:

1. Elements of Workshop Technology, Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Manufacturing Engineering and Technology, Kalpakjian S. and Steven S. Schmid, 4th edition, Pearson Education India Edition, 2002.

COURSE STRUCTURE FOR B.TECH II YEAR

S. No.	Category	Course Title	L	T	P	Credits
1	BS	Probability and Statistics	3	0	0	3
2	ES	Digital Logic Design	3	0	0	3
3	ES	Electronic Devices Circuits	3	0	0	3
4	PC-1	Data Structures	3	0	0	3
5	PC-2	Mathematical Foundations of Computer Science	3	0	0	3
6	PC-3	Python Programming	3	0	0	3
7	PC Lab	Data Structures & Python Programming lab	0	0	2	1
8	ES Lab	Digital Logic Design & Electronic Devices Circuits Lab	0	0	2	1
9	MC-1	Environmental Science/ Gender Sensitization/Cyber Laws	2	0	0	0
		Total	**20**	**0**	**4**	**20**

B. Tech. II Year I Semester:

B. Tech. II Year II Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	PC-4	Design & Analysis of Algorithms	3	1	0	4
2	PC-5	Computer Organization	3	0	0	3
3	PC-6	Java Programming	3	0	0	3
4.	PC-7	Software Engineering	3	0	0	3
5	PC-8	Database Management Systems	3	0	0	3
6	H&S	Professional Communication	1	0	2	2
7	PC Lab	Java Programming Lab	0	0	2	1
8	PC Lab	Database Management Systems Lab	0	0	2	1
9	MC-2	Environmental Science/ Gender Sensitization/Cyber Laws	2	0	0	0
Total			**21**	**0**	**6**	**20**

PROBABILITY AND STATISTICS

B. Tech. II Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes: After learning the contents of this course the students must be able to:

1. To differentiate among random variables involved in the probability models which are useful for all branches of engineering.
2. Derive relationship among variety of performance measures using probability distributions.
3. Acquire elementary knowledge of parametric and non-parametric –tests and understand the use of observing state analysis for predicting future conditions.
4. Identify and examine situations that generate using problems and able to solve the tests of ANOVA for classified data.
5. Apply proper measurements, Indicators and techniques of Correlation and regression analysis.

Syllabus:

UNIT-I:
Probability and Random Variables:
Introduction to Probability, Random variables- Discrete and Continuous, Expectation, Probability Distribution Function, Mass Function/ Density Function of a Probability Distribution.

UNIT-II:
Probability Distributions:
Fitting of Binomial, Poisson & Normal distributions and their properties (only Statements) Moment Generating Functions of the above three distributions and hence finding the mean and variance.

UNIT-III:
Sampling Theory & Testing of Hypothesis I:
Sampling Distribution-Definition of Sample, Population, and Types of Sampling. Estimation-Point estimation, Interval estimation, Testing of Hypothesis- Null hypothesis – Alternative hypothesis, Type I, & Type II errors – critical region confidence interval for mean, Testing of hypothesis for single mean and difference between the means for large samples.
Confidence interval for the proportions, Tests of hypothesis for the proportions- single and difference between the proportions for large samples

UNIT-IV:
Testing of Hypothesis II:
Small Samples - t-distribution, F-Distribution, χ^2 distribution, ANOVA for one-way classified data

UNIT-V:
Correlation, Regression & Curve Fitting:
Coefficient of Correlation-Regression coefficients- The lines of Regression- the Coefficient of Rank Correlation.
Curve Fitting- Fitting a Straight line- Second Degree Polynomial- Exponential, Power Curve by Method of Least Squares.

Text Books:

1. Probability and Statistics for Engineers, by Richard Arnold Johnson, Irvin Miller and John E Freund,
   New Delhi Prentice Hall.
2. Introduction to Probability & Statistics for Engineers and Scientists by Sheldon M.Ross

References Books:

1. An Introduction to Probability and Statistics, 2ed by Vijay K. Rohatgi, A.K. Md. Ehsanes Saleh, Weley.
2. Probability & Statistics for Engineers & Scientists, Walpole, Myers.et.al, Prentice Hall.
3. Fundamentals of probability and statistics for engineers, T T Soong, Weley.

DIGITAL LOGIC DESIGN

B. Tech. II Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of this course, the student would be able to

1. Understand various number systems, conversions, range and error detecting and correcting codes and their significance.
2. Evaluate the minimization of logic gates using Boolean algebraic principles and k-maps.
3. Design various simple and complex combinational circuits with real time applications.
4. Analyze the basic principles behind Flip flops & the design of sequential circuits with real time applications.
5. Illustrate various types of memory devices and their design.

UNIT -- I:

Number Systems: Binary, Octal, Hex Decimal, and Conversions, range; Binary additions and subtractions (using 1c, and 2c), concept of overflow; representations of negative numbers using 1's and 2's complement and range; BCD numbers: Representation of 8421, 2421, Ex-3, Gray and self-complementary codes; additions and subtractions on 8421 codes; Error detecting **codes:** even, odd parity, hamming codes; Error correcting codes: hamming codes, block parity codes; Floating point representation.

UNIT --II:

Boolean Algebra and Digital Logic GATES, Basic Boolean laws and properties; Boolean functions; canonical and standard forms (SOP, POS); Gate minimization using three and four variable K-Map's with and without don't cares. Encoders, Decoders, Multiplexers, D-Multiplexers;

UNIT -- III:

Definition of combinational circuits, design procedure for half, full, decimal (8421) adders and subtractors; Combinational Circuit Design for BCD code converters;

UNIT -- IV:

Sequential circuits, latches, Flip Flops; Analysis of clocked sequential circuits, State Reduction and Assignment, Register, Ripple Counters, Synchronous Counters, Other Counters.

UNIT -- V:

Types of Memory – Main memory – random access memory, ROM, Types of ROM; Decoder and RAM interface: Address lines, data lines, chip select signal; Design of large memories using small memories, using decoders; problems in memory design; Cache Memory- design issues, hit and miss ratio related problems; Associative and Auxiliary memory;

TEXT BOOKS:

1. M. Morris Mano, Digital Design, Third Edition, Pearson Education/PHI, 2001.
2. Roth, Fundamentals of Logic Design, Fifth Edition, Thomson, 2004

REFERENCE BOOKS:

1. John F. Wakerly, Digital Design: Principles and Practices, 4th Edition, Pearson / Prentice Hall, 2005.
2. Malvino& Leach, Digital Principles and Applications, Seventh Edition, Tata McGraw-Hill Edu., 2010.
3. A.K. Maini, Digital Electronics, Principles and Integrated Circuits, 1st Edition, Wiley India Publ., 2007.

B. Tech. II Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of this course, the student would be able to

1. Demonstrate the concepts of semiconductor theory.
2. Interpret the characteristics of different semiconductor devices with its applications.
3. Apply different biasing techniques of transistors for amplification.
4. Analyze transistor amplifiers using small signal model.
5. Ability to describe the behavior of special purpose diodes.

UNIT I

Diode: PN junction Diode – Characteristics, Current equation, Temperature dependence, Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances,

Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive Filter, Clippers, Clampers.

UNIT II

Bipolar Junction Transistor (BJT): Principle of Operation and characteristics - Common Emitter, Common Base, Common Collector Configurations, Operating point, DC & AC load lines, Transistor Hybrid parameter model, Determination of h-parameters from transistor characteristics, Conversion of h-parameters.

UNIT III

Transistor Biasing and Stabilization: Bias Stability, Fixed Bias, Collector to Base bias, Self-Bias, Bias compensation using Diodes and Transistors.

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT IV

Junction Field Effect Transistor: Construction, Principle of Operation, Pinch-Off voltage, Volt-Ampere characteristic, comparison of BJT and FET, Biasing of FET, FET as voltage variable resistor, MOSFET construction and its characteristics in enhancement and depletion modes.

UNIT V

FET Amplifiers: Small Signal Model, Analysis of CS, CD, CG JFET Amplifiers. Basic Concepts of MOSFET Amplifiers.

Special Purpose Devices: Zener Diode - Characteristics, Voltage Regulator; Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode.

TEXT BOOKS:

1. Millman and Halkias," Electronic devices and circuits", 2nd Edition, McGraw Hill Publication, 2007
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.

REFERENCES:

1. Electronic Devices and Circuits – S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, 2 Ed., 2008, TMH.
2. Electronic Devices and Circuits-J.B Gupta
3. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP

DATA STRUCTURES

B. Tech. II Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the course student would be able to

1. Understand the concepts of Stacks and Queues with their applications.
2. Analyze various operations on Binary trees.
3. Examine of various concepts of binary trees with real time applications.
4. Analyze the shortest path algorithm on graph data structures.
5. Outline the concepts of hashing, collision and its resolution methods using hash functions.

UNIT --I:

Data Structures: Introduction, Types of data structures, Static and Dynamic representation of data structure and comparison. **Stacks:** Stacks definition, operations on stacks, Representation and evaluation of expressions using Infix, Prefix and Postfix, Algorithms for conversions and evaluations of expressions from infix to prefix and postfix using stack.
Queues: types of Queues- Circular Queue, Deque and operations.

UNIT -- II:

Trees: Basic terminologies, Types of Binary Tree: Complete and Full Binary Tree, Extended Binary Trees, Representation of Trees using Arrays and Linked lists (advantages and disadvantages), Tree Traversal, Representation of Algebraic expressions, Threaded Binary Trees.

UNIT -- III:

Advanced concepts on trees: Representation and Creation of Binary Search Trees (BST), Operations on BST, Representation and advantages of AVL Trees, algorithms& operations on AVL Trees,Multi-way trees, Definition and advantages of B-trees, B+ Trees, Red-Black Trees.

UNIT -- IV:

Graphs-Basic terminology, Representation of graphs: sequential representation, Adjacency, Path Matrix) Linked representation. Graph Traversals-Breadth First Search, Depth First Search algorithms. Spanning Tree, Minimum Spanning Trees- Prim's Algorithm, Kruskals Algorithm, Dijkstra Algorithm.

UNIT --V:

Hashing: General Idea, Hash Functions, collisions, Collision avoidance techniques, SeparateChaining ,Open Addressing-Linear probing, Quadratic Probing, Double Hashing, Rehashing, Extensible Hashing, Implementation of Dictionaries.

Text Books:

1. Data Structures Using C, Second Edition ReemaThereja OXFORD higherEducation

2. Data Structures, A Pseudo code Approach with C, Richard F.Gillberg&Behrouz A. Forouzan, Cengage Learning, India Edition, Second Edition,2005.

Reference Books:

1. Data Structures, Seymour Lipschutz, Schaum's Outlines, Tata McGraw-Hill, Special Second Edition.
2. Data Structures Using C and C++ǁ, Aaron M. Tenenbaum, YedidyahLangsam and Moshe J. Augenstein PHI Learning Private Limited, DelhiIndia.
3. Fundamentals of Data Structuresǁ, Horowitz and Sahani, *Galgotia Publications* Pvt Ltd Delhi India.
4. Data Structure Using C, A.K. Sharma, Pearson EducationIndia.

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

L	T	P	C

B. Tech. II Year I Semester

3	0	0	3

Course Outcomes:

At the end of the course student would be able to

1. Analyze elementary mathematical arguments.
2. Apply discrete mathematics problems that involve computing permutations and combinations of a set.
3. Analyze problems involving recurrence relations & generating functions.
4. Demonstrate various operations on discrete structures.
5. Apply graph theory models to solve the problems of networks.

UNIT -- I:

Foundations: Basics, Sets, Statements, Connectives, Normal Forms, Fundamentals of Logic, Logical Inferences, First order logic and other methods of Proof, Rules of Inference for Quantified Propositions, Automatic Theorem Proving.

UNIT – II:

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumerating Combinations and Permutations with & without repetitions, constrained repetitions, Pigeon hole principle, Inclusion-Exclusionprinciple.

UNIT -- III:

Recurrence Relations: Generating Functions, Calculating coefficient of Generating Function, Solving Recurrence relations by substitution method and Generating Functions, The Method of Characteristic Roots, Solutions to inhomogeneous recurrence relations, Binomial Theorem.

UNIT -- IV:

Relations and Digraphs: Relations and Directed Graphs, Special Properties of Binary Relations, Equivalence Relations, Ordering Relations, Lattice, Paths and Closures, Directed Graphs and adjacency matrices.

UNIT -- V:

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

Text Books:

1. Discrete Mathematics forComputer Scientists and Mathematicians by JoeL.Mott,AbrahamKandel, TheodareP.Baker, Second Edition, PHI,2009.
2. Discrete Mathematical Structures with Applications to Computer Science, Tremblay J P and Manohar R, Tata McGraw Hill Publishing Company Limited, New Delhi,2007.

Reference Books:

1. Discrete Mathematics R.K.Bisht, H.S.Dhami, OXFORD HigherEducation.
2. Discrete Mathematics and its Applications‖, Kenneth H Rosen, Tata McGraw Hill Publishing Company Limited, New Delhi, Sixth Edition,2007.

PYTHON PROGRAMMING

B. Tech. II Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the course student would be able to

1. Identify the differences between scripts and programs
2. Solve the problems based on decision control statements
3. Develop programs on functions and data structures.
4. Demonstrate the programs on string operations
5. Analyze the object oriented techniques for solving real time problems

Unit – I:

Introduction to Python:

Features of Python Language, Data Types, Operators, Expressions, Control Statement, Standard I/O Operations.

Functions and Modules:

Declaration and Definition Function Calling, More on Defining Functions, Recursive Functions, Modules, Packages in Python, Doc Strings, Built-in Functions.

Unit – II:

Strings and Regular Expressions:

String Operations, Built-in String Methods and Functions, Comparing Strings, function in Regular Expression.

Sequence: List, Tuples, Dictionaries.

Unit - III:

Introduction to Object Oriented Programming:

Features of Object OrientedProgramming, Classes and Objects, Class Method and Self Argument. The __Init__Method, Class Variables and Object Variables, The _Del__Method, Public and Private Data Members, Private Methods, Buil-in Functions to Check, Get, Set and Delete Class Attributes, Garbage Collection(Destroying Objects).

Unit – IV:

Inheritance:

Inheriting Classes in Python: Types of Inheritance; Composition/Containership, Abstract Classes, Meta class.

Operator Overloading:

Introduction, Implementing Operator Overloading, Overriding Methods.

Unit – V:

File Handling

Introduction, Types of Files, Reading and Writing Files, File Positions, Renaming and Deleting Files, Listing files of directory.

Exception Handling:

Introduction, Handling Exception, Multiple Except Blocks and Multiple Exceptions, Finally Block. Case Study: Data Science.

Text Books

1. "ReemaThareja", Python Programming using Problem Solving Approach, First Edition, Oxford Higher Education.
2. James Payne, Beginning Python using Python 2.6 and Python 3

Reference Books

1. Kenneth A.Lambert, Fundamentals of Python
2. Charles Dierach, Introduction to Computer Science using Python

DATA STRUCTURES & PYTHON PROGRAMMING LAB

B. Tech. II Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

At the end of the course student would be able to

1. Develop the programs on stacks, trees and its applications.
2. Design and implementation of programs on BST and Graph Traversals.
3. Apply Hashing techniques in real world applications
4. Implement oops concepts in Python
5. Develop Programs on modules and Packages
6. Design Programs that handle errors

Part-A

1. C Programs to illustrate concepts of arrays, structures, unions and enumerated datatypes.
2. Program to convert infix to postfixnotation
3. Program to evaluate postfixnotations
4. Program to illustrate treetraversals
   i. In order b) Pre order c) Post order
5. Program to illustrate insertion, deletion and searching in Binary SearchTree.
6. Program to illustrate Insertion, deletion and Rotation on AVLTrees.
7. Program to illustrate Graphtraversals
   i. Breadth First Search
   ii. Depth First Search
8. Program to implement hash table using linear and quadraticprobing.

Part- B

Exercise I

a) Installation and Environment setup of python.

b) Write a program to demonstrate the use of basic Data Types

c) Write a program to demonstrate the Operators and Expressions

d) Write a program to demonstrate the Functions and parameter passing Techniques.

Exercise II

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)

b) Write a program to convert a given decimal number to other base systems

Exercise III

a) Write a Program to implement

i. Packages **ii.**Modules **iii.** Built-in Functions

b) Write a Program to implement

i. List **ii.**Tuple **iii.** Dictionaries

c) Programs on Stings, String Operations and Regular Expressions

Exercise IV

a) Write a Program to implement Class and Object

b) Write a Program to implement Static and Instance methods, and Abstract Classes.

Exercise V

a) Write a program to implement Inheritance

b) Write a program to implement Polymorphism

Exercise VI

a) Write a program to implement Files

b) Write a program to Implement Exception Handling.

DIGITAL LOGIC DESIGN & ELECTRONIC DEVICES & CIRCUITS LABORATORY

B. Tech. II Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

At the end of the course student would be able to

1. Identify and use the basic components and instruments in electronics laboratory
2. Outline the characteristics of different semiconductor devices.
3. Interpret the ripple factor, regulations of rectifiers.
4. Understand the concepts of UJT and observe its characteristics.
5. Design and construct the combinational and sequential circuits using digital IC's

Minimum 6 experiments from each part:

List of Experiments (EDC)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. UJT Characteristics

List of Experiments (DLD)

1. Verify the functionality of logic gates &Flip-flops
2. Verification of De-Morgan's laws
3. Implementation and verification of full adder and full subtractor using logic gates.
4. Implementation and verification of 4X1 multiplexer &Demultiplexer using logic gates.
5. Implementation and verification of 2X4 Decoder and 1X4 De-multiplexer using logic gates.
6. Implementation of given function and verification using IC 74LS151 (8X1 multiplexer).
7. To design and verify the 4-bit ripple counter & decade counter
8. Verify the functionality of 4-bit magnitude comparator using IC 74LS85.
9. Verify the functionality of Universal Shift Register IC 74LS194/195

CYBER LAW

B. Tech. II Year I Semester

L	T	P	C
2	0	0	0

Course Outcomes:

At the end of this course, the student would be able to

1. Understand Cyber Crimes & legal framework
2. Outline the features of IT Act2000
3. The application of Cyber laws in India
4. Examine the Intellectual property rights and related laws
5. Analyze the E-commerce governing laws in India

UNIT - I

Introduction to Cyber Law: Need for Cyber Law, Introduction to UNICITRAL Model Law on E-Commerce, Cyber Jurisprudence at International and Indian Level, Jurisdictional Aspects in Cyber Law, Issues of jurisdiction in cyberspace, Types of jurisdiction, Prerequisites of jurisdiction. Case Lets: Indian & International Cases -Case Lets: Indian & International Cases

UNIT - II

Cyber Crimes & Legal Framework: Introduction to Cyber Crimes, Cyber Crimes Vs. Conventional Crime, Reasons for cybercrimes and cyber criminals, Cyber Crimes against Individuals, Institution and State, Cyber Crimes Hacking Digital Forgery, Cyber Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber Terrorism, Cyber Defamation. - Right of Interception under IT Act. Different offences under IT Act, 2000 -Case Lets: Indian & International Cases

UNIT –III

Cyber Forensic and Computer Crimes: Crimes targeting Computers: Definition of Cyber Crime & Computer related Crimes, Classification & Differentiation between traditional crime and cybercrimes. (a) Data Theft (b) Hacking (c) Spreading Virus & Worms (d) Phishing (e) Cyber Stalking / Bullying (f) Identity Theft & Impersonation (g) Credit card & Online Banking Frauds (h) Obscenity, Pornography & Child Pornography (i) Cyber Defamation, Defacement, (j) Illegal online selling & Gambling (k) Denial of Service Attacks (l) Cyber terrorism (m)Software Piracy & illegal downloading -Case Lets: Indian & International Cases

UNIT– IV

Information Technology Law (Cyber Law): Evolution of the IT Act, Genesis and Necessity, Salient features of the IT Act, 2000, various authorities under IT Act and their powers. Penalties & Offences, amendments. Impact on other related Acts (Amendments to Indian Penal code, Indian evidence Act, Banker Book Evidence Act, RBI Act) Case Lets: Indian & International Cases.

UNIT-V

Evolution of E Commerce and Laws in India: Introduction to E Commerce in India. E Commerce; Issues and provisions in Indian Law, E – Governance; concept and practicality in India, Digital/Electronic Signature in Indian Laws E – Taxation issues in Cyberspace, E Contracts and its validity in India. Case Lets: Indian & International Cases.

TEXT BOOKS:

1. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi, (2012).
2. Karnika Seth, Computers, Internet and New Technology Laws, Lexis NexisButterworthsWadhwa Nagpur, (2013).

Reference Books:

1. Apar Gupta, Commentary on Information Technology Act, 2000, Lexis Nexis, (2015).
2. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New Delhi, (2004)
3. SudhirNaib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)

DESIGN AND ANALYSIS OF ALGORITHMS

B. Tech. II Year II Semester:

L	T	P	C
3	1	0	4

Course Outcomes:

At the end of the course student would be able to

1. Analyze the efficiency of algorithms
2. Develop algorithms divide & conquer, greedy and related problems
3. Examine the performance of Dynamic programming
4. Explain performance of algorithm using Backtracking
5. Analyze NP-Hard and NP-Complete problems

UNIT I:

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Disjoint Sets- disjoint set operations, union and find operations.

Divide and conquer: General method, applications - Binary search, Quick sort, Merge sort, Stassen's matrix multiplication.

UNIT II:

Graphs: BreadthFirst Search,DepthFirst Search, spanningtrees, connected and bi connectedcomponents

Greedy method: General method, Applications- Optimal storage on Tapes, Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT III:

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, Reliability design.

UNIT IV:

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph colouring, Hamiltonian cycles.

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

UNIT V:

Lower Bound Theory: Comparison Trees, NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Satisfiability problem, Clique Decision Problem (CDP), Node cover decision problem.

Text Books:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharan, Galgotia publications Pvt.Ltd.
2. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearsoneducation.

References:

1. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, McGrawHill.
2. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearsoneducation.

COMPUTER ORGANIZATION

L	T	P	C
3	0	0	3

B. Tech. II Year II Semester:

Course outcomes:

At the end of the course student would be able to

1. Understand the basic organization of computer and different instruction formats and addressingmodes.
2. Outline the concepts of 8086 microprocessor and arithmeticoperations.
3. Make use of microprocessor instructions to write simple programs in assemblylanguage.
4. Classify various modes of datatransfers.
5. Outline various inter connection structures of multiprocessors.

UNIT I:

Introduction to computer organization- Digital Computers,Instruction codes, stored program organization, computer registers, computer instructions , instruction cycle, types of instruction formats (Zero, one, two and three address), RISC instructions.

Addressing modes: mode field, implied, immediate register, register direct, register indirect, auto increment, decrement, indexed, relative, base address mode, Numerical examples and problems.

UNIT II:

CPU-Organization: 8086 – CPU – Block diagram and pin diagram, concept of pipelining, minimum and maximum mode, segment register and generation of 20 bit address, concept of address, data, control and systems bus, Types offlags.

UNIT III:

CPU and Main Memory interface- Programming the basic computer – Machine Assembly Languages.

Assembler: basic assembly language instructions (ADD, SUB, LOAD, STORE, MOV, CMP, JUMP).

Micro-programmed control: control memory, address sequencing, micro program example and design of control unit.

UNIT IV:

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

I/O interface: I/O Bus and Interface modules, I/O versus Memory Bus.

Modes of Transfer: Example of programmed I/O, interrupt-initiated I/O, software considerations. Daisy- Chaining priority.

DMA: DMA Controller, DMA Transfer, Intel 8089 IOP.

UNIT V:

Multi Processors: Characteristics of Multi-Processor; **Interconnection structures:** Time shared common bus, multiport memory, crossbar switch, multi-stage switchingnetwork;

Introduction to Flynn's classification: SISD, SIMD, MISD, MIMD (Introduction).

Text Books:

1. Computer System Architecture – M.Morris Mano, Third Edition, Pearson/PHI,2011.
2. Microprocessor and Interfacing – Douglas V Hall, Second Edition, TATA McGraw Hill,2006.

Reference Books:

1. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, V Edition,McGraw Hill.

JAVA PROGRAMMING

B. Tech. II Year II Semester:

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the course student would be able to

1. Understand OOP concepts to apply basic Java constructs.
2. Analyze different forms of inheritance and usage of Exception Handling
3. Understand the different kinds of file I/Multithreading in complex Java programs, and usage of Container classes
4. Contrast different GUI layouts and design GUI applications
5. Construct a full-fledged Java GUI application, and Applet with database connectivity.

UNIT I:

Java Basics History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program

Fundamentals of Object Oriented Programming: Object-Oriented Paradigm, Basic Concepts of Object Oriented Programming, Applications of OOP. Concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, static keyword, nested and inner classes, Strings, Object class.

UNIT II:

Inheritance & Polymorphism: Introduction, Forms of Inheritance - specialization, specification, construction, extension, limitation, combination, Member access rules, super keyword, polymorphism-method overriding, abstract classes, final keyword.

Interfaces and Packages: Introduction to Interfaces, differences between abstract classes and interfaces, multiple inheritance through interfaces, Creating and accessing a package, Understanding CLASSPATH, importing packages.

Exception handling - Concepts of exception handling, exception hierarchy, built in exceptions, usage of try, catch, finally, throw, and throws, creating own exception sub classes.

UNIT III:

Files: Introduction to I/O Streams: Byte Streams, Character Streams. File I/O.Multi-threading: Differences between multi-threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication.Java.util package- Collection Interfaces: List, Map, Set. The Collection classes: LinkedList, HashMap, TreeSet, StringTokenizer, Date, Random, Scanner.

UNIT IV:

AWT: Class hierarchy, Component, Container, Panel, Window, Frame, Graphics.

AWT controls: Labels, Button, Scrollbar, Text Components, Checkbox, CheckboxGroup, Choice, List, Panes – ScrollPane, Dialog and MenuBar.

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapterclasses.

UNIT V:

Layout Manager – Border, Grid, Flow, Card and Gridbag.

Applets – Concepts of Applets, life cycle of an applet, creating applets, passing parameters toapplets.

JDBC Connectivity: JDBC Type 1 to 4 Drivers, connection establishment, Query Execution.

Text Books:

1. Java- the complete reference, Seventh edition, Herbert Schildt, Tata McGraw Hill.
2. Database Programming with JDBC&JAVA, Second Edition, George Reese, O'Reilly Media.

Reference Books:

1. Thinking in Java Fourth Edition, Bruce Eckel
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

SOFTWARE ENGINEERING

L	T	P	C
3	0	0	3

B. Tech. II Year II Semester:

Course Outcomes:

At the end of the course student would be able to

1. Outline the framework activities for a givenproject.
2. Examine Right process model for a givenproject.
3. Analyze various system models for a givenContext.
4. Understand various testing techniques for a givenproject.
5. Identify various risks in projectdevelopment.

UNIT I:

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), personal and team process models.

UNIT II:

Process Models: The waterfall model, Incremental process models, Evolutionary process model, Unified process model,agile process model.

Software Requirements: Functional and non-functional requirements, the software requirements document.

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

UNIT III:

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

Design Engineering: Design process and Design quality, Design concepts, the design model, Modeling component level design: design class based components, conducting component level design.

User interface design: Golden rules.

UNIT IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testingtechniques, Validation testing, System testing.

Product Metrics: Software Quality, Metrics for Analysis Model- function based metrics, Metrics for Design Model-object oriented metrics, class oriented metrics, component design metrics, Metrics for source code, Metrics for Testing, Metrics for maintenance.

UNIT V:

Risk Management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management: Quality concepts, Software Reviews, Formal technical reviews, Software reliability, The ISO 9000 quality standards.

Text Books:

1. SoftwareEngineering, Apractitioner'sApproachRogerS.Pressman,6thedition McGraw Hill InternationalEdition.
2. Software Engineering- Sommerville, 7th edition, Pearsoneducation.

References:

1. Software Engineering- K.K. Agarwal&Yogesh Singh, New Age InternationalPublishers.
2. Software Engineering,anEngineeringapproachJames F. Peters, WitoldPedrycz,JohnWiely.
3. Systems Analysis and Design- ShelyCashmanRosenblatt,ThomsonPublications.
4. Software Engineering principles and practice- Waman S Jawadekar, the McGraw-Hill Companies.

DATABASE MANGEMENT SYSTEMS

L	T	P	C
3	0	0	3

B. Tech. II Year II Semester:

Course Outcomes:

At the end of the course student would be able to

1. Understand the concepts of Entity-Relationship Model for enterprise level databases.
2. Analyze the database and provide restricted access to different users of database.
3. Understand various Normal forms to carry out schema refinement.
4. Analyze various Concurrency control protocols.
5. Examine working principles of Recovery algorithms

UNIT-I:

Introduction to Database System Concepts: Database-System Applications, Purpose of Database Systems, View, Database Language, Database Architecture, Database Users and Administrators.

Introduction to the Relation Models and Database Design using ER Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Feature, Structure of relational databases , database schema , keys, schema diagrams.

UNIT-II:

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions Nested Sub queries, Modification of theDatabase.

Intermediate and Advanced SQL: Join Expressions, Views, Integrity Constraints, SQL Data Types, Authorization. Functions and Procedures, Triggers.

UNIT-III:

Formal Relational Query Languages: The Relational operations, The Tuple Relational Calculus, The Domain Relational Calculus.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Decomposition Using Multi valued Dependencies, BCNF.

UNIT-IV:

Transactions: Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity.

Concurrency Control: Lock-Based Protocols, Deadlock Handling, Timestamp- Based Protocols.

UNIT-V:

Recovery System: Failure Classification, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, ARIES, Remote Backup Systems.

Text Books:

1. Abraham Silberschatz, Henry F. Korth,S.Sudarshan,Database System Conceptsll,6thEdition, Tata McGraw-Hill.
2. RaghuRamaKirshna,JohannesGehrk,—DatabaseManagementSystemllTataMcGraw Hill 3rd Edition.

Reference Books:

1. PeterRob&CarlosCoronel—DatabaseSystemConceptsCengageLearning.
2. RamezElmasri, ShamkanthB. Navrate–FundamentalsofDatabaseSystems—7thEdition, Pearson Education.
3. C.J. Date —Introduction to Database Systems PearsonEducation

PROFESSIONAL COMMUNICATION

B. Tech. II Year II Semester:

L	T	P	C
1	0	2	2

Course Outcomes

1. Acquire enhanced personality
2. Exhibit appropriate professional etiquette
3. Practice team building with strong communication skills
4. Develop problem solving skills and decision-making
5. Demonstrate effective presentation skills'

UNIT-I:

Self-Appraisal

Self-Introspection/ Self Retrospection
Introducing self & others
Goal setting
SWOT Analysis,

UNIT- II:

Professional Etiquette

Etiquette-Telephone Etiquette- Netiquette
Email, Social Network
Behavioral Traits
Case study

UNIT-III:

Team Building

Leadership skills-Case Studies
Team Essentials
Negotiation Skills
Group Discussion-Functional Aspects

UNIT-IV:

Logical Thinking and Analytical Reasoning

Decision Making
Problem Solving
Conflict management
Case Study

UNIT-V:

Presentation Skills

Poster Presentation
Oral Presentation-Individual Presentation, Team Presentation, Thematic Presentation

Text Book

1. Ashrif Rizvi. Effective Technical Communication, Tata McGahill, 2011

Reference Books

1. Speaking and Writing for Effective Business, Soundaraja, MACMILLAN, 2010.
2. English for Professional Success, Hector Sanchez, THOMSON, 2010.

JAVA PROGRAMMING LAB

B. Tech. II Year II Semester:

L	T	P	C
0	0	2	1

Course Outcomes:

At the end of the course student would be able to

1. Apply basic Java constructs and OOP to solve mathematical problems.
2. Apply Inheritance in Java programs and Analyze Exception Handling code
3. Implement File input/output and multithreading concepts in advanced Java programs.
4. Design different GUI applications using GUI layouts.
5. Apply Applet development and Database connectivity to build GUI applications

Week 1 & 2:

1. Write a program to find total, average of given two numbers by using function with command-line arguments, static datamembers.
2. Write a program to illustrate class and objects.
3. Write a program to illustrate method & constructor overloading.
4. Write a program to illustrate parameter passing using objects.
5. Write a program to illustrate ArrayManipulation.

Week 3:

1. Write a program to illustrate different types of inheritances.
2. Write a java program to illustrate Methodoverriding.
3. Write a java program to demonstrate the concept ofpolymorphism (Dynamic Method Dispatch).
4. Write a program to demonstrate finalkeyword.

Week 4 & 5:

1. Write a program to illustrate the use of creation ofpackages.
2. Write a java program to handle the situation of exceptionhandling using multiple catch blocks.
3. Write a program to implement the concept of User definedExceptions.

Week 6 & 7:

1. Write a program to illustrate Multithreading andMultitasking.
2. Write a program to illustrate threadpriorities.
3. Write a program to illustrateSynchronization

Week 8 & 9:

1. Write a program to implementStringTokenizer.
2. Write a program to read one line at a time, and write it to another file.

Week 10 & 11:

1. Write a program to illustrate Event Handling (keyboard, Mouseevents)
2. Write a program to illustrate appletlife cycle and parameter passing.

Week 12:

1. Write a program to develop a calculator application usingAWT.

Week 13:

1. Write a program to illustrateJDBC.

DATABASE MANAGEMENT SYSTEMS LAB

B. Tech. II Year II Semester:

L	T	P	C
0	0	2	1

Course Outcomes:

At the end of the course student would be able to

1. Use the SQL commandssuch as DDL, DML and DCL statements to perform different operations.
2. Apply various Integrity constraints on the database tables.
3. Apply Joins to retrieve the information from multiple tables.
4. Design different Views of tables for different users.
5. Design and implement a PL/SQL program which includes procedures, functions, cursors and triggers.

1. Database Schema for a customer-sale scenario

Customer(**Cust id: integer**, cust_name: string)
Item(**item_id: integer**,item_name: string, price:integer)
Sale(**bill_no: integer**, bill_data: date, **cust_id: integer, item_id: integer**, qty sold: integer)
For the above schema, perform the following—

- **a.** Create the tables with the appropriate integrityconstraints
- **b.** Insert around 10 records in each of thetables
- **c.** List all the bills for the current date with the customer names and itemnumbers
- **d.** List the total Bill details with the quantity sold, price of the item and the finalamount
- **e.** List the details of the customer who have bought a product which has aprice>200
- **f.** Give a count of how many products have been bought by eachcustomer
- **g.** Give a list of products bought by a customer having cust_id as5
- **h.** List the item details which are sold as oftoday
- **i.** Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold,amount Create a view which lists the daily sales date wise for the last oneweek

2. Database Schema for a Student Libraryscenario

Student(**Stud_no: integer,**Stud_name: string)
Membership(**Mem_no: integer**,**Stud_no: integer**)
Book(**book_no: integer**, book_name:string, author: string)
Iss_rec**(iss_no:integer**, iss_date: date, **Mem_no: integer, book_no: integer**)
For the above schema, perform the following

- **a.** Create the tables with the appropriate integrityconstraints
- **b.** Insert around 10 records in each of thetables
- **c.** List all the student names with their membershipnumbers
- **d.** List all the issues for the current date with student and Booknames
- **e.** List the details of students who borrowed book whose author isCJDATE
- **f.** Give a count of how many books have been bought by eachstudent
- **g.** Give a list of books taken by student with stud_no as5
- **h.** List the book details which are issued as oftoday
- **i.** Create a view which lists out the iss_no, iss _date, stud_name, bookname
- **j.** Create a view which lists the daily issues-date wise for the last oneweek

3. Database Schema for an Employee-payscenario

employee(**emp_id:**integer,emp_name:string)

department(**dept_id:integer**,dept_name:string)

paydetails(**emp_id : integer,dept_id: integer**, basic: integer, deductions: integer, additions: integer, DOJ: date)

payroll(**emp_id : integer**, pay_date: date)

For the above schema, perform the following

a. Create the tables with the appropriate integrityconstraints
b. Insert around 10 records in each of thetables
c. List the employee details departmentwise
d. List all the employee names who joined after particulardate
e. List the details of employees whose basic salary is between 10,000 and20,000
f. Give a count of how many employees are working in eachdepartment
g. Give a names of the employees whosenetsalary>10,000
h. List the details for anemployee_id=5
i. Create a view which lists out the emp_name, department, basic, dedeuctions,netsalary
j. Create a view which lists the emp_name and hisnetsalary

4. Database Schema for a Video Library scenario

Customer(**cust_no: integer**,cust_name: string)

Membership(**Mem_no: integer**, **cust_no: integer**)

Cassette(**cass_no:integer**, cass_name:string, Language:String)

Iss_rec(**iss_no: integer**, iss_date: date, **mem_no: integer**, **cass_no: integer**)

For the above schema, perform the following

a. Create the tables with the appropriate integrityconstraints
b. Insert around 10 records in each of thetables
c. List all the customer names with their membershipnumbers
d. List all the issues for the current date with the customer names and cassettenames
e. List the details of the customer who has borrowed the cassette whose title is —The Legend‖
f. Give a count of how many cassettes have been borrowed by eachcustomer
g. Give a list of book which has been taken by the student with mem_no as5
h. List the cassettes issues fortoday
i. Create a view which lists outs the iss_no, iss_date, cust_name,cass_name
j. Create a view which lists issues-date wise for the last oneweek

5. Database Schema for a student-Lab scenario

Student(**stud_no: integer**, stud_name: string, **class: string**)
Class(**class: string,descrip:string**)
Lab(**mach_no: integer**, Lab no: integer, description: String)
Allotment(**Stud_no: Integer, mach_no: integer, day of week: string)**
For the above schema, perform the following

a. Create the tables with the appropriate integrityconstraints
b. Insert around 10 records in each of thetables
c. List all the machine allotments with the student names, lab and machinenumbers
d. List the total number of lab allotments daywise
e. Give a count of how many machines have been allocated to the 'IT'class
f. Give a machine allotment details of the stud_no 5 with his personal and classdetails
g. Count for how many machines have been allocated in **Lab_no 1** for the day of the week as –Monday‖
h. How many students class wise have allocated machines in thelabs
i. Create a view which lists out the stud_no, stud_name, mach_no, lab_no,dayofweek
j. Create a view whichliststhemachine allotmentdetailsfor–Thursday..

6. Create a cursor, which displays all employee numbers and names from the EMP table.

7. Create a cursor, which update the salaries of all employees as per the given data.

8. Create a cursor, which displays names of employees having salary > 50000.

9. Create a procedure to find reverse of a given number

10. Create a procedure to update the salaries of all employees as per the given data

11. Create a procedure to demonstrate IN, OUT and INOUT parameters

12. Create a function to check whether given string is palindrome or not.

13. Create a function to find sum of salaries of all employees working in depart number 10.

14. Create a trigger before/after update on employee table for each row/statement.

15. Create a trigger before/after delete on employee table for each row/statement.

16. Create a trigger before/after insert on employee table for each row/statement.

GENDER SENSITIZATION

II Year B.Tech. CSE - II Semester

L	T	P	C
2	0	0	0

Course Outcomes:

At the end of the course student would be able to

1. To develop awareness about gender discrimination and take measurable steps to counter it.
2. To identify the basic dimensions of biological, sociological, psychological and legal aspects of gender.
3. To acquire knowledge about gendered division of labour in relation to politics and economics.
4. To prepare the students against gender violence.
5. To prepare the students to work and live together as equals.

UNIT-I:

UNDERSTANDING GENDER

Gender: Why Should We Study It?

Socialization: Making Women, Making Men

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT-II:

GENDER AND BIOLOGY

Missing Women: Sex Selection and Its Consequences

Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary Two or Many? Struggles with Discrimination.

UNIT-III:

GENDER AND LABOUR

Housework: the Invisible Labour

"My Mother doesn't Work." "Share the Load."

Women's Work: Its Politics and Economics

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT-IV:

ISSUES OF VIOLENCE

Sexual Harassment: Say No!

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading:"Chupulu".

Domestic Violence: Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading:New Forums for Justice.Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face ofViolence.

UNIT-V:

GENDER: CO - EXISTENCE

Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.

Additional Reading: Rosa Parks-The Brave Heart.

TEXTBOOK

1.**"Towards a World of Equals: A Bilingual Textbook onGender"**

Written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote,VasudhaNagaraj, Asma Rasheed, GoguShyamala, DeepaSreenivas and Susie Tharu

Published by **Telugu Akademi, Hyderabad**,Telangana State,**2015**.

REFERENCE BOOKS:

1. Menon, Nivedita, Seeing like a Feminist, New Delhi, Zubaan, Penguin Books, 2012.
2. AbdulaliSohaila, "I Fought For My Life…and Won."

ENVIRONMENTAL SCIENCE

II Year B.Tech. CSE – I/II Semester

L	T	P	C
2	0	0	0

Course Outcomes:

At the end of the course student would be able to

- Define and explain the structure and functions of ecosystem, values of biodiversity, threats to biodiversity and conservation of biodiversity.
- Explain the limitations of the resources and impacts of over utilization of natural resources.
- Explain the sources and effects of environmental pollution and list and identify the available techniques to control the pollution.
- Explain the global environmental issues like climate change, ozone depletion and can explain the scope of EIA, Environmental Management Plan and environmental audit and list the EIA methods.
- Mention the salient features of environmental acts and rules and define the sustainable goals along with measures required for the sustainability.

UNIT I:

Ecosystem: Definition, Scope and Importance of ecosystem, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bio-magnification.
Biodiversity and Biotic Resources: Introduction, Definition, levels of Biodiversity, Values of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT II:

Natural Resources: Classification of Resources, **Water resources**: use and over utilization of surface and ground water, Dams: benefits and problems, Rain water harvesting; **Energy resources**: growing energy needs, Renewable and Non Renewable Energy resources. **Land resources**: land degradation – Landslide and Soil Erosion; **Forest Resources –** Uses and Exploitation.

UNIT III:

Environmental Pollution And Control: Types of Pollution, Sources, Effects and Control measures of Air Pollution, WaterPollution, Soil Pollution and Noise Pollution.

UNIT IV:

Global Environmental Problems and Global Efforts: Greenhouse effect, Global Warming, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Aid Rains.
Environmental Impact Assessment (EIA): Scope of EIA, EIA methods, scope of Environmental audit and Environmental Management Plan.

UNIT V:

Environmental Policy, Legislation, Rules And Regulations: Salient features of Environmental Protection act, Air (Prevention and Control of pollution) Act- 1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Municipal solid waste, Hazardous waste, E-waste, Bio-medical waste and Radioactive waste Rules.
Towards Sustainable Future: Concept of Sustainable Development, Sustainable goals defined by UN, Threats to Sustainability, Environmental Education, Role of IT in Environment, Smart Cities,

Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

TEXT BOOKS:

1. Text Book of Environmental Studies by AnubhaKaushik (4th Edition), New age International Publishers.
2. Environmental studies by ErachBharucha 2005, University Grants Commission, and University Press.

REFERENCE BOOKS:

1. Text book of Environmental Science and Technology by M.Anji Reddy 2007
2. Environmental Science: Towards a Sustainable Future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental studies, From crisis to cure by R.Rajagopalan, 2005

COURSE STRUCTURE FOR B.TECHIII YEAR

B. Tech. III Year I Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	PC-9	Formal Languages and Automata Theory	3	0	0	3
2	PC-10	Computer Networks	3	0	0	3
3	PC-11	Operating Systems	3	0	0	3
4	PC-12	Web Technologies	3	0	0	3
5	PE-1	Human Computer Interaction Linux Programming Software Project Management Computer Graphics	3	0	0	3
6	OE – 1	Open Elective –I	3	0	0	3
7	PC Lab	Computer Networks & Operating Systems Lab	0	0	2	1
8	PC Lab	Web Technologies Lab	0	0	2	1
9	Value added course -1	Quantitative Methods & Logical Reasoning/ Personality Development & Behavioural Skills	2	0	0	1
Total			**20**		**4**	**21**

B. Tech. III Year I Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	H&S	Managerial Economics and Financial Analysis	3	0	0	3
2	PC-13	Compiler Design	3	0	0	3
3	PC-14	Data Warehousing & Data Mining	3	0	0	3
4	PC-15	Artificial Intelligence	3	0	0	3
5	PE -2	Object Oriented Analysis & Design Information Security Software Testing Methodologies Principles of Programming Languages	3	0	0	3
6	OE – 2	Open Elective –II	3	0	0	3
7	PC Lab	Data mining & Case Tools Lab	0	0	2	1
8	H & S	Advanced Communication Skills Lab	0	0	2	1
9	Value added course -2	Quantitative Methods & Logical Reasoning/ Personality Development & Behavioural Skills	2	0	0	1
Total			**20**	**0**	**4**	**21**

FORMAL LANGUAGES AND AUTOMATA THEORY

L	T	P	C
3	0	0	3

B. Tech. III Year I Semester

Prerequisites: Discrete mathematics and any programming language.

Course Outcomes:

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

1. Appreciate the role and structure of Language theory.
2. Design of regular expressions for language constructs and conversions of NFA and DFA.
3. Demonstrate the derivations and properties of various CFG and Regular grammars.
4. Design of PDA for the given CFG.
5. Appreciate the role of the Turing machine as computational and universal machine.

Unit -I:

Fundamental concepts: Strings, Alphabets, Language operations, Regular Expressions, Regular Languages: Finite automata, Types of finite automata (FA)-Non deterministic Finite Automata (NFA), Deterministic Finite Automata(DFA), NFA with ε-Moves, regular expression representation; Regular expressions to NFA; NFA with ε-Moves to NFA without ε-Moves; NFA to DFA Conversions; Minimization of DFA (Proofs Not Required)

Unit -II:

DFA with outputs: Moore and Melay machines, Pumping Lemma for Regular Sets: Closure properties of Regular Sets (Proofs Not Required): Context Free Grammars (CFG), Right most, Left most –derivations, Parse Trees; Operator Grammar: Unit productions; Chomsky normal forms; (Proofs Not Required)

Unit –III:

Left recursion and Elimination of left recursion in CFG: Elimination of useless symbols and unit productions; Greibach Normal Form, Push Down automata (PDA): Types of PDA: Design of a PDA for a given CFG. (Proofs Not Required)

Unit -IV:

Regular Grammars (RG), Design of DFA for a given RG: Right linear and left linear Grammars and conversions: Definition of Context Sensitive Grammar (CFG) and Linear bounded automata (LBA) (Proofs Not Required).

Unit -V:

Definition of unrestricted Grammar and Turing Machine (TM): Chomsky hierarchy on Languages, Grammars and recognizers; Design of TM as recognizer; Types of TM: Computational problems of TM with multiple tracks; Decidability Problem; Churches hypothesis (Proofs Not Required)

Text Books:

1. John E.Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, Introduction to Automata Theory, Languages and Computation, Third Edition, Pearson, 2013.

Reference Books:

1. Daniel I.A.Cohen, Introduction to Computer Theory, Second Edition, John Wiley.
2. John C Martin, Introduction to languages and the theory of Computation, Third Edition, TATA McGraw Hill, 2014.
3. VivekKulakarni, Theory of Computation, Oxford University press 2013, Second Edition, 2014

COMPUTER NETWORKS

B. Tech. III Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Understand the overview of reference models.
2. Classify and illustrate various sub protocols in multi access protocols.
3. Understand various routing algorithms and their operations.
4. Recommend transport protocol for the given scenarios.
5. Identify the protocols and functionalities in application layer

UNIT - I:

Overview of the Internet: Definition of networks, Topology, Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

Physical Layer: Guided transmission media, wireless transmission media.

UNIT - II:

Data Link Layer - Design issues, CRC codes, Elementary Data Link Layer Protocols, sliding window protocol.

Multi Access Protocols - ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer – CSMA/CD with Binary Exponential Back off, Ethernet Performance, Switched, Fast, Gigabit, 10-Gigabit Ethernets, Data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III:

Network Layer: Network Layer Design issues, routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, **Count to Infinity Problem**, Hierarchical Routing, Congestion control algorithms, admission control

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP.

UNIT - IV:

Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

The Internet Transport Protocols: UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

UNIT - V:

Application Layer Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS.

TEXT BOOKS:

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav, 2ndEdition, Pearson Education.
2. Understanding Communications And Networks, 3rdEdition,W.A .Shay,Cengage Learning.
3. Introduction To Computer Networks And Cyber Security, Chwan-Hwa(John)Wu,J.David Irwin, CRC Press.
4. Computer Networking: Atop Down Approach Featuring The Internet, James F.Kurose, K.W.Ross,3rdEdition, Pearson Education.

OPERATING SYSTEMS

L	T	P	C
3	0	0	3

B. Tech. III Year I Semester

Course Outcomes:

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

1. Understand the basic functions of Operating systems and system calls.
2. Analyze process scheduling and synchronization.
3. Understand the concepts of memory management.
4. Examine the concepts of MASS storage structure
5. Compare different protection methods of OS and understand the deadlock concepts.

UNIT - I:

Operating System Introduction: Operating Systems Objectives and functions, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special - Purpose Systems, Operating System services, user OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, Virtual Machines.

UNIT - II:

Process and CPU Scheduling - Process concepts - The Process, Process State, Process Control Block, Threads, Process Scheduling - Scheduling Queues, Schedulers, Context Switching, Preemptive Scheduling, Scheduling Criteria, Scheduling algorithms, thread scheduling, Case studies: Linux, Windows.

Process Coordination - Process Synchronization, The Critical section Problem, Peterson's solution, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

UNIT - III:

Memory Management and Virtual Memory - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms, Thrashing.

UNIT - IV:

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Implementation - File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance.

Mass Storage Structure - Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management.

UNIT - V:

Deadlocks System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery.

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

TEXT BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

REFERENCES BOOKS:

1. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
2. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A. S. Godbole, 2nd Edition, TMH

WEB TECHNOLOGIES

L	T	P	C
3	0	0	3

B. Tech. III Year I Semester

Course Outcomes:

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

1. Develop static and dynamic web pages using HTML and javascript.
2. Understand the XML tags and to parse XML data with java.
3. Develop web applications using server side programming with PHP.
4. Implement web applications using JDBC and Servlets.
5. Apply web applications with JSP.

UNIT –I:

Introduction to HTML: HTML tags, Lists, Tables, Images, Forms, Frames, Cascading Style Sheets **Client Side Scripting:** Java Script Language – Declaring variables, Scope of variables, Functions, Objects in java scripts, Dynamic HTML with java scripts, Form Validation.

UNIT –II:

XML: Introduction to XML, Defining XML tags their attributes and values, Document Type Definition, XML Schema, Document Object Model, and XHTML.
Parsing XML Data: DOM and SAX Parsers in java.

UNIT –III:

Introduction to PHP:

Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc. Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.
File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. binary files listing directories.

UNIT –IV:

Introduction to Servlets: Common Gateway Interface (CGI), The Servlet API, Life cycle of a Servlet, Deploying a Servlet, Reading Servlet parameters, Reading Initialization parameters, Handling HTTP Request &Responses,Using Cookies and Sessions,
Introduction to JDBC: JDBC Drivers, JDBC Process, Connecting to a Database using JDBC

UNIT –V:

Introduction to JSP: The Anatomy of a JSP Page, Introduction to MVC Architecture, JSP Processing, Declarations, Directives, Expressions, Code Snippets, Implicit Objects, Using Beans in JSP Pages, Using Cookies and Session for Session Tracking, Connecting to Database using JSP.

TEXT BOOKS

1. Programming the World Wide Web 7th Edition by Robert W. Sebesta
2. Web Technologies Uttam K Roy, Oxford University Press

REFERENCE BOOKS

1. Web Programming, Building Internet Applications , Chris Bates 2nd edition , Wiley Dreamtech
2. Java Script , D Flanagan, O'Reilly,SPD
3. Java Server Pages- Hans Bergsten, SPD O'Reilly

HUMAN COMPUTER INTERACTION

(Professional Elective-1)

B. Tech. III Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the course, students will be able to

1. Explain the capabilities of both humans and computers from the viewpoint of human information processing.
2. Describe and use HCI design principles, standards and guidelines.
3. Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
4. Discuss about different mobile applications and related design issues.
5. Analyze and discuss HCI issues in virtual reality, multimedia, and Word Wide Web-related environments.

UNIT I:

FOUNDATIONS OF HCI: The Human- I/O channels, Human Memory, Thinking: Reasoning and problem solving; the **computer-**Display Devices, Memory, processing and networks.
The Interaction- Models of interaction, frameworks and HCI, Ergonomics, Interaction styles, Elements of the WIMP interface, Interactivity.

UNIT II:

DESIGN PROCESS: Interaction Design basics – The process of design, Scenarios, Navigation design, Screen Design and layout, Iteration and prototyping.
HCI in software process – software life cycle, Usability engineering, Design rationale.
Design rules – Principles to support usability, Standards, guidelines Golden rules and heuristics.

UNIT III:

MODELS AND THEORIES: Cognitive models, Socio-Organizational issues and stake holder requirements, Communication and collaboration models.

UNIT IV:

MOBILE HCI: Mobile Ecosystem-Platforms, Application frameworks.
TypesofMobileApplications:Widgets, Applications, Games, Mobile Information Architecture.
Mobile Design: Elements of Mobile Design, Tools, **Mobile 2.0**.

UNIT V:

WEB INTERFACE DESIGN: Drag & Drop, Overlays, Inlays and Virtual Pages, Process Flow.

TEXT BOOKS:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004 (UNIT I, II & III).
2. Brian Fling, "Mobile Design and Development", First Edition, O'Reilly Media Inc., 2009 (UNIT –IV).

REFERENCE BOOKS

1. Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O'Reilly, 2009.(UNIT-V Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech

LINUX PROGRAMMING

(Professional Elective-1)

B. Tech. III Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Understand and make effective use of Linux file handling utilities.
2. Solve problems using shell scripting language (bash).
3. Develop the skills necessary for systems programming.
4. Examine various operations involved in process and signal management.
5. Distinguish intra and inter process communication.

UNIT - I:

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.Sed-Scripts, Operation, Addresses, Commands, Applications, awk-Execution, Fields and Records, Scripts, Operation, Patterns, Actions, functions.

UNIT - II:

Shell programming with Bourn again shell(bash) - Introduction, shell responsibilities, pipes and Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT - III:

Files and Directories- File Concept, File types, File System Structure, Inodes, library functions kernel support for files, system calls for file I/O operations- open, create, read, write, close.
Directories-Creating, removing and changing Directories-mkdir, rmdir, chdir.

UNIT - IV:

Process - Process concept, process identification, process control process- creation, waiting for a process, process termination, Kernel support for process, zombie process, orphan process.
Signals - Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise, alarm, pause, abort, sleep functions.

UNIT - V:

Inter Process Communication - Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pies-creation, IPC between related processes using unnamed pipes, FIFOs- creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions. Message Queues- APIs for message queues Semaphores- APIs for semaphores Shared Memory- APIs for shared memory.
Sockets- Introduction to Sockets, basic functions of Socket.

TEXT BOOKS:

1. UNIX Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
2. UNIX and Shell Programming, B. A. Forouzan and R. F. Gilberg, Cengage Learning.

REFERENCE BOOKS:

1. Unix System Programming using C++, T. Chan, PHI.
2. Beginning Linux Programming, 4th Edition, N. Mathew, R. Stones, Wrox, Wiley India Edition.
3. UNIX for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson.
4. UNIX shell Programming, S. G. Kochan and P. Wood, 3rd edition, Pearson Education.
5. Shell Scripting, S. Parker, Wiley India Pvt. Ltd.
6. C Programming Language, Kernighan and Ritchie, PHI

SOFTWARE PROJECT MANAGEMENT
(Professional Elective-1)

B. Tech. III Year I Semester

L	T	P	C
3	0	0	3

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

1. Compare and contrast the various CSM models.
2. Understand the principle of software engineering.
3. Examine the lifecycle phases, artifacts of the process and model based software architectures.
4. Compare various work flow process models.
5. Evaluate different software product metrics.

UNIT I:
ConventionalSoftwareManagement: Thewaterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT II:
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.
The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

UNIT III:
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.
Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.
Model based software architectures: A Management perspective and technical perspective.

UNIT IV:
Work Flows of the process: Software process workflows, Inter trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning. Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.
Process Automation: Automation Building Blocks, the Project Environment.

UNIT V:
Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Example: Future Software Project Management: Modern Project Profiles Next generation Software economics, modern Process transitions.
Case Study: The Command Center Processing and Display System-Replacement (CCPDS-R)

TEXT BOOKS:

1. Software Project Management, Walker Royce, Pearson Education, 1998

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition,TataMc-Graw Hill,2006
2. Applied Software Project Management, Andrew Stellman& Jennifer Greene, O'Reilly, 2006.
3. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.

COMPUTER GRAPHICS
(Professional Elective–1)

L	T	P	C
3	0	0	3

B. Tech. III Year I Semester

Course Outcomes:

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

1. Outline the areas of Computer Graphics.
2. Examine various 2D Geometrical transforms.
3. Understand 3D Geometrical transforms.
4. Apply different visible surface detection methods.
5. Plan the sequence of an animation for a given scenario.

UNIT-I:

Introduction

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

Output Primitives

Points and lines, tine drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT-II:

2D Geometrical Transformations

Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms transformations between coordinate systems.

2D Viewing

The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen- Sutherland and Cyrus-beck line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT-III:

3D Object Representation

Polygon surfaces, quadric surfaces. Spline representation, Hermite curve, Bezier curve and B-spine curves. Bezier and B-spline surfaces, sweep representations, octrees BSP Trees.

3D Geometric transformations

Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and Clipping.

UNIT-IV:

Visible Surface Detection Methods:

Classification, back face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, and area sub division and octree methods.

Illumination Models and Surface Rendering Methods Basic illumination models, polygon rendering method.

UNIT-V

Computer Animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame system, Motion specification.

TEXT BOOKS

1 "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.

REFERENCE BOOKS

1 Computer Graphics Principles & practice, second edition In C, Foley, VanDam, Feiner and Hugues, Pearson Education.
2 "Computer Graphics Second edition", Zhigandxiang. Roy Plastock, Schaum's outlines. ratsMcGraw 19 edition.
3 Procedural elements lot Computer Graphics, David F Rogers. Tata McGraw hill, 2nd edition.
4 Principles of interactive Computer Graphics. Neuman and Sprout TMH.
5 Principles of Computer Graphics. Shalni, Govil-Pal, Springer.
6 Computer Graphics F.S.H. S.M.Kelley. PHI.

COMPUTER NETWORKS & OPERATING SYSTEMS LAB

B. Tech. III Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

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

1. Implement various CPU scheduling algorithms
2. Apply the memory management techniques
3. Write Programs on File allocation strategies
4. Implement various algorithms for error detection and correction
5. Implement Algorithms on Shortest path routing
6. Write a program for congestion control

Week 1: Simulate the following CPU Scheduling Algorithms using C program:

a) FCFS b) SJF

Week 2: Simulate the following CPU Scheduling Algorithms using C program:

a) Priority b) Round Robin

Week 3: Simulate Paging Technique of Memory Management using C program.

Week 4: Write a program to implement page replacement algorithms (FCFS, Optimal, and LRU).

Week 5: Write a C program to simulate the following file allocation strategies.

a) Sequential b) Indexed c) Linked

Week 6: Write a program to implement Banker's algorithm for deadlock avoidance.

Week 7: Implement the data link layer farming methods such as character stuffing and bit stuffing.

Week 8: Implementation of hamming code algorithm

Week 9: Implement on a data set of characters the three CRC polynomials – CRC 12, CRC and CCIP.

Week 10: Implement Dijkstra's algorithm to compute the Shortest path through a graph.

Week 11: Take an example subnet of hosts. Obtain broadcast tree for it.

Week 12: Write a program for congestion control using leaky bucket algorithm.

WEB TECHNOLOGIES LAB

B. Tech. III Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

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

1. Design static web pages that perform client side authentication.
2. Understand XML data representation.
3. Create dynamic web application using PHP and access database.
4. Implement sessions in web applications
5. Design dynamic web applications using MVC architecture.

List of Experiments

Week 1: Create a Registration page using HTML.

Week 2: Create a static HTML application with three frames as below:
First frame at the top containing a header
Second frame a navigation frame that contains hyperlinks to open 3 other pages
Third frame that displays a page corresponding to the hyperlinks in the second frame

Week 3: Design a static HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

Week 4: Design a HTML page with required JavaScript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show "out of range" and if it is not a number, it should show "not a number" message in the result box.

Week 5: Validate the fields of registration page created in the first experiment using regular expressions in JavaScript.

Week 6: Validate an XML document using DTD and XML schema.

Week 7: Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser

Week 8: Create a PHP application that reads request parameters from the registration page created in the first experiment and stores in the database.

Week 9: Create a PHP application program for authenticating users for the above program using sessions.

Week 10: Installation and configuration of Tomcat and deploy a simple "Hello World" servlet.

Week 11: Write a servlet that reads request parameters from the registration page created in the first experiment and stores in the database.

Week 12: Write a servlet program for authenticating users for the above program.

Week 13: Implement the following session handling techniques using servlets:

i) Cookies
ii) Hidden form field
iii) HttpSession
iv) URL Rewriting

Week 14: Create a JSP application that reads request parameters from the registration page created in the first experiment and stores in the database using Java Beans.

Week 15: Create a JSP application for authenticating users for the above program

QUANTITATIVE METHODS & LOGICAL REASONING

(Common for all Branches)

B. Tech. III Year I Semester

L	T	P	C
2	0	0	1

Course Outcomes:

At the end of the completion of the course a student is expected

1. To perform well in various competitive exams and placement drives.
2. To solve basic and complex mathematical problems in short time.
3. To become strong in Quantitative Aptitude and Reasoning which can be applied for GRE, GATE, GMAT or CAT exam also.
4. To develop problem solving skills and analytical abilities, which play a great role in corporate and industry set up.

Quantitative Aptitude and Reasoning:

Unit – I:

Number System: Speed Maths, Numbers, Factors, Prime & Co Primes, LCM & HCF, Divisibility Rules, Finding Unit Place Digit and Last Two Digits of an Expression

Ratio, Proportion and Variations: Definition of Ratio, Ratio of Proportion, Comparison of Ratios, Compound ratio, Direct and Indirect Proportion

Percentages: Converting Fractions and Decimal into Percentages, Successive Percentage, Populations, Expenditure and Savings

Profit and loss: Relation between Cost Price and Selling Price, Discount and Marked Price, Gain or Loss Percentages on Selling Price

Simple and Compound Interest: Problems on Interest (**I**), Amount (**A**), Principal (**P**) and Rate of Interest (**R**) difference between the Simple Interest and Compound Interest for 2 and 3 years.

Unit – II:

Partnership: Relation between Partners, Period of Investment and Shares

Averages, Ages and Allegation : Average of Different Groups, Change in Averages by Adding, Deleting and Replacement of Objects, Problems on ages, Allegation Rule, Mean Value of the Mixture, Replacement of Equal Amount of Quantity.

Time and Work: Men and Days, Work and Wages, Pipes and Cisterns, Hours and Work, Alternate Days Concept,

Time and Distance: Difference between the Average and Relative Speeds, Reaching the Destination Late and Early, Stoppage Time Per Hour, Time and Distance between Two Moving Bodies : Train Crossing Man - same and opposite directions, Speed of Boat and Stream,

Unit – III:

Progressions and Quadratic Equations: Arithmetic, Geometric and Harmonic Progressions, Arithmetic Mean, Geometric Mean and Harmonic Mean and their Relations. General form of Quadratic Equation, Finding the Roots of Quadratic Equation, Nature of the Roots.

Permutation and Combination: Fundamental Rules, Problems on Permutations & combinations.

Probability: Definition of probability, Notations and Formulae, Problems on Probability.

Data Interpretation and Data Sufficiency: Tabular and Pie-charts, Bar and Line Graphs, Introduction to Data Sufficiency, Problems on Data Sufficiency.

Unit – IV:
Deductions: Statements and conclusions using Venn diagram and Syllogism Method

Series completion: Number series, Alphabet series, Letter Series.

Coding and Decoding: Letter coding, Number coding, Number to letter coding, Matrix Coding, Substitution, Mixed Letter Coding, Mixed Number Coding, Deciphering Individual Letter Codes by Analysis.

Analytical Reasoning Puzzles:
Problems on Linear, Double line-up and Circular Aarrangements, Selections and Comparisons.

Blood Relations:
Defining the various Relations among the Members of a Family, Solving Blood Relation Puzzles by using Symbols and Notations. Problems on Coded Relations.

Unit – V:
Direction sense Test: Sort of directions in puzzles distance between two points, problems on shadows, Application of triangular triplets.

Clocks: Relation between Minute-Hour Hands, Angle vs Time, Exceptional Cases in Clocks

Calendars: Definition of a Leap Year, Finding the Odd days, finding the Day of any Random Calendar Date, repetition of Calendar Years.

Cubes and Dices: Finding the Minimum and Maximum Number of Identical Pieces and Cuts, Painting of Cubes and cuts, Problems on Dice.
Venn Diagrams: Circular Representation of given words, Geometrical Representation of Certain class, Set theory based Problems.

Text Books:

1. Verbal Reasoning, GL Barrons, Pinterest, Latest Edition 2019.
2. A Modern Approach to Logical Reasoning & Quantitative Aptitude, R S Agarwal, S. Chand, Publications, Revised edition, 2019.

Reference Books:

1. Quantitative Aptitude, G.L Barrons, Pinrest 2019.
2. Quantitative Aptitude, AbhijitGuha, McGraw Hills, Edition 2019.
3. Quantitative Aptitude, U. Mohan Rao SCITECH.

MANAGERIAL ECONOMICS & AND FINANCIAL ANALYSIS

B. Tech. III Year II Semester

L	T	P	C
3	0	0	3

PRE REQUISITES:

1. Probability and statistics
2. Operation research
3. Mathematics-I
4. Environmental studies

Course Outcomes:

1. The students will be able to
2. Understand the nature and scope of business economics.
3. Differentiate the various forms of Business organizations.
4. Identify the impact of economic variables on the Business firms
5. Analyze the Demand, Supply, Production, Cost, Market Structure, Pricing aspects
6. Analyze, compare and interpret the Financial Statements of a Company using ratios.

UNIT – I:

Introduction to Business and Economics: Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT – II:

Demand and Supply Analysis:

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT- III:

Production, Cost, Market Structures & Pricing:

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale.

Cost analysis: Types of Costs. Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis

UNIT – IV:

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, and Preparation of Final Accounts.

UNIT – V:

Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems)

TEXT BOOKS:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.

REFERENCES:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S.N. Maheshwari, Sunil.KMaheshwari, Sharad.KMaheshwari, Financial Accounting, 5e, Vikas Publications, 2013.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.

COMPILER DESIGN

B. Tech. III Year II Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the course student would be able to

1. Formulate tokens for various programming languages.
2. Apply principles of parsing techniques to do syntax analysis.
3. Formulate semantic rules to do semantic analysis.
4. Apply optimization techniques on the intermediate code.
5. Generate the target code.

Unit I:

Introduction to Compilers: Structure of Compiler-Phases of Compiler, Symbol Table Management, Grouping of Phases into Passes, Compiler Vs Interpreter.

Lexical Analysis: Role and need of Lexical Analyzer, Input Buffering, Regular expressions for identifiers, Signed numbers etc.., A Language for specifying Lexical Analyzer, Lexical phase errors.

Unit II:

Syntactic Specification: Context Free Grammars, Derivations and Parse Trees, Capabilities of Context Free Grammars, Syntactic Phase errors, Semantic errors.

Basic Parsing Techniques: Parsers, Top-Down parsing, Predictive parsers and construction of predictive parsing and LL (1) parser table, LL (1) grammar.

Unit III:

Construction of efficient Parsers: Introduction to Bottom Up parsing, shift reduceparser,LR Parsers, Canonical collection of LR(0) items, construction of SLR parsing tables, Construction of canonical LR(0) parsing tables, Construction of LALR parsing tables, Comparison of SLR,LALR and CALR parsers, Comparison of Top down and Bottom up parsers.

Unit IV:

Syntax Directed Translation: Syntax Directed Translation schemes, Intermediate codes, Postfix notation, Three Address code, Quadruples and triples..

Run-Time Environments: Storage allocation strategies, Stack allocation of space, Access to non-local names.**Symbol table:** Contents of Symbol table, Data Structures for symbol tables, representing scope information.

Unit V:

Code Optimization: Principal sources of optimization, Loop optimization, Copy Propagation, Dead code elimination, Redundant sub expression elimination.

Code Generation: Object programs, problems in Code generation, A Machine Model, A Simple Code generator, Register allocation and assignment, Peephole optimization.

Text Book:

1. Alfred V Aho, Jeffrey D Ullman, Principles of Compiler Design, Pearson Education, 2001.

Reference Books:

1. J P Trembly and P G Sorenson, The Theory and practice of Compiler Writing, McGraw Hill, 2005.
2. Alfred V Aho, Ravi sethi, Jeffrey D Ullman, Compilers-Principles, Techniques and Tools, Pearson Education, second edition.
3. Dick Grone, Henri E Bal, Ceriel J H Jacobs, Modern Compiler Design, Wiley Dreamtech, 2006.

DATA WAREHOUSING & DATA MINING

B. Tech. III Year II Semester

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Understand the fundamentals of Data warehousing and OLAP technology.
2. Outline the Data Mining and Data pre-processing techniques.
3. Identify the frequent patterns using association algorithms.
4. Distinguish how classification algorithms are used on data sets.
5. Compare different clustering techniques on large data sets.

UNIT – I:

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data ware housing to data mining.

UNIT – II:

Introduction to Data Mining: What motivated data mining? Why it is important? So- What is Data mining, Data Mining-On What Kind of Data, Data Mining Functionalities-What kind of patterns can be Mined, Are All of the patterns Interesting, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data warehouse system, Major issues in Data mining.

Data pre-processing:-Why Preprocess the Data, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT – III:

Mining Frequent Patterns, Associations and Correlations: Basic Concepts and a Road Map, Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT – IV:

Classification & Prediction: What is Classification? What is Prediction? Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back Propagation, Support Vector Machines, Associative Classification: Classification by Association Rule Analysis, Lazy Learners, Other Classification Methods, Prediction, Evaluating the Accuracy of a Classifier or Predictor.

UNIT – V:

Cluster Analysis: What is Cluster Analysis, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis.

Text Books:

1. Data Mining- Concepts and Techniques by Jiawei Han, MichelineKamber and Jian Pei Morgan Kaufmann publishers 2nd edition
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

References:

1. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aanhory& Dennis Murray Pearson Edn Asia.
3. Insight into Data Mining,K.P.Soman,S.Diwakar,V.Ajay,PHI,2008.
4. Data Warehousing Fundamentals – PaulrajPonnaiah Wiley student Edition.

ARTIFICIAL INTELLIGENCE

B. Tech. III Year II Semester

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Understanding the evolution and present status of AI
2. Understanding different algorithms of AI
3. Understanding different AI techniques like HMM and Reinforcement Learning
4. Able to apply the basic concepts of AI in real life

Unit – I:

Concept of AI, History, Current Status, Scope, Intelligent Agents, Environments, Problem Formulations, Review of Tree and Graph Structures, State Space Representation, Search Graph and Search Tree.

Unit – II:

Uninformed and Informed Search Algorithms: Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search: Generate & Test, Hill Climbing, Best first search, A* algorithm, Game Search, Alpha-Beta Pruning Genetic Algorithm

Unit – III:

Probabilistic Reasoning : Probability, Conditional Probability, Bayes Rule, Bayesian Networks-Representation, Construction and Inference, Temporal Model, Hidden Markov Model, Dynamic Bayesian networks (DBN), Natural Language Processing using HMM

Unit – IV:

Markov Decision Process, MDP Formulation, Utility Theory, Utility Functions, Value Iteration, Policy Iteration and Partially Observable MDPs.

Unit – V:

Reinforcement Learning: Passive Reinforcement Learning, Direct Utility Estimation, Adaptive dynamic Programming, Temporal Difference Learning, Active Reinforcement Learning- Q Learning.

Text Books:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Prentice Hall
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill.

Reference Books:

1. Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi.
2. SarojKaushik, "Artificial Intelligence", Cengage Learning India, 2011.

OBJECT ORIENTED ANALYSIS & DESIGN
(Professional Elective-2)

B. Tech. III Year II Semester

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Understand Object Oriented Software Development Process
2. Construct class and object diagrams for the given scenario
3. Model interaction diagrams, use case diagrams and activity diagrams for a given project
4. Design State diagrams involving processes and threads
5. Apply the concept of architectural design for deploying the code for software.

UNIT– I:

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

UNIT– II:

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Packages.
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT– III:

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT– IV:

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

UNIT– V:

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.
Case Study: The Unified library application, ATM System.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:

1. Analysis & Design and Unified Process, Craig Larman, Pearson Education.
2. Object Oriented Analysis, Design and Implementation,B.Dathan. S.Ramnath, Universities Press.
3. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.

INFORMATION SECURITY
(Professional Elective-2)

B. Tech. III Year II Semester

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Identify various Security Attacks.
2. Understand various Encryption Principles and algorithms.
3. Implement Cryptography algorithms.
4. Understand various Security Associations and Key Management.
5. Design a Firewall for Security.

UNIT - I:

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT – II:

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT – III:

Public key cryptography principles; public key cryptography algorithms; digital signatures, digital Certificates; Certificate Authority and key management Kerberos, X.509; Directory Authentication Service; Email privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT – IV:

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

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT – V:

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3. Intruders, Viruses and related threats. Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

TEXT BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W. Manzuik and Ryan Permeh, wileyDreamtech.

REFERENCE BOOKS:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press).
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson.
4. Principles of Information Security, Whitman, Thomson.

5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH.
6. Introduction to Cryptography, Buchmann, Springer

SOFTWARE TESTING METHODOLOGIES
(Professional Elective-2)

L	T	P	C
3	0	0	3

B. Tech. III Year II Semester

Course Outcomes:

At the end of this course, the student would be able to

1. Understand the purpose of Software testing.
2. Discuss various testing techniques and able to prepare the test cases for specific requirements.
3. Understand transaction and data flow testing.
4. Construct the test plans and validate the test plan
5. Understand the testing policies and standards.

UNIT-I:

Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Basic Definitions, Software Testing Principles, The Tester's Role in a Software Development Organization, Consequences of bugs and taxonomy of bugs, Levels of Testing.

UNIT-II:

Test Case Design Strategies, Using Black Box Approach to Test Case Design: Requirements based testing, positive and negative testing, Boundary Value Analysis, Logic based Testing, Equivalence Class Partitioning, State-transition testing, Domain Testing, Using White Box Approach to Test design: code functional testing, Coverage and Control Flow Graphs, Covering Code Logic, Paths and their Role in White–box Based Test Design.

UNIT-III:

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

UNIT-IV:

Test Management: People and organizational issues in testing ,organization structures for testing teams,testing services, Test Planning – Test Plan Components, Test Plan Attachments, Locating Test Items, test management, test process, Reporting Test Results, The role of three groups in Test Planning and Policy Development, Introducing the test specialist, Skills needed by a test specialist, Building a Testing Group.

UNIT-V:

Test Automation: Skills needed for automation, scope of automation, designand architecture for automation, requirements for a test tool, challenges in automation, Test metrics and measurements, project, progress and productivity metrics.

TEXT BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson education, 2006.
2. Boris Beizer, "Software Testing Techniques", Second Edition,Dreamtech, 2003

REFERENCE BOOKS:

1. Ilene Burstein, "Practical Software Testing" , Springer International Edition, 2003
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education,2008.

3. Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003.
4. RenuRajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.

PRINCIPLES OF PROGRAMMING LANGUAGES
(Professional Elective-2)

III Year B.Tech. CSE – II Semester

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Understand the importance of programming paradigms.
2. Illustrate the syntax and semantics in formal notation.
3. Make use of expressions and statements for subprograms and blocks.
4. Select different object oriented concepts for solving a given problem.
5. Compare the features of different programming languages.

UNIT I:

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms Imperative, Object Oriented, functional Programming, Logic Programming. Programming Language Implementation Compilation and Virtual Machines, programming environments

UNIT II:

Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotation semantics and axiomatic semantics for common programming language features.

Names, Bindings, Data types: Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types.

UNIT III:

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements and guarded commands.

Subprograms and Blocks: Fundamentals of sub-programs, Scope and life time of variables, static and dynamic scope, design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

UNIT IV:

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95.

Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

UNIT V:

Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

TEXT BOOKS:

1. Concepts of Programming Languages Robert.W. Sebesta, Tenth Edition, Pearson Education.

REFERENCE BOOKS:

1. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech, rp-2007.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003.
3. LISP Patric Henry Winston and Paul Horn Pearson Education.
4. Programming in Prolog, W. F. Clocksin& C. S. Mellish, 5th Edition, Springer.
5. Programming Python, M. Lutz, 3rd Edition, O'reilly, SPD, rp-2007.
6. Core Python Programming, Chun, II Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michel Dawson, Thomson, 2008

DATA MINING & CASE TOOLS LAB

B. Tech. III Year II Semester

L	T	P	C
0	0	2	1

Course outcomes:

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

1. Demonstrate frequent pattern algorithms
2. Explore Weka environment
3. Apply data mining techniques for realistic data
4. Design various UML diagrams for ATM allpication
5. Design Unified Library application
6. Explore real time applications

Data Mining Lab

Week-1: Demonstrate Apriori based Association Rule Mining
Week-2: Demonstrate FP –growth based Association Rule Mining
Week-3: Weather classification using WEKA Tool
Week-4: Demonstrate K-means based Clustering
Week-5: Demonstrate Hierarchical Clustering
Week-6: Credit Risk Assessment

Description: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

Case Tools Lab

Week 1 & Week 2:

Draw the following diagrams using UML for an ATM system whose description is given below.
UML diagrams to be developed are:

1. Use Case Diagram
3. Class Diagram
4. Sequence Diagram
5. Collaboration Diagram
6. State Diagram
7. Activity Diagram
8. Component Diagram
9. Deployment Diagram

Description for an ATM System

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the ma-chine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.).

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned - except as noted below;

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction. The ATM will provide the customer with a printed receipt for each successful transaction.

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit enve-lopes and reload the machine with cash, blank receipts, etc.

Week 3 & Week 4:
The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

Week 5 & Week 6:
Student has to take up another case study of his/her own interest and do the same whatever mentioned in first problem.

ADVANCED COMMUNICATION SKILLS (ACS) LAB

B. Tech. III Year II Semester

L	T	P	C
0	0	2	1

Course Outcomes

1. Develop sound communication skills in various situations with the help of enriched vocabulary.

2. Practice reading techniques for a faster and better comprehension.
3. Exhibit strong writing skills to express ideas effectively.
4. Demonstrate effective presentation skills.
5. Use appropriate verbal and non-verbal skills for a successful career.

UNIT-I:
Activities on Fundamentals of inter-personal Communication and Building Vocabulary – Starting a conversation – responding appropriately and relevantly – using the right body language - Role Play in different situations & Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

UNIT-II:
Activities on Reading Comprehension – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.

UNIT-III:
Activities on Writing Skills – Structure and presentation of different types of writing – letter writing/ Resume writing/ Statement of purpose - E-correspondence/ Technical report writing / Portfolio writing – planning for writing – improving one's writing.

UNIT-IV:
Activities on Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.

UNIT-V:
Activities on Group Discussion and interview Skills – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation. Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video – conference and Mock Interviews.

REFERENCE BOOKS:

1. Technical Communication by Meenakshi Raman &Sangeeta Sharma, Oxford University, 2nd Edition, 2011.
2. Functional English for Success, Orient Longman, 2014.

PERSONALITY DEVELOPMENT AND BEHAVIORAL SKILLS

B. Tech. III Year II Semester

L	T	P	C
2	0	0	1

Course Outcomes
1. Practice optimistic attitude for an efficient, socially viable and multi-faceted personality.
2. Demonstrate functions of non-verbal ***communication in formal context***.
3. Build effective individual & team dynamics for professional accomplishments.

4. Analyze appropriate strategic Interpersonal Skills for productive workplace relationships.
5. Correspond in multiple contexts, for varied audiences, across genres and modalities.

Unit – I:

Personality Development:

Definition - Various Aspects of Personality Development - Behavioural Traits.

Importance of Soft Skills for personal and professional development - Success stories.

Unit – II:

Non Verbal Communication:

Kinesics, Haptics,Proxemics, Vocalics, Oculesics

Body Language informal contexts such as Group Discussions, Presentations and Interviews.

Unit – III:

Team Dynamics:

Different Types of Teams– Role of an individual communicating as a group or team leader

Individual Presentations/Team Presentation-Project Presentations- Case Studies

UNIT-IV:

Interpersonal Skills:

Time Management- Stress Management- Emotional Intelligence- Conflict Management-Relationship Management

UNIT-V:

Digital Correspondence:

Role of Multimedia in Communication Communication in a Digital Edge (Video Conference Etc.) Social Networking: Importance and Effects.

TEXT BOOK:

1. Personality Development and Soft Skills, Preparing for Tomorrow, Shikha Kapoor 2nd Edition,2020.

REFERENCE BOOKS:

1. Barun, K Mitra, Personality Development and Soft Skills, Oxford University Press, 2nd Edition, 2016.
2. Professional Ethics.R Subramanian, Oxford University Press, 2ndEdition,2015.

COURSE STRUCTURE FOR B.TECHIV YEAR

B. Tech. IV Year I Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	PC-16	Mobile Application Development	3	0	0	3
2	PC-17	Cloud Computing	3	0	0	3
3	PE -3	Big Data Analytics Internet of Things R Programming Image Processing	3	0	0	3
4	PE-4	Advanced Databases Block-Chain Technologies Information Retrieval Systems Machine Learning	3	0	0	3
6	PC Lab	Mobile Application Development Lab	0	0	2	1
7	PE-3 Lab	Big Data Analytics Lab Internet of Things Lab R Programming Lab Image Processing Lab	0	0	2	1
8	PW	Mini Project	0	0	6	3
Total			**18**	**0**	**10**	**20**

B. Tech. IV Year II Semester:

S. No.	Category	Course Title	L	T	P	Credits
1	PC-18	E-Commerce	3	0	0	3
2	PC-19	Semantic Web and Social Networks	3	0	0	3
3	PW	Technical Seminar	0	0	4	2
4	PW	Comprehensive Viva Voce	0	0	4	2
5	PW	Major Project	0	0	20	10
		Total	**6**	**0**	**28**	**20**

MOBILE APPLICATION DEVELOPMENT

B. Tech. IV Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of this course, the student would be able to:

1. Understand the basics of Android devices and Platform.
2. Acquire knowledge on basic building blocks of Android programming required for App development.
3. Understand persistence Data storage mechanism in Android
4. Understand advanced application concepts like networking, Animations and Google Maps services etc.
5. Develop and publish Android applications in to Android Market

UNIT I:

JAVA FX TECHNOLOGY FOR RICH CLIENT APPLICATIONS

Introduction: Introduction to mobile application development, trends, introduction to various platforms, introduction to smart phones.

Android platform: Android platform features and architecture, versions, comparison added features in each versions,ART (Android Runtime), ADB (Android Debug Bridge).

Development environment/IDE: Android studio and its working environment, gradle build system, emulator setup.

Application anatomy: Application framework basics: resources, layout, values, asset XML representation and generated R.Javafile, Android manifest file,creating a simple application.

UNIT II:

ANDROID UI DESIGN

GUI for Android: Introduction to activities, activities life-cycle, Android v7 support library form API21 for lower version support.

Intent: intent object, intent filters, adding categories, linking activities, user interface design components.

Views and View Groups: Basic views, picker views, adapter views, Menu, App Bar etc, basics of screen design; different layouts. App widgets.

Lollipop Material design: new themes, new widgets, Card layouts. Recycler View **Fragments**: Introduction to activities, activities life-cycle.

UNIT III:

DATA PERSISTENCE

Different Data persistence schemes: Shared preferences, File Handling, Managing data using SQLite database

Content providers: User content provider, Android in build content providers.

UNIT IV:

BACK GROUND RUNNING PROCESS, NETWORKING AND TELEPHONY SERVICES

Services: introduction to services – local service, remote service and binding the service, the communication between service and activity, Intent Service.

Multithreading: Handlers, AsyncTask

Android network programming: HttpUrlConnection, Connecting to REST-based and SOAP based Web services

Broad cast receivers: LocalBroadcastManager, Dynamic broadcast receiver, System Broadcast. Pending Intent, Notifications

Telephony Manager: Sending SMS and making calls.

UNIT V:
ADVANCED APPLICATIONS
Location based services: Google maps V2 services using Google API,
Animations and Graphics: Property Animation, View Animations, Drawable Animations
Media and Camera API: Working with video and audio inputs, camera API
Sensor programming: Motion sensors, Position sensors, Environmental sensors.
Publishing Android Apps: Guide lines, policies and process of uploading Apps to Google play.

TEXT BOOKS:

1. Dawn Griffiths, David Griffiths,*"Head First: Android Development" ,OReilly2015,ISBN*: 9781449362188
2. J.F.DiMarzio's, "Android 4 Application Development"

REFERENCE BOOKS:

1. Greg Milette,AdamStroud,"PROFESSIONAL Android™ Sensor Programming", John Wiley and Sons, Inc2012,ISBN/978111265055,9781280678943,978111227459
2. Paul Deital,HarveyDeital, Alexander Wald, "Android 6 for Programmers ,App Driven approach",2015, Prentice Hall ,*ISBN*: 9780134289366

CLOUD COMPUTING

B. Tech. IV Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of this course, the student would be able to:

1. Understand different Cloud Services
2. Analyze different cloud deploy and service models.
3. Understand various enterprise applications in cloud computing
4. Understand and apply the virtualization concepts
5. Understand the data security mechanism and SLA management in cloud.

UNIT - I:
Introduction to cloud computing: Cloud Computing in a Nutshell, Roots of Cloud Computing, Layers and Types of Clouds, Desired Features of Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenge and Risks.

UNIT II:
Migration into a Cloud: Introduction, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration in to a Cloud.
Enriching the 'Integration as a Service' Paradigm for the Cloud Era: An Introduction, The Onset of Knowledge Era, The Evolution of SaaS, The challenges of SaaS Paradigm, Approaching the SaaS integration enigma, new integration scenarios, the integration. Methodologies, Saas integration products and platforms, SaaS Integration Services, Business to Business Integration (B2Bi) Services.

UNIT III:
The Enterprise Cloud Computing Paradigm: Introduction, Background, Issues for Enterprise Applications on the Cloud, Transition Challenges, Enterprise Cloud Technology and Market Evolution, Business Drivers toward a Marketplace for Enterprise Cloud Computing, the Cloud Supply Chain.

UNIT IV:
Virtual Machines Provisioning and Migration Services: Introduction and Inspiration, Background and Related Work, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services, VM Provisioning and Migration in Action, Provisioning in the Cloud Context, Future Research Directions.
Secure Distributed Data Storage in Cloud Computing: Introduction, Cloud Storage: from LANs TO WANs, Technologies for Data Security in Cloud Computing, Open Questions and Challenges.

UNIT V:
SLA Management in Cloud Computing: A Service Provider's Perspective: Inspiration, Traditional Approaches to SLO Management, Types of SLA, Life Cycle of SLA , SLA Management in Cloud, Automated Policy based Management.
Data Security in the Cloud: An Introduction to the idea of Data Security, The Current State of Data Security in the Cloud, Homo Sapiens and Digital Information, Cloud Computing and Data Security Risk, Cloud Computing and Identity, Digital Identity and Data Security, Content Level Security-Pros and Cons.

TEXT BOOK:

1. RajkumarBuyya, James Broberg, AndrZejGoscinski, Cloud Computing Principles and Paradigms, Wiley Publications.

REFERENCE BOOKS:

1. Michael Miller, Cloud Computing – Web-Based Application That Change the Way You Work and Collaborate Online, Pearson Publications.
2. Thomas Erl, ZaighamMahmood, & Ricardo Puttini, Cloud Computing- Concepts, Technology & Architecture Pearson Publications.
3. Kai Hwang, Geoffrey C.Fox. Jack J. Dongarra, Distributed and Cloud Computing From Parallel Processing to the Internet of Things, ELSEVIER Publications.

BIG DATA ANALYTICS
(Professional Elective-3)

B. Tech. IV Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of this course, the student would be able to:

1. Explain the foundations, definitions, and challenges of Big Data.
2. Use Hadoop file system interfaces.
3. Program using HADOOP and Map reduce.
4. Understand various Hadoop Eco Systems like Pig, Hive.
5. Outline Hadoop Eco System using HBase, Zookeeper.

UNIT-I:
Introduction to Big Data and Hadoop
Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analyzing Data with UNIX tools, Analyzing Data with Hadoop, Hadoop Streaming, Hadoop Echo System.

UNIT-II:
HDFS (Hadoop Distributed File System)
The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

UNIT-III:
Map Reduce
Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

UNIT-IV:
Hadoop Eco System-I
Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators.
Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions.

UNIT-V:
Hadoop Eco System-II
HBase: HBasics, Concepts, Clients, Example, Hbase versus RDBMS.
Zookeeper: The Zookeeper Services, Zookeeper in Production.

TEXT BOOK:

1. Tom White “Hadoop: The Definitive Guide” Third Edition, O’reily Media, 2012.

REFERENCE BOOKS:

1. Seema Acharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015. References

2. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
3. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
4. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
5. AnandRajaraman and Jefrey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
6. Michael Mineli, Michele Chambers, AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.

INTERNET OF THINGS (IoT)
(Professional Elective - 3)

B. Tech. IV Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of this course, the student would be able to:

1. Describe various IoT enabled technologies.
2. Understand the concepts of M2M with necessary protocols.
3. Illustrate Python programming for IoT
4. Examine the Python programming with Raspberry PI
5. Design web applications for IoT

UNIT I:

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT– IoT Protocols, IoT communication models, IoT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT II:

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPPER.

UNIT III:

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib.

UNIT IV:

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT V:

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs. Web server – Web server for IoT, Cloud for IoT, Python web application framework designing a RESTful web API.

Case study: Amazon web services for IoT.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOKS:

1. Getting started with the Internet of Things: connecting sensors and micro controllers to the cloud – CUNO Pfister, O' Reily publications.

(Professional Elective - 3)

L	T	P	C
3	0	0	3

B. Tech. IV Year I Semester

Course Outcomes:

At the end of this course, the student would be able to:

1. Apply operations on basic data types using R
2. Apply various operators on data frames, factors and list
3. Develop functions using iterative programming for real world problems
4. Analyze the data by plotting using R
5. Formulate linear and multiple regression models for time series data & web data

Unit – I:

Basics of R: Introduction, R-Environment Setup, Programming with R, Basic Data Types, Vectors: Creating and Naming Vectors, Vector Arithmetic, Vector Subsetting, Matrices: Creating and Naming Matrices, Matrix Subsetting, Arrays, Class.

Unit – II:

Factors and Data Frames : Introduction to Factors: Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, Subsetting of Data Frames, Extending Data Frames, Sorting Data Frames,

Lists: Introduction, Creating a List: Creating a Named List, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting Lists to Vectors, Conditionals and Control Flow: Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements.

Unit – III:

Iterative Programming in R: Introduction, While Loop, For Loop, Looping Over List.

Functions in R: Introduction, Writing a Function in R, Nested Functions, Function Scoping, Recursion, Loading an R Package, Mathematical Functions in R, Cumulative Sums and Products, Calculus in R, Input and Output Operations.

Unit – IV:

Apply Family in R : Introduction, Using Apply in R, Using Lapply in R, Using Sapply, Using Tapply in R: Split Function, Using Mapply in R, Charts and Graphs : Introduction, Pie Chart: Chart Legend, 3D Pie Chart, Bar Chart, Box Plot, Histogram, Line Graph: Multiple Lines in Line Graph, Scatter Plot.

Unit-V:

Data Interfaces: Introduction, CSV Files: Syntax, Importing a CSV File, Excel Files: Syntax, Importing an Excel file, Binary Files: Syntax, XML Files, Web Data, Databases.

Statistical Applications: Introduction, Basic Statistical Operations, Linear Regression Analysis, Chi-Squared Goodness of Fit Test, Chi-Squared Test of Independence, Multiple Regression, Time Series Analysis.

TEXT BOOK:

1. K G Srinivas, G M Siddesh “Statistical programming in R”, Oxford Publications.

REFERENCE BOOKS:

1. K Beginning R: The Statistical Programming Language,MarkGardener,Wrox
2. Y. anchangZhao,R and Data Mining: Examples and Case Studies. Elsevier in December 2012.
3. Avril Coghlan,A Little Book of R For Time Series,Release 0.2.

IMAGE PROCESSING

(Professional Elective - 3)

L	T	P	C
3	0	0	3

B. Tech. IV Year I Semester

Course Outcomes:

After completion of the course, student would be able to:

1. Understand Digital image fundamentals,
2. Program Image Transformations,
3. Design Color Image Processing and Restoration,
4. Implement Image segmentation techniques and
5. Program Image Compression techniques.

UNIT-I:

Digital image fundamentals - Digital Image through scanner, digital camera. Concept of gray levels. Gray level to binary image conversion. Sampling and quantization. Relationship between pixels. Imaging Geometry.

UNIT-II:

Image Transforms 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hotelling transform. Image enhancement Point processing. Histogram processing. Spatial filtering.

UNIT-III:

Enhancement in frequency domain, Image smoothing, Image sharpening. Color image processing: Pseudo color image processing, full color image processing.
Image Restoration Degradation model, Algebraic approach to restoration, Inverse filtering, least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-IV:

Image segmentation Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.

UNIT-V:

Image compression Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

TEXT BOOKS:

1 Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education.

REFERENCE BOOKS:

1 Image Processing with Scilab and Image Processing Design Toolbox; Dr. Eng. (J) HaraldGalda, 2011.
2 Fundamentals of Digital Image processing – A.K.Jain , PHI.
3 Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
4 Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.

ADVANCED DATABASES

(Professional Elective- 4)

L	T	P	C
3	0	0	3

B. Tech. IV Year I Semester

Course Outcomes:

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

1. Understand the concepts of Distributed Database Systems.
2. Identify different Architectural Models for Distributed DBMS.
3. Characterize the query processors.
4. Design Algorithms for Concurrency control Mechanisms.
5. Decide different Parallel DBMS Techniques based on given constraints.

UNIT-I:

Introduction

Distributed Data Processing, Distributed Database System, Promises of DDBSs, Design Issues.

UNIT-II:

Distributed DBMS Architecture: ANSI SPARC, Centralized DBMS Architecture, Architectural Models for Distributed DBMS.

Distributed Database Design:Top-Down Design Process, Distribution Design issues, Fragmentation, Allocation.

UNIT-III:

Introduction to RDBMS: Overview of Relational DBMS: Relational Database Concepts, Normalization, And Relational Data Languages.

Query Processing and Decomposition: Query Processing Objectives, Characterization of query processors, layers of query processing, query decomposition, Localization of distributed data.

UNIT–IV:

Distributed Query Optimization: Query optimization, centralized query optimization, Distributed query optimization algorithms.

Transaction Management: Definition, properties of transaction; types of transactions.

UNIT-V:

Distributed Concurrency Control: Serializability theory, Concurrency control Mechanisms & Algorithms; Time stamped & Optimistic concurrency control algorithms, Deadlock Management, Relaxed Concurrency Control.

TEXT BOOKS:

1. Distributed Databases Stefano Ceri and WillipsePelagatti:, McGraw Hill.
2. Principles of Distributed Database Systems, M.TamerOzsu, Patrick Valduriez, 3rd Edition, Springer.

REFERENCE BOOKS:

1 M.Tamer OZSU and PauckValduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.

2 Henry F Korth, a Silberchatz and Sudershan: Database System Concepts. Tata MGH.

3 Raghuramakrishnan and JohhanesGehrke: Database Management Systems, MGH

BLOCKCHAIN TECHNOLOGIES
(Professional Elective - 4)

B. Tech. IV Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:
At the end of the course student would be able to
1. Understand the Cryptography, and Block Chain
2. Discuss about Generic elements of blockchain
3. Demonstrate various methods and routes of Decentralization
4. Analyze the concepts of Bitcoin
5. Apply Block chain in Real time scenario.

Unit I:
Introduction to Cryptography and Blockchain: Symmetric Cryptography, Stream Ciphers, Block Ciphers, Hash functions: Design of SHA-256, Merkle trees, Patricia trees, Distributed hash tables, Digital signatures. The Growth of Block Chain Technology: Electronic cash, Block Chain

Unit II:
Generic Elements of Blockchain, Blockchain working and Accumulation blocks, Benefits and Limitations of blockchain, Tiers of blockchain technology, Features of blockchain, Types of block chain, Consensus, CAP Theorem and block chain.

Unit-III:
Decentralization: Decentralization using block chain, Methods of Decentralization, Routes to Decentralization, Block chain and full Ecosystem Decentralization, Smart Contracts, Platforms for Decentralization.

Unit IV:
Introducing Bitcoin: Digital keys and addresses, Transactions, Block Chain, Mining, TheBitcoin Network.

Unit V:
Ethereumblockchain, The Ethereum Network, Components of Ethereum Ecosystem.
Current Landscape and what'snext: Emerging trends, Blockchain Research.

TEXT BOOKS:
1. Imran Bashir,Mastering Block chain, Packt Publishing,2018.
2. VikramDhillon,DavidMetcalf,MaxHooper,BlockchainEnabledApplications,Apress,2017.

REFERENCE BOOKS:
1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

INFORMATION RETRIEVAL SYSTEMS
(Professional Elective – 4)

B. Tech. IV Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes

1. Understand the concepts of information system models
2. Ability to use various retrieval utilities for improving search
3. Analyze the crossing language barrier and learn about crossing language information retrieval.
4. Evaluate indexing and compressing documents to improve space and time efficiency.
5. Understand issues in web search, structured and unstructured data.

UNIT-I:
Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.
Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models.

UNIT-II:
Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

UNIT-III:
Retrieval Utilities: Semantic networks, Parsing Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

UNIT-IV:
Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection.

UNIT-V:
Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema
Distributed information Retrieval: A Theoretical model of distributed retrieval Web search.

TEXT BOOK:
1. David A. Grossman, OphirFrieder, information Retrieval —Algorithms and Heuristics, Springer, 2nd Edition (Distributed by Universities Press), 2004.

REFERENCE BOOKS:
1. Gerald J Kowaiski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000
2. SoumenChakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan- Kaufrnann Publishers, 2002
3. Christopher D. Manning, PrabhakarRaghavan, HinñchSchütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009

MACHINE LEARNING
(Professional Elective -4)

L	T	P	C
3	0	0	3

B. Tech. IV Year I Semester

Course Outcomes:

At the end of this course, the student would be able to:

1. Ability to understand the basic concepts such as Decision trees and Neural Networks.
2. Analyze various Machine Learning techniques and their efficiency.
3. Apply Machine Learning algorithms to solve problems of moderate complexity.
4. Understand Genetic algorithms and their applications.
5. Identify ML Applications.

Unit – I:

Introduction and Concept Learning: An illustrative learning task, A few approaches of learning task, what is known from algorithms? Theory, Experiment, Biology and Psychology, Introduction to Concept Learning, Version Space, Inductive Bias, Active Queries, Mistake Bound/PAC Model, Basic Results, Overview of issues regarding data sources, Success Criteria

Unit II:

Decision Tree learning and Neural Network learning: Introduction to Decision Tree Learning, Minimum Description Length Principle, Occam's razor, learning with active queries, Introduction to Neural Network Learning, Introduction to Perceptions, Perceptions, Introduction to Gradient Descent and Back propagation.

Unit III:

Sample Complexity and Over fitting And Bayesian Approaches: Introduction to Sample Complexity and Over fitting, Errors in estimating means, Cross Validation and Jackknifing VC Dimension, Irrelevant features , Multiplicative rules for Weight tuning, Introduction to Bayesian Approaches, The basics Expectation Maximization, Hidden Markov Models

Unit – IV:

Instance-based Techniques: Introduction to Instance-based Techniques, Lazy vs. eager generalization, K nearest neighbor, Case-based reasoning

Unit – V:

Genetic Algorithms: Different search methods for induction, Explanation based Learning, Using prior knowledge to reduce sample complexity

TEXT BOOKS:

1. Machine Learning - McGraw Hill, Tom M. Mitchell.
2. Trevor Hus tie, Robert Tibshirani& Jerome Friedman. The Elements of Statically Learning, Springer Veriag 2001.

REFERENCE BOOKS:

1. Machine Learning Methods en the Environmental Science, Neural Network, William W Hsieh Cambridge UniversityPress.
2. Rbchard o Duda, Peter E. Hart and David G. Stork, & pattern Classification, John Wiley & Sons Inc,2001.
3. Chris Bishop, Neural Network for, Pattern Recognition, Oxford University Press. 1995.

MOBILE APPLICATION DEVELOPMENT LAB

B. Tech. IV Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

At the end of this course, the student would be able to:

1. Ability to develop GUI based android applications.
2. Ability to develop event based android applications.
3. Design android applications that can access database.

LIST OF EXPERIMENTS

Week 1: Installation and configuration of Android Studio

Week 2: Develop an application that uses GUI components to display a "Hello World" message and change its color and font size.

Week 3: Develop an application that receives user's name, contact and city and displays the same using Layout Managers and Event Listeners.

Week 4: Create a native calculator application.

Week 5: Design an application that draws basic graphical primitives: line, circle, square, rectangle etc., on the screen.

Week 6: Develop a Registration and Login application that makes use of database.

Week 7: Develop an application that makes use of RSS Feed.

Week 8: Create an application that implements Multi-threading.

Week 9: Develop a native application that uses GPS location information.

Week 10: Implement an application that writes data to the SD card.

Week 11: Develop an application that creates notification upon receiving a message.

Week 12: Create an alarm clock mobile application.

BIG DATA ANALYTICS LAB
(Professional Elective – 3 Lab)

B. Tech. IV Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

At the end of this course, the student would be able to:

1. To introduce the tools required to manage and analyze big data like Hadoop, NoSql
2. To impart knowledge of map reduce paradigm to solve complex problems Map-Reduce
3. To introduce several new algorithms for big data mining like classification, clustering and finding frequent patterns.

LIST OF EXPERIMENTS

Week 1, 2:

Implement the following Data structures in Java

a) Linked Lists b) Stacks c) Queues d) Set e) Map

Week 3

Perform setting up and Installing Hadoop in Pseudo distributed mode.

Week 4:

Implement the following file management tasks in Hadoop:

i. Adding files and directories
ii. Retrieving files
iii. Deleting files

Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

Week 5:

Run a basic Word Count Map Reduce program to understand Map-Reduce Paradigm.

Week 6:

Write a Map Reduce program that mines weather data.Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with Map-Reduce, since it is semi structured and record-oriented.

Week 7:

Implement Matrix Multiplication with Hadoop Map Reduce

Week 8, 9:

Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your Data.

Week 10, 11:

i) Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, Functions and indexes

ii) Performance techniques in Hive partitions, bucketing.

Week 12:

Migration from Mysql database to hive using Sqoop.

INTERNET OF THINGS LAB
(Professional Elective – 3 Lab)

L	T	P	C
0	0	2	1

B. Tech. IV Year I Semester

Course outcomes:

At the end of this course, the student would be able to:

1. Apply the concepts of IoT by identifying different related technologies.
2. Apply IoT to different applications by evaluating IoT protocols.
3. Design and develop smart IoT solutions by analyzing the data received from sensors.

List of Experiments

Week 1:

1. Introduction to Arduino Uno – Sensors & Actuators
    a. Temperature & Humidity Sensors
    b. Air Quality Sensor
    c. PIR Motion Sensor
    d. Micro Servo Motor
    e. Stepper Motor
    f. 100RPM Motor

Week 2:

1. Introduction to NodeMCU – Sensors & Actuators
    a. Temperature & Humidity Sensors
    b. Air Quality Sensor
    c. PIR Motion Sensor
    d. Micro Servo Motor
    e. Stepper Motor
    f. 100RPM Motor

Week 3:

1. Setting up your Raspberry Pi. Installation of software.
2. Introduction to Raspberry Pi – Sensors & Actuators
    a. Temperature & Humidity Sensor
    b. Ultrasonic Sensor
    c. Micro Servo Motor

Week 4:

1. Introduction to IoT& Sensor control with IFTTT.

Week 5:

1. Build a Web-App: Blinking an LED over Internet.
2. Build a Web-App: Control a motor over Internet when motion is detected.

Week 6:

1. Live Temperature and Humidity monitoring over Internet.

Week 7:

1. Introduction to Open Source Cloud Platforms for IoT: OpenIoT, ThingSpeak.

Week 8:

1. Open Source Cloud Platforms for IoT: thinger.io, Google Cloud Platform.

Week 9 & 10:

1. Introduction to Open Web Services for IoT
2. Experiments with Open Web Services for IoT:
    a. M2M Labs
    b. The Thing Box
    c. The Thing System
    d. Node-RED

Week 11:

1. Home Automation System.

Week 12:

1. Build a Restful web service for IoT Management.

Week 13:

1. Build a web server for IoT Management

R PROGRAMMING LAB
(Professional Elective – 3 Lab)

B. Tech. IV Year I Semester

L	T	P	C
0	0	2	1

Course outcomes:

At the end of this course, the student would be able to:

1. Explore R environment
2. Visualize data insights using charts and graphs
3. Analysis data with linear regression model

Week-1:

Installation and Environment set up R and Rstudio

Week-2:

Experiments on Vector Arithmetic operations

Week-3:

Experiments on Matrices operations

Week-4

Experiments on Arrays functions

Week-5:

Experiments on Factors

Week-6:

Experiments on Data Frames

Week-7:

Experiments on List operations

Week-8:

Write R scripts which demonstrate logical operations and Conditional Statements

Week-9:

Write R scripts which demonstrate Looping over List

Week-10:

Write R scripts which demonstrate Nested Functions and Function Scoping

Week-11:

Experiments on Mathematical Functions in R

Week-12:

Experiments on Calculus in R

Week13:

Experiments on Lapply, Sapply and Apply functions

Week-14:

Generate different Charts and Graphs using R

IMAGE PROCESSING LAB
(Professional Elective -3 Lab)

L	T	P	C
0	0	2	1

B. Tech. IV Year I Semester

List of Experiments

1. Display of Grayscale Images.
2. Histogram Equalization.
3. Non-linear Filtering.
4. Edge detection using Operators.
5. 2-D DFT and DCT.
6. Filtering in frequency domain.
7. Display of color images.
8. Conversion between color spaces.
9. DWT of images.
10. Segmentation using watershed transform.

MINI PROJECT

B. Tech. IV Year I Semester

L	T	P	C
0	0	0	3

E – COMMERCE

L	T	P	C
3	0	0	3

B. Tech. IV Year II Semester

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

1. Identify the anatomy of E-Commerce applications and its process models.
2. Categorize different Electronic payment systems.
3. Examine Supply chain Management.
4. Analyze the various marketing strategies for an online business.
5. Design strategies for E-Commerce Catalogues.

UNIT-I:
Electronic Commerce
Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications and E-Commerce organization applications, Consumer Oriented Electronic commerce, Mercantile Process models.

UNIT-II:
Electronic Payment Systems
Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Inter Organizational Commerce EDI, EDI Implementation, Value added networks.

UNIT-III:
Intra Organizational Commerce work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT-IV:
Corporate Digital Library Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing Information based marketing, advertising on Internet, on-line marketing process, market research.

UNIT-V:
Consumer Search and Resource Discovery
Information search and Retrieval, Commerce Catalogues, Information Filtering. Multimedia – key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing.

TEXT BOOK:
1. Frontiers of electronic commerce Kalakata, Whinston, Pearson.

REFERENCE BOOKS:
1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.JaiswalGalgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce Gary P.Schneider Thomson.

SEMANTIC WEB AND SOCIAL NETWORKS

L	T	P	C
3	0	0	3

B. Tech. IV Year II Semester

Course Outcomes:

At the end of this course, the student would be able to:

1. Identify the Structure of the Semantic Web Technology in reference with the World Wide Web.
2. Design the concepts of Resource Description Framework, Ontology and Web Ontology Language (OWL).
3. Understand Ontology Engineering Tools and Methods.
4. Apply Logic, Rule and Inference Engines in Semantic Applications.
5. Understand and Analyze Social Networks and design solution for Web based Social Networks like Blogs and Online Communities.

UNIT-I:

Empowering the Information Age: Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web.

Turing: What is Machine Intelligence? : Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents.

Berners-Lee: What is Solvable on the Web? : Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT-II:

Resource Description Framework: HTML Language, XML Language,RDFLanguage,Basic Elements, RDF Schema.

Web Ontology Language: Ontology Language,Ontology Language Requirements, Compatibility of OWL and RDF/RDFS, The OWL Language, Basic Elements, OWL Example: Compute Ontology,OWL Capabilities and Limitations.

UNIT-III:

Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

UNIT-IV:

Logic, Rules, Inference & Semantic Web Applications: Logic, Rule and Inference, Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base.

Semantic Search Technology: Search Engines, Semantic Search, Semantic Search Technology, Web Search Agents, Semantic Methods.

UNIT-V:

Social Network Analysis: What is Networks analysis, Development of the social networks analysis.

Electronic sources for network analysis: Electronic Discussion networks. Blogs and Online Communities, Web Based Networks.

Developing social-semantic applications: Building Semantic Web Applications with social network features, Semantic Web Architecture.

TEXT BOOKS:

1. Thinking on the Web – Berners Lee, Godel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, Audi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)

TECHNICAL SEMINAR

IV Year B.Tech. CSE – II Semester

L	T	P	C
0	0	4	2

COMPREHENSIVE VIVA VOCE

IV Year B.Tech. CSE – II Semester

L	T	P	C
0	0	4	2

MAJOR PROJECT

IV Year B.Tech. CSE – II Semester

L	T	P	C
0	0	20	10