VIDYA JYOTHI INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

Aziz Nagar Gate, C.B. Post, Hyderabad - 500 075, Telangana.

COURSE STRUCTURE & SYLLABI
R-22

For

B. Tech (Information Technology)

Course Structure (R22)
B.TECH (INFORMATION TECHNOLOGY)

I Year - I Semester

Sl. No	Course Code	Course Title	L	T	P	Credits
1	A221001	Mathematics-I (Matrices & Calculus)	3	1	0	4.0
2	A221002	Applied Physics	3	1	0	4.0
3	A221502	Programming for Problem Solving	3	0	0	3.0
4	A221381	Engineering Workshop	0	1	3	2.5
5	A221003	English for Skill Enhancement	2	0	0	2.0
6	A221503	Elements of Computer Science & Engineering	0	0	2	1.0
7	A221081	Applied Physics Lab	0	0	3	1.5
8	A221082	English Language & Communication Skills Lab	0	0	2	1.0
9	A221582	Programming for Problem Solving Lab	0	0	2	1.0
10		Induction Programme				
		Total	**11**	**3**	**12**	**20**

I Year - II Semester

Sl. No	Course Code	Course Title	L	T	P	Credits
1	A222005	Mathematics – II (Ordinary Differential Equations & Vector Calculus)	3	1	0	4.0
2	A222006	Engineering Chemistry	3	1	0	4.0
3	A222303	Engineering Graphics & Modelling	1	0	4	3.0
4	A222204	Basic Electrical Engineering	2	0	0	2.0
5	A222402	Electronic Devices & Circuits	2	0	0	2.0
6	A222583	Python Programming Lab	0	2	2	3.0
7	A222084	Engineering Chemistry Lab	0	0	2	1.0
8	A222283	Basic Electrical Engineering Lab	0	0	2	1.0
		Total	11	4	10	20

Course Structure (R22)
B.TECH (INFORMATION TECHNOLOGY)

II Year - I Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A223011	Mathematical Foundations of Computer Science	3	0	0	3
2	A223504	Data Structures	3	0	0	3
3	A223009	Probability & Statistics	3	1	0	4
4	A223505	Computer System Architecture	3	0	0	3
5	A223506	Database Management Systems	3	0	0	3
6	A223584	Data Structures Lab	0	0	2	1
7	A223585	Database Management Systems Lab	0	0	2	1
8	A223012	Professional Communication	2	0	0	1
9	A223588	Skill development Course : Data Visualization-R Programming	0	0	2	1
		Total	**17**	**1**	**6**	**20**

II Year - II Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A224514	Software Engineering	3	0	0	3
2	A224511	Design & Analysis of Algorithms	3	0	0	3
3	A224512	Operating Systems	3	0	0	3
4.	A224516	Fundamentals of Internet of Things	2	0	0	2
5	A224513	Object Oriented Programming through Java	3	0	0	3
6	A224592	Object Oriented Programming through Java Lab	0	0	2	1
7	A224591	Operating Systems Lab	0	0	2	1
8	A2245P1	Real-time Research Project/ Societal Related Project	0	0	4	2
9	A224013	Quantitative Methods & Logical Reasoning	2	0	0	1
10	A224597	Skill Development Course - Node JS	0	0	2	1
		Total	**16**	**0**	**10**	**20**

Course Structure (R22)
B.TECH (INFORMATION TECHNOLOGY)

III Year - I Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A225525	Computer Networks	3	1	0	4
2	A225538	Cloud Computing	3	1	0	4
3	A225535 A225529 A225530 A225541	**Professional Elective – 1** Introduction to Data Science Software Project Management Principles of Programming Languages Computer Graphics	3	0	0	3
4		**Open Elective – 1**	3	0	0	3
5	A225015	Business Economics and Financial Analysis	3	0	0	3
6	A225087	Advanced English Communication Skills Lab	0	0	2	1
7	A2255A0	Computer Networks Lab	0	0	2	1
8	A225016	Environmental Science	2	0	0	0
9	A2255A8	Skill Development Course(UI Designs-Flutter)	0	0	2	1
		Total	**17**	**2**	**6**	**20**

III Year - II Semester

Sl. No	Course Code	Course Title	L	T	P	Credits
1	A226569	Automata & Compiler Design	3	1	0	4
2	A226570	Full Stack Development	3	0	0	3
3	A226571	Essentials of Artificial Intelligence	3	0	0	3
4	A226554 A226572 A226573 A226558	**Professional Elective - 2** Data Warehousing & Data Mining Software Testing Methodologies Scripting Languages Object Oriented Analysis & Design	3	0	0	3
5		**Open Elective - 2**	3	0	0	3
6	A2265B2	Full Stack Development Lab	0	0	2	1
7	A2265B3 A2265B4 A2265B5	**Professional Elective – 2 Lab** Data Mining & Case Tools Lab Software Testing Methodologies Lab Scripting Languages Lab	0	0	2	1
8	A2265P1	Industrial Oriented Mini Project / Internship	0	0	4	2
9	A226019	Gender Sensitization	2	0	0	0
		Total	**17**	**1**	**8**	**20**

Course Structure (R22)
B.TECH (INFORMATION TECHNOLOGY)

IV Year - I Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A2275E7	Big Data Analytics	3	0	0	3
2	A2275F1	Mobile Application Development	3	0	0	3
3	A2275F6 A2275F3 A2275G7 A2275E9	**Professional Elective - 3** Blockchain Technologies Advanced Databases Human Computer Interaction Fundamentals of Machine Learning	3	0	0	3
4	A2275F4 A2275G9 A2275H0 A2275H1	**Professional Elective – 4** Information Security Image Processing DevOps Agile Methodologies	3	0	0	3
5		**Open Elective - 3**	3	0	0	3
6	A2275C2	Big Data Analytics Lab	0	0	2	1
7	A2275C5	Mobile Application Development Lab	0	0	2	1
8	A2275PS1	Project Stage-I	0	0	6	3
		Total	**15**	**0**	**10**	**20**

IV Year - II Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A2285J8	Organization Behavior	3	0	0	3
2	A2285J4	Semantic Web & Social Networks	3	0	0	3
3	A2285J6	E-Commerce	3	0	0	3
4	A2285PS2 / A2285TS	Project Stage-II (Including Seminar)	0	0	22	9+2
		Total	**9**	**0**	**22**	**20**

Course Structure (R22)
B.TECH (INFORMATION TECHNOLOGY)

I Year - I Semester

Sl. No	Course Code	Course Title	L	T	P	Credits
1	A221001	Mathematics-I (LinearAlgebra & Calculus)	3	1	0	4.0
2	A221002	Applied Physics	3	1	0	4.0
3	A221502	Programming for Problem Solving	3	0	0	3.0
4	A221381	Engineering Workshop	0	1	3	2.5
5	A221003	English for Skill Enhancement	2	0	0	2.0
6	A221503	Elements of Computer Science & Engineering	0	0	2	1.0
7	A221081	Applied Physics Lab	0	0	3	1.5
8	A221082	English Language & Communication Skills Lab	0	0	2	1.0
9	A221582	Programming for Problem Solving Lab	0	0	2	1.0
10		Induction Programme				
		Total	**11**	**3**	**12**	**20**

I Year - II Semester

Sl. No	Course Code	Course Title	L	T	P	Credits
1	A222005	Mathematics – II (Ordinary Differential Equations & Vector Calculus)	3	1	0	4.0
2	A222006	Engineering Chemistry	3	1	0	4.0
3	A222303	Engineering Graphics & Modelling	1	0	4	3.0
4	A222204	Basic Electrical Engineering	2	0	0	2.0
5	A222402	Electronic Devices & Circuits	2	0	0	2.0
6	A222583	Python Programming Lab	0	2	2	3.0
7	A222084	Engineering Chemistry Lab	0	0	2	1.0
8	A222283	Basic Electrical Engineering Lab	0	0	2	1.0
		Total	11	4	10	20

MATHEMATICS-I (LINEAR ALGEBRA AND CALCULUS)

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221001	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

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

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 extrima of functions of two variables with/ without constraints.

UNIT-I Matrices and Linear System of Equations :
Introduction of Matrices, Rank - Echelon form, Normal form. Solution of Linear Systems – Gauss Elimination and 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: Nature, Index and Signature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

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: Improper Integrals and Mean Value Theorems:
Improper Integrals: Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Generalized Mean Value theorem (Taylor's and MacLaurin's Series all theorems without proof) – Geometrical interpretation of Mean value theorems.

UNIT-V: Functions of several variables:
Partial Differentiation: Total derivative, 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 by B.S. Grewal, Khanna Publishers, 36th Edition, 2010
2. Advanced Engineering Mathematics by Jain &Iyengar Narosa Publications.

Reference Books:

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

APPLIED PHYSICS

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221002	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

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

1. Understand various optical phenomena of light
2. Apply the basic principles of quantum mechanics to classify solids based on the band theory
3. Elucidate the characteristics of semiconductors and semiconductor devices
4. Apply the knowledge of nanotechnology for societal applications
5. Explain the working principle of lasers and optical fibers

Unit – I Wave Optics

Principle of superposition, coherence. Interference - Interference in thin films by reflection, Newton's rings. Diffraction – Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit, Plane diffraction grating, Resolving power of grating (qualitative treatment). Polarization – Polarization of light waves, Plane of vibration, Plane of polarization, Double refraction, Nicol's Prism, Applications of polarization.

UNIT-II Introduction to Quantum Physics and Band theory of solids

Introduction to quantum physics: Planck's Law (qualitative treatment), wave-particle duality, de-Broglie hypothesis of matter waves, properties of matter waves, time independent Schrodinger equation, Born interpretation of wave function, particle in one dimensional potential box, Fermi-Dirac distribution.

Classical free electron Theory (Qualitative treatment)- merits and demerits, Bloch theorem, Kronig-Penny model (qualitative treatment), E-k diagram, effective mass of electron, Energy bands in solids, classification of materials into metals, semiconductors and insulators.

UNIT-III Semiconductors and Semiconductor devices

Intrinsic and extrinsic semiconductors- energy band diagram and position of fermi level (qualitative treatment).

Direct and indirect band-gap semiconductors, Formation of PN junction, energy level diagram of PN junction, I-V characteristics of PN junction diode; construction, working and characteristics of Photo diode, solar cell and light emitting diode, Hall effect and its applications

UNIT-IV Nanotechnology

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods-top-down fabrication: Ball milling, physical vapor deposition (PVD), chemical vapor deposition (CVD), characterization techniques – basic principles of XRD, SEM, TEM; applications of nanomaterials.

UNIT-V Lasers and Fiber Optics

Introduction to interaction of radiation with matter: Absorption, spontaneous emission and stimulated emission, Einstein coefficients and their relations, characteristics of a laser, population inversion, important components of a laser: active medium, pumping source,

optical resonator. Construction and working of Ruby laser, He-Ne laser and semiconductor laser, applications of lasers.
Introduction to optical fibers, total internal reflection, construction of optical fiber, acceptance angle and numerical aperture, step and graded index fibers, block diagram of optical fiber communication system, applications of optical fibers.

Text books:

1. A Text book of Engineering Physics by P K Palanisamy: Scietech publication.
2. Engineering Physics by V Rajendran, McGraw Hill Education.

Reference books:

1. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd dition,2022.
2. Essentials of Nanoscience & Nanotechnology by Narsimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.
3. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"- S. Chand Publications.

PROGRAMMING FOR PROBLEM SOLVING

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221502	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:
At the end of this course, the student would be able to
CO1: Write algorithms and to draw flowcharts for solving problems.
CO2: To understand the usage of control statements, arrays and strings.
CO3: Develop programs with user defined data types and pointers.
CO4: To decompose a problem into functions and to develop modular reusable code.
CO5: Analyze various Searching and sorting problems.

UNIT - I:
Introduction to Programming: Compilers, compiling and executing a program.
Representation of Algorithm - Algorithms for finding roots of quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number Flowchart/ Pseudocode with examples, Program design and structured programming
Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, type conversion
I/O: Simple input and output with scanf and printf, formatted I/O

UNIT - II:
Control statements, Arrays and Strings:
Control statements: if, if-else, nested if else, else if ladder, switch-case, Iteration with for, while, do- while loops, break, continue.
Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays, basic searching and sorting algorithms using an array (Linear Search, Bubble Sort)
Strings: Introduction to strings, handling strings as array of characters, string manipulation without & with built-in functions (strlen(), strcat(), strcpy(), strcmp(), strupr(), strlwr(), strrev()), arrays of strings

UNIT - III:
Structures, Pointers:
Structures: Defining structures, initializing structures, unions, Array of structures
Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, Enumeration data type.
Preprocessor directives: Commonly used Preprocessor commands like include, define, Command line arguments

UNIT - IV:
Function and Dynamic Memory Allocation:
Functions: Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, call by reference, Passing arrays to functions, passing pointers to functions.

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions.
Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays ofdifferent data types, Storage classes (auto, extern, static and register)

UNIT - V:
Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data toexisting files, Writing and reading structures using binary files, Random access using fseek(), ftell() andrewind() functions.

TEXT BOOKS:

1. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)
2. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition,Pearson

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. Ashok N. Kamthane, “C and Data Structures”, Pearson Education. 2010.

PROGRAMMING FOR PROBLEM SOLVING LAB

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221582	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:
At the end of this course, the student would be able to
CO 1: Apply the syntax rules for numerical constants, variables and data types.
CO 2: Design programs on control statements, Arrays and Strings.
CO 3: Develop applications on user defined data types.
CO 4: Develop programs on code reusability using functions.
CO 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
Program to find the roots of quadratic equation.
Program to implement Storage classes.
Programs on operators (9 programs).
Programs on Command line arguments.

Week 4
Programs on Conditional Statements (9)
Programs on Looping Statements. (9)

Week 5
Programs on One Dimensional Arrays. (4 programs), Linear search & Bubble sort
Programs on Two Dimensional Arrays. (2 programs)

Week 6
Programs on Strings.
Programs on Strings with and without using string built-in Functions.

Week 7
Programs on Accessing Structures and Nested Structures.
Programs on Pointers, pointer arithmetic, pointer expression
Programs on Pointer to structure, Call by Reference, Pointer to Pointer.
Programs on Unions, typedef and enum.

Week 8
Programs on Functions. (4 programs)
Programs using Recursion.

Week 9
Programs on Dynamic Memory Allocation Functions (3 programs).

Week 10
Programs on File Input and Output functions (3 programs).
Programs on File Operations. (5 programs)
Week 11
Revision

ENGLISH FOR SKILL ENHANCEMENT

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221003	L	T	P	C	CIE	SEE	Total
	2	0	0	2	40	60	100

Course Outcomes:

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

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for oral and writtencommunication.
3. Demonstrate understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages through effective reading strategies.
5. Construct paragraphs, letters, essays, abstracts, précis and reports in various contexts thereby improving proficiency in writing modules of English.

UNIT - I

Chapter entitled '***Toasted English***' **by R.K.Narayan** from ***"English: Language, Context and Culture"*** published by Orient Black Swan, Hyderabad.

Vocabulary: The Concept of Word Formation - The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

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

Writing: Sentence Structures - Use of Phrases and Clauses in Sentences - Importance of Proper Punctuation - Techniques for Writing precisely – Paragraph Writing -Types, Structures and Features of a Paragraph - Creating Coherence - Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture" published*** by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-Verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing - Defining/Describing People, Objects, Places and Events – Classifying - Providing Examples or Evidence.

UNIT - III

Chapter entitled **'Lessons from Online Learning' by F. Haider Alvi, Deborah Hurst et al** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive

Reading – Exercises for Practice.

Writing: Format of a Formal Letter - Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion – Précis Writing.

UNIT - V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (*Covering all the other aspects of grammar which were not covered in the previous units*)

Reading: Reading Comprehension-Exercises for Practice

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

TEXTBOOK:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
3. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
4. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221503	L	T	P	C	CIE	SEE	Total
	0	0	2	1	50	-	50

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

1. Know the working principles of functional units of a basic Computer
2. Understand program development, the use of data structures and algorithms in problemsolving.
3. Know the need and types of operating system, database systems.
4. Understand the significance of networks, internet, WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence.

UNIT – I

Basics of a Computer – Hardware, Software, Generations of computers. Hardware - functional units,Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software – systems software, application software.

UNIT – II

Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, datastructures – definition, types of data structures.

UNIT – III

Operating systems: Functions of operating systems, types of operating systems, Device & Resource management.

Database Management Systems: Data models, RDBMS, SQL, Database Transactions, data centers,cloud basics & services.

UNIT – IV

Computer Networks: Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensornetworks, 5G communication.

World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Online social networks.

UNIT – V

Autonomous Systems: IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development,image and video processing.

TEXT BOOK:

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. GerstingUniversity of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

REFERENCE BOOKS:

1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage.

APPLIED PHYSICS LAB

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221081	L	T	P	C	CIE	SEE	Total
	0	0	3	1.5	40	60	100

Course Outcomes:

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

1. Apply optical phenomena to characterize optical sources and components.
2. Characterize semiconductors and semiconductor devices.
3. Study transient response of RC circuit and resonance mechanisms in mechanical and electrical systems.
4. Collect data and evaluate the outcomes of an experiment quantitatively and qualitatively.
5. Carry out experimental data analysis.

LIST OF EXPERIMENTS

1. Newton's rings: Determination of the radius of curvature of a given plano-convex lens by forming Newton's rings.
2. Diffraction grating: Determination of wavelength of a given monochromatic source using a plane diffraction grating.
3. Dispersive power: Determination of dispersive power of given prism.
4. Single Slit Diffraction using Laser- Determination of wavelength of given Laser.
5. Energy gap of P-N junction diode: Determination of the energy gap of a semiconductor diode.
6. Light emitting diode: Study of V-I and P-I characteristics of a given light emitting diode.
7. Photo diode: Study of V-I characteristics of photo diode at different intensities.
8. Solar cell: Study of V-I characteristics of solar cell.
9. LCR Circuit: Determination of the resonance frequency of forced electrical oscillator in series and parallel.
10. RC- Circuit: Determination of the time constant of RC-circuit.
11. Optical fiber: a) Determination of the acceptance angle and numerical aperture of optical fiber.
    b) Estimation of attenuation in optical fiber
12. Method of least squares-Torsional pendulum.

Note: Any 10 experiments are to be performed.

Reference books:

1. Engineering Physics Theory and Practical, C. K. Pandey, A. K. Katiyar.
2. Engineering Physics Lab Manual, C. V. Madhusudan Rao.

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221082	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

Students will be able to:

1. Reproduce speech sounds and improve language
2. Develop accent and pronunciation in various situations
3. Understand variants in pronunciation by differentiating between British and American accents
4. Identify the diverse purposes of listening and speaking
5. Exhibit critical thinking, problem-solving and decision-making skills through Group Discussions

Exercise I

CALL Lab:

Understand: Listening Skill- its importance-Purpose-Process-Types-Barriers-Effective Listening.

Practice: Introduction to Phonetics- Speech Sounds- Vowels and Consonants-Minimal Pairs - Consonant Clusters - Past Tense Marker and Plural Marker - *Testing Exercises*

ICS Lab:

Understand: Spoken vs. Written language - Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –Introducing Oneself and Others.

Exercise II

CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress patternin sentences – Intonation - *Testing Exercises*

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise III

CALL Lab:

Understand: Errors in Pronunciation-Neutralizing Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and AmericanPronunciation - *Testing Exercises*

ICS Lab:

Understand: Descriptions – Narrations - Giving Directions and Guidelines – Blog Writing

Practice: 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:
Understand: Listening for General Details.
Practice: Listening Comprehension Tests - *Testing Exercises*
ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication - Presentation Skills.
Practice: Making a Short Speech – Extempore - Making a Presentation.

Exercise V
CALL Lab:
Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests -*Testing Exercises*
ICS Lab:
Understand: Group Discussion
Practice: Group Discussion

REFERENCE BOOKS:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook*. Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook*. Cambridge University Press
3. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities*.Orient Black Swan Pvt. Ltd.

ENGINEERING WORKSHOP

Department : IT					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221381	L	T	P	C	CIE	SEE	Total
	0	1	3	2.5	40	60	100

Course Outcomes:

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

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.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry – T-Lap Joint, Dovetail Joint & Tenon Joint.
2. Fitting – V-Fit, Step Cutting & Flat Filling.
3. Tin-Smithy – Open Scoop, Rectangular Tray & Conical Funnel.
4. Foundry – Preparation of Green Sand Mould using Single Piece and Split Pattern.
5. Welding Practice – Arc Welding – Lap Joint & Butt Joint.
6. House-wiring – Parallel Connection, Series Connection & Two-way Switch.

2.TRADES FOR DEMONSTRATION & EXPOSURE

Plumbing, Machine Shop, Power tools in construction and Wood Working

TEXT BOOKS:

1. Manufacturing Engineering and Technology, Kalpakjian S. and Steven S. Schmid, 4th edition, Pearson Education India Edition, 2002.
2. 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.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP

MATHEMATICS II (ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS)

Department : IT					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222005	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

Course Outcomes:

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

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:

Introduction to ODE, 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, Equations reducible to Linear ODE with constant coefficients: Cauchy-Euler Equation and Legendre's Equations.

Applications: Electric Circuits

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

Reference Books:

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

ENGINEERING CHEMISTRY

Department : IT					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222006	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

Course Outcomes:

The students will able to

1. understand the basic properties of water and its usage in domestic and industrial purposes.
2. acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
3. learn the fundamentals and general properties of polymers and other engineering materials.
4. acquire knowledge of various energy sources.
5. apply the knowledge of engineering materials in daily life.

UNIT - I: Water and its treatment: (10)

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of F^- ion by ion- selective electrode method.

Boiler Troubles - Introduction. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange process. Desalination of Brackish water - Reverse osmosis.

UNIT – II Battery Chemistry & Corrosion: (11)

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of Zn-air and Lithium-ion battery. Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting
corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode & impressed current methods and Electroless plating.

UNIT - III: Polymeric materials: (9)

Definition – Classification of polymers with examples – Types of polymerizations – addition and condensation polymerization with examples – Nylon 6:6, Terylene

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC, Bakelite and Teflon.

Rubbers: Natural rubber and its vulcanization.

Synthetic Rubbers- Characteristics –preparation – properties and applications of Buna-

S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages – Poly lactic acid and poly vinyl alcohol and their applications.

UNIT - IV: Energy Sources: (9)

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula, Numerical problems. Classification- Solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Trans esterification and advantages.

UNIT - V: Engineering Materials: (9)

Cement: Portland cement, its composition, setting and hardening.

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermo response materials- Poly acryl amides and Poly vinyl amides

Lubricants: Classification of lubricants with examples-characteristics of a good lubricant - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpat rai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.

REFERENCE BOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

ENGINEERING GRAPHICS & MODELING

Department : IT					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222303	L	T	P	C	CIE	SEE	Total
	1	0	4	3	40	60	100

Course Outcomes: At the end of course the students are able to

1. Comprehend the concepts of engineering drawing and CAD software.
2. Conceptualize and draw the projections of points and straight lines.
3. Visualize and project different views of a planes and solids.
4. Evaluate the surfaces of solids developed for further processing in the engineering applications.
5. Generate isometric and corresponding orthographic views of any given component.

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.

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: 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 orthographic views to isometric views.

Orthographic Projections: conversion of isometric views to orthographic views.

Implementation In Cad: Drawing isometric views from giving orthographic views and vice-versa using a CAD package.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

BASIC ELECTRICAL ENGINEERING

Department : IT					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222204	L	T	P	C	CIE	SEE	Total
	2	0	0	2	40	60	100

Course Outcomes:
At the end of the course, students will be the able to
CO1.Understand basic principles of electrical elements.
CO2.Apply the concepts of AC circuits to various elements and combinations.
CO3.Examine principle and tests of transformer.
CO4.Contrast the working of DC machines and induction motors.
CO5.Assess working principle of AC generator and electrical installations.

UNIT- I
Introduction to Electrical Engineering and DC Circuits:
Basic definitions, Ohm's law, types of elements, types of sources, Kirchhoff's laws, resistive networks-series, parallel circuits, delta- star and star- delta transformation, Network theorems- Superposition, Thevenin's - simple problems.

UNIT- II
AC Circuits: Representation of sinusoidal waveforms, peak, rms and average values. Phase representation of alternating quantities, analysis of AC circuits with single basic network element (R, L, C), single phase series circuits, concept of resonance, three-phase balanced circuits-voltage and current relations in star and delta connections.

UNIT- III
Transformers: Constructional details, principle of operation, ideal and practical single-phase transformer, losses in transformer, OC-SC tests, 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**-** Working principle.

UNIT- V
Ac Generator &Electrical Installation
Ac Generator: Construction, principle of operation of synchronous generator, EMF equation.
Electrical Installation: Fuse, circuit breakers, difference between fuse and circuit breaker, Types of batteries, battery backup.

TEXT BOOKS:

1. Basic Electrical Engineering - by T.K. Nagasarkar and M.S. Sukhija, Oxford University press.
2. Basic Electrical Engineering-by M.S. Naidu and S. Kamakshiah-TMH.

REFERENCE BOOKS:

1. Network Analysis by Sudhakar & Shyam Mohan.
2. Basic Electrical Engineering-by S.K. Bhattacharya, Pearson Publications.
3. Basic Electrical Engineering by K. Uma Rao and A. Jayalakshmi, IK Publications.

ELECTRONIC DEVICES & CIRCUITS

Department : IT					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222402	L	T	P	C	CIE	SEE	Total
	2	0	0	2	40	60	100

Course Outcomes:

Upon completion of the Course, the students will be able to:

1. Acquire the knowledge of various electronic devices and their use on real life.
2. Know the applications of various devices.
3. Acquire the knowledge about the Bipolar Junction Transistor.
4. Acquire the knowledge about the Field Effect Transistor.
5. Acquire the knowledge about the role of special purpose devices and their applications.

UNIT- I

Diodes: Diode - Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances, V-I Characteristics, Diode as a switch- switching times.

UNIT- II

Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

UNIT- III

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times,

UNTI- IV

Field Effect Transistor (FET): JFET**-** Construction, Principle of Operation, Pinch-Off Voltage, Volt- Ampere Characteristic, Comparison of BJT and FET, FET as Voltage Variable Resistor, MOSFET, MOSFET as a capacitor.

UNIT- V

Special Purpose Devices: Zener Diode **-** Characteristics, Zener diode as Voltage Regulator, Principleof Operation - SCR, Tunnel diode, UJT, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode.

TEXT BOOKS:

1. Jacob Millman - Electronic Devices and Circuits, McGraw Hill Education
2. Robert L. Boylestead, Louis Nashelsky- Electronic Devices and Circuits theory, 11th Edition,2009, Pearson.

REFERENCE BOOKS:

1. Horowitz -Electronic Devices and Circuits, David A. Bell – 5thEdition, Oxford.
2. Chinmoy Saha, Arindam Halder, Debaati Ganguly - Basic Electronics- Principles andApplications, Cambridge, 2018.

PYTHON PROGRAMMING LAB

Department : IT					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222583	L	T	P	C	CIE	SEE	Total
	0	2	2	3	40	60	100

Course Outcomes:

After completion of the course, the student should be able to

- Develop the application specific codes using python.
- Understand Strings, Lists, Tuples and Dictionaries in Python
- Implement programs using modular approach, file I/O, Python standard library

Week -1 (Installation & Simple Applications)

1. i) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   ii) Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.

Week - 2: (Mathematical Expressions & I/O Operations)

1. i) Write a program to calculate compound interest when principal, rate and number of periods are given.
   ii) Given coordinates (x1, y1), (x2, y2), find the distance between these two points.
2. Read name, address, email and phone number of a person through keyboard and print the details.

Week – 3 (Conditional statements)

1. Write a Program to find the given number is even or odd.
2. Write a program to find the maximum of three numbers (use 'if-elif-else' ladder).

Week – 4 (Loop Statements)

1. Write a program to Print the Fibonacci sequence using while loop.
2. Write a program to Print the below triangle using for loop:

   5
   4 4
   3 3 3
   2 2 2 2
   1 1 1 1 1

3. Write a program to print all prime numbers in a given interval (using break statement).

Week – 5 (List, Tuple, Dictionary)

1. i) Write a program to illustrate operations of List & Tuple
   ii) Write a program to find common values between two lists.
2. Write a program to perform addition of two matrices.
3. Write a program to read dictionary values from the user and find an element using given key.

Week – 6 (Functions & Modules)

1. Write a function called is_sorted that takes a list as a parameter and return True if the list is sorted in ascending order and False otherwise.
2. Write a function called GCD that takes parameters **a** and **b** and return their greatest common divisor.
3. How do you make a module? Give an example of construction of a module using different

geometrical shapes and operations on them as its functions.

Week –7(Strings)

1. Write a program to add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
2. Write a program to remove the given word in all the places in a string?
3. Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?

Week–8 (Classes & objects)

1. Write a program to add two complex numbers using classes and objects
2. Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draw a representation of the Rectangle on the Canvas.

Week– 9 (Inheritance)

1. Write a program to demonstrate the various types of Inheritances.

Week– 10(File Concepts)

1. Write a program to merge two given file contents into a third file.
2. Write a program to Read text from a text file, find the word with most number of occurrences
3. Write a program that reads a file *file1* and displays the number of words, number of vowels, and blank spaces.

Week – 11(Packages)

1. a) Install NumPy package with pip and explore it.
   b) Illustrate 1-D and 2-D vector processing and slicing.
2. Explore matplotlib with plotpy and visualize the data.

TEXT BOOKS:

1. "Python Programming- Using Problem Solving Approach", Reema Thareja, Oxford
2. "Python Programming-Problem Solving, Packages and Libraries", Anurag Gupta, G.P. Biswas, Mc Graw Hill

ENGINEERING CHEMISTRY LABORATORY

Department : IT					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222084	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

The experiments will make the student gain skills on:

1. Determination of parameters like hardness and Chloride content of water.
2. Determination of rate of corrosion of mild steel in various conditions.
3. To perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
4. To prepare polymers like Thiokol rubber and Nylon-6.
5. Estimation of Saponification value, Viscosity and Surface tension of lubricant oils.

Choice of 8-10 Experiments from the following:

1. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.
2. **Corrosion:** Determination of rate of corrosion of mild steel in various conditions.
3. **Conductometry:**
   a. **1.**Estimation of the concentration of an acid by Conductometry.
   b. **2.**Estimation of the concentration of Mixture of acids by conductometry
4. **Potentiometry:**
   a. Estimation of the Concentration of an acid by potentiometry
   b. Estimation of the amount of Fe^{+2} by Potentiometry
5. **pH Metry:** Determination of an acid concentration using pH meter.
6. **Argentometry:** Estimation of Chloride content of water by argentometry
7. **Preparations:**
   a. Preparation of Thiokol rubber.
   b. Preparation Nylon – 6.

I. **Lubricants:**

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.
3. Estimation of Surface tension of lubricant oil using Stalagmometer.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publication

BASIC ELECTRICAL ENGINEERING LABORATORY

Department : IT					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222283	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

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

CO1. Understand basic electrical laws.
CO2. Analyze the response of different types of electrical circuits to different excitations.
CO3. Apply electric laws and find out performance of various electrical machines.
CO4. Assess the losses in electrical machines.
CO5. Evaluate the performance of Electrical Circuits and 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. Sudhakar and Shyam Mohan, "Circuits and Networks" Tata Mc Graw Hill Companies.
2. P.S.Bimbra, "Electrical Machines", Khanna Publishers.

Course Structure (R22)
B.TECH (INFORMATION TECHNOLOGY)

II Year - I Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A223011	Mathematical Foundations of Computer Science	3	0	0	3
2	A223504	Data Structures	3	0	0	3
3	A223009	Probability & Statistics	3	1	0	4
4	A223505	Computer System Architecture	3	0	0	3
5	A223506	Database Management Systems	3	0	0	3
6	A223584	Data Structures Lab	0	0	2	1
7	A223585	Database Management Systems Lab	0	0	2	1
8	A223012	Professional Communication	2	0	0	1
9	A223588	Skill development Course : Data Visualization-R Programming	0	0	2	1
		Total	**17**	**1**	**6**	**20**

II Year - II Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A224514	Software Engineering	3	0	0	3
2	A224511	Design & Analysis of Algorithms	3	0	0	3
3	A224512	Operating Systems	3	0	0	3
4.	A224516	Fundamentals of Internet of Things	2	0	0	2
5	A224513	Object Oriented Programming through Java	3	0	0	3
6	A224592	Object Oriented Programming through Java Lab	0	0	2	1
7	A224591	Operating Systems Lab	0	0	2	1
8	A2245P1	Real-time Research Project/ Societal Related Project	0	0	4	2
9	A224013	Quantitative Methods & Logical Reasoning	2	0	0	1
10	A224597	Skill Development Course - Node JS	0	0	2	1
		Total	**16**	**0**	**10**	**20**

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Department : IT					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223011	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

B. Tech II Year I Semester- IT

Course Outcomes: At the end of the course, the student should 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.

UNIT - II

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

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, Binomial Theorem.

Functions: Domain, Range, Inverse of functions, composite functions.

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 for Computer Scientists and Mathematicians by Joe L. Mott, Abraham Kandel, Theodare P.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 Higher Education.

2. Discrete Mathematics and its Applicationsǁ, Kenneth H Rosen, Tata McGraw Hill Publishing Company Limited, New Delhi, Sixth Edition, 2007.

DATA STRUCTURES

Department : IT					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223504	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

B. Tech II Year I Semester- IT

Course Outcomes: At the end of the course, the student should 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, Separate

Chaining ,Open Addressing-Linear probing, Quadratic Probing, Double Hashing, Rehashing, Extensible Hashing, Implementation of Dictionaries

Text Books:

1. Data Structures Using C, 2nd Edition Reema Thereja OXFORD higher Education
2. Fundamentals of Data Structures, 2nd Horowitz and Sahani, *Galgotia Publications* Pvt Ltd Delhi India.

Reference Books:

1. Data Structures, Seymour Lipschutz, Schaum's Outlines, Tata McGraw-Hill, Special Second Edition.
2. Data Structures Using C and C++‖, Aaron M. Tenenbaum, YedidyahLangsam and Moshe J. Augenstein PHI Learning Private Limited, Delhi India.
3. Data Structures, A Pseudo code Approach with C, Richard F.Gillberg & Behrouz A. Forouzan, Cengage Learning, India Edition, Second Edition, 2005.

COMPUTER SYSTEM ARCHITECTURE

Department : IT					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223009	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

B.Tech. II Year I Sem. IT

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

1. Understand the various number System
2. Classify the basics of instruction sets
3. Demonstrate the design of functional units of a digital computer system.
4. Analyze various computer arithmetic operations.
5. Design a pipeline for consistent execution of instruction with minimum hazards

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.

UNIT - II

Structure of Computers: Computer types, functional units, basic operational concepts, VonNeumann architecture, bus structures, software, performance, multiprocessors and multicomputer, data representation, fixed and floating point and error detecting codes. Register Transfer and Micro Operations: Register transfer language, register transfer, bus and memory transfers, arithmetic micro operations, shift microoperations, arithmetic logic shift unit

UNIT III:

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, instruction cycle, timing and control, memory reference instructions, input, output and interrupt.

Central Processing Unit: stack organization, instruction formats, addressing modes, data tr ansfer and manipulation, program control, reduced instruction set computer (**RISC).**

UNIT IV:

Computer Arithmetic: Addition and subtraction, multiplication and division algorithms, floating point arithmetic operation, decimal arithmetic unit, and decimal arithmetic operations.

UNIT V:

The Memory System: Basic concepts, semiconductor RAM types of read only memory (ROM), cache memory, performance considerations, virtual memory, secondary storage raid, direct memory access (DMA).

Processor and control unit Basic MIPS implementation Building data path Control Implementation scheme Pipelining Pipelined data path and control Handling Data hazards & Control hazards Exceptions.

TEXT BOOK:

1. Computer System Architecture – M. Moris Mano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:

1. Computer Organization – Car Hamacher, Zvonks Vranesic, Safea Zaky, Vth Edition, McGraw Hill.

2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

DATABASE MANGEMENT SYSTEMS

Department : IT					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223505	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

B. Tech II Year I Semester- IT

Course Outcomes: At the end of the course, the student should 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. Understand working principles of Recovery algorithms

UNIT-I

Introduction to Database System Concepts:

Database-System Applications, Purpose of Database Systems, View of data, 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.

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 the Database.

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, validation 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 Concepts, 6th Edition, Tata McGraw-Hill.
2. Raghu Rama Kirshna, Johannes Gehrk, Database Management Systemll Tata McGraw Hill 3rd Edition.

Reference Books:

1. Peter Rob & Carlos Coronel Database System Concepts Cengage Learning.
2. RamezElmasri, Shamkanth B. Navrate – Fundamentals of Database Systems 7th Edition, Pearson Education.
3. C.J. Date Introduction to Database Systems Pearson Education

DATA STRUCTURES LAB

Department : IT					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223584	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

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

1. Develop the programs on stacks and its applications.
2. Design and implementation of programs on Linked lists and Tree Traversals.
3. Apply Tree Concepts on advanced Trees
4. Implement Graph and its Traversing techniques
5. Apply Hashing techniques in real world applications

List of Experiments:

1. C Programs to illustrate concepts of arrays, structures, unions and enumerated data types.
2. Write a Program to implement stack, queue using linked list
3. Program to convert infix to postfix notation
4. Program to evaluate postfix notations
5. Write a program to implement doubly linked list and its operations
6. Program to illustrate tree traversals
    a) In order
    b) Pre order
    c) Post order
7. Program to illustrate insertion, deletion and searching in Binary Search Tree.
8. Program to illustrate Insertion, deletion and Rotation on AVL Trees.
9. Program to illustrate Graph traversals
    i. Breadth First Search
    ii. Depth First Search
10. Program to implement hash table using linear and quadratic probing.
11. Implement Dictionaries using hashing.

DATABASE MANAGEMENT SYSTEMS LAB

Department : IT					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223585	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

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

1. Use the SQL commands such as DDL and DML 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, 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 the tables
c. List all the bills for the current date with the customer names and item numbers
d. List the total Bill details with the quantity sold, price of the item and the final amount
e. List the details of the customer who have bought a product which has a price>200.
f. Give a count of how many products have been bought by each customer
g. Give a list of products bought by a customer having cust_id as5.
h. List the item details which are sold as of today
i. Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount.
j. Create a view which lists the daily sales date wise for the last oneweek

2. Database Schema for a Student Library scenario

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 integrity constraints.
b. Insert around 10 records in each of the tables.
c. List all the student names with their membership numbers
d. List all the issues for the current date with student and Book names
e. List the details of students who borrowed book whose author is KORTH.
f. Give a count of how many books have been bought by each student.
g. Give a list of books taken by student with stud_no as 5.
h. List the book details which are issued as oftoday.
i. Create a view which lists out the iss_no, iss _date, stud_name, book name

j. Create a view which lists the daily issues-date wise for the last one week

3. Database Schema for a Employee-payscenario

Employee (**emp_id:**integer,emp_name:string)
Department (**dept_id:integer**,dept_name:string)
Pay details (**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 integrity constraints.
b. Insert around 10 records in each of the tables.
c. List the employee details department wise.
d. List all the employee names who joined after particular date.
e. List the details of employees whose basic salary is between 50,000 and 1,00,000
f. Give a count of how many employees are working in each department.
g. Give a name of the employees whose net salary>1,00,000.
h. List the details for an employee_id=5
i. Create a view which lists out the emp_name, department, basic, deductions, net salary.
j. Create a view which lists the emp_name and his net salary.

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 integrity constraints
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 cassette names
e. List the details of the customer who has borrowed the cassette whose title is —The Legendǁ
f. Give a count of how many cassettes have been borrowed by eachcustomer.
g. Give a list of cassettes which has been taken by the Customer with mem_no as 5
h. List the cassettes issues for today.
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 one week

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 integrity constraints.
b. Insert around 10 records in each of the tables.
c. List all the machine allotments with the student names, lab and machine numbers

d. List the total number of lab allotments daywise.
e. Give a count of how many machines have been allocated to the 'CSE' class
f. Give a machine allotment details of the stud_no 5 with his personal and class details.
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 the labs.
i. Create a view which lists out the stud_no, stud_name, mach_no, lab_no,day of week.
j. Create a view which lists the machine allotment details for–Thursday.

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

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

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

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

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

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

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

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

SKILL DEVELOPMENT COURSE: DATA VISUALIZATION - R PROGRAMMING

Department : IT					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223588	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes: At the end of the course, the student should 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. Analyse the data by plotting using R
5. Formulate linear and multiple regression models for time series data & web data

Week 1:

1. Write a R Program to create and name a Vector
2. Write a R program implement vector subsetting

Week 2:

1. Write a R Program to create and name a Matrix
2. Write a R program implement Matrix Subsetting

Week 3:

1. Write a R program to Access list elements and Manipulate list elements
2. Write a R program which converts list into a Vector

Week 4:

1. Write a R program to Control flow statements:
   i. If condition
   ii. If-else condition
2. Write a R program to implement Iterative statements:
   i. For loop
   ii. While loop
3. Write a R program to demonstrate usage of
   i. Repeat
   ii. Break
   iii. Return
   iv. Next

Week 5:

1. Write a R program to find reverse of a given number using functions
2. Write a R program to find factorial of a given number using recursion

Week 6:

1. Write a R program to demonstrate R Packages

Week 7:

1. Write a R program to calculate mean, median

Week 8:

1. Write a R program to implement
   i. Factor levels
   ii. Summarizing Factors
   iii. Comparing Ordered factors

Week 9:

1. Write a R program to implement
   i. Subsetting of Data Frames
   ii. Extending Data Frames
   iii. Sorting Data Frames

Week 10:

1. Write a R program to demonstrate
   1. Lapply()
   2. Sapply()
   3. Split()

TEXT BOOKS:

1. K.G. Srinivas, G.M. Siddesh "Statistical Programming in R", OXFORD Publications.
2. R Programming for Data Science by Roger D. Peng (References)
3. The Art of R Programming by Norman Matloff Cengage Learning India.

SOFTWARE ENGINEERING

Department : IT					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
	L	T	P	C	CIE	SEE	Total
A224514	3	0	0	3	40	60	100

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

1. Outline the framework activities for a given project.
2. Examine Right process model for a given project.
3. Analyze various system models for a given Context.
4. Understand various testing techniques for a given project.
5. Identify various risks in project development.

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 testing techniques , Validation testing, System testing.

Product Metrics:

Software Quality, Metrics for Requirements 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. Software Engineering, A practitioner's Approach- Roger S. Pressman, 8th edition McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson education.

References Books:

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, WitoldPedrycz, JohnWiely.
3. Systems Analysis and Design- ShelyCashmanRosenblatt,Thomson Publications.

DESIGN AND ANALYSIS OF ALGORITHMS

Department : IT					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
	L	T	P	C	CIE	SEE	Total
A224511	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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:

Breadth First Search, Depth First Search, spanning trees, connected and bi- connected components

Greedy method:

General method, Applications- 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, Satraj Sahni and Rajasekharan, Galgotia publications Pvt. Ltd.

References:

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, McGraw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.

OPERATING SYSTEMS

Department : IT					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
	L	T	P	C	CIE	SEE	Total
A224512	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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.

FUNDAMENTALS OF INTERNET OF THINGS

Department : IT					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
	L	T	P	C	CIE	SEE	Total
A224516	2	0	0	2	40	60	100

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

1. Known basic protocols in sensor networks.
2. Program and configure Arduino boards for various designs.
3. Python programming and interfacing for Raspberry Pi.
4. Explore IoT applications in different domains.

UNIT – I

Introduction to Internet of Things, Characteristics of IoT, Physical design of IoT, Functional blocks of IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks.

UNIT - II

Machine-to-Machine Communications, Difference between IoT and M2M, Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino.

UNIT – III

Introduction to Python programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi, Case studies.

UNIT - IV

Implementation of IoT with Raspberry Pi, Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics.

UNIT - V

Cloud Computing, Sensor-Cloud, Smart Cities and Smart Homes, Connected Vehicles, Smart Grid, Industrial IoT.
Case Study: Agriculture, Healthcare, Activity Monitoring

TEXT BOOKS:

1. Pethuru Raj and Anupama C. Raman "The Internet 'of Things: Enabling Technologies, Platforms, and Use Cases", (CRC Press)
2. Terokarvinen, kemo, karvinen and villey valtokari, “Make sensors”: 1st edition, maker media, 2014.

REFERENCE BOOKS:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
3. Beginning Sensor networks with Arduino and Raspberry Pi – Charles Bell, Apress, 2013

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Department : IT					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224513	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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/O and 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 Menu Bar.

Event Handling:

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

UNIT - V

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

Applets: Concepts of Applets, life cycle of an applet, creating applets, passing parameters to applets.

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. Programming in JAVA, Second Edition, OXFORD Higher Education.
2. Thinking in Java Fourth Edition, Bruce Eckel
3. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
4. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Department : IT					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224592	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes: At the end of the course, the student should 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 data members.
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 Array Manipulation.

Week 3

6. Write a program to illustrate different types of inheritances.
7. Write a java program to illustrate Method overriding.
8. Write a java program to demonstrate the concept of polymorphism (Dynamic Method Dispatch).
9. Write a program to demonstrate final keyword.

Week 4 & 5

10. Write a program to illustrate the use of creation of packages.
11. Write a java program to handle the situation of exception handling using multiple catch blocks.
12. Write a program to implement the concept of User defined Exceptions.

Week 6 & 7

13. Write a program to illustrate Multithreading and Multitasking.
14. Write a program to illustrate thread priorities.
15. Write a program to illustrate Synchronization

Week 8 & 9:

16. Write a program to implement StringTokenizer.
17. Write a program to read one line at a time, and write it to another file.

Week 10 & 11

18. Write a program to illustrate Event Handling (keyboard, Mouse events)
19. Write a program to illustrate applet life cycle and parameter passing.

Week 12:

20. Write a program to develop a calculator application using AWT.

Week 13

21. Write a program to illustrate JDBC.

OPERATING SYSTEMS LAB

Department : IT					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224591	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

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

1. Implement various CPU scheduling algorithms
2. Apply the memory management techniques
3. Implement Page replacement Techniques
4. Analyze File allocation strategies
5. Implement Deadlock avoidance

Programs:

1. Simulate the following CPU Scheduling Algorithms using C program:
   a. FCFS b. SJF

2. Simulate the following CPU Scheduling Algorithms using C program:
   a. Priority b. Round Robin

3. Write a C program tom implement the producer-consumer problem using semaphores.

4. Write a C program for implementing memory allocation method for fixed partition using First fit.

5. Write a C program for implementing memory allocation method for fixed partition using Best fit

6. Write a C program for implementing memory allocation method for fixed partition using Worst fit

7. Simulate Paging Technique of Memory Management using C program.

8. Write a program to implement FCFS page replacement algorithm

9. Write a program to implement Optimal page replacement algorithm

10. Write a program to implement LRU page replacement algorithm

11. Write a C program to simulate the following file allocation strategies.
   a) Sequential b) Indexed c) Linked

12. Write a program to implement Banker's algorithm for deadlock avoidance.

SKILL DEVELOPMENT COURSE - NODE JS

Department : IT					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224597	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

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

1. Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
2. Demonstrate Advanced features of JavaScript and learn about JDBC
3. Develop Server – side implementation using Java technologies like servlet
4. Develop the server – side implementation using Node JS.
5. Design a Single Page Application using React.

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages for the above 2 web applications.
4. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.
5. Create an xml for the bookstore. Validate the same using both DTD and XSD.
6. Design a controller with servlet that provides the interaction with web application
7. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism using Cookies
8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism using Sessions.
9. Develop an express web application that can interact with REST API to perform CRUD operations on student data
10. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
11. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.

Text Books:

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2nd Edition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

Course Structure (R22)
B.TECH (INFORMATION TECHNOLOGY)

III Year - I Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A225525	Computer Networks	3	1	0	4
2	A225538	Cloud Computing	3	1	0	4
3	A225535 A225529 A225530 A225541	**Professional Elective – 1** Introduction to Data Science Software Project Management Principles of Programming Languages Computer Graphics	3	0	0	3
4		**Open Elective – 1**	3	0	0	3
5	A225015	Business Economics and Financial Analysis	3	0	0	3
6	A225087	Advanced English Communication Skills Lab	0	0	2	1
7	A2255A0	Computer Networks Lab	0	0	2	1
8	A225016	Environmental Science	2	0	0	0
9	A2255A8	Skill Development Course(UI Designs-Flutter)	0	0	2	1
		Total	**17**	**2**	**6**	**20**

III Year - II Semester

Sl. No	Course Code	Course Title	L	T	P	Credits
1	A226569	Automata & Compiler Design	3	1	0	4
2	A226570	Full Stack Development	3	0	0	3
3	A226571	Essentials of Artificial Intelligence	3	0	0	3
4	A226554 A226572 A226573 A226558	**Professional Elective - 2** Data Warehousing & Data Mining Software Testing Methodologies Scripting Languages Object Oriented Analysis & Design	3	0	0	3
5		**Open Elective - 2**	3	0	0	3
6	A2265B2	Full Stack Development Lab	0	0	2	1
7	A2265B3 A2265B4 A2265B5	**Professional Elective – 2 Lab** Data Mining & Case Tools Lab Software Testing Methodologies Lab Scripting Languages Lab	0	0	2	1
8	A2265P1	Industrial Oriented Mini Project / Internship	0	0	4	2
9	A226019	Gender Sensitization	2	0	0	0
		Total	**17**	**1**	**8**	**20**

COMPUTER NETWORKS

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225525	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

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

1. Understand the overview of reference models.
2. Illustrate various sub protocols in multi access protocols.
3. Analyze various routing algorithms and their operations.
4. Apply transport protocols for the given scenarios.
5. Evaluate various protocols and functionalities of 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.

Multiple Access Protocols:

ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer – CSMA/CD with Binary Exponential Backoff, 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, 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, Application 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,
   a. 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

Reference Books:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding Communications And Networks, 3rd Edition, W.A.Shay, Cengage Learning.
3. Introduction To Computer Networks And Cyber Security, Chwan-Hwa(John)Wu, J. David Irwin, CRC Press.

CLOUD COMPUTING

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225538	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

Course Outcomes: At the end of the course, the student should 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, new integration scenarios, the integration Methodologies, 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 **Secure Distributed Data Storage in Cloud Computing:**

Introduction, Cloud Storage: from LANs TO WANs, Technologies for Data Security in Cloud Computing

UNIT - V

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, Digital Identity and Data Security, Content Level Security-Pros and Cons.

Text Book:

1. Rajkumar Buyya, James Broberg, Andrzej Goscinski, Cloud Computing Principles and Paradigms, Wiley Publications-2013

Reference Books:

1. Michael Miller, Cloud Computing Web-Based Application That Change the Way You Work and Collaborate Online, Pearson Publications-2008
2. Thomas Erl, Zaigham Mahmood, & Ricardo Puttini, Cloud Computing- Concepts, Technology & Architecture Pearson Publications-2013
3. Kai Hwang, Geoffrey C.Fox. Jack J. Dongarra, Distributed and Cloud Computing – From Parallel Processing to the Internet of Things, ELSEVIER Publications-First Edition.

INTRODUCTION TO DATA SCIENCE

(Professional Elective - 1)

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225535	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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

1. Understand the significance of data science tools and techniques.
2. Apply data cleaning, transformation and discretization techniques.
3. Analyze various inferential statistics and time-series methods.
4. Understand predictive analytics and its applications.
5. Apply data science techniques to deal with the real – world problems.

UNIT– I

Introduction: What Is Data Science, Where Do We See Data Science, How Does Data Science Relate to Other Fields, The Relationship between Data Science and Information Science, Computational Thinking, Skills for Data Science, Tools for Data Science, Issues of Ethics, Bias, and Privacy in Data Science.

UNIT– II

Data: Introduction, Data Types, Data Reduction, Data Collections, Data Pre-processing.

UNIT – III

Techniques: Introduction, Data Analysis and Data Analytics, Descriptive Analysis, Diagnostic Analytics, Predictive Analytics, Prescriptive Analytics, Exploratory Analysis, Mechanistic Analysis.

UNIT – IV

Data Collection, Experimentation, and Evaluation: Introduction, Data Collection Methods, Picking Data Collection and Analysis Methods, Evaluation.

UNIT – V

Solving Data Problems: Introduction, Collecting and Analyzing Twitter Data, Collecting and Analyzing YouTube Data, Analyzing Yelp Reviews and Ratings

Text Books:

1. A Hands-On Introduction to Data Science, Chirag Shah, Cambridge University Press, 2020.
2. EMC Education Services “DataScience and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data”, Wiley Publishers, 2012.

Reference Books:

1. NeilA.Weiss,"IntroductoryStatistics",10th Edition, Pearson Education Limited, 2017. JiaweiHan, Micheline Kamber and JianPei, Data Mining: Concepts and Techniques, 3rd ed.

SOFTWARE PROJECT MANAGEMENT
(Professional Elective - 1)

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225529	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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

Conventional Software Management:

The waterfall 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 Book:

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

Reference Books:

1. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition,Tata Mc-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.

PRINCIPLES OF PROGRAMMING LANGUAGES
(Professional Elective - 1)

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225530	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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.

UNIT IV

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.

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

UNIT V
Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.
Logic Programming Language:
Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

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.

COMPUTER GRAPHICS
(Professional Elective - 1)

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225541	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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 Book:

2. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, 2nd Edition, 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", Zhigand xiang. Roy Plastock, Schaum's outlines. rats Mc Graw 19 edition.
3. Procedural elements lot Computer Graphics, David F Rogers. Tata Mc Graw hill, 2nd edition.

BUSINESS ECONOMICS & FINANCIAL ANALYSIS

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225015	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course the students are expected to
CO1: Understand the nature and scope of business economics.
CO2: Analyze the Demand, Supply Functions and to forecast the demand.
CO3: Understand the concept of production and its relationship with business operations.
CO4: Analyze the Financial Statements of a Company.
CO5: Compare and interpret the Financial Statements of a Company using ratios.

UNIT-I

Introduction to Business and Economics: Types of Business Entities, Theory of Firm, Capital and Sources of Capital for a Company, Economics - Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Types of 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.
3. GeethikaGhosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.

Reference Books:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting,5e, Vikas Publications, 2013.

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225087	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Objectives:

The course intends to:

- Improve the students' fluency in English with a focus on vocabulary
- Enable them to listen to English spoken at normal conversational speed by educated English speakers
- Respond appropriately in different socio-cultural and professional contexts
- Communicate their ideas relevantly and coherently in writing
- Prepare the students for placements

Course Outcomes:

At the end of the course a student is expected to:

1. Enhance reading and active listening techniques for a faster and better comprehension.
2. Exhibit strong writing skills to exhibit ideas effectively in social and professional situations.
3. Demonstrate effective presentation skills.
4. Develop critical thinking, problem-solving, decision-making and communication skills.
5. Display confidence during job interviews.

SYLLABUS:

1. **Activities on Listening and Reading Comprehension:** Active Listening – Development of Listening Skills Through Audio clips - Benefits of Reading– Methods and Techniques of Reading – Basic Steps to Effective Reading – Common Obstacles – Discourse Markers or Linkers - Sub- skills of reading – Reading for facts, negative facts and Specific Details-GuessingMeaningsfromContext,InferringMeaning-CriticalReading—ReadingComprehension–ExercisesforPractice.

2. **Activities on Writing Skills**: Vocabulary for Competitive Examinations – Planning for Writing – Improving Writing Skills-Structure and presentation of different types of writing–Free Writing and Structured Writing- Letter Writing –Writing a Letter of Application –Resume vs. Curriculum Vitae–Writing a Résumé–Styles of Résumé-e-Correspondence–Emails–Blog Writing-(N)etiquette– Report Writing – Importance of Reports – Types and Formats of Reports– Technical Report Writing– Exercises for Practice.

3. **Activities on Presentation Skills -**Starting a conversation – responding appropriately and relevantly–usingtherightlanguageandbodylanguage–RolePlayindifferentsituationsincluding Seeking Clarification, Making a Request, Asking for and Refusing Permission, Participating in a Small Talk–Oral presentations (individual land group) through JAM sessions-PPTs–Importance of

Presentation Skills–Planning,Preparing,Rehearsing and Making a Presentation– Dealing with Glossophobia or Stage Fear – Understanding Nuances of Delivery -Presentations through Posters/Projects/Reports – Checklist for Making a Presentation and Rubrics of Evaluation.

4. **Activities on Group Discussion (GD):**Types of GD and GD as a part of a Selection Procedure- Dynamics of Group Discussion- Myths of GD - Intervention, Summarizing - Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas**–**Do's and Don'ts-GD Strategies – Exercises for Practice.

5. **Interview Skills**: Concept and Process - Interview Preparation Techniques - Types of Interview Questions–Pre-interview Planning, Opening Strategies, Answering Strategies-Interview through Tele-conference & Video-conference - Mock Interviews.

Minimum Requirement:

The Advanced English Communication Skills (AECS) Laboratory shall have the followinginfrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- One PC with latest configuration for the teacher
- T.V, a digital stereo & Camcorder
- Headphones of High quality

Suggested Software:

1. TOEFL&GRE(BARRONS,USA,Cracking GRE by CLIFFS)
2. Oxford Advanced Learner's Dictionary,10th Edition
3. Cambridge Advanced Learner's Dictionary

Textbooks:

1. Rizvi, M. Ashraf (2018). *Effective TechnicalCommunication*. (2nd ed.).McGraw Hill Education (India) Pvt. Ltd.
2. Bailey, Stephen. (2018). Academic *Writing: A Handbook for International Students*. (5th Edition). Routledge.

References Books:

1. Raman, Meenakshi & Sharma, Sangeeta. (2022).*Technical Communication, Principles and Practice*. (4th Edition) Oxford University Press.
2. Anderson,PaulV(2007).*Technical Communication*. Cengage LearningPvt.Ltd.NewDelhi.

COMPUTER NETWORKS LAB

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2255A0	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

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

1. Implement various network topologies and protocols of Physical and Data Link Layer
2. Design various networks and Apply Routing algorithms of Network Layer
3. Analyze the packets in Transport and Application Layer Protocols.

Programs:

Week1: Study of different types of Network cables and Implement the cross-wired cable and straight through cable and configure the Network Topology using Packet Tracer

Week 2: Implement the data link layer framing methods such as character stuffing and bit stuffing.

Week 3: Implementation of hamming code algorithm

Week 4: Implementation of CRC polynomial.

Week 5: Study of Basic Network Configuration Commands and Classification of IP address and Sub netting

Week 6: Connect the computers in Local Area Network and Observing Static and Dynamic Routing using Packet Tracer

Week 7: Implement Dijkstra's algorithm to compute the shortest path through a graph.

Week 8: Now obtain Routing table of each node using distance vector routing algorithm

Week 9: Take an example subnet of hosts. Obtain broadcast tree for it.

Week 10: Write a program for congestion control using leaky bucket algorithm.

Week 11: Capture and Analyze the Packets using Wire shark for the following Protocols IPv4, TCP, UDP

Week 12: Capture and Analyze the Packets using Wire shark for the following Protocols HTTP, DNS

SKILL DEVELOPMENT COURSE (UI DESIGNS-FLUTTER)

Department : IT					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2255A8	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

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

1. Knowledge on installation of various softwares.
2. Understanding of various widgets.
3. Application of animation to app.

Week 1:

Installation of Android studio & Flutter.

Week 2:

Create an application using Flutter to print hello world.

Week 3:

Create an application to implement Decision making and loops using Dart.

Week 4:

Create an application to demonstrate user defined functions using Dart.

Week 5:

Create an application to implement object oriented programming using Dart.

Week 6:

Create an application for platform basic widgets (Text, Image, and Icon).

Week 7:

Create an application for Layout widgets (Single child, Multiple Child).

Week 8:

Create an application to demonstrate Gesture Detector.

Week 9 & 10:

Create an application for Registration form.

Week 11:

Create an application to implement flutter calendar.

Week 12:

Create an application to implement Animated Text in Flutter.

Text Book:

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development, 1st edition, Wrox publisher.

Reference Books:

1. Flutter for Beginners: An introductory guide to building cross-platform mobile applications with Flutter and Dart 2, Packt Publishing Limited.
2. Rap Payne, Beginning App Development with Flutter: Create Cross-Platform Mobile Apps, 1st edition, Apress.
3. Frank Zammetti, Practical Flutter: Improve your Mobile Development with Google's Latest Open-Source SDK, 1st edition, Apress

AUTOMATA AND COMPILER DESIGN

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226569	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

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

1. Design of regular expressions for language constructs and conversions of NFA and DFA
2. Formulate tokens for various programming languages and understand the Top-Down parser, construction of LL.
3. Understand the Bottom-up parsers Techniques; get knowledge about the synthesized and inherited attributes.
4. Acquire knowledge about run time data structure like symbol table organization and different techniques.
5. Apply optimization techniques on the intermediate code and Generate the target code.

Unit - I

Introduction to Automata

Languages, Definitions, Regular Expressions, Regular Grammars, Acceptance of Strings and Languages, Finite Automaton Model, DFA, NFA, conversion of NFA to DFA, Conversion of Regular Expression to NFA.

UNIT - II

Introduction To Compilers: Definition of compiler, interpreter and its differences, the phases of a compiler

Context Free grammars: Context free grammars, derivations, parse trees, Ambiguity, Elimination of Ambiguity .

Top Down Parsing: Parse Trees, Ambiguous Grammars, Backtracking, LL (1), Recursive Descent parsing, Predictive parsing.

Unit – III

Bottom Up Parsing and Semantic Analysis

Bottom up parsing: Handle pruning ,Shift Reduce Parsing ,LR (k) grammar parsing, LALR (k) grammars.

Syntax Directed Translation:

Syntax directed definition, construction of syntax trees, S-attributed and L-attributed definitions, translation schemes.

UNIT - IV

Intermediate Code Generation: intermediate forms of source programs– abstract syntax tree, polish notation and three address code, types of three address statements and its implementation.

Run-Time Environments and Symbol table:

Storage allocation strategies, Stack allocation of space, Access to non-local names, Contents of Symbol table, Data Structures for symbol tables.

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 Books:

1. "Introduction to Automata Theory, Languages and Computation". Hopcroft H.E. and Ullman J.D.,3 rd Edition, Pearson Education.
2. Principles of Compiler Design, Alfred V Aho, Jeffrey D Ullman, Pearson Education, 2001.

Reference Books:

1. Daniel I. A.Cohen, Introduction to Computer Theory, Second Edition, John Wiley.
2. J P Trembly and P G Sorenson, The Theory and practice of Compiler Writing, McGraw Hill, 2005.
3. Dick Grone, Henri E Bal, Ceriel J H Jacobs, Modern Compiler Design, Wiley Dreamtech, 2006.

FULL STACK DEVELOPMENT

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
	L	T	P	C	CIE	SEE	Total
A226570	3	0	0	3	40	60	100

B. Tech III Year II Semester - IT

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

1. Design Front-End of the Full Stack Applications by using HTML and CSS.
2. Create dynamic web pages with the help of JavaScript and JQuery.
3. Design interactive User Interfaces with React JS and implement using Servlets
4. Implement Back-End programs using JSP and Spring framework.
5. Connect database with server-side applications using Hibernate.

UNIT - I

Building Blocks of Full Stack Development: Introduction, Front-End Technologies, Back-End Technologies, MVC, Web Services, Communication between Front-End and Back-End, JSON - Syntax, Parsing and Serialization.

HTML 5.0: Components of HTML, Text Formatting tags, Quotations, Links, Images, **CSS**: syntax, Box Model, CSS outline, Links in CSS, Responsiveness, Position Property, Navigation Bars, Dropdown, Forms.

UNIT - II

JavaScript: Introduction, variables, functions, Event handling, DOM, Form validation, **JQuery** - Syntax, Selectors, Events.

React: Introduction, Components - React Classes, Composing Components, passing data using Properties & Children, Dynamic Composition, React State - Initial State, Async State Initialization, Updating State, Event Handling, Stateless Components, Designing Components.

UNIT - III

More about React: React Router - Simple Routing, Route Parameters, Query Parameters, Links, Nested Routes, React Forms - Controlled Components, Filters, Typed Input, Edit Form, Number Input, Date Input, Text Input, Update API, Delete API.

Servlet: Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, Connecting to database.

UNIT - IV

JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, implicit objects, Java Bean, Connecting to database.

Spring Framework: Introduction, Architecture, MVC, Interception, Chain of Resolvers, View Resolution, Multiple View Pages, Multiple Controllers, Model Interface, RequestParam, Form Tag Library, Form Text Field, CRUD example, File Upload, Validations.

UNIT - V

Hibernate: Introduction, Architecture, Installation and Configuration, Java Objects, Inheritance Mapping, Collection Mapping, Mapping with Map, Hibernate Query Language, Caching, Spring Integration.

Web Services: Introduction, types of web services, Building RESTful Web Services with JAX-RS.

Text Books:

1. MAYURRAMGIR, FullStack Development with Spring MVC,Hibernate,jquery and BootStrap, WILEY Publications,2020.
2. Uttam K. Roy, Web Technologies, OXFORD University press, 2010.

References:

1. Matt Frisbie, Professional JavaScript for Web Developers, WILEY Publications, 2020.
2. Terry Ann Felke-Morris, Basics of Web Design, Pearson, Fifth Edition.
3. Alex Banks and Eve Porcello, Learning React, O'Reilly, 2017.

ESSENTIALS OF ARTIFICIAL INTELLIGENCE

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226571	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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

1. Understand the evolution and present status of AI
2. Understand different searching algorithms used in AI
3. Analyze different knowledge representation techniques.
4. Demonstrate probabilistic reasoning & uncertain knowledge
5. Apply various learning techniques to AI systems for learning process.

Unit – I

Concept of AI, History, Current Status, Scope, Agents and Environments, Problem Formulations, State of Art, Good Behavior, Nature of Environment, Structure of Agents.

Unit – II

Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search , Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking ,Local Search).

Advanced Search: Constructing Search Trees , Stochastic Search , A* Search Implementation , Mini -max Search, Alpha- Beta Pruning.

Unit – III

Logical Agents: Knowledge-Based Agents, The Wumpus World, First-Order Logic: Representation of FOL, Syntax and Semantics of FOL

Uncertain Knowledge and reasoning: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distribution, Independence,.

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, inference in Bayesian Networks.

Unit – IV

Probabilistic Reasoning over Time: Time and Uncertainty, Baye's Rule and Its use, Hidden Markov Models (HMM).

Sequential Decision Problems: Markov Decision Process, MDP Formulation, Utilities over time, Optimal policies and utilities of states, Value Iteration, Policy Iteration

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

Reference Books:

1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill.
2. Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi.
3. Saroj Kaushik, "Artificial Intelligence", Cengage Learning India, 2011.

DATA WAREHOUSING & DATA MINING
(Professional Elective - 2)

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226554	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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:

Motivation and Importance of Data mining, What is Data mining?, Data Mining on various kinds of Data, Data Mining Functionalities, 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:

Introduction to Classification and Prediction, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back Propagation, Support Vector Machines, Lazy Learners, Prediction

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, Outlier Analysis

Text Books:

1. Data Mining- Concepts and Techniques by Jiawei Han, Micheline Kamber and Jian Pei –Morgan Kaufmann publishers 2nd edition

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. 3.Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition.

SOFTWARE TESTING METHODOLOGIES
(Professional Elective – 2)

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226572	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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

1. Design and develop the best test strategies in accordance to the development model.
2. Distinguish characteristics of structural testing methods
3. Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible
4. Discuss about the functional and system testing methods
5. Demonstrate various issues for object oriented testing

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT - V

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win- runner).

Text Books:

1. Software Testing techniques, Baris Beizer, 2nd Edition, Dreamtech.
2. Software Testing Tools, Dr.K.V.K.K.Prasad, Dreamtech.

Reference Books:

1. The craft of software testing, Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World, Edward Kit, Pearson.

SCRIPTING LANGUAGES
(Professional Elective – 2)

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226573	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. Apply Ruby for solving a given problem.
3. Gain knowledge of the strengths and weakness of Perl
4. Apply Perl for solving a given problem.
5. Acquire programming skills in scripting language

UNIT - I

Introduction : Ruby ,Rails, The structure and Excution of Ruby Programs ,Package Management with RUBYGEMS, Ruby and web : Writing CGI scripts , cookies, Choice of Webservers ,SOAP and webservices RubyTk – Simple Tk Application ,widgets , Binding events , Canvas ,scrolling

UNIT - II

Extending Ruby : Ruby Objects in C , the Jukebox extension, Memory allocation ,Ruby Type System , Embedding Ruby to Other Languages , Embedding a Ruby Interperter

UNIT - III

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages,Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT - IV

Advanced Perl : Finer points of looping, pack and unpack, filesystem, eval, datastructures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Isses.

UNIT – V

TCL: TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk: Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

Text Books:

1. The World of Scripting Languages , David Barron,Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The Pramatic Programmers guide by Dabve Thomas Second edition

Reference Books:

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP,J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Perl by Example, E.Quigley, Pearson Education.
3. Programming Perl,Larry Wall,T.Christiansen and J.Orwant, O'Reilly, SPD.

OBJECT ORIENTED ANALYSIS & DESIGN
(Professional Elective – 2)

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226558	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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 Unified Modeling Language Construct for Developing Structural Design of an ATM Project.

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-2003

Reference Books:

1. Analysis and 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.

FULL STACK DEVELOPMENT LAB

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A2265B2	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

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

1. To gain the knowledge of various Front-End technologies.
2. To Design Front-End of the full stack applications.
3. To understand and develop Back-End applications to connect to database.
4. To work with different case studies by using frameworks.

WEEK-1

1. a) Create a Web Page using HTML which contains a Heading, Image and 2 hyperlinks. Each hyperlink opens a new page in the same web browser. New page contains "Go Back" link that takes you to the main page.
b) Write a HTML program to create a Registration form, which contains User Name, Password, Date of Birth, Gender, Mail-id, Contact number, Address and submit button.

WEEK-2

2. a) Create a web page to demonstrate Position Property in CSS.
b) Create a Newspaper Style Design to print minimum 2 articles using HTML and CSS.

WEEK-3

3. a) Write a JavaScript program to change the background color after clicking "change color" button.
b) Write a JavaScript program to validate registration page using regular expression.

WEEK-4

4. a) Write a code to hide and show an element in a periodic interval without any action from the user using JQuery.
b) Write a program to create and Build a star rating system using JQuery.

WEEK-5

5. a) Write a program to demonstrate ReactJS Class and Instance.
b) Write a program to create a basic calculator to perform arithmetic operations using ReactJS.

WEEK-6

6. a) Demonstrate simple event handling example using ReactJS.
b) Write a program to create a simple voting application system using ReactJS.

WEEK-7

7. a) Create a webpage to display "Hello World" using SERVLET.
b) Implement a web application using SERVLET, which takes a name as input and on submitting it, shows a hello <name> page. It shows start time at the right top comer of the page and provides a logout button. On clicking logout button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).

WEEK-8

8. a) Write a JSP program to find a factorial of the given number.

b) Create a user validation web application using JSP, where the user submits the login name and password to the server. The name and password are checked against the data already available in database and if the data matches, a successfull login page is returned. Otherwise show a failure message to the user.

WEEK-9

9. a) Demonstrate a simple example of Spring web MVC framework.

b) Illustrate how database is connected in Spring Framework by using simple CRUD application.

WEEK-10

10. a) create a simple example of hibernate application using eclipse IDE.

b) Create an application to demonstrate Hibernate Query Language.

WEEK-11 and 12

CASE STUDY-1: Create a Chat module/Interface using HTML CSS and JavaScript. The chat interface primarily consists of two segments: the message header and the chat box.

Message-Header- The message header resides at the top of the chat box. It includes the user's name, avatar or profile image, and the user's last seen. Last seen is the last time the user was active.

The Chat-Box- The chat box consists of the message page and the message bottom sections.

- Message page-The message page consists of incoming and outgoing messages, as well as the avatars of the senders. It also displays the time at which each message is sent.
- The Message-Bottom-This section contains an input field where the user can type in the messages and a send button to send them.

DATA MINING & CASE TOOLS LAB
(Professional Elective – 2 Lab)

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A2265B3	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course outcomes: At the end of the course, the student should 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 Application.
5. Design Unified Library application
6. Explore real time applications

Data Mining Lab

Experiments using WEKA tool

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
2. Class Diagram
3. Sequence Diagram
4. Collaboration Diagram
5. State Diagram
6. Activity Diagram
7. Component Diagram
8. 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.

SOFTWARE TESTING METHODOLOGIES LAB
(Professional Elective – 2 Lab)

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A2265B4	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course outcomes: At the end of the course, the student should be able to

1. Apply knowledge of Software Testing Methods
2. Develop Skills in Software test automation and management using Latest tools

List of Experiments

1. Recording in context sensitive mode and analog mode
2. GUI checkpoint for single property
3. GUI checkpoint for single object/window
4. GUI checkpoint for multiple objects
5. a) Bitmap checkpoint for object/window
   b) Bitmap checkpoint for screen area
6. Database checkpoint for Default check
7. Database checkpoint for custom check
8. Database checkpoint for runtime record check
9. a) Data driven test for dynamic test data submission
   b) Data driven test through flat files
   c) Data driven test through front grids
   d) Data driven test through excel test
10. a) Batch testing without parameter passing
    b) Batch testing with parameter passing
11. Data driven batch
12. Silent mode test execution without any interruption

SCRIPTING TECHNOLOGIES LAB
(Professional Elective – 2 Lab)

Department : IT					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A2265B5	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course outcomes: At the end of the course, the student should be able to

1. Ability to understand the differences between Scripting languages and programming languages
2. Able to gain some fluency programming in Ruby, Perl, TCL

List of Experiments

1. Write a Ruby script to create a new string which is n copies of a given string where n is a non-negative integer
2. Write a Ruby script which accept the radius of a circle from the user and compute the parameter and area.
3. Write a Ruby script which accept the user's first and last name and print them in reverse order with a space between them
4. Write a Ruby script to accept a filename from the user print the extension of that
5. Write a Ruby script to find the greatest of three numbers
6. Write a Ruby script to print odd numbers from 10 to 1
7. Write a Ruby scirpt to check two integers and return true if one of them is 20 otherwise return their sum
8. Write a Ruby script to check two temperatures and return true if one is less than 0 and the other is greater than 100
9. Write a Ruby script to print the elements of a given array
10. Write a Ruby program to retrieve the total marks where subject name and marks of a student stored in a hash
11. Write a TCL script to find the factorial of a number
12. Write a TCL script that multiplies the numbers from 1 to 10
13. Write a TCL script for Sorting a list using a comparison function
14. Write a TCL script to (i)create a list (ii)append elements to the list (iii)Traverse the list(iv)Concatenate the list
15. Write a TCL script to comparing the file modified times.
16. a) Write a Perl script to find the largest number among three numbers.
    b) Write a Perl script to print the multiplication tables from 1-10 using subroutines.

17.a) Write a Perl script to substitute a word, with another word in a string.

b) Write a Perl script to validate IP address and email address.

18. Write a Perl script to print the file in reverse order using command line arguments

Course Structure (R22)
B.TECH (INFORMATION TECHNOLOGY)

IV Year - I Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A2275E7	Big Data Analytics	3	0	0	3
2	A2275F1	Mobile Application Development	3	0	0	3
3	A2275F6 A2275F3 A2275G7 A2275E9	**Professional Elective - 3** Blockchain Technologies Advanced Databases Human Computer Interaction Fundamentals of Machine Learning	3	0	0	3
4	A2275F4 A2275G9 A2275H0 A2275H1	**Professional Elective – 4** Information Security Image Processing DevOps Agile Methodologies	3	0	0	3
5		**Open Elective - 3**	3	0	0	3
6	A2275C2	Big Data Analytics Lab	0	0	2	1
7	A2275C5	Mobile Application Development Lab	0	0	2	1
8	A2275PS1	Project Stage-I	0	0	6	3
		Total	**15**	**0**	**10**	**20**

IV Year - II Semester

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	A2285J8	Organization Behavior	3	0	0	3
2	A2285J4	Semantic Web & Social Networks	3	0	0	3
3	A2285J6	E-Commerce	3	0	0	3
4	A2285PS2 / A2285TS	Project Stage-II (Including Seminar)	0	0	22	9+2
		Total	**9**	**0**	**22**	**20**

BIG DATA ANALYTICS

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275E7	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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 Books:

1. Tom White “Hadoop: The Definitive Guide” Third Edition, O’reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

Reference Books:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis”, Springer, 2007.
2. Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press (2013)
3. 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.

MOBILE APPLICATION DEVELOPMENT

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275F1	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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. Learn & Analyze about various Data Persistence schemes
4. Implement background services Multithreading Networking, Broadcast Receivers and Telephony Manager
5. Understand and Implement Location based services

UNIT I - Introduction to Mobile Applications & Android Studio

Introduction: Types of Mobile Applications, mobile application development, Android platform features and architecture, versions, comparison added features in each version, 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

Intent: intent object, intent filters, linking activities.

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

Material design: 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 - LOCATION BASED SERVICES

Displaying Maps, Obtaining the Maps API Key, Displaying the zoom control, changing views, navigating to a specific location, Getting the location that was touched, Geocoding and Reverse Geocoding, Getting Location Data, Monitoring a Location

Text Books:

1. Professional Android 4 Application Development by Reto Meier
2. Beginning Android Programming with Android Studio, 4th Edition , J. F. DiMarzio Published by. John Wiley & Sons, Inc., Indianapolis, Indiana

Reference Books:

1. Dawn Griffiths, David Griffiths,"Head First: Android Development", OReilly2015,ISBN: 9781449362188

BLOCKCHAIN TECHNOLOGIES
(Professional Elective - 3)

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275F6	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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, The Bitcoin Network.

Unit - V

Ethereum blockchain, The Ethereum Network, Components of Ethereum Ecosystem. Current Landscape and what's next: Emerging trends, Blockchain Research.

Text Books:

1. Imran Bashir, Mastering Block chain, Packt Publishing, 2018.
2. VikramDhillon, David Metcalf, 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).

ADVANCED DATABASES
(Professional Elective - 3)

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275F3	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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. Identify 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, 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. Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez, 3rd Edition, Springer.
2. Raghu Rama Kirshna, Johannes Gehrk, Database Management Systemll Tata McGraw Hill 3rd Edition.

Reference Books:

1. Distributed Databases Stefano Ceri and Willipse Pelagatti:, McGraw Hill.
2. M.Tamer OZSU and Pauck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
3. Henry F Korth, a Silberchatz and Sudershan: Database System Concepts. Tata MGH.

HUMAN COMPUTER INTERACTION
(Professional Elective - 3)

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275G7	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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; T**he computer-**Display Devices, Memory, processing and networks;

The Interaction- Models of interaction, frameworks and HCI, Ergonomics, Interaction styles, Elements of the WIMP interface, Interactivity; **Paradigms**.

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, Prototyping in practice, Design rationale; **Design rules** – Principles to support usability, Standards, guidelines Golden rules and heuristics; **Evaluation Techniques,Universal Design**.

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; **Types of Mobile Applications**: 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).
3. Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O'Reilly, 2009.(UNIT-V).

Reference Books:

1. The essential guide to user interface design, Wilbert 0 Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
3. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.

FUNDAMENTALS OF MACHINE LEARNING
(Professional Elective - 3)

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275E9	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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

1. Ability to identify machine learning problems corresponding to different applications.
2. Ability to understand the basic concepts such as Decision trees and Neural Networks.
3. Apply Machine Learning algorithms to solve problems of moderate complexity.
4. Identify Machine Learning applications
5. Understand Genetic algorithms and their applications

Unit – I

Introduction and Concept Learning:

Well posed learning problems, designing a learning system Perspectives and issues in machine learning, Types of learning. Concept learning task, Concept Learning as search through a hypothesis space, Finding maximally specific hypotheses, Version spaces and the candidate elimination algorithm, Inductive Bias

Unit - II

Decision Tree learning and Neural Network learning: Decision Tree representation and learning algorithm, appropriate problems for Decision Tree Learning, Hypothesis space search in Decision Tree Learning, Inductive bias in Decision Tree Learning: Occam's razor, Issues in Decision Tree Learning.

Introduction to Neural Network Learning, Introduction to Perceptions, Perceptions, Introduction to Gradient Descent and Back propagation.

Unit - III

SupportVectorMachines: Introduction,LinearClassifier,Non-linearClassifier,TrainingSVM, Support Vector Regression.

BayesianLearning: Bayestheoremandconceptlearning,MinimumDescriptionLengthPrinciple, Bayes optimal classifier, Gibbs Algorithm, Naïve Bayes Classifier, The EM algorithm.

Unit – IV

Instance-based Techniques: Introduction to Instance-based Techniques, Lazy vs. eager generalization, K nearest neighbor, Radial Basis Function, Case Based reasoning, Remarks on Lazy vs Eager learning.

Unit – V

Genetic Algorithm: Biological motivation, Representing Hypothesis, Genetic Operators, Fitness function and selection, Hypothesis space search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms.

Text Books:

1. Machine Learning - Mc Graw Hill, Tom M. Mitchell.

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

INFORMATION SECURITY

(Professional Elective - 4)

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275F4	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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

1. Identify various Security Attacks.
2. Understand various Encryption Principles and algorithms.
3. Implement Cryptography algorithms.
4. Understand various Security Associations..
5. Inferring various Security Policies.

UNIT - I

Computer and Network Security Concepts

Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services
Security Mechanisms, Fundamental Security Design Principles, A Model for Network Security.

Classical Encryption Techniques

Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography.

UNIT - II

Block Ciphers and the Data Encryption Standard

Traditional Block Cipher Structure, The Data Encryption Standard, A DES Example, The Strength of DES, Block Cipher Design Principles.

Advanced Encryption Standard

AES Structure, AES Transformation Functions, AES Key Expansion, An AES Example.

UNIT - III

Block Cipher Operation

Multiple Encryption and Triple DES, Electronic Codebook, Cipher Block Chaining Mode, Cipher Feedback Mode, Output Feedback Mode, Counter Mode

Asymmetric Ciphers

Principles of Public-Key Cryptosystems, The RSA Algorithm, Diffie-Hellman Key Exchange, Elgamal Cryptographic System , Elliptic Curve Cryptography.

UNIT - IV

Data Integrity Algorithms

Applications of Cryptographic Hash Functions, Secure Hash Algorithm

Message Authentication Codes

Message Authentication Requirements, Message Authentication Functions, MACs Based on Hash Functions: HMAC, Digital Signatures, X.509 Certificates, Kerberos

UNIT - V

Electronic Mail Security, Internet Mail Architecture ,Email Formats , Email Threats and Comprehensive Email Security ,S/MIME, Pretty Good Privacy , HTTPS,

IP Security

IP Security Overview, IP Security Policy.

Text Book:

1. Cryptography and Networks Security (Principles and Practice) by William Stallings Pearson Education, 7th Edition.

Reference Books:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)-2007
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner,2nd Edition, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson.

IMAGE PROCESSING
(Professional Elective - 4)

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275G9	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course, the student should 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) Harald Galda, 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.

DevOps
(Professional Elective - 4)

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275H0	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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

1. Understand the various components of DevOps environment.
2. Identify Software development models and architectures of DevOps
3. Use different project management and integration tools.
4. Select an appropriate testing tool and deployment model for project.

UNIT-I

Introduction to DevOps: Introduction, Agile development model, DevOps and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, identifying bottlenecks.

UNIT-II

Software development models and DevOps: DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing.

DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb,The separation of concerns, Handling database migrations, Micro services and the data tier, DevOps, architecture, and resilience.

UNIT-III

Introduction to project management: The need for source code control, the history of source code management, Roles and code, source code management system and migrations, shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

UNIT-IV

Integrating the system: Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers, Collating quality measures.

UNIT-V

Testing Tools and Deployment: Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development. Deployment of the system: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible,

Text Books:

1. Joakim Verona., Practical DevOps, Packt Publishing, 2016.

Reference Books:

1. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications.

2. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley.

AGILE METHODOLOGIES
(Professional Elective - 4)

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275H1	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

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

1. Identify basic concepts of agile methodology and Extreme programming
2. Analyze real customer involvement in collaboration
3. Discuss risk management and iteration planning
4. Understanding incremental requirements, refactoring, incremental design and architecture

UNIT - I

Introduction Extreme Programming (XP) - Agile Development: Why Agile?, Understanding Success, Beyond Deadlines, Importance of Organizational Success, Introduction to Agility, Agile methods-Scrum and XP, Manifesto for Agile Software Development, Principles of Agile Process. Understanding XP (Extreme Programming) - XP life cycle, XP team, XP Concepts, Adopting XP - Knowing whether XP is suitable, Implementing XP, assessing Agility, Practicing XP - Thinking, Pair Programming, Energized work, Informative Workspace, Root cause Analysis, Retrospectives.

UNIT - II

Collaborating: Trust, Sit together, Real customer involvement, Ubiquitous language, Stand-Up meetings, coding standards, Iteration demo, Reporting.

UNIT - III

Releasing: Bugfree Release, Version Control, Ten-Minute Build, continuous integration, Collective ownership and Documentation.

UNIT – IV

Planning: Version, Release Planning, The Planning Game, Risk Management, Iteration Planning, Slack, Stories and Estimating

UNIT - V

Developing: Incremental requirements, Customer tests, Test driven development, Refactoring, Incremental design and architecture, spike solutions, Performance optimization, Exploratory testing.

Text Book:

1. The art of Agile Development, James Shore and Shane Warden, 11th Indian Reprint, O'Reilly,2018.

Reference Books:

1. Learning Agile, Andrew Stellman and Jennifer Greene, O'Reilly, 4th Indian Reprint, 2018
2. Practices of an Agile Developer, Venkat Subramaniam and Andy Hunt, SPD, 5th Indian Reprint,2015
3. Agile Project Management - Jim Highsmith, Pearson Low price Edition 2004

BIG DATA ANALYTICS LAB

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275C2	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes: At the end of the course 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:
1. Implement the following Data structures in Java
a) Linked Lists b) Stacks c) Queues d) Set e) Map

Week 3
2. Perform setting up and Installing Hadoop in Pseudo distributed mode

Week 4:
3. 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:
4. Run a basic Word Count Map Reduce program to understand Map-Reduce Paradigm.

Week 6:
5. 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, 8:
6. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your Data.

Week 9, 10:
7. 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.

MOBILE APPLICATION DEVELOPMENT LAB

Department : IT					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A2275C5	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course outcomes: At the end of the course student would be able to

1. Understand the working of Android OS Practically
2. Able to develop dynamic user interface applications
3. Able to Develop, Deploy and Maintain Android Applications

List of Experiments

1. Installation of Android Studio and Android Virtual Device
   Develop an android application to display "Hello World"
2. Develop an application that receives user's name, contact and city and displays the same using Layout Managers and Event Listeners.
3. Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a "Back" button
4. Create a native calculator application.
5. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.
6. Develop a Registration and Login application that makes use of database.
7. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.
8. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.
9. Create an alarm application using time picker to set alarm time.
10. Create an application that shows the given URL (from a text field) in a browser
11. Develop a native application that uses GPS location information.

SEMANTIC WEB AND SOCIAL NETWORKS

Department : IT					IV B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A2285J4	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course 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,RDF Language,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)
3. Information sharing on the semantic Web Heiner Stucken schmidt; Frank Van Harmelen, Springer Publications.

E – COMMERCE

Department : IT					IV B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A2285J6	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course 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 and work Flow, Automation, Customization, 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 Education, 2004.

References Books:
1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.