B.Tech COMPUTER SCIENCE AND BUSINESS SYSTEMS(R-21)

III YEAR I SEMESTER

S.No	Course Code	Course Title	Category	L	T	P	C
1	21CS3111	Computer Networks	PC	3	-	-	3
2	21BU3112	Marketing Management and Research	PC	3	-	-	3
3	21CS3113	Web Technologies	PC	3	-	-	3
4		Professional Elective – I		3	-	-	3
	21BU3171	Business Law and Ethics	PE				
	21BU3172	Artificial Intelligence	PE				
	21BU3173	Software Engineering	PE				
	21CS3174	Distributed Systems	PE				
5		Open Elective – I		3	-	-	3
6	21BU3151	Computer Networks Lab	PC	-	-	3	1.5
7	21CS3152	Web Technologies Lab	PC	-	-	3	1.5
8	21HS3153	Advanced English Communication Skills Lab	HS	-	-	2	1
9	21BU3181	Summer Internship	PW	-	-	-	1
10	21MC0006	Aptitude & Logical Reasoning	MC	3	-	-	-
		Total Credits		**18**	**-**	**10**	**20**

III   YEAR II SEMESTER

S.No	Course Code	Course Title	Category	L	T	P	C
1	21BU3211	Design and Analysis of Algorithms	PC	3	1	-	4
2	21CS3213	Machine Learning	PC	3	-	-	3
3	21BU3213	Behavioral Economics	PC	3	1	-	4
4		**Professional Elective – II**		3	-	-	3
	21BU3271	Internet of Things	PE				
	21CS3272	Software Project management	PE				
	21BU3273	Advanced Data Structures	PE				
	21BU3274	Mobile Application Development	PE				
5		***Open Elective – II**	OE	3	-	-	3
6	21BU3251	Design Analysis of Algorithms Lab	PC	-	-	3	1.5
7	21CS3253	Machine Learning Lab	PC	-	-	3	1.5
8	21BU3253	IT Project Management Lab	PC	-	-	3	1.5
9	21MC0007	Yoga and Indian Philosophy	MC	3	-	-	0
		Total Credits		**18**	**1**	**9**	**21.5**

*Note: Environmental Science for Lateral Entry students
*Note: Summer Internship to be carried out during Summer Break after II Year II semester.

21CS3111: COMPUTER NETWORKS

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Prerequisites
- A course on "Programming for problem-solving"
- A course on "Data Structures"

Course Objectives
- To Introduce an overview of the concepts and fundamentals of computer networks.
- To Study Data Link Layer Concepts, Design issues, and protocols.
- Familiarize the working mechanism of the network layer.
- Understanding of Transport Layer Concepts and Protocols.
- To Explore the concepts of DNS,E-Mail, WWW, and various application layer Protocols.

Course Outcomes
- Gain knowledge of basic computer network technology.
- Gain knowledge of the functions of each layer in the OSI and TCP/IP reference model.
- Obtain skills in sub netting and routing mechanisms.
- Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
- Gain Knowledge of E-Mail Protocols, Streaming Audio, and Video on the Web.

UNIT – I
Introduction: Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.
Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT – II
Data link layer: Design Issues, Framing, Error Detection, and Correction.
Elementary data link protocols: simplex protocol, A simplex stop and wait-for protocol for an error-free channel.
Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat.
Medium Access sub layer: The Channel Allocation Problem, Multiple Access Protocols: ALOHA, Carrier Sense Multiple Access Protocols.

UNIT – III
Network Layer: Design issues, Routing Algorithms: Shortest Path Routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service.

UNIT – IV
Transport Layer: Transport Services, Elements of Transport protocols, Congestion Control, Connection management, TCP and UDP protocols.

UNIT – V
Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK:
1. Computer Networks - Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI.

REFERENCES:

1. An Engineering Approach to Computer Networks-S. Keshav, 2 nd Edition, Pearson Education.
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

21BU3112 -MARKETING MANAGEMENT AND RESEARCH

B.Tech. III Year I Sem.

	L	T	P	C
	3	-	-	3

Course Objective:
1. To understand the scope of marketing, philosophies and environment.
2. To analyze various marketing opportunities and product development.
3. To analyze markets and design customer driven strategies.
4. To communicate the decisions towards business development with superior customer value.
5. To understand the Product Research and Promotional Research for the Test Marketing.

Course Outcome:
1. The students will be able to understand the scope of marketing, philosophies and environment.
2. The students will be able to analyze various marketing opportunities and product development.
3. The students will be able to analyze markets and design customer driven strategies.
4. The students will be able to communicate the decisions towards business development with superior customer value.
5. The students will be able to understand the Product Research and Promotional Research for the Test Marketing

UNIT – I:
Introduction to Marketing and Market Research: Importance and scope of Marketing, Core Marketing Concepts, Marketing Philosophies, Marketing Environment, Marketing Strategies & Plans, Changing Marketing landscape

UNIT – II:
Analyzing Marketing Opportunities, Customer Value and Marketing Mix: Consumer, Decision Making, Building Customer Value, Analyzing Consumer Markets – Consumer Behavior –Cultural, Social & Personal Factors, developing products & brands – product levels; classifying products, product range, product line & product mix, Product Life Cycles, new product development., New Service Development, Stages of Product/ Service innovation development, The process of adoption, Branding.

UNIT – III:
Designing a Customer Driven Strategy: Market segmentation - STP Process -segmentation of consumer market, business market, requirement for effective segmentation, Market Targeting – evaluating market segmentation, selecting target market segmentation, positioning –Positioning and repositioning positioning maps, product positioning strategies.

UNIT – IV:
Marketing Research: Introduction, Management uses of marketing research design, Types of Marketing Research and Significance, Marketing Research Process, Problem Formulation & steps in decision Making Process, Marketing Information systems..

UNIT – V:
Marketing Research & Ethics, International Marketing Research, Product Research,
Advertising Research, Copy Testing, Test Marketing, Media Selection, Research Report.

TEXTBOOKS:
1. Philip Kotler, Gray Armstrong, Principles of Marketing, 15e, Pearson Education, 2016.
2. Marketing Research- Text and Cases Harper W. Boyd Jr., Ralph Westfall

REFERENCE BOOKS:
1. Lamb, Hair, Sharma, Mc Daniel, Principles of Marketing, A South Asian Perspective Cengage Learning, 2016.
2. Paul Baines, Chris Fill, Kelly Page, Piyush Sinha, Marketing, Asian Edition, Oxford University Press, 2015.
3. Arun Kumar & N. Meenakshi, Marketing Management, Vikas, 2012
4. Rajan Saxena, Marketing Management, 3e, Tata Mc Graw Hill, 2012.
5. Kenneth E Clow, Donald Baack, Cases in Marketing Management, Sage South Asia edition, 2012.
6. Research for Marketing Decisions Paul E. Green, Donald S. Tull

21CS3113: WEB TECHNOLOGIES

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Course Objectives
- To introduce Client-side scripting with Java script and AJAX.
- To introduce PHP language for server-side scripting
- To introduce XML and processing of XML Data with Java
- To introduce Server-side programming with Java Servlets
- To introduce Server-side Programming with JSP

Course Outcomes
- Understand basics of HTML and CSS and Design and Development of Dynamic Web Pages (using Validations) with Java Script and AJAX programming
- Understand Server-side Scripting with PHP language.
- Analyse what is XML and how to parse and use XML data with JAVA
- Develop Server side Application with Servlets (Sessions and Cookies).
- Create JSP pages with Database Server**.**

UNIT-I:

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;
Client-side Scripting: Introduction to JavaScript, JavaScript language – declaring variables, scope of variables, functions, event handlers (onclick, on submit etc.), Document Object Model, Form validation.

UNIT-II:

XML: XML: Introduction to XML, XML document structure, DTD, Namespaces and XML Schemas.
Web Application Frameworks: Introduction to AngularJS, ReactJS, NodeJS , JQuery.

UNIT - III:

Introduction to Servlets: Common Gateway Interface (CGI), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Session tracking, Cookies and Sessions, connecting to a database using JDBC.

UNIT-IV:

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT-V:

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, and lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling

results, Handling sessions and cookies

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

TEXT BOOKS:
1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

REFERENCES:
1. Web Programming, building internet applications, Chris Bates 2″ edition, Wiley Dreamtech
2. Java Server Pages —Hans Bergsten, SPD O'Reilly,
3. Java Script, D.Flanagan
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition ,Pearson.
6. Internet and World Wide Web — How to program. Dietel and Nieto,Pearson.

21BU3171: BUSINESS LAW AND ETHICS
(Professional Elective – I)

	L	T	P	C
B. Tech III Year I Sem	**3**	**-**	**-**	**3**

Course Objective:
- To understand the Legal and Regulatory Framework for doing business in India.
- To understand corporate governance in an organization.
- To understand essential elements of a valid contract.
- To know different types of Negotiable Instruments.
- To understand the value and importance of Ethics in business.

Course Outcome: Students will be able to understand
- About Company Law to incorporate a business
- Corporate governance of a company
- Prerequisites to execute valid negotiable instruments
- Necessity of doing business on ethical parameters.
- To protect business interests from Cyber Crimes

UNIT – I:
Companies Act, 2013: Steps and procedure for incorporation of the company, Appointment of Directors, Powers, duties, & liabilities of Directors, Company Meetings, Resolutions, Winding-up of a Company.

UNIT – II:
Law of Contract: Nature of Contract and Essential elements of valid contract, Offer and Acceptance, Consideration, Capacity to contract and Free Consent, Legality of Object. Unlawful and illegal agreements, Contingent Contracts, Performance and discharge of Contracts, Remedies for breach of contract. Contracts-II: Indemnity and guarantee, Contract of Agency, Sale of goods Act - 1930: General Principles, Conditions & Warranties, Performance of Contract of Sale.

UNIT – III:
Negotiable Instruments Act - 1881: Negotiable Instruments- Promissory Note, Bills of Exchange, & Cheque, and their definitions and characteristics, Types of endorsements, Holder- Holder in due course, Discharge of Parties. Introduction to Goods and Services Tax (GST)

UNIT – IV:
Business Ethics: The Changing Environment: Business Ethics-why does it matter? ; Levels of Business Ethics-Five Myths about Business Ethics-can Business Ethics be taught and trained? Stages of Moral development Kohlberg's study-carol Gilligan's Theory-Principles of Ethics.

UNIT – V:
Cyber Crime: The Legal Landscape - Need for cyber laws in the Indian context - The Indian IT Act Challenges to Indian Law and cyber crime scenario in Indian – issues and Challenges in Cyber Crime.

TEXT BOOKS:
1. Ravinder Kumar, Legal Aspects of Business, 4e, Cengage Learning, 2016.
2. P.P.S. Gogna, Company Law, S. Chand, 2016.

REFERENCE BOOKS:
1. RSN Pillai, Bagavathi, Legal Aspects of Business, S. Chand, 2016.
2. Akhileshwar Pathak , Legal Aspects of Business, Tata McGraw Hill, 3e, 2011.
3. Nina Godbole & Sunit Belapure, Cyber Security, Wiley India, 2012.

21BU3172 - ARTIFICIAL INTELLIGENCE
(Professional Elective – I)

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Pre-requisites:
- A course on "Computer Programming and Data Structures"
- A course on "Advanced Data Structures"
- A course on "Design and Analysis of Algorithms"
- A course on "Mathematical Foundations of Computer Science"
- Some background in linear algebra, data structures and algorithms, and probability will all be helpful

. **Course Objectives: The objective of this course is to:**

1. Learn the distinction between optimal reasoning Vs. human like reasoning
2. Understand the concepts of state space representation, exhaustive search, and heuristic search together with the time and space complexities.
3. Learn different knowledge representation techniques.
4. Understand the applications of AI, namely game playing, theorem proving, and machine learning.
5. Know about the various applications of AI.

Course Outcomes: At the end of the course, student will be able to:
1. Ability to formulate an efficient problem space for a problem expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique for a given problem.
4. Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.
5. Apply AI techniques to real-world problems to develop intelligent systems.

UNIT - I
Problem Solving by Search - I: Introduction to AI, Intelligent Agents
Problem Solving by Search - II: Problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces, Searching with Non-Deterministic Actions, Searching wih Partial OBUervations, Online Search Agents and Unknown Environment.

UNIT - II

Problem Solving by Search - II and Propositional Logic

Adversarial Search: Games, Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions. Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems. Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT - III

Logic and Knowledge Representation

First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

UNIT - IV

Planning

Classical Planning: Definition of Classical Planning, Algorithms for Planning with State- Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent Planning.

UNIT - V

Uncertain knowledge and Learning Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use, **Probabilistic Reasoning:** Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning; Dempster-Shafer theory.

Learning: Forms of Learning, Supervised Learning, Learning Decision Trees. Knowledge in Learning: Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming.

TEXT BOOK:

1. Artificial Intelligence A Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education.

REFERENCE BOOKS:

1. Artificial Intelligence, 3rd Edn, E. Rich and K.Knight (TMH)
2. Artificial Intelligence, 3rd Edn., Patrick Henny Winston, Pearson Education.
3. Artificial Intelligence, Shivani Goel, Pearson Education.
4. Artificial Intelligence and Expert systems – Patterson, Pearson Education

21BU3173 - SOFTWARE ENGINEERING
(Professional Elective – I)

B. Tech III Year I Sem

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Prerequisites:
- Computer Programming
- Database Management Systems

Course Objectives:
- To understand fundamental principles of Software engineering, and their application in the development of software products.
- To understand and create the software requirements specifications document.
- To understand and use unified modelling language for specifying, analysis and designing.
- To understand testing strategies for testing software applications
- To understand Software metrics and Risk Management strategies to identify potential problems before they occur.

Course Outcomes:
- Able to apply the software engineering lifecycle phases communication, planning, analysis, design, construction, and deployment.
- Ability to translate end-user requirements into system and software requirements into Software Requirements specification Document (SRS)
- Able to apply UML in object-oriented software modeling to develop computer software.
- Able to identify problems in software and will be able to develop a simple testing report.
- To understand Software Metrics, potential risk and how to manage them though RMMM plan.

UNIT – I
Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths.
A Generic view of process: Software engineering- A layered technology, process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models, COCOMO Model.
Process models: The waterfall model, Incremental process models, Evolutionary process models, specialized process models, The Unified process**.**

UNIT - II: **Software Requirements**
Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management, Software requirements documents
System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT - III:
Modeling Techniques using UML: The Unified Approach to Modeling, Structural and Behavioral Diagrams.

Design Engineering: Data Flow Diagrams, Design process and Design quality, Design concepts, the design model, pattern-based software design.
Creating an architectural design: Architectural styles and patterns, Architectural Design, assessing alternative architectural designs.

UNIT - IV: Implementation and Quality Assurance
Implementation: Structured coding Techniques, Coding Styles-Standards and Guidelines.
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Regression Testing, Unit Testing, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.
Quality Management: Quality concepts, software quality assurance, software reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

UNIT - V: Metrics for Process and Products
Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.
Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan,

TEXT BOOKS
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modelling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, and Pearson Education.

REFERENCE BOOKS
1. "Software Engineering", Ian Sommerville, Addison-Wesley, 9th Edition, 2010, ISBN- 13: 978- 0137035151.
2. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.
4. Software testing techniques by Boris Beizer, dreamtech.
5. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
6. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.

21CS3174 - DISTRIBUTED SYSTEMS
(Professional Elective – I)

	L	**T**	**P**	**C**
B. Tech III Year I Sem	**3**	**-**	**-**	**3**

Pre-requisites
- A course on "Operating Systems".
- A course on "Computer Organization & Architecture".

COURSE OBJECTIVES
- To understand the foundations of distributed systems.

- To learn issues related to clock Synchronization and the need for global state in distributed systems.

- To understand the significance of agreement, fault tolerance and recovery protocols in Distributed Systems.

- To introduce the concepts of distributed file systems, shared memory and message passing systems, synchronization and resource management.

- To introduce the concepts of Transactions and Concurrency Control and Distributed deadlocks

COURSE OUTCOMES:
- Distinguish distributed computing paradigm from other computing paradigms.

- Able to explain various distributed algorithms, such as logical clocks and leader election.

- Illustrate the mechanisms of inter process communication in distributed system.

- Explain name services and distributed shared memory.

- The students will be able to define, explain and illustrate fundamental principles of concurrent transaction processing.

UNIT-I
Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges.
System Models: Introduction, Architectural and Fundamental models.

UNIT-II
Time and Global States: Introduction, Clocks, Events and Process states, synchronizing physical clocks, Logical time and Logical clocks, Global states, Distributed Debugging.
Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast Communication, Consensus and Related problems.

UNIT-III
Inter Process Communication: Introduction, The API for the internet protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX.
Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case study-Java RMI.

UNIT-IV

Distributed File Systems: Introduction, File service Architecture, Case Study1: Sun Network File System, Case Study 2: The Andrew File System.

Name Services: Introduction, Name Services and the Domain Name System, Directory Services, Case study of the Global Name Service.

Distributed Shared Memory: Introduction Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, other consistency models.

UNIT-V

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery

TEXT BOOK:

1. Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tlm Kindberg, Pearson Education, 4h Edition, 2009.

REFERENCE BOOKS:

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van
2. Steen, Second Edition, PHI.
3. Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC,
4. Taylor & Fransis Group, 2007.
5. Distributed Systems, Principles and Paradigms, Andrew S.Tanenbaum, Maarten Van Steen, 2d Edition, PHl.

6. Distributed Systems, An Algorithm Approach, Sukumar Ghosh,Chapman&HalyCRC, Taylor & Fransis Group, 2007.

OPEN ELECTIVE-I

<h1 align="center">21BU3151- COMPUTER NETWORKS LAB</h1>

B. Tech III Year I Sem

L	T	P	C
-	-	3	1.5

Course Objectives
- To understand the working principle of various communication protocols.
- To understand the network simulator environment and visualize a network topology and observe its performance.
- To analyze the traffic flow and the contents of protocol frames.

Course Outcomes
- Implement data link layer farming methods.
- Analyze error detection and error correction codes.
- Implement and analyze routing and congestion issues in network design.
- Implement Encoding and Decoding techniques used in presentation layer.
- To be able to work with different network tools.

List of Experiments
COMPUTER NETWORKS Experiments:
1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers
10. Wiresharkx
    i. Packet Capture Using Wire shark.
    ii. Starting Wire shark.
    iii. Viewing Captured Traffic.
    iv. Analysis and Statistics & Filters.
11. How to run Nmap scan
12. Operating System Detection using Nmap
13. Do the following using NS2 Simulator
    i. NS2 Simulator-Introduction
    ii. Simulate to Find the Number of Packets Dropped
    iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
    iv. Simulate to Find the Number of Packets Dropped due to Congestion
    v. Simulate to Compare Data Rate& Throughput.

    vi. Simulate to Plot Congestion for Different Source/Destination
    vii. Simulate to Determine the Performance with respect to Transmission of Packets.

21CS3152: WEB TECHNOLOGIES LAB

B.Tech. III Year I Sem.

L	T	P	C
-	-	3	1.5

Course Objectives
- To enable the student to program web applications using the following technologies HTML, Java script , AJAX, PHP, Tomcat Server, Servlets ,JSP.

Course Outcomes
- USE LAMP / XAMP for Web Applications
- Simple Applications with Technologies like HTML, JavaScript and AJAX
- Design web application using PHP
- Parse XML Files using JAVA(DOM AND SAX Parsers)
- Use Tomcat Server for Servlets and connect to Database
- Develop JSP Applications using Tomcat Server and Java Bean development

List of Experiments
1. Write an HTML code to demonstrate
   a) Lists b) Tables (row span and col span) c) Cascading Style Sheets

2. Design a web page to demonstrate
   a) Divisions b) Frames c) Embedding Images

3. Develop static pages (use Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
   a) Home page
   b) Registration and user Login
   c) User Profile Page
   d) Books catalog
   e) Shopping Cart
   f) Payment By credit card
   g) Order Conformation

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

5. Write a JavaScript program to validate the registration form contents with the following
   Rules (Use RegExp Object)
   a) Username Must starts with Uppercase followed by set of lowercase letters or digits.
   b) Password must contain only uppercase letters and length must be in between 8 to12.
   c) Phone number contains 10 digits.
   d) E-mail must follow some predefined format(example@domain.com)

6. Build an application on a) React JS b) Angular JS c) Node.js and JSON.

7. Write the following XML Programs
   a) Create a DTD document to validate the XML document.

b) Create a XML Schema document to validate the XML document

8. Install the following on the local machine
   a) Apache Tomcat Web Server
   b) Install MySQL/Oracle (if not installed)
   d) Install PHP and configure it to work with Apache web server and MySQL

9. a) Write a Servlet program to read the parameters from user interface and display
   Welcome message.
   b) Write a Servlet program to read initialization parameters using ServletConfig and
   Servlet Context object.

10. Write Servlet programs to work with the following session tracking techniques.
    a) Http Session b) Cookies c) Hidden form controls

11. Develop a dynamic web page which contains Registration and Login Forms using servlet with Oracle
    database .Validate the login page.

12. Write a JSP Program to handle the exceptions.

13. Develop a dynamic web page which contains Registration and Login Forms using JSP with Oracle
    database .Validate the login page.

14. Write a PHP script that reads data from one file and write into another file.

15. Develop a dynamic web page which contains Registration and Login Forms in PHP with MySQL
    database .Validate the login page.

TEXT BOOKS:
1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education

REFERENCES:
1. Deitel H.M. and Deitel P.J., "Internet and World Wide Web How to program", Pearson International,
   2012, 4th Edition.
2. J2EE: The complete Reference By James Keogh,McGraw-Hill
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming,Thomson
4. Paul Dietel and Harvey Deitel," Java How to Program", Prentice Hall of India, 8thEdition
5. Web technologies, Black Book, Dreamtech press.

21HS3153 - ADVANCED ENGLISH COMMUNICATION SKILLS LAB

B. Tech III Year I Semester

L	T	P	C
-	-	2	1

1. INTRODUCTION:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalized context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

2. OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

3. SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word suBUtitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading& effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/Technical report writing/* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.

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

4. MINIMUM REQUIREMENT:
The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural 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
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. SUGGESTED SOFTWARE:
The software consisting of the prescribed topics elaborated above should be procured and used.
- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dream tech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS:
1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd. 2nd Edition
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCE BOOKS:
1. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
2. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. English Vocabulary in Use series, Cambridge University Press 2008.
6. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
7. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.

21BU3181- SUMMER INTERNSHIP

B. Tech III Year I Semester

L	T	P	C
-	-	-	1

21MC0006 - Aptitude and Logical Reasoning

B. Tech III Year I Semester

L	T	P	C
3	-	-	-

21BU3211 - DESIGN AND ANALYSIS OF ALGORITHMS

B. Tech III Year II Semester

L	T	P	C
3	1	-	4

Prerequisites:
- A course on "Computer Programming and Data Structures"
- A course on "Advanced Data Structures"

Course Objectives:
- Introduces the notations for analysis of the performance of algorithms.
- Introduces the data structure of disjoint sets.
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic Programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate
- Describes how to evaluate and compare different algorithms using worst-, average-, and best-case analysis.
- Explains the difference between tractable and intractable problems, and introduces the Problems that are P, NP and NP complete.

Course Outcomes:
- Ability to analyze the performance of algorithms and describe the Divide and Conquer Method .
- Ability to describe about disjoint sets and describe the Backtracking Technique.
- Describe the dynamic programming paradigm and explain when an algorithmic design situation calls for it. Synthesize dynamic programming algorithms and analyze them.
- Describes the greedy paradigm and explain when an algorithmic design situation calls for it. Synthesize greedy algorithms and analyze them.
- Describe the Brand and Bound and Differentiate between tractable and intractable problems and to introduce P and NP classes.

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

UNIT - II
Disjoint Sets: Disjoint set operations, union and find algorithms. **Backtracking:** General method, applications, n-queen's problem, sum of suBUets problem, graph coloring

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

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

UNIT - V
Branch and Bound: General method, applications - Traveling salesperson problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.
NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP-Complete classes, Cook's theorem.

TEXT BOOK:
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press.

REFERENCE BOOKS:
1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C.
   Stein, PHI Pvt. Ltd./ Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons.

21CS3213: MACHINE LEARNING

B.Tech. III Year II Sem.

L	T	P	C
3	-	-	3

Prerequisites:
1. Statistics, 2 Linear Algebra, 3. Calculus, 4.Probability, 5 Programming Languages and data structures.

COURSE OBJECTIVES:

1. The basic theory underlying machine learning.
2. Machine learning problems corresponding to different applications.
3. A range of machine learning algorithms along with their strengths and weaknesses
4. Machine learning algorithms to solve problems of moderate complexity.
5. The algorithms to a real-world problem optimize the models learned and report on the expected accuracy that can be achieved by applying the model.

COURSE OUTCOMES:

1. Appreciate the importance of visualization in the data analytics solution.
2. Apply structured thinking to unstructured problems.
3. Understand a very broad collection of machine learning algorithms and problems.
4. Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theory.
5. Develop an appreciation for what is involved in learning from data.

UNIT - I
Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning
Concept learning and the general to specific ordering – introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias, Gradient Descent Algorithm and its variants.

UNIT – II
Supervised Learning- Regression: Linear-Simple, Multiple, Logistic Regression.
Classification- Naive Bayes Classifier, k-NN classifier, Support Vector Machines -Linear, Non Linear
Ensemble Techniques I-Decision Trees-ID3(Iterative Dichotomiser3), CART(Classification and Regression Tree)

UNIT – III
Ensemble Techniques II- C4.5, CHAID (Chi-Square Automatic Interaction Detection), Random Forest Algorithm.
Unsupervised Learning-Clustering: Measures of distance, k-means, Gaussian Mixture Model Clustering, Hierarchical Learning- Divisive, Agglomerative Clustering

UNIT- IV
Artificial Neural Networks-1– Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.
Artificial **Neural Networks-2**- Remarks on the Back-Propagation algorithm, An illustrative example: face recognition, advanced topics in artificial neural networks.

UNIT - V
Genetic Algorithms – Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms.
Reinforcement Learning – Introduction, the learning task, Q–learning, non-deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

TEXT BOOK:
1. Machine Learning – Tom M. Mitchell, - MGH.
2. Introduction to Machine Learning with Python, Author – Andreas C. Müller, Sara h Guido, Edition – First Edition, Publisher – O'Reilly Media, Inc.

REFERENCE BOOK:
1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis.
2. Mathematics for Machine learning, Author – Marc Peter Deisenroth, Edition – First Edition, Publisher – Cambridge University Press.

21BU3213 -BEHAVIORAL ECONOMICS

B. Tech III Year II Semester

L	T	P	C
3	1	-	4

Course Objectives:
- To aims at getting the students familiar with the concepts and scope of contemporary behavioural economics.
- To focus on a strong emphasis on preferences and beliefs in decision making under risk and uncertainty.
- To provide a contemporary and forward-looking view on the different models of Behavioural Economics
- To aim at providing an emphasis on Behavioural game theory and modelling.
- To focus on the practice of behavioural policies and its applications.

Course Outcomes:
- understand the fundamentals concepts of behavioural economics
- understand the significance of decision making under risk and uncertainty
- Analyze the discounted utility model and other alternative inter temporal choice models
- Understand and analyze the social preferences
- Understand and analyze Strategic interaction, Nudges & Happiness

UNIT - I
Introduction
What is behavioral economics? - History and evolution- relation with other disciplines objectives, and scope- themes and methodology of behavioral economics (theory, evidence, consilience) – application

UNIT - II
Foundation
Values, preferences and choice- believes- heuristic and biases- state dependent preferences (such as habit formation and addiction)- mis-prediction and projection bias-anticipation and information avoidance-decision making under risk and uncertainty- prospect theory- the role of reference-dependent preference in both risky (loss aversion) and risk free (endowment) choices-mental accounting- applications

UNIT – III:
Inter temporal choice, The discounted utility model (origin, features, methodology, anomalies with discounted utility models)- alternative inter temporal choice models (time preferences, time inconsistent preferences- hyperbolic discounting- modifying the instantaneous functions)-applications

UNIT - IV:
Strategic interaction, Behavioral game theory (nature, equilibrium, mixed strategies, bargaining, iterated games, signaling, learning) - application, Modelling of social preferences –nature andFactors affecting social preferences distributional social preferences based on altruism, inequality aversion models- reciprocity, models, evidence and policy implications

UNIT - V:
Nudges & Happiness: Nudges, Policy, and Happiness- the application

TEXT BOOKS:
1. An introduction to behavioural economics by Wilkinson and Klaes, Palgrave McMillan
2. Behavioural Economics and Finance, by Michelle Beddeley, Rutledge, 2019

REFERENCE BOOKS:
1. Behaviour economics and business ethics- interrelation and application by Alexander Rajko, Rutledge, London, 2012
2. Philosophical problems of behavioural economics by Steffan Heidel, Routlege, 1996
3. Varieties of modern economic rationality – from Adam Smith to Contemporary Behavioural and evolutionary economists by Michael S Zoubulakis, Routledge, 1997.
4. Behavioural foundations of economics by J.L. Buxter, McMillan Press

B. Tech III Year II Semester	**L**	**T**	**P**	**C**
	3	**-**	**-**	**3**

Course Objectives:
- Introduce the terminology, technology and its applications.
- Introduce the concept of M2M (machine to machine) with necessary protocols.
- Introduce the Python Scripting Language which is used in many IoT devices.
- Introduce the Raspberry PI platform,that is widely used in IoT applications.
- Introduce the implementation of web-based services on IoT devices.

Course Outcomes:
- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect themto network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify theapplications of IoT in Industry.

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

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

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

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

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

TEXT BOOKS:

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

21CS3272 - SOFTWARE PROJECT MANAGEMENT
(Professional Elective – II)

B. Tech III Year II Semester

L	T	P	C
3	-	-	3

Course Objectives
- A basic knowledge of software project management principles
- The ability to come up with a project schedule and assign resources
- Choose an appropriate project development methodology (e.g. waterfall,spiral ...)
- Identify project risks, monitor and track project deadlines.
- The capability to work in a team environment and be aware of different modes of communications.

Course Outcomes
- Identify and describe how different project contexts will impact upon all aspects of a software development project
- Identify and describe the key phases of project management and the key skills associated with each.
- Determine an appropriate project management approach through an evaluation of the business contextandprojectscopeandknowledgeofagileandtraditionalprojectmanagement approaches.
- Demonstrate through application, knowledge of the key project management skills, such as product and work break-down structure, schedule; governance including progress reporting, risk and quality management.
- As part of a small team research and produce a concise piece of writing suitable for presentation to senior management.

UNIT-I
Conventional Software Management: The waterfall model, conventional software Management performance. Overview of Project Planning – Stepwise Project Planning.
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT-II
The old way and the new way: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.
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.

UNIT –III
Work Flows of the process: Software process workflows, Iteration workflows. Checkpoints of the process: Major milestones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT–IV
Process Automation: Automation Building blocks.
Project Control and Process instrumentation: These Vencor Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.
Tailoring the Process: Process discriminants.

UNIT–V
Project Organizations and Responsibilities:
Line-of-Business Organizations, Understanding Behavior – Organizational Behavior
Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.
Case Study: The command Center Processing and Display system-Replacement (CCPDS-R).

TEXT BOOKS:

1. Software Project Management, Walker Royce: Pearson Education,2005.

REFERENCES:

1. Software Project Management, Bob Hughes and Mike Cotterell:Tata McGraw-HillEdition.
2. Software Project Management, Joel Henry, Pearson Education.
Software Project Management in practice, Pankaj Jalote, Pearson Education.2

21BU3273: ADVANCED DATA STRUCTURES
(Professional Elective – II)

B. Tech III Year II Semester

L	T	P	C
3	-	-	3

Prerequisites: A course on "Data Structures".

Course Objectives:
- Introduces the heap data structures such as leftist trees, binomial heaps, Fibonacci and min-max heaps
- Introduces Hashing and collisions
- Introduces Search Structures
- Introduces a variety of data structures such as search structures and digital search structures
- Introduces Pattern Matching concepts.

Course Outcomes:
- Ability to select the Heap structures that efficiently model the information in a problem
- Understand Hashing and collisions
- Ability to understand how the choice of Search data structures impact the performance of programs
- Design programs using a variety of digital search structures
- Understand various Pattern Matching algorithms

UNIT - I
Heap Structures: Introduction, Min-Max Heaps, Leftist trees, Binomial Heaps, Fibonacci heaps.

UNIT - II
Hashing and Collisions: Introduction, Hash Tables, Hash Functions, different Hash Functions: Division Method, Multiplication Method, Mid-Square Method, Folding Method, Collisions

UNIT - III
Search Structures: OBUT, AVL trees, Red-Black trees, Splay trees,
Multiway Search Trees: B-trees., 2-3 trees

UNIT - IV
Digital Search Structures: Digital Search trees, Binary tries and Patricia, Multiway Tries, Suffix trees, Standard Tries, Compressed Tries

UNIT - V
Pattern Matching: Introduction, Brute force, the Boyer –Moore algorithm, Knuth-Morris-Pratt algorithm, Naïve String, Harspool, Rabin Karp

TEXT BOOKS:
1. Fundamentals of data structures in C++ Sahni, Horowitz, Mehatha, Universities Press.
2. Introduction to Algorithms, TH Cormen, PHI.

REFERENCE BOOKS:

1. Design methods and analysis of Algorithms, SK Basu, PHI.
2. Data Structures & Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education.
3. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Universities Press.

21BU3274: MOBILE APPLICATION DEVELOPMENT
(Professional Elective – II)

B. Tech III Year II Semester

L	T	P	C
3	-	-	3

Prerequisites
- Acquaintance with JAVA programming.
- A Course on DBMS.

Course Objectives
- Demonstrate their understanding of the fundamentals of Android operating systems.
- Improves their skills of using Android software development tools.
- Demonstrate their ability to develop software with reasonable complexity on mobile platform.
- Demonstrate their ability to deploy software to mobile devices.
- Demonstrate their ability to debug programs running on mobile devices.

Course Outcomes
- Student understands the working of Android OS Practically.
- Student will be able to develop Android user interfaces
- Understand the use of various Layouts and Widgets in Android Applications.
- Student will be able to develop, deploy and maintain the Android Applications.
- Able to develop embedded software for Mobile phones with SQLite.

UNIT - I
Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes
Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT - II
Android User Interface: Measurements – Device and pixel density independent measuring UNIT - s Layouts – Linear, Relative, Grid and Table Layouts
User Interface (UI) Components –Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers
Event Handling – Handling clicks or changes of various UI components
Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT - III

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

Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity

Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT - IV

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

UNIT - V

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

TEXT BOOKS:
1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012.
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013.

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

21BU3251 - DESIGN AND ANALYSIS OF ALGORITHMS LAB

B. Tech III Year II Semester

L	T	P	C
-	-	3	1.5

Course Objectives
- To write programs in to solve problems using divide and conquer strategy.
- To write programs in to solve problems using backtracking strategy.
- To write programs in to solve problems using greedy and dynamic programming techniques.

Course Outcomes
- Ability to analyze the performance of algorithms and describe the Divide and Conquer Method .
- Ability to describe about disjoint sets and describe the Backtracking Technique.
- Describe the dynamic programming paradigm and explain when an algorithmic design situation calls for it. Synthesize dynamic programming algorithms and analyze them.
- Describes the greedy paradigm and explain when an algorithmic design situation calls for it. Synthesize greedy algorithms and analyze them.
- Describe the Brand and Bound and Differentiate between tractable and intractable problems and to introduce P and NP classes.

Week 1: Write a program to implement Merge Sort algorithm for sorting a list of integers in ascending order.

Week 2: Write a program to implement Quick Sort algorithm for sorting a list of integers in ascending order.

Week 3: Write a program to implement the Depth First Search (DFS) algorithm for a graph.

Week 4: Write a. program to implement the Breadth First Search (BFS) algorithm for a graph.

Week 5: Write a program to implement greedy algorithm for job sequencing with deadlines.

Week 6: Write a program to implement Dijkstra's algorithm for the Single source shortest path problem.

Week 7: Write a program that implements Prim's algorithm to generate minimum cost spanning tree.

Week 8: Write a program that implements Kruskal's algorithm to generate minimum cost spanning tree.

Week 9: Write a program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.

Week 10: Write a java program to implement Dynamic Programming algorithm for the Optimal Binary Search Tree Problem.

Week 11: Write a program to implement Floyd's algorithm for the all pairs shortest path problem.

Week 12: Write a program to implement backtracking algorithm for the N-queens problem.

Week 13: Write a program to implement the backtracking algorithm for the sum of subsets problem.

Week 14: Write a program to implement the backtracking algorithm for the Hamiltonian Circuits problem.

Week 15: Write a program to Implement Graph Coloring using Back Tracking.

TEXT BOOKS:
1. Data structures, Algorithms and Applications in java, 2nd Edition, S. Sahani, Universities Press.
2. Data structures and Algorithms in java, 3rd edition, A. Drozdek, Cengage Learning.
3. Data structures with Java, J. R. Hubbard, 2nd edition, Schaum's Outlines, TMH.

REFERENCES:
1. Data structures and algorithms in Java, 2nd Edition, R. Lafore, Pearson Education.
2. Data Structures using Java, D. S. Malik and P.S. Nair, Cengage Learning.

21CS3253: MACHINE LEARNING LAB

B.Tech. III Year II Sem.   **L T P C**
                                                                    - - 3 1.5

Course Description

- Machine Learning is concerned with computer programs that automatically improve their performance through experience.
- This course covers the theory and practical algorithms for machine learning from a variety of perspectives.
- This course covers topics such as FIND-S, Candidate Elimination Algorithm, Decision tree (ID3 Algorithm), Back propagation Algorithm, Naïve Bayesian classifier, Bayesian Network, k-Means Algorithm, k-Nearest Neighbor Algorithm, Locally Weighted Regression Algorithm.

Course Objectives

- Make use of Data sets in implementing the machine learning algorithms
- Implement the machine learning concepts and algorithms in any suitable language of choice.

Course Outcomes

- Understand the implementation procedures for the machine learning algorithms
- Design Java/Python programs for various Learning algorithms.
- Apply appropriate data sets to the Machine Learning algorithms
- Identify and apply Machine Learning algorithms to solve real world problems

List of Experiments

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample
4. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

21BU3253 -IT PROJECT MANAGEMENT LAB

B. Tech III Year II Semester

L	T	P	C
-	-	3	1.5

Course Objectives:

      Knowledge on fundamental concepts of scope, time, quality of information technology project management.

Course Outcomes:

1. Understand the fundamentals of project management and information technology context
2. Analyze project integration management
3. understand the significance of project scope and time management
4. Discuss the importance of project quality management

List of Experiments:

1. Introduction to MS Project: Perform the following activities
   A. start MS Project
   B. create a Project Plan from template
   C. switch to a different view
   D. view a report
   E. create a visual report

2. Create Tasks List in MS Project and perform the following activities
   A. create a new project plan & its start date
   B. set working & non-working time
   C. enter properties about a project plan
   D. enter new tasks in the project, set duration for each task & to create a milestone task
   E. organizing tasks into phases
   F. link adjacent and non-adjacent tasks
   G. enter a task note
   H. enter a task hyperlink
   I. check a Project plans duration and other statistics
   J. display projects entire duration in Gantt Chart View

3. Set-up Resources in MS Project and perform the following activities
   A. Setup work (people and equipment) resources
   B. Setup material resources
   C. Setup cost resources
   D. Enter work (people & material) resource pay rates
   E. Make a onetime adjustment to an individual resource s working time
   F. Edit regular work week for an individual resource
   G. Document resources with resource notes

4. Assign Resources to Tasks
    A. Assign resources to tasks
    B. Control how MS Project schedules the work on a task after assigning an additional resource
    C. Assign material resources to tasks
    D. Assign cost resources to tasks

5. Formatting & Printing Project Plan
    A. Display the project summary tasks
    B. Create a new view based on an existing view
    C. Format Gantt Bars with the Gantt Chart Wizard
    D. Draw a text box on a Gantt Chart
    E. Format a category of text in a view
    F. Format selected text in a view
    G. Edit a report s header or footer

6. Tracking Progress on different tasks in a planned project.
    A. Set current values in a schedule as a baseline
    B. Display the Variance table in the Task Sheet view
    C. Record project progress as scheduled
    D. Record a task s completion percentage
    E. Enter actual work values for tasks
    F. Enter actual start and duration values for tasks

TEXT BOOK:
    1. Kathy Schwalbe, information Technology Project Management, 8th edition.

REFERENCE BOOKS:
    1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
    2. Software Project Management, Joel Henry, Pearson Education.
    3. Software Project Management in practice, Pankaj Jalote, Pearson Education. 2005.

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Unit-I

Bhagavad Gita, chapter 2 Sankhya Yoga slokas 54-72 about emotional intelligence

(Stitaprajnata)

Unit-II

Bhagavad Gita, chapters 3-7

Unit-III

Bhagavad Gita, chapters 8-11

Unit-IV

Bhagavad Gita, chapters 12-15

Unit-V

Bhagavad Gita, chapters 16-18

10 quotes from each chapter of ref (2)

References:

1) Bhagavad Gita By Swami Swarupananda, R K Math Publication

2) Vivekananda-His Call to the Nation, R K Math Publication