



**DEPARTMENT
OF
COMPUTER SCIENCE AND ENGINEERING**

(Computer Science and Business Systems)

III YEAR I SEM



19CS3111: COMPUTER NETWORKS

B. Tech III Year I Semester

L	T	P	C
3	1	-	4

Prerequisites:

- A course on “Programming for problem solving”.
- A course on “Data Structures”.

Course Objectives:

- The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
- Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.
- Analyze the contents in a given Data Link layer packet, based on the layer concept.
- Decide routing entries given a simple example of network topology
- Analyze the contents in a given Application Layer, based on the layer concept.

Course Outcomes:

- Gain the knowledge of the basic computer network technology.
- Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
- Obtain the skills of subnetting and routing mechanisms.
- Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
- Gain the knowledge on various Application Layer Protocols

UNIT - I

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 protocol for an error-free channel, A simplex stop and wait protocol for noisy channel. Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols. Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

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, Internetworking, The Network layer in the internet.

UNIT - IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.



UNIT - V

Application Layer –Domain name system, SNMP, Electronic Mail; the World Wide WEB, HTTP,

TEXT BOOK:

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education


19IT3112: WEB TECHNOLOGIES
B. Tech III Year I Semester

L	T	P	C
3	1	-	4

Prerequisite:

- Object oriented concepts

Course Objectives:

- To introduce HTML, CSS and to introduce Client-Side Scripting with JavaScript.
- To introduce XML and processing of XML Data with Java.
- To introduce Server-side programming with Java Servlets.
- To introduce JSP and MVC architecture.
- To introduce PHP language for server-side scripting.

Course Outcomes:

- To gain knowledge of html, client-side scripting, validation of forms.
- Implement XML and how to parse and use XML Data with Java.
- To implement JDBC connectivity to any database and to have understanding of server-side scripting using Servlets.
- To introduce Server-side programming with JSP.
- To implement PHP Server side scripts.

UNIT I

Introduction to HTML: Introduction to HTML: Table, images, forms, frames, CSS, Client side scripting:

Introduction to Java Script: Java script language – declaring variables, scope of variables, functions, event handlers (on click, on submit etc.), Document Object Model, Form validation.

UNIT II

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

UNIT III

JDBC: Introduction, Types of JDBC Drivers, Process to establish a connection, Types of Statements, Result set Metadata.

Introduction to Servlet: Common Gateway Interface (CGI), 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 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, MVC architecture Using Cookies and Sessions for Session Tracking, Connecting to database using JDBC, Simple AJAX application.

**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, 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 and Contemporary topics.

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 2nd edition, Wiley Dreamtech.
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D. Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
Programming World Wide Web, R. W. Sebesta, Fourth Edition, Pearson Internet and
World Wide Web – How to program, Dietel and Nieto, Pearson


19BU3111: FUNDAMENTALS OF DATA SCIENCE

L	T	P	C
3	-	-	3

B. Tech III Year I Semester
Course Objectives

- To learn concepts, techniques and tools that need to deal with various facets of data science practice, including data collection and integration
- To exploring data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication
- To understand the basic knowledge of algorithms and reasonable programming experience and some familiarity with basic linear algebra and basic probability and statistics
- To learn concepts, techniques and tools for Web Scrapping
- To identify the importance of recommendation systems and data visualization techniques

Course Outcomes

- Understand basic terms what Statistical Inference means. Identify probability distributions commonly used as foundations for statistical modeling. Fit a model to data
- Discuss the significance of exploratory data analysis (EDA) in data science and to apply basic tools (plots, graphs, summary statistics) to carry out EDA
- Apply basic machine learning algorithms and their usage in applications.
- Enable to explore Web Scrapping tools and apply algorithms for Feature generation and selection from Web.
- Analyze data and give pictorial representation using Data Visualization tools and address ethical issues

UNIT I:

Introduction: What is Data Science? - Big Data and Data Science hype – and getting past the hype - Why now? – Datafication - Current landscape of perspectives - Skill sets needed - Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model – Over fitting, Basics of R: Introduction, R-Environment Setup, Programming with R, Basic Data Types

UNIT II:

Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary statistics) of EDA - Philosophy of EDA - The Data Science Process - Case Study: Real Direct (online real estate firm) - Three Basic Machine Learning Algorithms, Linear Regression - k-Nearest Neighbors (k-NN) - k-means

UNIT III:

Machine learning Algorithms and Applications - Motivating application: Filtering Spam - Why Linear Regression and k-NN are poor choices for Filtering Spam - Naive Bayes and why it works for Filtering Spam

UNIT IV:

Data Wrangling: APIs and other tools for scrapping the Web - Feature Generation and Feature Selection (Extracting Meaning From Data) - Motivating application: user (customer) retention - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests

**UNIT V:**

Data Visualization - Basic principles, ideas and tools for data visualization 3 - Examples of inspiring (industry) projects - Exercise: create your own visualization of a complex dataset - Data Science and Ethical Issues - Discussions on privacy, security, ethics - A look back at Data Science - Next-generation data scientists

TEXT BOOKS:

1. Doing Data Science, Straight Talk from the Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014
2. Mining of Massive Datasets v2.1, Jure Leskovek, Anand Rajaraman and Jeffrey Ullman, Cambridge University Press, 2014
3. Machine Learning: A Probabilistic Perspective, Kevin P. Murphy, 2013 (ISBN 0262018020)

REFERENCE BOOKS:

1. Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani and Jerome Friedman, 2nd Edition, 2009 (ISBN 0387952845)
2. Foundations of Data Science, Avrim Blum, John Hopcroft and Ravindran Kannan
3. Data Mining and Analysis: Fundamental Concepts and Algorithms, Mohammed J. Zaki and Wagner Miera Jr. Cambridge University Press, 2014
4. Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber and Jian Pei, 3rd Edition, 2011 (ISBN 0123814790)


19BU3112 - FINANCIAL MANAGEMENT
B. Tech III Year I Semester

L	T	P	C
3	-	-	3

Course Objectives:

- To understand the basic finance functions in a Corporate.
- To understand the investment decision process for the effective utilization of resources.
- To understand the theories of the relationship between capital structure and the value of the firm.
- To understand the importance of dividend decisions and valuation of firm.
- To Underline the need for investing the current assets and elaborate the concept of operating cycle.

Course Outcomes:

- Understand Goals of financial function
- Identify the significance of Investment criteria and decision process
- Understand and analyze capital structure and Dividend Decisions
- To understand the importance of dividend decisions and valuation of firm.
- To understand the working capital financing.

UNIT- I:

The Finance Function: Nature and Scope; Evolution of finance function – Its new role in the contemporary scenario –Goals of finance function – maximizing vs. satisfying; Profit vs. Wealth vs. Welfare; the Agency relationship and costs; Risk-Return trade off; Concept of Time Value of Money – Future Value and Present value and the basic valuation model.

UNIT - II:

The Investment Decision: Investment decision process- Project generation, project evaluation, project selection and project Implementation. Developing Cash Flow; Data for New Projects; Capital Budgeting Techniques –Traditional and DCF methods. The NPV vs. IRR Debate; Approaches for reconciliation. Capital budgeting decision under conditions of risk and uncertainty.

UNIT- III:

Capital Structure and Financial Decisions: Capital structure vs. financial structure -Capitalization, financial leverage, operating leverage and composite leverage. EBIT-EPS Analysis.

Cost of Capital: Concept and measurement of cost of capital, Cost of Debt, cost of equity, preference shares, retained earnings, weighted average cost of capital and marginal cost of capital. Importance of cost of capital in capital budgeting decisions. Simple Problems on WACC

UNIT- IV:

Dividend Decisions: Dividends and value of the firm - Relevance of dividends, Factors determining Dividend Policy - dividends and valuation of the firm - Major theories of Gordon, Walter Models.

**UNIT - V: Working Capital Management and Finance:**

Working Capital Management: Components of working capital, gross vs. net working capital, determinants of working capital needs, the operating cycle approach..

Management of Current Assets and Corporate Restructuring: Management of cash – Basic strategies for cash management, cash planning, cash budget, cash management techniques/processes. Marketable securities

Corporate Restructuring: Corporate Mergers, Acquisitions and Takeovers: Types of Mergers.

*The students need a Discounting Table and Annuity tables for the examination.

TEXT BOOKS:

1. I M Pandey, Financial Management, 11 e, Vikas Publications, 2015.
2. M.Y Khan, P K Jain, Financial Management-Text and Problems, TMH, 2015.
3. James C Van Horne, Sanjay Dhamija, Financial Management and Policy, Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Eugene F. Brigham Michael C. Ehrhardt, Financial Management, Cengage Learning, 12e, 2012.
2. Arindam Banerjee, Financial Management, Oxford Publications, 2016.
3. Rajesh Kothari, Financial Management A Contemporary Approach, Sage publications, 2017.


19BU3171: BUSINESS LAW AND ETHICS
(Professional Elective – I)

L	T	P	C
3	-	-	3

B. Tech III Year I Semester**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.

R19 - CSBS



19CY3172: DATA WAREHOUSING AND DATA MINING
(Professional Elective – I)

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

Course Objective:

- Study data warehouse principles and its working
- Passing on knowledge about advanced data mining algorithms and working with complex data representations at various stages of the knowledge discovery process.
- Understand Association rules mining.
- Acquiring knowledge about techniques and algorithms of Classification
- Acquiring knowledge about techniques and algorithms of Clustering

Course Outcome:

- Students should be able to understand why the data warehouse in addition to database systems.
- Ability to perform the pre-processing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using data mining Classification techniques
- Ability to identify real world problems in business and scientific information using data mining Clustering techniques

UNIT- I

Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modelling, Schema Design, Star and Snow-Flake Schema, Fact Consultation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact- Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

UNIT- II

Introduction to Data Mining: Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Pre-processing, Data Cleaning, Missing data, Dimensionality Reduction, Feature SuBUet Selection, Discretization and Binarization, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

UNIT- III

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT- IV

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction,



Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction; Naive-Bayes Classifier, Bayesian Belief Networks; K-Nearest neighbour classification-Algorithm and Characteristics.

UNIT- V

Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, K-Means Additional issues, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness; Outlier Detection.

TEXT BOOKS:

1. Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers Elsevier 3rd Edition, 2011.
2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education

REFERENCE BOOKS:

1. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
2. Data Warehousing Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.
3. The Data Warehouse Life Cycle Toolkit – Ralph Kimball, Wiley Student Edition. Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press.


19BU3172: SOFTWARE ENGINEERING
(Professional Elective – I)
B. Tech III Year I Semester

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 through 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 Rumbaugh, 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.



19BU3173: DISTRIBUTED SYSTEMS
(Professional Elective – I)

B. Tech III Year I Semester

L	T	P	C
3	-	-	3

Pre-requisites

- A course on “Operating Systems”.
- A course on “Computer Organization & Architecture”.

Course Objectives:

- Provides an insight into Distributed systems.
- Exposing the need for Operating System Support
- Topics include Peer to Peer Systems
- Impart knowledge on Transactions and Concurrency control, Security and Distributed shared memory
- Equip students with principles of replication.

Course Outcomes:

- Ability to understand characteristics of Distributed Systems
- Ability to understand OS communication processes
- Ability to understand Peer to Peer system communication techniques.
- Ability to understand Transactions and Concurrency control.
- Understanding Distributed shared memory.

UNIT - I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models -Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication, Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI

UNIT - II

Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture.

UNIT - III

Peer to Peer Systems-Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore. 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 - IV

Transactions and Concurrency Control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering. Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

**UNIT - V**

Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data. Distributed shared memory, Design and Implementation issues, and Consistency models.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S. Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

1. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
2. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshema kalyani and Mukesh Singhal, Cambridge.


19BU3174: E – COMMERCE
(Professional Elective – I)
B. Tech III Year I Semester

L	T	P	C
3	-	-	3

Course Objectives:

- Identify the need of e-commerce applications and its framework.
- Identify the major categories and trends of e-Payment systems.
- Provide knowledge on intra Organizational Commerce
- Enable to know Corporate Digital Library
- Impart knowledge on Consumer Search and Resource Discovery

Course Outcomes:

- Ability to identify the business relationships between the organizations and their customers
- Ability to perform various transactions like payment, data transfer and etc.
- Define various electronic payment types and associated security risks and the ways to protect against them.
- Understand the main technologies used in Corporate Digital Library
- Understand E-Commerce implementations in consumer search, Resource discovery and Multimedia

UNIT - I

Electronic Commerce-Framework, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT - II

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT - III

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

UNIT - IV

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

UNIT - V

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing.



TEXT BOOK:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCE BOOKS:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S. Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.


19BU3175: BEHAVIOURAL ECONOMICS
(Professional Elective – II)
B. Tech III Year I Semester

L	T	P	C
3	-	-	3

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 behavioural economics? - History and evolution- relation with other disciplines objectives, and scope- themes and methodology of behavioural 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, Behavioural game theory (nature, equilibrium, mixed strategies, bargaining, iterated games, signalling, learning) - application, Modelling of social preferences –nature and



factors 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, PalgraveMcMillan
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, Routledge, 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



19BU3176: ENTERPRISE RESOURCE PLANNING
(Professional Elective – II)

B. Tech III Year I Semester

L	T	P	C
3	-	-	3

Course Objectives:

- To provide a contemporary and forward-looking view on the theory and practice of Enterprise Resource Planning Technology.
- To focus on a strong emphasis upon practice of theory in Applications and Practical oriented approach.
- To train the students to develop the basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth.
- To aim at preparing the students technologically competitive and make them ready to self-upgrade with the higher technical skills.

Course Outcomes:

- Make basic use of Enterprise software, and its role in integrating business functions
- Analyze the strategic options for ERP identification and adoption.
- Design the ERP implementation strategies.
- Create reengineered business processes for successful ERP implementation.
- Integration of ERP into organization culture

UNIT - I

ERP Introduction, Origin, Evolution and Structure: Conceptual Model of ERP, the Evolution of ERP, the Structure of ERP. Integrated Data Model. Scope – Technology – Benefits of ERP: Reduction in cycle Time, Lead Time & Cost, Improved Resource Utilization, Supplier Performance. Flexibility, Accuracy & Decision Making, Customer Satisfaction & On-time Shipment.

UNIT - II

Business Process Reengineering, Management Information system, Decision Support System, Executive Information System. Data ware Housing, Data Mining, Online Analytic Processing (OLAP), Product Life Cycle Management (PLM), LAP, Supply chain Management.

UNIT - III

ERP Marketplace and Marketplace Dynamics: Market Overview, Marketplace Dynamics, the Changing ERP Market. ERP-Modules: Functional Modules, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications, Manufacturing and logistics modules.

UNIT - IV

ERP Implementation: Implementation Life Cycle -Implementation Methodology - Hidden Costs - Organizing Implementation - Vendors, Consultants and Users Contracts-Project Management and Monitoring- Role of SDLC/SSAD.

UNIT - V

ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into organizational culture.



TEXT BOOKS

1. Vinod Kumar Garg and Venkita Krishnan N K, “Enterprise Resource Planning Concepts and Practice”, PHI.
2. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology.

REFERENCE BOOKS

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill
2. Rahul V. Altekar “Enterprise Resource Planning”, Tata McGraw Hill
3. Vinod Kumar Garg and Venkitakrishnan N K, “Enterprise Resource Planning – A Concepts and Practice”, PHI Mary Summer, “Enterprise Resource Planning”- Pearson Education


19BU3177: FINANCIAL MODELING
(Professional Elective – II)
B. Tech III Year I Semester

L	T	P	C
3	-	-	3

Course Objectives:

- Its general objective is to develop spreadsheet and management skills for creating computer-based models in financial modelling process.
- The course helps in analyzing a variety of decision problems facing today's financial managers and professionals.
- To know about fixation of optimal financial structure for business development.
- The course concept is covered with the help of case studies and simulation with real market data.
- To analyze benefits and challenges of Risk modelling

Course Outcomes:

- Understand basic concepts of Financial Statement Analysis, Cash flows and Valuation Modelling
- Understand and analyze Corporate Finance Models
- Understand various portfolio models
- Analyze risk modeling and Visual Basic For Application
- Analyze the simulation techniques in risk modelling.

UNIT - I

Financial Statement Analysis, Cash flows and Valuation Modeling: Income statement Analysis, Balance sheet Analysis, Cash flow Statement Analysis and Forecasting, Terminal value Calculations-the use of fade periods, the return on capital, and valuation of a perpetuity, sensitivity analysis-long term growth and economic profit assumption.

UNIT - II

Corporate Finance Models: Basic financial calculation - PV, NPV, IRR, MIRR, Flat payment schedules, Cost of Capital- Cost of Equity, Cost of Debt, WACC

UNIT – III

Dividend Decisions theories-Walters Model-Gordon Model, Miller -Modigliani theories-Effect of Dividend policy on Share value of firm- Valuation of Firm, Security Market line, CAPM.

UNIT - IV

Portfolio Models: Introduction, portfolio mean and variance, efficient portfolios, capital market line, SML, Variance-covariance Matrix, Convertibility, MBA/CMO and other bonds-Convertible bonds, Mortgage Based Securities, CMO- Collateralized Mortgage Obligation, Managing a CMO Portfolio.

UNIT – V

Risk Modelling: Benefits and challenges of risk modelling, the risk modelling process, Introduction to Simulation Techniques, Value at Risk-Delta Normal Methodology, Historical Simulation Methodology, Monte Carlo Simulation Methodology, and Extreme Value Theory.



Visual Basic for Application: User defined function with VBA, Using Excell functions in VBA, Types and Loops, Macros and users interaction, Arrays, Objects and Add-Ins.

TEXT BOOKS

1. Michael Rees: Financial Modelling in practice-A concise guide for intermediate and advance level, Willey a John Wiley and sons Ltd. Publication, 2008.
2. Simon Benninga: Financial Modelling, 3/e, the MIT Press London, 2008.

REFERENCE BOOK:

1. Thomas S.Y.Ho and Sang Bin Lee: The Oxford guide to Financial Modelling-Application for capital markets, corporate finance, Risk Management and financial Institutions, Oxford University Press, 2004.


19BU3178: BUSINESS INTELLIGENCE
(Professional Elective – II)
B. Tech III Year I Semester

L	T	P	C
3	-	-	3

Course objectives:

- To understand Knowledge on various concepts of business intelligence,
- To know about Business Intelligence implementation and business analytics.
- To analyze Customer Relationship Management Techniques
- To know about key elements in Corporate Performance Management
- To know about ethics in social networking.

Course Outcomes:

- Understand fundamental concepts of BI and Analytics
- Application of BI Key Performance indicators
- Design of Dashboards, Implementation of Web Analytics
- Understanding Utilization of Advanced BI Tools and their Implementation.
- Implementation of BI Techniques and BI Ethics.

UNIT - I

Business Intelligence Introduction – Definition, Leveraging Data and Knowledge for BI, BI Components, BI Dimensions, Information Hierarchy, Business Intelligence and Business Analytics. BI Life Cycle. Data for BI - Data Issues and Data Quality for BI.

UNIT - II

BI Implementation - Key Drivers, Key Performance Indicators and Performance Metrics, BI Architecture/ Framework, Best Practices, Business Decision Making, Styles of BI - vent - Driven alerts - A cyclic process of Intelligence Creation. The value of Business intelligence - Value driven and Information use.

UNIT - III

Business Analytics – Objective Curve, Web Analytics and Web Intelligence, Customer Relationship Management.

Business/Corporate Performance Management - Dashboards and Scorecards, Business Activity Monitoring, Six Sigma.

UNIT-IV

Advanced BI – Re-evaluate Current BI Processes -Big Data and BI, Social Networks, Mobile BI, emerging trends, Description of different BI-Tools (Pentaho, KNIME)

UNIT-V

Business intelligence implementation-Connecting in BI systems- Issues of legality- Privacy and ethics- Social networking and BI-Future of Business Intelligence-Emerging Technologies, Machine Learning, Predicting the future with Data Analysis, BI search and Text analysis-Advanced Visualization-Rich report, future beyond technology.



TEXT BOOKS:

1. Efraim Turban, Ramesh Sharda, Jay Aronson, David King, Decision Support and Business Intelligence Systems, 9th Edition, Pearson Education, 2009.
2. David Loshin, Business Intelligence - The Savy Manager's Guide Getting Onboard with Emerging IT, Morgan Kaufmann Publishers, 2009.
3. Rajiv Sabherwal "Business Intelligence" Wiley Publications, 2012.

REFERENCE BOOKS

1. Philo Janus, Stacia Misner, Building Integrated Business Intelligence. Solutions with SQL Server, 2008 R2 & Office 2010, TMH, 2011.
2. Business Intelligence Data Mining and Optimization for decision making, Carlo-Verellis, Wiley Publications.



19BU3179: CLOUD COMPUTING
(Professional Elective – II)

B. Tech III Year I Semester

L	T	P	C
3	-	-	3

Pre-Requisites: courses on Computer Networks, Operating Systems, Distributed Systems.

Course Objectives:

- To explain the evolving computer model called cloud computing.
- To Understand the current trend and basics of cloud computing
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.
- To Learn cloud enabling technologies and its applications

Course Outcomes:

- Ability to understand various service delivery models of a cloud computing architecture.
- Ability to understand the virtualization and cloud computing concepts.
- Able to understand cloud computing architecture and managing cloud infrastructure and its applications.
- Acquire knowledge on cloud service models.
- Acquire knowledge on cloud service providers.

UNIT - I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT - II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT - III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT - IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

**UNIT V**

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP LaBU, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft, Aneka Platform

TEXT BOOK:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.


19BU3151: FUNDAMENTALS OF DATA SCIENCE LAB
B. Tech III Year I Semester

L	T	P	C
-	-	3	1.5

Course Objectives: The course should enable the students to:

- Understand the R Programming Language.
- Recollect concepts on Statistics.
- Reading and Writing different types of Datasets
- Exposure on Solving data science problems.
- Understand The classification and Regression Model

Course Outcomes:

- Illustrate the use of various data structures.
- Analyze and manipulate Data using Pandas
- Creating static, animated, and interactive visualizations using Matplotlib.
- Understand the implementation procedures for the machine 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. R AS CALCULATOR APPLICATION

- Using with and without R objects on console
- Using mathematical functions on console
- Write an R script, to create R objects for calculator application and save in a specified location in disk

2. DESCRIPTIVE STATISTICS IN R

- Write an R script to find basic descriptive statistics using summary
- Write an R script to find suBUet of dataset by using suBUet ()

3. READING AND WRITING DIFFERENT TYPES OF DATASETS

- Reading different types of data sets (.txt, .csv) from web and disk and writing in file in specific disk location.
- Reading Excel data sheet in R.
- Reading XML dataset in R.



VISUALIZATIONS

- Find the data distributions using a box and scatter plot.
- Find the outliers using a plot.
- Plot the histogram, bar chart and pie chart on sample data

CORRELATION AND COVARIANCE

- Find the correlation matrix.
- Plot the correlation plot on dataset and visualize giving an overview of relationships among data on iris data.
- Analysis of covariance: variance (ANOVA), if data have categorical variables on iris data

4. REGRESSION MODEL

Import a data from web storage. Name the dataset and now do Logistic Regression to find out relation between variables that are affecting the admission of a student in a institute based on his or her GRE score, GPA obtained and rank of the student. Also check the model is fit or not. require (foreign), require (MASS).

5. MULTIPLE REGRESSION MODEL

Apply multiple regressions, if data have a continuous independent variable. Apply on above dataset.

6. REGRESSION MODEL FOR PREDICTION

Apply regression Model techniques to predict the data on above dataset

7. CLASSIFICATION MODEL

- Install relevant packages for classification.
- Choose a classifier for classification problems.
- Evaluate the performance of the classifier.

8. CLUSTERING MODEL

- Clustering algorithms for unsupervised classification.
- Plot the cluster data using R visualizations.

TEXT BOOKS:

- Doing Data Science, Straight Talk from The Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014
- Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, 3rd ed. The Morgan Kaufmann Series in Data Management Systems.
- K G Srinivas, G M Siddesh, "Statistical programming in R", Oxford Publications.

REFERENCE BOOK:

- Yanchang Zhao, "R and Data Mining: Examples and Case Studies", Elsevier, 1st Edition, 2012


19BU3152: COMPUTER NETWORKS AND WEB TECHNOLOGIES LAB
B. Tech III Year I Semester

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 framing 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 Dijkstra'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

WEB TECHNOLOGIES Experiments:

1. Write a PHP script to print prime numbers between 1-50.
2. PHP script to
 - a. Find the length of a string.
 - b. Count no of words in a string.
 - c. Reverse a string.
 - d. Search for a specific string.
- 3 Write a PHP script to merge two arrays and sort them as numbers, in descending order.
- 4 Write a PHP script that reads data from one file and write into another file.
- 5 Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The weBUite 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
- 6 Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
- 7 Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
- 8 Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
- 9 Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the weBUite.

TEXT BOOK:

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



REFERENCE BOOKS:

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, 8th Edition
5. Web technologies, Black Book, Dreamtech press.
6. Gopalan N.P. and Akilandeswari J., “Web Technology”, Prentice Hall of India


19HS3151: 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 substitutes, 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.



19BU3181: SUMMER INTERNSHIP

B. Tech III Year I Semester

L	T	P	C
-	-	-	1

R19 - CSBS


19MC0005: PROFESSIONAL ETHICS
B. Tech III Year I Semester

L	T	P	C
2	-	-	0

Course Objectives

- To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.

Course Outcomes

- The students will understand the importance of Values and Ethics in their personal lives and professional careers.
- The students will learn the rights and responsibilities as an employee, team member and a global citizen.

UNIT - I

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT - II

Basic Theories: Basic Ethical Principles, Moral Developments, Deontology, Utilitarianism, Virtue Theory, Rights Theory, Casuist Theory, Moral Absolution, Moral Rationalism, Moral Pluralism, Ethical Egoism, Feminist Consequentialism, Moral Issues, Moral Dilemmas, Moral Autonomy.

UNIT - III

Professional Practices in Engineering: Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central Responsibilities of Engineers - The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

UNIT - IV

Work Place Rights & Responsibilities, Ethics in changing domains of Research, Engineers and Managers; Organizational Complaint Procedure, difference of Professional Judgment within the Nuclear Regulatory Commission (NRC), the Hanford Nuclear Reservation. Ethics in changing domains of research - The US government wide definition of research misconduct, research misconduct distinguished from mistakes and errors, recent history of attention to research misconduct, the emerging emphasis on understanding and fostering responsible conduct, responsible authorship, reviewing & editing.

UNIT - V

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing, Media Ethics; War Ethics; BioEthics, Intellectual Property Rights.



TEXT BOOKS:

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

REFERENCES:

1. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e, Cengage learning, 2015.
2. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.



III YEAR I SEM

R19 -


19DS3211: COMPILER DESIGN
B. Tech III Year II Semester

L	T	P	C
3	-	-	3

Prerequisites

- A course on “Formal Languages and Automata Theory”
- A course on “Computer Organization and architecture”
- A course on “Computer Programming and Data Structures”

Course Objectives:

- Provide an understanding of the fundamental principles in compiler design
- Provide the skills needed for building compilers for various situations that one may encounter in a career in Computer Science.
- Introduce the major concepts of language translation and impart the knowledge of practical skills necessary for constructing a compiler.
- Understand phases of compiler, parsing, syntax directed translation, type checking use of symbol tables.
- Code optimization techniques, intermediate code generation, code generation and data flow analysis.

Course Outcomes:

- Demonstrate the ability to design a compiler given a set of language features.
- Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool & yacc tool for developing a scanner and parser., design and implement LL and LR parsers
- Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
- Design algorithms to generate machine code.

UNIT –I

Introduction: The structure of a compiler, the science of building a compiler, programming language basics.

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT –II

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing.

Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars and Parser Generators.

UNIT –III

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, and Implementing L-Attributed SDD's.



Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

UNIT –IV

Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

UNIT –V

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

TEXT BOOK:

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman.

REFERENCES:

1. Lex & Yacc –John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Compiler Construction, Loudon, Thomson.


19BU3212: DESIGN ANALYSIS OF ALGORITHMS
B. Tech III Year II Semester

L	T	P	C
3	-	-	3

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.


19BU3213: OPERATIONS RESEARCH
B. Tech III Year II Semester

L	T	P	C
3	-	-	3

Course Objectives:

Students should be able to

- Knowledge on concepts of optimization techniques,
- Know the formulation of a LPP
- Understand Non-linear programming concepts
- Understand Scheduling and sequencing
- Gain Knowledge on Competitive Models

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

- Apply the dynamic programming to solve problems of discrete and continuous variables.
- Deduce Graphical Solutions and apply Parametric programming
- Apply the concept of non-linear programming
- Carry out sensitivity analysis
- Model the real-world problem and simulate it.

UNIT - I

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models

UNIT - II

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

UNIT- III

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

UNIT - IV

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

UNIT - V

Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

TEXT BOOKS:

1. H.A. Taha, Operations Research, An Introduction, PHI, 2008
2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.

REFERENCE BOOKS:

1. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008
2. Hitler Libermann Operations Research: McGraw Hill Pub. 2009
3. Pannerselvam, Operations Research: Prentice Hall of India 2010
4. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India


19BU3271: IT PROJECT MANAGEMENT
(Professional Elective – III)
B. Tech III Year II Semester

L	T	P	C
3	-	-	3

Pre-requisite: A course on “Software Engineering”.

Course Objectives:

- Knowledge on fundamental concepts of Project Management
- Give exposure on Project integration management
- Provide knowledge on Project scope and time management.
- Include topics on Project Cost management
- Include Project Resource Management

Course Outcomes:

- Understand the fundamentals of project management and information technology context
- Analyze project integration management
- Understand the significance of project scope and time management
- Discuss the importance of project cost and quality management
- Understand the importance of Project Resource Management

UNIT I
Introduction to Project Management: Introduction, What Is a Project, Program and Project Portfolio Management, The Role of the Project Manager, The Project Management Profession

The Project Management and Information Technology Context: A Systems View of Project Management, Understanding Organizations, Stakeholder Management, Project Phases and the Project Life Cycle, The Context of Information Technology Projects, Recent Trends Affecting Information Technology Project Management

UNIT II
Project Integration Management: What Is Project Integration Management? Strategic Planning and Project Selection, Developing a Project Charter, Developing a Project Management Plan, Directing and Managing Project Execution, Monitoring and Controlling Project Work, Performing Integrated Change Control, Closing Projects or Phases, Using Software to Assist in Project Integration Management

UNIT - III
Project Scope Management: What Is Project Scope Management? Collecting Requirements, Defining Scope, Creating the Work Breakdown Structure, Verifying Scope, Controlling Scope

Project Time Management: The Importance of Project Schedules, Defining Activities, Sequencing Activities, Estimating Activity Resources, Estimating Activity Durations, Developing the Schedule, Controlling the Schedule, Using Software to Assist in Project Time Management

UNIT IV
Project Cost Management: The Importance of Project Cost Management, Basic Principles of Cost Management, Planning Cost Management, Estimating Costs, Determining the Budget, Controlling Costs Using Project, Management Software to Assist in Project Cost Management, Considerations for Agile/Adaptive Environments.



Project Quality Management: The Importance of Project Quality Management, What Is Project Quality Management? Planning Quality, Performing Quality Assurance, Performing Quality Control, Modern Quality Management, Improving Information Technology Project Quality, Using Software to Assist in Project Quality Management

UNIT V

Project Resource Management: The Importance of Resource Management, What Is Project Resource Management? Keys to Managing and Leading People, Motivation Theories, Developing the Resource Management Plan and Team Charter, Estimating Activity Resources, Developing the Project Team, Managing the Project Team, Controlling Resources, Using Software to Assist in Resource Management, Considerations for Agile/Adaptive Environments

Project Risk Management: The Importance of Project Risk Management, Planning Risk Management, Common Sources of Risk on IT Projects, Identifying Risks, Performing Qualitative Risk Analysis, Performing Quantitative Risk Analysis, Planning Risk Responses, Implementing Risk Responses, Monitoring Risks, Using Software to Assist in Project Risk Management, Considerations for Agile/Adaptive Environments

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


19BU3272: INTERNET OF THINGS
(Professional Elective – III)
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 them to 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 the applications 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 NETCONF, 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

R19 - CSBS


19BU3273: R PROGRAMMING
(Professional Elective – III)
B. Tech III Year II Semester

L	T	P	C
3	-	-	3

Course Objectives:

- Understanding and being able to use basic programming concepts
- Automate data analysis
- Working collaboratively and openly on code
- Knowing how to generate dynamic documents
- Being able to use a continuous test-driven development approach

Course Outcomes:

- Understand to use and program in the programming language R
- Understand to use Control structures, functions and vector operations.
- Implementing various data types like List and applying them on data frames
- Implement Factors and Tables
- Implement plotting Graphs and Debugging techniques

UNIT – I

Introduction: Overview of R, R data types and objects, reading and writing data, sub setting, R Objects, Essentials of the R Language, Installing R, Running R, Packages in R, Calculations, Complex numbers in R, Rounding, Arithmetic, Modulo and integer quotients, Variable names and assignment, Operators, Integers, Factors, Logical operations.

UNIT – II

Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames, Classes, Vectors: Generating sequences, Vectors and subscripts, Extracting elements of a vector using subscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical Operations, Vector Indexing, Common Vector Operations.

UNIT – III

Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List, Elements, Getting the Size of a List, Extended Example: Text Concordance Accessing List, Components and Values Applying Functions to Lists, DATA FRAMES, Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations.

UNIT - IV

Factors and Tables: Factors and Levels, Common Functions Used with Factors, Working with Tables, Matrix/Array-Like Operations on Tables, Extracting a Subtable, Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions.

UNIT - V

Graphics: Creating Graphs, Customizing Graphs, Saving Graphs to Files, Customizing Graphs, Creating Three-Dimensional Plots.

Debugging: Fundamental Principles of Debugging, Why Use a Debugging Tool?, Using R



Debugging Facilities, Moving Up in the World: More Convenient Debugging Tools, Ensuring Consistency in Debugging Simulation Code, Syntax and Runtime Errors, Running GDB on R Itself.

TEXT BOOKS:

1. R Programming for Data Science by Roger D. Peng
2. The Art of R Programming by Norman Matloff Cengage Learning India.

REFERENCE BOOKS:

1. Hadley Wickham, Garrett Golemund, R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition, O'Reilly.
2. Tilman M. Davies, The book of R a first course in programming and statistics, no starch press.

**19BU3274: ADVANCED DATA STRUCTURES**
(Professional Elective – III)**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.

R19 - CSBS



19DS3273: MOBILE APPLICATION DEVELOPMENT
(Professional Elective – III)

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.



19BU3251: COMPILER DESIGN LAB

B. Tech III Year II Semester

L	T	P	C
-	-	3	1.5

Course Objectives

- To understand the various phases in the design of a compiler & to understand the design of top-down and bottom-up parsers.
- To understand syntax directed translation schemes
- To introduce lex and yacc tools.
- To understand the working principle of various communication protocols.
- To analyze the traffic flow and the contents of protocol frames

Course Outcomes

- Ability to design, develop, and implement a compiler for any language , use lex and yacc tools for developing a scanner and a parser.
- Able to design and implement LL and LR parsers.
- 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

COMPILER DESIGN LAB

List of experiments:

1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value. Simulate the same in C language.
2. a. Write a C program to identify whether a given line is a comment or not
b. Write a C program to test whether a given identifier is valid or not.
3. Write a C program to simulate lexical analyzer for validating operators
4. To Study about Lexical Analyzer Generator(LEX) and Flex(Fast Lexical Analyzer)
5. Implement following programs using Lex.
 - A. Create a Lexer to take input from text file and count no of characters, no. of lines & no. of words.
 - B. Write a Lex program to count number of vowels and consonants in a given input string.
6. Implement following programs using Lex.
 - A. Write a Lex program to print out all numbers from the given file.
 - B. Write a Lex program to printout all HTML tags in file.c.
7. Write a Lex program which adds line numbers to the given file and display the same onto the standard output.
8. Write a C program for constructing of LL (1) parsing.
9. Write a C program for constructing recursive descent parsing
10. Write a C program to implement LALR parsing.


19BU3252: DESIGN ANALYSIS OF ALGORITHMS LAB
B. Tech III Year II Semester

L	T	P	C
-	-	3	1.5

Course Objectives

- To write programs in java to solve problems using divide and conquer strategy.
- To write programs in java to solve problems using backtracking strategy.
- To write programs in java 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 java program to implement Merge Sort algorithm for sorting a list of integers in ascending order.

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

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

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

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

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

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

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

Week 9: Write a java 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 java program to implement Floyd's algorithm for the all pairs shortest path problem.

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

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

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

Week 15: Write a java 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.


19BU32P1: IT PROJECT MANAGEMENT LAB
(PE – III 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.


19BU32P2: INTERNET OF THINGS LAB
(PE – III Lab)
B. Tech III Year II Semester

L	T	P	C
-	-	3	1.5

Course Objectives:

- Introduce the raspberry PI platform, that is widely used in IoT applications
- Introduce the implementation of distance sensor on IoT devices
- Design and program IoT devices
- Design an IoT device to work with a Cloud Computing infrastructure.
- Transfer IoT data to the cloud and in between cloud providers

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

- Ability to introduce the concept of M2M (machine to machine) with necessary protocols and get awareness in implementation of distance sensor
- Get the skill to program using python scripting language which is used in many IoT devices
- Understand the concept of Internet of Things
- Implement interfacing of various sensors with Arduino/Raspberry Pi.
- Demonstrate the ability to transmit data wirelessly between different devices.

List of Experiments

1. Using raspberry pi
 - a. Calculate the distance using a distance sensor.
 - b. Basic LED functionality.

2. Using Arduino
 - a. Calculate the distance using a distance sensor.
 - b. Basic LED functionality.
 - c. Calculate temperature using a temperature sensor.

3. Using Node MCU
 - a. Calculate the distance using a distance sensor.
 - b. Basic LED functionality.
 - c. Calculate temperature using a temperature sensor.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016.
2. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.


19BU32P3: R PROGRAMMING LAB
(PE – III Lab)
B. Tech III Year II Semester

L	T	P	C
-	-	3	1.5

Pre-requisites: Any Programming Language.

Course Objectives:

- Understanding and being able to use basic programming concepts
- Working collaboratively and openly on code
- Knowing how to generate dynamic documents
- Being able to use a continuous test-driven development approach

Course Outcomes:

- At the end of the Course, the Student will be able to:
- Setup R Programming Environment.
- Understand and use R – Data types and R – Data Structures.
- Develop programming logic using R – Packages.
- Analyze data sets using R – programming capabilities

LIST OF EXPERIMENTS:

1. Download and install R-Programming environment and install basic packages using `install.packages()` command in R.
2. Learn all the basics of R-Programming (Data types, Variables, Operators etc)
3. Write a program to find a list of even numbers from 1 to n using R-Loops.
4. Create a function to print squares of numbers in sequence.
5. Write a program to join columns and rows in a data frame using `cbind()` and `rbind()` in R.
6. Implement different String Manipulation functions in R.
7. Implement different data structures in R (Vectors, Lists, DataFrames)
8. Write a program to read a csv file and analyze the data in the file in R.
9. Create pie chart and bar chart using R.
10. Create a data set and do statistical analysis on the data using R.

TEXT BOOKS:

1. R Programming for Data Science by Roger D. Peng
2. The Art of R Programming by Norman Matloff Cengage Learning India.

REFERENCE BOOKS:

1. Hadley Wickham, Garrett Golemund, R for DataScience: Import, Tidy, Transform, Visualize, and Model Data 1st Edition, O'Reilly
2. Tilman M. Davies, The book of R a first course in programming and statistics, no starch press



19BU32P4: ADVANCED DATA STRUCTURES LAB
(PE – III Lab)

B. Tech III Year II Semester

L	T	P	C
-	-	3	1.5

Prerequisites: A course on Computer Programming & Data Structures

Course Objectives:

- Introduces the basic concepts of Abstract Data Types.
- Reviews basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs, and B-trees.
- Introduces sorting and pattern matching algorithms.

Course Outcomes:

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and B-trees.
- Ability to perform Min Max operations on heap.

List of Programs:

1. Write a program to perform the following operations:
 - a) Insert an element into a binary search tree.
 - b) Delete an element from a binary search tree.
 - c) Search for a key element in a binary search tree.
2. Write a program for implementing the following sorting methods:
 - a) Merge sort b) Heap sort c) Quick sort
3. Write a program to perform the following operations:
 - a) Insert an element into a B- tree.
 - b) Delete an element from a B- tree.
 - c) Search for a key element in a B- tree.
4. Write a program to perform the following operations:
 - a) Insert an element into a Min-Max heap
 - b) Delete an element from a Min-Max heap
 - c) Search for a key element in a Min-Max heap
5. Write a program to perform the following operations:
 - a) Insert an element into a Leftist tree
 - b) Delete an element from a Leftist tree
 - c) Search for a key element in a Leftist tree



6. Write a program to perform the following operations:
 - a) Insert an element into a binomial heap
 - b) Delete an element from a binomial heap.
 - c) Search for a key element in a binomial heap

7. Write a program to perform the following operations:
 - a) Insert an element into a AVL tree.
 - b) Delete an element from a AVL search tree.
 - c) Search for a key element in a AVL search tree.

8. Write a program to perform the following operations:
 - a) Insert an element into a Red-Black tree.
 - b) Delete an element from a Red-Black tree.
 - c) Search for a key element in a Red-Black tree.

9. Write a program to implement all the functions of a dictionary using hashing.

10. Write a program for implementing Knuth-Morris-Pratt pattern matching algorithm.

11. Write a program for implementing Brute Force pattern matching algorithm.

12. Write a program for implementing Boyer pattern matching algorithm.

TEXT BOOKS:

1. Fundamentals of Data structures in C, E. Horowitz, S. Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.
2. Data Structures Using C – A.S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.
3. Introduction to Data Structures in C, Ashok Kamthane, 1st Edition, Pearson.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan, Dennis M. Ritchie, PHI/Pearson Education.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.
3. Data structures: A Pseudocode Approach with C, R.F. Gilberg And B.A. Forouzan, 2nd Edition, Cengage Learning.


19DS32P3: MOBILE APPLICATION DEVELOPMENT LAB
(PE – III Lab)
B. Tech III Year II Semester

L	T	P	C
-	-	3	1.5

Course Objectives:

- Learn how to develop Applications in android environment.
- Learn how to develop user interface applications.
- Learn how to develop URL related applications.
- Learn Storage Techniques and Animation in Android.
- Learn how to develop SQLite integration

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

- Understand the working of Android OS Practically.
- Able to develop user interfaces.
- Able to develop, deploy and maintain the Android Applications.
- Understand the use of various Layouts and Widgets in Android Applications.
- Able to Develop Android applications related to mobile related server-less database like SQLITE

List of Experiments:

1. Create an Android application that shows Hello + name of the user and run it on an emulator.
(b) Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.
2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.
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. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.
4. Develop an application that uses a menu with 3 options for dialling a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.
5. 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.
6. Create an application that uses a text file to store user names and passwords (tab separated fields and one record per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with Login Failed message.
7. Create a user registration application that stores the user details in a database table.



8. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.
9. Create an admin application for the user table, which shows all records as a list and the admin can select any record for edit or modify. The results should be reflected in the table.
10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc.
11. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.
12. Create an alarm that rings every Sunday at 8:00 AM. Modify it to use a time picker to set alarm time.
13. Create an application that shows the given URL (from a text field) in a browser

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.



**19BU3291: TECHNICAL
PRESENTATION**

B. Tech III Year II Semester

L	T	P	C
2	-	-	1

R19 - CSBS



VIGNANA BHARATHI
Institute of Technology

(An UGC Autonomous Institution, Approved by AICTE, Affiliated by JNTUH, Accredited by NBA & NAAC)

Open Electives offered by the Department of Computer Science and Business Systems to other departments

R19 - CSBS



VIGNANA BHARATHI
Institute of Technology

(An UGC Autonomous Institution, Approved by AICTE, Affiliated by JNTUH, Accredited by NBA & NAAC)

Open Elective - I

R19 - CSBS



19BU3261 - Operation Research - II

B.Tech. III Year II Sem.

L T P C

3 - - 3

Course Objectives: Knowledge on concepts of optimization techniques, formulation of a LPP, Non- linear programming concepts

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

- Apply the dynamic programming to solve problems of discrete and continuous variables.
- Apply the concept of non-linear programming
- Carry out sensitivity analysis
- Model the real-world problem and simulate it.

UNIT - I

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models

UNIT - II

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

UNIT- III

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

UNIT – IV

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models.

UNIT - V

Competitive Models, Single and Multi-channel Problems, Dynamic Programming, Flow in Networks, Elementary Graph Theory.

TEXT BOOKS:

1. H.A. Taha, Operations Research, An Introduction, PHI, 2008
2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.

REFERENCE BOOKS:

3. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008
4. Hitler Libermann Operations Research: McGraw Hill Pub. 2009
5. Pannerselvam, Operations Research: Prentice Hall of India 2010
6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010



19BU3262 - Cloud Computing

B.Tech. III Year II Sem.

L T P C
3 - - 3

Pre-Requisites: courses on Computer Networks, Operating Systems, Distributed Systems.

Course Objectives: The objective of this course is to

1. This course provides an insight into cloud computing
2. Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.
3. The fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges
4. Cloud storage technologies and relevant distributed file systems
5. The basic ideas and principles in data center design; cloud management techniques and cloud software deployment considerations

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

1. Ability to understand various service delivery models of a cloud computing architecture.
2. Ability to understand the ways in which the cloud can be programmed and deployed.
3. Understanding cloud service providers.
4. Ability to understand network and storage virtualization and outline their role in enabling the cloud computing system model.
5. Analyze various cloud programming models and apply them to solve problems on the cloud.

UNIT – I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT – II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT – III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.



UNIT – IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP LaBU, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft, Aneka Platform

TEXT BOOK:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.



VIGNANA BHARATHI
Institute of Technology

(An UGC Autonomous Institution, Approved by AICTE, Affiliated by JNTUH, Accredited by NBA & NAAC)

Open Elective – II

R19 - CBBS



19BU4161 - R-Programming

B.Tech. IV Year I Sem.

L T P C
3 - - 3

Course Objectives:

1. Understanding and being able to use basic programming concepts
2. Automate data analysis
3. Working collaboratively and openly on code
4. Knowing how to generate dynamic documents
5. Being able to use a continuous test-driven development approach

Course Outcomes:

1. Understand to use and program in the programming language R
2. Understand to use Control structures, functions and vector operations.
3. Implementing various data types like List and applying them on data frames
4. Implement Factors and Tables
5. Implement plotting Graphs and Debugging techniques

UNIT – I

Introduction: Overview of R, R data types and objects, sub setting, R Objects, Essentials of the R Language, Installing R, Running R, Packages in R, Calculations, Complex numbers in R, Rounding, Arithmetic, Modulo and integer quotients, Variable names and assignment, Operators, Integers, Logical operations.

UNIT – II

Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames, Classes, Vectors: Generating sequences, Vectors and subscripts, Extracting elements of a vector using subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical Operations, Vector Indexing, Common Vector Operations.

UNIT – III

Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List, Elements, Getting the Size of a List, Extended Example: Text Concordance Accessing List, Components and Values Applying Functions to Lists, DATA FRAMES, Creating Data Frames, Accessing Data Frames.

UNIT - IV

Factors and Tables: Factors and Levels, Common Functions Used with Factors, Working with Tables, Matrix/Array-Like Operations on Tables, Extracting a Subtable, Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions.

UNIT - V

Graphics: Creating Graphs, Customizing Graphs, Saving Graphs to Files, Customizing Graphs, Creating Three-Dimensional Plots.



TEXT BOOKS:

1. R Programming for Data Science by Roger D. Peng
2. The Art of R Programming by Norman Matloff Cengage Learning India.

REFERENCE BOOKS:

1. **Hadley Wickham, Garrett Grolemund, R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition, O'Reilly.**
2. Tilman M. Davies, The book of R a first course in programming and statistics, no starch press.

R19 - CSBS



19BU4162 - Design Thinking

B.Tech. IV Year I Sem.

L T P C
3 - - 3

COURSE OBJECTIVES:

1. To inculcate core design principles and applied creativity to develop innovative strategies that better connect engineers with their end users
2. To build mind-set leading to flow of creative ideas, validating those ideas and prioritizing the best ones
3. To incorporate tools that designers need to take a design project from inspiration and insights to ideation and implementation
4. To instil full scope of organizational innovation and strategy through knowledge, insight and analytical skills
5. To Identify and resolve issues with working in diverse teams

COURSE OUTCOMES: After completion of the course, the student should be able to

1. Use design thinking and hypothesis-driven innovation processes to develop viable solutions to user challenges
2. Use multiple brainstorming techniques to find innovative solutions
3. Develop and test a business model or business case to support the viability of the solution
4. Prototype a solution to a user challenge
5. Investigate the cultural, emotional, technological and business factors relevant to developing new product or service design concept

UNIT-I

Revisiting Design Thinking: Creative thinking as basis of innovation; Empathy process for deep understanding of challenge with practical ingenuity; Making sense of observations and insights; Defining a point of view and context Design thinking skills for Problem Discovery, Definition, and Ideation – Identifying problems in daily lives and in the world at large, Understanding user and customer perspectives, Thinking from the problem before thinking of a solution

UNIT-II

Ideation Process: Clear Articulation of problem statement with focus on latent needs;

Brainstorming

potential solutions; Ideation methods with case-study based approach to using Systematic Inventive Thinking (SIT) Methods such as Addition, Subtraction, Multiplication, Division and Task Unification Strategic Innovation for competition in future: Linear Innovation vs. non-linear innovation, Understanding and identifying weak signals, 3-box thinking, 3-Box framework and Box-3 ideation



UNIT-III

Designing Customer Experience: Understanding Innovation through Design Thinking; Enhancing Customer Experience; Service Design and Development Process and Case Studies; Service Experience Cycle and Case Studies

UNIT-IV

Sustainable Design Approaches: Concern for Environment and Sustainability in Design, Case Studies to understand good Design for Environment (DFE) Decisions; Design Considerations in the five stages of the Product Life Cycle.

UNIT-V

Integrative Engineering Design Solutions: Identifying and resolving issues with working in diverse teams, Modularising, prototype building by different engineering disciplines within the team, validated learning with accessible metrics, Capstone Project (Interdisciplinary) Applying Design Thinking Principles and Methods for Ideation and Prototyping, Testing Solution, Refining Solution, and Taking the Solution to the Users

TEXT BOOKS:

1. 101 Design Methods: A Structured Approach for Driving Innovation in your organization, Vijay Kumar, John Wiley & Sons, ISBN: 978-1118083468, 2012
2. Living with Complexity, Donald A Norman, MIT Press, ISBN: 978-0262528948, 2016
3. Design Thinking for Entrepreneurs and Small Businesses: Putting the Power of Design to Work, Beverly Rudkin Ingle, A Press, ISBN: 978-1430261810, 2013

REFERENCE BOOKS:

1. Emotionally Durable Design: Objects, Experiences and Empathy, Jonathan Chapman, 2nd Edition, Routledge, ISBN: 978-0415732161, 2015
2. Innovation Design: How Any Organization Can Leverage Design Thinking to Produce Change, Drive New Ideas, and Deliver Meaningful Solutions, Thomas Lockwood, Edgar Papke, New Page Books, ISBN: 978-1632651167, 2017
3. Design Thinking Business Analysis: Business Concept Mapping Applied, Thomas Frisendal, Springer, ISBN: 978-3642434822, 2012
4. Chapter 1: A Simple Framework for Leading Innovation, The Three Box Solution, HBR Press, 2016
5. Design a Better Business: New Tools, Skills and Mindset for Strategy and Innovation, Patrick Van Der Pijl, Justin Lokitz, Lisa Kay Solomon, Erik van der Pluijm, Maarten van Lieshout, Wiley, ISBN: 978-8126565085, 2016



VIGNANA BHARATHI
Institute of Technology

(An UGC Autonomous Institution, Approved by AICTE, Affiliated by JNTUH, Accredited by NBA & NAAC)

Open Elective – III

R19 - CSBS



19BU4261 - Innovation IP Management & Entrepreneurship

B.Tech. IV Year II Sem.

L T P C
3 - - 3

Course Objectives:

1. To develop Entrepreneurship skills of students by enriching knowledge about substantive aspects of management, strategy and legal literature.
2. To discuss intellectual property strategy to protect inventions and innovations of new ventures.
3. The course will make the students understand the different types of IP and make them aware of IP Protection.
4. The course will enable students to strategize IP lifecycle effectively throughout the journey of start-up, in a time when it is aspired highly by the economy and society.
5. Students will learn the fundamentals and advanced strategies of IP. They will be given the opportunity for understanding the same in the MSME sector. They will finally be provided brief exposure about the valuation techniques and audits of IP.

Course Outcomes:

1. Describe the requirements and responsibilities put on management, board members and shareholders in different development situations
2. define the needs for resources as well as obstacles in the early stages of the development of a business
3. independently formulate a business plan based on a business idea in technology
4. students will be able to plan and implement a development project in a team
5. Describe the fundamentals of intellectual property rights and legislation, particularly in the biotech industry.

UNIT - I:

Entrepreneurship: Introduction, Relation between IP and Entrepreneurship, Role of IP identifying threshold innovative entrepreneurs. Innovative entrepreneurship, Opportunity recognition and entry strategies. Competitive advantage through IP protection, IP protection for Start-ups.

UNIT - II:

Innovation: Introduction to innovation, Creativity, Different types of innovation, Open innovation, Adaptability of an innovation, Innovation vs. Invention, Divergent and convergent thinking, Idea generation, Idea validation, Idea protection, Necessity of innovation in current business world.

UNIT - III:

Intellectual Property: Introduction, Traditional knowledge vs. Intellectual Property, Different types of IP, Copyrights, Trademarks, Geographical Indications, Trade secrets, Patents; Transforming IP into Economy; IP protection in developed nations, and developing



(An UGC Autonomous Institution, Approved by AICTE, Affiliated by JNTUH, Accredited by NBA & NAAC)
nations. Position of India in IP protection (Agriculture, Pharmaceutical and engineering sectors).

UNIT - IV:

IPR and Technical Inventions: Patent, Patentability requirements, Patent drafting, Patent lifecycle; Software Patents: Design Patents; Protection of Various aspects of Embodied Inventions; Integrated circuit designs protection; Software Inventions or algorithms: Copyright vs Patent.

UNIT - V:

IP strategy and Entrepreneurship: IP strategy for start-up and MSME, IP transaction, IP valuation, Government Initiatives: Incubators, research parks, Various Government policies, Integrative approach – Entrepreneurship & IP strategy, Fee relaxations for patents for Start-ups and small entities.

TEXT BOOKS:

1. Ove Granstrand, The Economic and management of Intellectual Property, (1999)
2. Narayanan, V. K., Managing technology and innovation for competitive advantage, first edition, Pearson education, New Delhi, (2006)
3. Idris, K. (2003), Intellectual property: a power tool for economic growth, second edition, WIPO publication no. 888, Switzerland
4. Bosworth D. & WeB Uter E, The Management of Intellectual Property, Edward Elgar.

REFERENCE BOOKS:

1. Berman, Ideas to Assets, Wiley publications
2. Richard Dorf & Thomas Byers, Technology ventures from idea to enterprise, 2 nd edition.

ADDITIONAL READING: WIPO - <http://www.wipo.int/patents/en/>



19BU4262 - Social Media Analytics

B.Tech. IV Year II Sem.

L T P C
3 - - 3

Course Objectives:

1. To enable students to understand its fundamental concepts of Social Media and Social Networking systems.
2. To understand and analyze social Media analytics and tools.
3. To study its various types of Social Media text analytics.
4. To understand and analyze social Media Actions, Actions Analytics.
5. To study its various types of Hyperlink Analytics, Hyperlink Analytics.

Course Outcomes:

1. The students will be able to understand its fundamental concepts of Social Media and Social Networking systems.
2. The students will be able to gain knowledge on layers of Social Media analytics.
3. The students will be able to apply text analytics tools on Social Media data.
4. The students will be able to know the importance of Social Media action and action analytics.
5. The students will be able to understand and analyse various types of Hyperlink Analytics, Hyperlink Analytics

UNIT - I:

Introduction to Social Media: World Wide Web, Web 1.0, Web 2.0, Web 3.0, Social Media, Core Characteristics of Social Media, Types of Social Media, Social Networking Sites, Using Facebook For Business Purposes, Content Communities.

UNIT- II:

Social Media Analytics Overview: Purpose of Social Media Analytics, Social Media Vs. Traditional Business Analytics, Seven Layers of Social Media Analytics, Types of Social Media Analytics, Social Media Analytics Cycle, Challenges to Social Media Analytics, Social Media Analytics Tools.

Case Study: The Underground Campaign That Scored Big

UNIT - III:

Social Media Text Analytics: Types of Social Media Text, Purpose of Text Analytics, Steps in Text Analytics, Social Media Text Analysis Tools. Case Study: Tapping into Online Customer Opinions

UNIT -IV:

Social Media Actions Analytics: Introduction to Actions Analytics, Common Social Media Actions, Actions Analytics Tools. Case Study: Cover-More Group



UNIT - V:

Social Media Hyperlink Analytics: Types of, Types of Hyperlink Analytics, Hyperlink Analytics Tools. Case Study: Hyperlinks and Viral YouTube Videos

TEXT BOOK:

2. Seven Layers of Social Media Analytics Mining Business Insights from Social Media Text, Actions, Networks, Hyperlinks, Apps, Search Engine, And Location Data by Gohar F. Khan ISBN: 1507823207, Isbn-13: 9781507823200

REFERENCE BOOKS:

1. Social Media Analytics: Techniques and Insights for Extracting Business Value Out of Social Media by Matthew Ganis, Avinash Kohirkar, Pearson Education.
2. Social Media Analytics: Effective Tools for Building, Interpreting, and Using Metrics, Marshall Sponder, MGH.
3. Big Data and Analytics, Seema Acharya, Subhasini Chellappan, Wiley Publications.
4. Big Data, Black Booktm, Dreamtech Press, 2015 Edition.