Counselling Code : VBIT

VIGNANA BHARATHI Institute of Technology ®

(A UGC Autonomous Institution, Approved by AICTE, Accredited by NBA & NAAC-A Grade, Affiliated to JNTUH)

DEPARTMENT OF

COMPUTER SCIENCE AND BUSINESS SYSTEM

(R22 B.Tech CSBS)

R22 III B.Tech COURSE STRUCTURE & SYLLABUS

III YEAR I SEMESTER

S.No	Course Code	Course Title	Category	L	T	P	C
1	22BU3111	Financial Management	PC	3	-	-	3
2	22CS3112	Computer Networks	PC	3	-	-	3
3	22CS3113	Web Technologies	PC	3	-	-	3
4	**Professional Elective – I**			3	-	-	3
	22BU3171	Data Warehousing and Business Intelligence	PE				
	22BU3172	Business Law and Ethics	PE				
	22BU3173	Design Patterns	PE				
	22BU3174	E-Commerce	PE				
	Professional Elective – II						
5	22BU3175	Behavioral Economics	PE	3	-	-	3
	22BU3176	Enterprise Resource Planning	PE				
	22BU3177	Financial Modeling	PE				
	22BU3178	Cloud Computing	PE				
6	22BU3151	Computer Networks Lab	PC	-	-	3	1.5
7	22CS3152	Web Technologies Lab	PC	-	-	3	1.5
8	22HS3151	Advanced English Communication Skills Lab	HS	-	-	2	1
9	22BU3154	UI design –Flutter	PC	-	-	2	1
10	22MC0005	Intellectual Property Rights	MC	3	0	0	0
Total				**18**	**0**	**10**	**20**

III YEAR II SEMESTER

S.No	Course Code	Course Title	Category	L	T	P	C
1	22BU3211	Marketing Management and Research	PC	3	-	-	3
2	22BU3212	Algorithm Design and Analysis	PC	3	-	-	3
3	22IT3211	Automata Theory and Compiler Design	PC	3	-	-	3
4	**Professional Elective – III**			3	-	-	3
	22IT3271	Block Chain Technology	PE				
	22CS3272	Internet of Things	PE				
	22BU3271	R Programming	PE				
	22BU3272	Mobile Application Development	PE				
5	***Open Elective – I**		OE	3	-	-	3
6	22BU3251	Algorithm Design and Analysis Lab	PC	-	-	3	1.5
7	22BU3252	IT Project Management Lab	PC	-	-	3	1.5
8	22BU3281	Industry Oriented Mini Project	PC	-	-	4	2
9	22MC0002	Environmental science	MC	3	-	-	0
Total				**18**	**-**	**10**	**20**

***Open Elective -1 offered by other Departments**
***Note: Environmental Science for Lateral Entry students**

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22BU3111 - FINANCIAL MANAGEMENT

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Prerequisites:

- A course on Business Economics Financial Analysis.

Course Objective:

- To provide an understanding of basic decisions taken by a Finance Manager in a corporate and help the manager to understand the use of resources efficiently, effectively and economically.
- To explain the various aspects in Investment Decision.
- To learn about Capital structure and its theories.
- To educate students on the significance of dividends and valuation of the firm.
- To elucidate the importance of working capital management, management of current assets.

Course Outcome:

- Students will be able to: Understand the concept of time value of money.
- Learn about the capital budgeting techniques and cost of capital.
- Learn the significance of Capital structure vs. financial structure.
- Assess dividend policies of Indian companies, determinants of working capital, analysis of investment in inventory.
- Understand the Concepts and Applications of Working Capital Management and Management of Current Assets.

UNIT – I

The Finance Function: Nature and Scope, Evolution of Finance Function, Its New Role in the Contemporary Scenario, Goals of Finance Function, Profit Maximization and Wealth Maximization, 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. Cost Of Capital: Concept and Measurement of Cost of Capital, Weighted Average Cost of Capital and Marginal Cost of Capital. Importance of Cost of Capital in Capital Budgeting Decisions.

UNIT – III

Capital Structure and Dividend Decisions: Capital Structure vs. Financial Structure, Capitalization, Financial Leverage, Operating Leverage and Composite Leverage. EBIT-EPS Analysis, Indifference Point/Break-even Analysis of Financial Leverage.

Capital Structure Theories: The Modigliani Miller Theory, NI, NOI Theory and Traditional Theory

UNIT – IV

Dividend Decisions: Dividends and Value of the Firm, Relevance of Dividends, the MM Hypothesis, Factors Determining Dividend Policy, Dividends and Valuation of the Firm, the Basic Models, Forms of Dividend. Declaration and Payment of Dividends. Bonus Shares, Rights Issue, Share- splits, Major

Forms of Dividends, Cash and Bonus Shares. Dividends and Valuation. Major Theories centered onthe works of Gordon, Walterand Lintner, Dividend Policies of Indian companies.

UNIT – V

(a) 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. Financing of Working Capital through Bank Finance and Trade Credit.

(b) Management of Current Assets: Basic Strategies for Cash Management, Cash Planning, Cash Budget, Cash Management Techniques/Processes. Marketable Securities: Characteristics, Selection Criterion, Management of Receivables, Credit Policy, Credit Evaluation of Individual Accounts, Monitoring Receivables.

(c) Management of Inventory: Inventory Management Process, Inventory Control Systems, Analysis of Investment in Inventory

TEXTBOOKS:

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

REFERENCE BOOKS:

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

22CS3112 - COMPUTER NETWORKS

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Prerequisites:

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

Course Objectives

- To introduce various types of networks
- To Study data link layer concepts, design issues, and protocols.
- Familiarize the working mechanism of network layer
- Understanding of transport layer concepts and protocol design
- To explore the concepts of DNS, Email, WWW and various network protocols

Course Outcomes

- Understand the fundamentals of computer networks, their types, transmission modes, and different reference models.
- Apply error-free transmission of data and analyze data collision with various protocols
- Able to apply various routing and congestion control algorithms over a network.
- Understand the concepts of TCP and UDP, congestion control, QOS.
- Apply the different types of protocols in application layer.

UNIT – I

Introduction: Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.

Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT – II

Data link layer: Design issues, framing, Error detection and correction.

Elementary data link protocols: simplex protocol, A simplex stop and wait 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.

Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols

UNIT – III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet(IPv4 and IPv6).

UNIT – IV

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

UNIT – V

Application Layer – Domain name system, Electronic Mail: the World WEB, HTTP, Streaming audio andvideo.

TEXT BOOK:

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

REFERENCES:

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

22CS3113 - WEB TECHNOLOGIES

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Prerequisites:

- **Java programming**

Course Objectives:

- To introduce Client-side scripting with HTML and java script
- To introduce Server-side programming with java servlets
- To introduce server-side programming with JSP
- To introduce Struts framework.
- To introduce PHP language for server-side scripting.

Course Outcomes: After completion of the course, the student will be able to:

- Understand basics of HTML, CSS, Design and Development of Web pages Pages (using Validations) with Java Script.
- Develop Server-side Applications with Servlets (Sessions and Cookies).
- Create JSP pages with Database Server.
- Create application development using struts
- Understand Server-side Scripting with PHP language

UNIT -I

HTML Common tags- List, Tables, images,frames,divisions,forms; Cascading Style sheets;
XML: Introduction to XML, Defining XML tags, their attributes and values, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java.

UNIT –II

Client-side Scripting: Introduction to Javascript, Javascript language – declaring variables, scope of variables, functions. event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

UNIT -III

Introduction to Servlets: Common Gateway Interface (CGI), Lifecycle of a Servlets, deploying a Servlets, The Servlets API, Reading Servlets 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, Session tracking in JSP, connecting to database in JSP. Struts framework, application development using struts

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.

TEXT BOOKS

1. Web Technologies, Uttam K Roy, Oxford University Press
2. Web Programming, building internet applications, Chris Bates 2nd edition,WILEY Dreamtech
3. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
4. Java Server Pages –Hans Bergsten, SPD O'Reilly

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.
5. Programming World Wide Web, R. W. Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson

22BU3171 - DATA WAREHOUSING AND BUSINESS INTELLIGENCE

(Professional Elective – I)

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Prerequisites:

- A course on Database Management System

Course Objectives

- To introduce Data Warehousing components, architecture and Business Analytics tools.
- To introduce Implementation concepts of data warehousing.
- Describe BI Components and Life cycle.
- Describe BI Implementation
- To introduce advanced BI concepts

Course Outcomes

- Understand architecture of data warehouse and OLAP operations and Fundamental concepts of BI and Analytics
- Application of BI Key Performance indicators**.**
- Design of Dashboards, Implementation of Web Analytics
- Understand Utilization of Advanced BI Tools and their Implementation.
- Implementation of BI Techniques and BI Ethics.

UNIT-I

Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse – Data Warehouse Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT – II

Implementation and Maintenance issues of Data Warehouse: Data warehouse Physical Design, Best practices of DW project Implementation and DW deployment process and issue.

Architectures for Data Warehousing: General Architecture Principles, Data Warehousing Design Business Case Examples of Data Warehouse Designs

UNIT – III

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 - IV

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 & Information use

UNIT - V

Advanced BI – Big Data and BI, Social Networks, Mobile BI, emerging trends, Description of different BI-Tools (Pentaho, KNIME).**Business intelligence implementation**-Business Intelligence and integration implementation-connecting in BI systems- Issues of legality- Privacy and ethics- Social networking and BI.

TEXTBOOKS:

1. Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals by Ponniah, ISBN: 978-0-470-46207-2.
2. Rajiv Sabherwal "Business Intelligence" Wiley Publications, 2012
3. Business Intelligence Guidebook: From Data Integration to Analytics 1st Edition by Rick Sherman

REFERENCE 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. Philo Janus, Stacia Misner, Building Integrated Business Intelligence Solutions with SQL Server, 2008 R2 & Office 2010, TMH, 2011.

4. Business Intelligence Data Mining and Optimization for decision making [Author: Carlo-Verellis] [Publication: (Wiley)].

5. Data Warehousing, Data Mining & OLAP- Alex Berson and Stephen J. Smith- Tata McGraw Hill Edition, Tenth reprint 2007.

6. Building the Data Warehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd.

7. Data Mining Introductory and Advanced topics –MARGARET H DUNHAM, PEA

22BU3172 - BUSINESS LAW AND ETHICS
(Professional Elective – I)

L	T	P	C
3	-	-	3

B. Tech III Year I Sem:

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.

22BU3173-DESIGN PATTERNS
(Professional Elective-I)

B. Tech III Year I Sem

L	T	P	C
3	-	-	3

Prerequisites:

- A course on Object oriented programming language

Course Objective:

- Demonstration of patterns related to object oriented design
- Describe the design patterns that are common in software applications
- Analyze a software development problem and express it
- Design a module structure to solve a problem, and evaluate alternatives
- Implement a module so that it executes efficiently and correctly

Course Outcomes:

- Construct a design consisting of a collection of modules
- Examine well-known design patterns (such as Iterator, Observer, Factory and Visitor)
- Distinguish between different categories of design patterns
- Ability to understand and apply common design patterns to incremental/iterative development
- Identify appropriate patterns for design of given problem and Design the software using Pattern Oriented Architectures

UNIT-1

Introduction: Design Pattern, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern. A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, and Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation.

UNIT-2

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT-3

Structural Pattern: Adapter, Bridge, Composite, Decorator, açade, Flyweight, Proxy.

UNIT-4

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer.

UNIT-5

Behavioral Patterns: State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns, a Brief History, the Pattern Community an Invitation, a Parting Thought.

Text Books:

1. “Design Patterns”, Erich Gamma, Pearson Education.
2. “Head First Design patterns”, Eric Freeman & Elisabeth Freeman, O’REILLY, 2007.

References:

1. “Design Patterns in Java”, Steven John Metsker & William C. Wake, Pearson education, 2006
2. “J2EE Patterns”, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
3. “Design Patterns in C#”, Steven John metsker, Pearson education, 2004.
4. “Pattern Oriented Software Architecture”, F.Buschmann& others, John Wiley & Sons.

22BU3174 - E COMMERCE

(Professional Elective – I)

B. Tech III Year I Sem:

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

22BU3175 - BEHAVIORAL ECONOMICS

(Professional Elective – II)

B. Tech III Year I Sem.

L	T	P	C
3	-	-	3

Course Objectives:

- To aims at getting the students familiar with the concepts and scope of contemporary behavioral 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 Behavioral Economics
- To aim at providing an emphasis on Behavioral game theory and modelling.
- To focus on the practice of behavioral policies and its applications.

Course Outcomes:

- Understand the fundamentals concepts of behavioral 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, Palgrave McMillan
2. Behavioural Economics and Finance, by Michelle Beddeley, Rutledge, 2019

REFERENCE BOOKS:

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

22BU3176 - ENTERPRISE RESOURCE PLANNING

(Professional Elective – II)

B. Tech III Year I Sem.

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 Business Process Reengineering.
- 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

22BU3177 - FINANCIAL MODELING

(Professional Elective – II)

B. Tech III Year I Sem.

L	T	P	C
3	-	-	3

Course Objective:

- 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- Collaterized 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.

22BU3178 - CLOUD COMPUTING

(Professional Elective – II)

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

Pre-requisites:

1. A course on "Computer Networks".
2. A course on "Operating System".

Course Objectives:

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

Course Outcomes:

- Understand different computing paradigms and potential of the paradigms and specifically Cloud computing
- Understand cloud service types, cloud deployment models and technologies supporting and driving the cloud
- Acquire the knowledge of programming models for cloud and development of software application that runs the cloud and various services available from major cloud providers
- Understand the security concerns and issues in cloud computing
- Acquire the knowledge of advances in cloud computing.

UNIT - I

Computing Paradigms, Cloud Computing Fundamentals, Cloud Computing Architecture and Management

UNIT - II

Cloud Deployment Models, Cloud Service Models, Technological Drivers for Cloud Computing: SOA and Cloud, Multicore Technology, Web 2.0 and Web 3.0, Pervasive Computing, Operating System, Application Environment

UNIT - III

Virtualization, Programming Models for Cloud Computing: MapReduce, Cloud Haskell, Software Development in Cloud

UNIT - IV

Networking for Cloud Computing: Introduction, Overview of Data Center Environment, Networking Issues in Data Centers, Transport Layer Issues in DCNs, Cloud Service Providers

UNIT - V

Security in Cloud Computing, and Advanced Concepts in Cloud Computing

TEXT BOOK:

1. Chandrasekaran, K. Essentials of cloud computing. CRC Press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
2. Enterprise Cloud Computing - Technology, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010
3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010

22BU3151 - COMPUTER NETWORKS LAB

B. Tech III Year I Sem.

L	T	P	C
-	-	3	1.5

Course Objectives:

- To understand the working principle of various communication protocols.
- To study data link layer concepts, design issues and protocols.
- Understanding of transport layer protocols.
- To understand the network simulator environment and visualize a network topology and observe its performance.
- To analyze the traffic flow and the contents of protocol frames.

Course Outcomes:

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

List of Experiments

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers
10. SSSWiresharkx
    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.

TEXT BOOK:

1. Computer Networks - Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI.
2. Data and Computer Communications – William Stallings, 10th Edition, Pearson India education services Pvt. Ltd, 2014.

REFERENCES:

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

22CS3152 - WEB TECHNOLOGIES LAB

B.Tech. III Year I Sem.

L	T	P	C
-	-	3	1.5

Course Objectives:

- To enable the student to program web applications using HTML, JavaScript
- To enable the student to program web applications using Servlets, JSP
- To enable the student to program web applications using struts application
- To enable the student to program web applications using PHP

Course Outcomes: After completion of the course, the student will be able to:

- Simple Applications with Technologies like HTML, JavaScript
- Use Tomcat Server to Develop Servlet Applications and connect to Database
- Develop JSP Applications using Tomcat Server and connect to Database
- Develop Applications using struts
- Design web application using PHP

EXPERIMENTS:

List of Experiments

1) Develop HTML page to demonstrate
   a) Lists
   b) Tables (row span and col span)
   c) Cascading Style Sheets
   d) Divisions
   e) Frames
   f) Embedding Images

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

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

4) Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using
   a) DOM Parser and (b) SAX parser
5) Install the following on the local machine
   a. Apache Tomcat Web Server
   b. Install MySQL/Oracle (if not installed)
   c. Install PHP and configure it to work with Apache web server and MySQL

6) a) Write a Servlet program to read the parameters from user interface and display Same on the browser .
   b) Write a Servlet program to read initialization parameters using ServletConfig and Servlet Context object.

7) Write Servlet programs to work with the following session tracking technique.
   a) Http Session b) Cookies c) URL rewriting d) Hidden Form controls

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

9) Write a JSP program to read the parameters from user interface and display The same on the browser

10) Write a JSP Program to work session tracking techniques.

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

12) 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.

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

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

15) Create and Run struts application and validate it using struts components.

TEXT BOOKS:

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

REFERENCES:

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

22HS3151 - ADVANCED ENGLISH COMMUNICATION SKILLS LAB

B. Tech III Year I Sem.

L	T	P	C
-	-	2	1

Course Objectives

This lab focuses on using Multi-media instruction as well as stimulating peer group activities for language development to meet the following targets:

1. To improve students fluency in spoken English.
2. To enable them to listen to English spoken at normal conversational speed.
3. To help students develop their vocabulary.
4. To read and comprehend texts in different contexts.
5. To communicate their ideas relevantly and coherently in writing.

Course Outcomes: Students will be able to

1. Acquire vocabulary and Grammar and use them contextually.
2. Listen and speak effectively, and present themselves effectively.
3. Develop proficiency in academic reading and writing.
4. Communicate confidently in formal and informal contexts.
5. Increase their job opportunities.

Syllabus

The following course activities will be conducted as part of the Advanced English Communication Skills (AECS) Lab:

Unit I

Vocabulary and Grammar: Vocabulary Building – Word Formation: Prefixes and Suffixes - Synonyms, and Antonyms, One-word Substitutes, Idioms, Phrases, Collocations, and Compound Words.

Grammar – Articles, Prepositions, Tenses, Subject-Verb Agreement, Voice and Speech- Spotting Errors - Correction of Sentences,

Unit II

Advanced Reading Comprehension: Argumentative Analysis of (with reference to) GRE, TOEFL, IELTS – Jumbled Sentences and Sentence Completion.

Unit III

Writing Skills– Structure and Different Types of Writings – Argumentative Writing – Letter Writing - Resume Writing - Technical Report Writing

Creating and Using LinkedIn Profile - Netiquette - Statement of Purpose (SOP) - Letter of Recommendation

Unit IV

Presentation Skills -_Oral Presentations (Group/Individual) and Written Presentations – PPTs/ Posters (Virtual/Offline) – Projects, Reports and Assignments - Introducing Oneself Virtually (Making a Video on Oneself and Analyzing it critically).

Unit V

Group Dynamics & Interviews: Group Discussion - Dos and Don'ts - Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas – Debate: Concept and Process - Difference between Group Discussions and Debates- Rubrics of Evaluation - Interviews and Types of Interviews - Pre-interview Planning, Opening Strategies, Answering Strategies - Introducing Self - Oral Interviews (face-to-face) – Virtual Interviews - Mock Interviews - Handling Technical Glitches.

References

- Kumar, Sanjay and Pushp Lata. English for Effective Communication, Oxford University Press, 2015.
- Konal, Nira. English Language Laboratories- A Comprehensive Manual, PHI Learning Pvt. Ltd. 2011.
- The Official Guide to the GRE General Test. Tamil Nadu: McGra Hills Education (India) 3rd Edition, 2017.

22BU3154 - UI design- Flutter LAB

B. Tech III Year I Sem.

L	T	P	C
-	-	2	1

Prerequisites:

- Basic programming experience (e.g., Java, Python).
- Familiarity with object-oriented programming concepts.

Course Objectives:

- Understand the basics of the Flutter framework and Dart programming language.
- Build user interfaces with Flutter widgets and layouts.
- Implement state management in Flutter applications.
- Create animations and interactive elements in Flutter apps.
- Work with APIs and databases in Flutter applications.

Course Outcomes:

- Enable students on working with basics of flutter framework and dart programming language
- Able to implement state management in Flutter applications
- Understand creating interactive animations and interactive elements in flutter apps
- Enable students to Understand APIs and databases in flutter applications
- Ability to Publish Flutter applications to the App Store and Google Play Store.

The lab will meet for 2 hours per week for a total of 10 weeks.

Week 1:
Introduction to Flutter
What is Flutter?
Advantages and disadvantages of using Flutter
Setting up the Flutter development environment
Building your first Flutter application
Week 2:
Dart Fundamentals Variables, data types, and operators Control flow statements Functions Classes and objects
Week 3:
Flutter Widgets: Introduction to widgets Different types of widgets (e.g., Text, Button, Image) Building layouts with widgets Customizing widgets
Week 4:
State Management in Flutter: Understanding state in Flutter applications
Managing state with set State Using state management libraries (e.g., Provider, Bloc)
Week 5:
User Interaction and Gestures Handling user input with gestures Implementing buttons, sliders, and other interactive elements Building forms and collecting user data
Week 6:
Animations in Flutter Creating basic animations using the Animated Container widget implementing

complex animations with custom code

Week 7:
Routing in Flutter Navigating between different screens in your app
Using the Navigator widget implementing different navigation patterns

Week 8:
Working with APIs and Databases Fetching data from APIs Using the http package Working with SQLite databases in Flutter

Week 9:
Deployment and Testing Preparing your app for release Testing your app on different devices
Publishing your app to the App Store and Google Play Store

Week 10:
Project Presentations Students will present their final projects to the class
Each presentation should include a demo of the app and a discussion of the development process
Students will be assigned weekly lab exercises to reinforce the concepts learned in each session. These exercises will be completed individually or in pairs.

Text Books:
Flutter in Action by Eric Windmill
Learning Flutter by Alessandro La Rocca

Web Links:
Official Flutter documentation: https://docs.flutter.dev/
Flutter tutorials: https://docs.flutter.dev/codelabs

22MC0005: INTELLECTUAL PROPERTY RIGHTS

III B.Tech I Semester	**L**	**T**	**P**	**C**
	3	**0**	**0**	**0**

Course Objectives:

- To know the concept of intellectual property
- To study about trade marks
- To study about law of copyrights and law of patents.
- To impart the knowledge on trade secrets
- To know new developments in IPR laws at national and international level.

Course Outcomes: At the end of this course, students will demonstrate the ability to

- Distinguish and Explain various forms of IPRs
- Identify criteria to fit one's own intellectual work in particular form of IPRs
- Apply statutory provisions to protect particular form of IPRs.
- Explain about trade secrets
- Appraise new developments in IPR laws at national and international level

UNIT – I:

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II:

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes**.**

UNIT – III:

LAW OF COPYRIGHTS: Fundamental of copyright law, originality of material, rights of reproduction, rights to perform the work publicly, copyright ownership issues, copyright registration, notice of copyright, International copyright law.

LAW OF PATENTS: Foundation of patent law, patent searching process, ownership rights and transfe

UNIT – IV:

TRADE SECRETS: Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission, trade secret litigation.

Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V:

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: new developments in trade mark law; copyright law, patent law, intellectual property audits. International overview on intellectual property, international – trade mark law, copyright law, international patent law, and international development in trade secrets law.

TEXT BOOK:

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.

REFERENCE BOOK:

1. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd

III YEAR – SEM-II

22BU3211 - MARKETING MANAGEMENT AND RESEARCH

B.Tech III Year II Sem.

L	T	P	C
3	-	-	3

Course Objectives:

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

Course Outcomes:

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

UNIT – I

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

UNIT – V

Marketing Research & Ethics, International Marketing Research, Product Research, Advertising Research, Copy Testing, Test Marketing, Media Selection, Research Report

TEXTBOOKS:

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

REFERENCE BOOKS:

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

22BU3212 - ALGORITHM DESIGN AND ANALYSIS

B. Tech III Year II Sem.

L	T	P	C
3	-	-	3

Prerequisites:

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

Course Objectives:

- To analyze performance of algorithms.
- To understand and choose the appropriate algorithm design technique for a specified application.
- To solve problems using algorithm design techniques such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- To analyze the impact of algorithm design techniques on each application solved.
- To introduce and understand P and NP classes

Course Outcomes:

- Able to analyze the different algorithm design techniques for a given problem.
- Able to design algorithms for various computing problems.
- Able to argue the correctness of algorithms using inductive proofs and invariants.
- Able to Analyze the limitations of algorithms.
- Able to explain about coping with the limitations of algorithms.

UNIT - I

Notation of an Algorithm: Fundamentals of Algorithmic Problem Solving, Fundamentals of the Analysis of Algorithm Efficiency–Order Notations and its properties, Mathematical analysis for Recursive -Towers of Hanoi and Non-recursive algorithms

Divide and conquer- General method-Control abstraction, Solving Recurrence Relation using Substitution method and Master's Theorem, applications - Binary search, Merge sort, Quick sort, Strassen's Matrix Multiplication, Finding Maximum and Minimum element.

UNIT - II

Greedy Method- General method-Control abstraction, applications- Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem.

UNIT - III

Dynamic Programming: General Method, applications-Multi Stage Graphs, Chained matrix multiplication, All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem,Reliability design, Traveling sales person problem.

UNIT - IV

Backtracking: General method-Control abstraction, applications-The 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT - V

Branch and Bound: General Method-Control abstraction, applications-15-Puzzle Problem - LC search,0/1 Knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution, Travelling sales person problem.

NP-Hard and NP-Complete problems: Basic concepts, Non-deterministic algorithms, NP – Hard and NP-Complete classes, Cook's theorem- proof of reduction.

TEXT BOOKS:

1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotia publishers
2. M.T. Goodrich, Robert Tamassia, Algorithm design: Foundations, Analysis and Internet examples,Wiley student Edn, John Wiley &sons.
3. Parag Himanshu Dave,Himanshu Bhalchandra Dave, Design and Analysis algorithms PearsonPublication.

REFERENCES:

1. Allen Weiss, Data structures and Algorithm Analysis in C++, 2nd Edn, Pearson Education
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited.
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education.

22IT3211 - AUTOMATA THEORY AND COMPILER DESIGN

B. Tech III Year II Sem.

L	T	P	C
3	-	-	3

Prerequisites:

1. Digital logic design
2. Computer Organization and operating systems

Course Objectives

- To introduce the fundamental concepts of formal languages, grammars and automata theory.
- To understand deterministic and non-deterministic machines and the differences between decidability and un decidability.
- To introduce Regular Expressions.
- Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler.
- Topics include phases of compiler, parsing, syntax directed translation, type checking use of symbol tables, intermediate code generation

Course Outcomes

- Able to employ finite state machines for modeling and solving computing problems.
- Able to design context free grammars for formal languages.
- Able to distinguish between decidability and undecidability.
- Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool and design LR parsers

UNIT - I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.

Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.

Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of

DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA

UNIT - II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

Pumping Lemma for Regular Languages: Statement of the pumping lemma, Applications of the Pumping Lemma.

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar,

Leftmost and Rightmost Derivations, the Language of a Grammar, Parse Trees,Ambiguity in Grammars and Languages.

UNIT - III

Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state

Turing Machines:

Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine **Undecidability:**Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines

UNIT - IV

Introduction: The structure of a compiler

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical- Analyzer Generator Lex

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

UNIT - V

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

Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code

Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management

TEXT BOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3rd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.

2. Theory of Computer Science- Automata languages and computation, Mishra and Chandrashekaran, 2nd Edition, PHI.

REFERENCE BOOKS:

1. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, 2nd Edition, Pearson.

2. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan, Rama R, Pearson.

3. Introduction to Languages and The Theory of Computation, John C Martin, TMH.

4. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly

5. Compiler Construction, Kenneth C. Louden, Thomson. Course Technology.

22IT3271 - BLOCK CHAIN TECHNOLOGY
(Professional Elective – III)

B. Tech III Year II Sem.

L	T	P	C
3	-	-	3

Pre-requisites:
- Knowledge in Security and Applied Cryptography.
- Knowledge in Distributed Databases.

Course Objectives:
- Impart strong technical understanding of Blockchain technologies.
- Gain knowledge about applications of cryptography in Blockchain.
- Learn about the concepts of various implementations of Blockchain technology such as Bit coin, Ethereum and Hyper ledger.
- Understand the modern currencies and their market usage.
- Introduce application areas, current practices and research activity.

Course Outcomes: After the completion of the course student should be able to
- Learn fundamentals of Blockchain techniques.
- Analyze various consensus problems.
- Adapt Bitcoin technology to improve usage.
- Make use of Ethereum frameworks to write smart contract.
- Interpret Blockchain technology in real time applications.

UNIT I
Introduction: What is Blockchain, The history of block chain, Benefits and limitations of Blockchain, Distributed systems, Decentralization using block chain, CAP theorem and block chain, Crowd funding.

UNIT II
Cryptography in Blockchain: Cryptocurrency, How a Cryptocurrency works, cryptographic primitives, Asymmetric cryptography, public and private keys, line interface, Bitcoin improvement proposals (BIPs) , Consensus Algorithms, Digital Identity verification, Blockchain Neutrality, Digital art.

UNIT III
Bitcoin:- The Bitcoin network, Wallets and its types, Bitcoin payments, Bitcoin investment and buying and selling bitcoins, Bitcoin installation, Bitcoin programming and the command line interface, Bitcoin improvement proposals (BIPs).
Blockchain Science: Grid coin, Folding coin, Blockchain Genomics

UNIT IV
Ethereum:- Ethereum Virtual Machine (EVM),Wallets for Ethereum, Solidity, Smart Contracts, Some Attacks on Smart Contracts, The Ethereum network, Applications developed on Ethereum , Scalability and security issues.

UNIT V
Issues in Blockchain: - Technical challenges, Business model challenges, Government Regulations, Zero Knowledge proofs and protocols in Blockchain
Introduction to Hyperledger: - Hyperledger as a protocol, Fabric, Hyper ledger Fabric, Saw tooth Lake, Corda Architecture.

Text Books:

1. Blockchain Blue print for Economy by Melanie Swan.
2. I. Bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2nd Edition, 2nd revised edition. Birmingham: Packt Publishing, 2018.

References:

1. Vigna, Paul, and Michael J. Casey. The Truth Machine: The Block chain and the Future of Everything. Picador, 2019.

2. Gerard, David. Attack of the 50 foot block chain: Bitcoin, block chain, Ethereum & smart contracts. David Gerard, 2017.

3**.** Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, "An Overview of Block chain Technology: Architecture, Consensus, and Future Trends," in 2017 IEEE International Congress on Big Data (Big Data Congress), 2017, pp.557–564.

22CS3272 - INTERNET OF THINGS
(Professional Elective – III)

B. Tech III Year II Sem.

L	T	P	C
3	-	-	3

Pre-Requisites:

- A Course on "Computer organization"& "Computer Networks"

Course Objectives:

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

Course Outcomes: After the completion of the course student will be able to

- 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.
- Identify the applications of IoT in Industry.
- Understand various Case Studies

UNIT - I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT,Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Deployment Templates
Domain Specific IoTs – Home automation, Environment, Agriculture, Health and Lifestyle

UNIT - II

IoT and M2M – M2M, Difference between IoT and M2M, SDN and NFV for IoT,
IoT System Management with NETCOZF, YANG- Need for IoT system Management, Simple Network management protocol, Network operator requirements, NETCONF, YANG, IoT Systems Management with NETCONF-YANG

UNIT - III

IoT Systems – Logical design using Python-Introduction to Python – Python Data types & Data structures, Control flow, Functions, Modules, Packaging, File handling, Data/Time operations, Classes,Exception, Python packages of Interest for IoT

UNIT - IV

IoT Physical Devices and Endpoints - Raspberry Pi, Linux on Raspberry Pi, Raspberry Pi Interfaces,Programming Raspberry PI with Python, Other IoT devices.
IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs, WAMP-AutoBahn for IoT, Xively Cloud for IoT, Python web application framework –Django, Designing a RESTful web API

UNIT V

Case studies- Home Automation, Environment-weather monitoring-weather reporting- air pollution monitoring, Agriculture.

TEXT BOOK:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.

REFERENCE BOOK:

1. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

22BU3271 – R PROGRAMMING
(Professional Elective – III)

B. Tech III Year II Sem.

L	T	P	C
3	-	-	3

Pre-requisites:

- Knowledge in C-Programming Language
- Knowledge in Data Structures

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 ebugging 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 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.

22BU3272 - MOBILE APPLICATION DEVELOPMENT
(Professional Elective – III)

B. Tech III Year II Sem.

L	T	P	C
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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.
2. Mobile Applications Development with Python in kivy framework by Hiran and Kamalkant.

22BU3251 - ALGORITHM DESIGN AND ANALYSIS LAB

B. Tech III Year II Sem.

L	T	P	C
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Prerequisite:

Proficiency in a C & C++ programming language
Knowledge of Discrete Structures as minimum cost spanning trees

Course Objectives:

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

Course Outcomes:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

TEXT BOOKS:

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

REFERENCES:

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

22BU3252 -IT PROJECT MANAGEMENT LAB

B. Tech III Year II Sem.

L	T	P	C
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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.
2. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.

REFERENCE BOOKS:

1. Software Project Management, Joel Henry, Pearson Education.
2. Software Project Management in practice, Pankaj Jalote, Pearson Education. 2005.

22BU3281 – INDUSTRY ORIENTED MINI PROJECT

B. Tech III Year II Sem.	L	T	P	C
	-	-	4	2

22MC0002: ENVIRONMENTAL SCIENCE

(Only for Lateral Entry students)

L	T	P	C
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III B.Tech II Semester

Course Objectives:

- To study and Understand the importance of ecosystems.
- To impart knowledge on various natural resources.
- To know about biodiversity and biotic resources
- To impart knowledge on environmental pollution and control technologies
- To study and understand the environmental policies and regulations.

Course Outcomes: At the end of this course students will demonstrate the ability to

- Explain the importance of ecosystems.
- Discuss about various natural resources.
- Describe the importance biodiversity and biotic resources
- Discuss about environmental pollution and control technologies
- Explain the environmental policies and regulations.

UNIT - I

ECOSYSTEMS: Definition, Scope and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

NATURAL RESOURCES: Classification of Resources: Living and Non-Living resources,
Water Resources: use and over utilization of surface and ground water, floods and droughts,
Dams: benefits and problems.
Mineral Resources: use and exploitation, environmental effects of extracting and using mineral resources, **Land Resources:** Forest resources
Energy Resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT - III

BIODIVERSITY AND BIOTIC RESOURCES: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity:habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES:
Environmental Pollution: Classification of pollution
Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards.
Water Pollution: Sources and types of pollution, drinking water quality standards.
Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil.
Noise Pollution: Sources and Health hazards, standards
Solid Waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management.

Pollution Control Technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation.
Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

UNIT - V
ENVIRONMENTAL POLICY, LEGISLATION & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socioeconomical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).
Towards Sustainable Future: Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:
1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.