

**II B. Tech. – II Semester**  
**(19BT31202) SOFTWARE ENGINEERING**  
 (Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Concepts of software engineering; Software process models; Conventional and agile process models; Software requirements engineering process; System analysis; Architectural design; User interface design and re-engineering; Software testing; Risk and quality management.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Understand fundamental concepts of software engineering and analyze process models required to develop a software system.
- CO2. Analyze software requirements and model requirements for the given scenario.
- CO3. Apply design concepts and metrics for software development.
- CO4. Apply testing strategies and techniques for quality software.
- CO5. Analyze risks in software development life cycle and apply risk strategies to mitigate risks.

**DETAILED SYLLABUS:**

**UNIT- I: SOFTWARE ENGINEERING AND SOFTWARE PROCESS (11 Periods)**

**A Generic View of Process:** The Nature of software, Software engineering- Software engineering layers; The software process, Software engineering practice, Software myths.

**Process Models:** A generic process model, prescriptive process models-The Waterfall model, Incremental process models, Specialized process models; The unified process, Agile development-agility, Agile process, Extreme programming (XP), Scrum, Dynamic system development method, Agile modeling (AM), Agile unified process (AUP).

**UNIT- II: REQUIREMENTS ENGINEERING AND MODELING (7 Periods)**

**Requirements Engineering:** Functional and non-functional requirements, The software requirements document, Requirements specifications, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management.

**Requirements Modeling:** Requirements analysis, Data modeling concepts, Flow-oriented modeling, Scenario based modeling, UML models that supplement the use case, Case study on requirements modeling for Web and Mobile Apps.

**UNIT- III: DESIGN ENGINEERING AND METRICS (9 Periods)**

**Design using UML:** Design concepts, Software architecture, Architectural styles, Class diagram - Terms and concepts, Use case diagram - Terms and concepts, Activity diagrams - Terms and concepts, Interaction diagrams - Terms and concepts, State machine

diagram- Terms and concepts, Component diagram- Terms and concepts, Deployment diagram- Terms and concepts.

**Process and Project Metrics:** Metrics in the process and project domains, Software measurement, Metrics for software quality.

#### **UNIT- IV: SOFTWARE TESTING STRATEGIES AND APPLICATIONS (8 Periods)**

**Testing strategies:** A strategic approach to software testing, Strategic issues, Test strategies for conventional software, Test strategies for object oriented software, Validation testing, System testing, The art of debugging.

**Testing Conventional Applications:** Software testing fundamentals, White box testing- Basis path testing, Control structure testing; Black box testing, Object oriented testing methods.

#### **UNIT- V: RISK, QUALITY MANAGEMENT AND REENGINEERING (10 Periods)**

**Risk and Quality Management:** Reactive and proactive risk strategies, Software risks, Risk Mitigation Monitoring and Management (RMMM), RMMM plan, Formal Technical Reviews (FTR), Software Quality Assurance (SQA)-Tasks, Goals and Metrics; Software reliability.

**Reengineering:** Introduction, Business Process Reengineering (BPR), Software reengineering, Restructuring, Reverse engineering, Forward engineering.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

#### **TEXT BOOKS:**

1. Roger S. Pressman, *Software Engineering - A Practitioner's Approach*, McGraw-Hill International Edition, Eighth Edition, 2015.
2. Ian Sommerville, *Software Engineering*, Pearson Education, Ninth Edition, 2011.

#### **REFERENCE BOOKS:**

1. Grady Booch, James Rumbaugh and Ivar Jacobson, *The Unified Modeling Language User Guide*, Second Edition, Pearson Education, 2009.
2. K. K. Aggarwal and Yogesh Singh, *Software Engineering*, New Age International Publishers, Third Edition, 2007.
3. Shelly Cashman Rosenblatt, *Systems Analysis and Design*, Thomson Publications, Sixth Edition, 2006.

#### **ADDITIONAL LEARNING RESOURCES:**

- <https://nptel.ac.in/courses/106105087/>
- <https://nptel.ac.in/courses/106105182/>

**II B. Tech. - II Semester**  
**(19BT40501) COMPUTER NETWORKS**  
(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES:** A course on "Operating Systems"

**COURSE DESCRIPTION:** Introduction to computer networks; Protocols of physical layer, data link layer, medium access control sub layer, network layer, transport layer, application layer.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Analyze the types of network topologies, layers and protocols.
- CO2. Evaluate sub netting and routing algorithms for finding optimal paths in networks.
- CO3. Solve problems related to flow control, error control and congestion control in data transmission.
- CO4. Assess the impact of wired and wireless networks in the context of network protocols Like DNS, SMTP, HTTP, and FTP.
- CO5. Apply ethical principles and standards for developing network-based solutions.

**DETAILED SYLLABUS:**

**UNIT- I: INTRODUCTION AND PHYSICAL LAYER (9 Periods)**

Network hardware, Network software, Reference models - OSI, TCP/IP; Example networks – Internet; Wireless LANs - 802.11.

**Physical Layer** - Guided transmission media, Wireless transmission, Switching - Circuit switching, Packet switching.

**UNIT- II: DATA LINK LAYER AND MEDIUM ACCESS CONTROL SUBLAYER (9 Periods)**

**Data Link Layer:** Data link layer design issues, Error detection and correction - CRC, Hamming codes; Elementary data link protocols, Sliding window protocols.

**Medium Access Control Sub layer:** ALOHA, Carrier sense multiple access protocols, Collision free protocols, Ethernet, Data link layer switching - Repeaters, Hubs, Bridges, Switches, Routers, Gateways.

**UNIT- III: NETWORK LAYER (9 Periods)**

Network layer design issues, Routing algorithms - Shortest path algorithm, Flooding, Distance vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing, Anycast routing; Congestion control algorithms, Network layer in the internet - The IP version 4 protocol, IP addresses, IP version 6, Internet control protocols, OSPF, BGP.

**UNIT- IV: TRANSPORT LAYER****(9 Periods)**

UDP – Segment header, Remote procedure call, Real-time transport protocols; TCP – service model, Protocol, Segment header, Connection establishment, Connection release, Sliding window, Timer management, Congestion control.

**UNIT- V: APPLICATION LAYER****(9 Periods)**

Domain Name System (DNS) - Name space, Domain resource records, Name servers; Electronic mail - Architecture and services, User agent, Message formats, Message transfer, Final delivery; The World Wide Web - Architectural overview, HTTP, FTP.

**Total Periods: 45**

***Topics for self-study are provided in the lesson plan***

**TEXT BOOK(S):**

1. Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks*, Pearson, 5<sup>th</sup> Edition, 2015.

**REFERENCE BOOKS:**

1. Behrouz A. Forouzan, *Data Communications and Networking*, McGraw Hill, 5<sup>th</sup> Edition, 2013.
2. James F. Kurose and Keith W. Ross, *Computer Networking: A Top-Down Approach*, Pearson, 7<sup>th</sup> Edition, 2017.

**ADDITIONAL LEARNING RESOURCES:**

- <https://www.cisco.com/c/en/us/solutions/small-business/resourcecenter/networking/networking-basics.html>
- <https://memberfiles.freewebs.com/00/88/103568800/documents/Data.And.Computer.Communications.8e.WilliamStallings.pdf>

**II B. Tech. - II Semester**  
**(19BT40502) DATABASE MANAGEMENT SYSTEMS**  
 (Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	4

**PRE-REQUISITES:** A course on "Data Structures"

**COURSE DESCRIPTION:** Introduction to database systems; Database design; Relational model; Relational algebra; SQL queries; Constraints and triggers; PL/SQL; Schema refinement and normal forms; Transaction management; Concurrency control; Overview of storage and indexing.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Apply the concepts of ER-modeling and normalization to design viable data models for a given problem.
- CO2. Formulate relational database schemas, apply suitable integrity constraints, for querying databases.
- CO3. Use SQL to store, query, and manipulate data in relational databases.
- CO4. Develop PL/SQL blocks to centralize database applications for maintainability and reusability.
- CO5. Analyze transaction processing, concurrency control and storage methods for database management.

**DETAILED SYLLABUS:**

**UNIT- I: INTRODUCTION TO DATABASE SYSTEMS AND DATABASE DESIGN**

**(8 Periods)**

**Introduction to Database Systems:** Database system applications, Purpose of database systems, View of data - Data abstraction, Instances and schemas, Data models; Database languages - Data Definition Language, Data Manipulation Language; Database architecture, Database users and administrators.

**Introduction to Database design:** Database design and ER diagrams, Entities, attributes and entity sets, Relationships and relationship sets, Additional features of ER model, Conceptual Design with ER model.

**UNIT- II: RELATIONAL MODEL AND RELATIONAL ALGEBRA**

**(8 Periods)**

**Relational Model:** Creating and modifying relations, Integrity constraints over relations, Enforcing integrity constraints, Querying relational data, Logical database design, Introduction to views, Destroying/altering tables and views.

**Relational Algebra:** Preliminaries, Relational Algebra operators.

**UNIT- III: SQL AND PL/SQL**

**(10 Periods)**

**SQL:** Form of basic SQL query, Nested queries, Aggregate operators, Null values, Complex integrity constraints in SQL, Triggers and active databases.

**PL/SQL:** Generic PL/SQL block, PL/SQL data types, Control structure, Procedures and functions, Cursors, Database triggers.

**UNIT- IV: SCHEMA REFINEMENT AND TRANSACTIONS****(10 Periods)**

**Schema Refinement:** Problems caused by redundancy, Decompositions, Problems related to decomposition, Functional dependencies, Reasoning about FDs, First normal form, Second normal form, Third normal form, Boyce-Codd normal form, Multivalued dependencies, Fourth normal form, Join dependencies, Fifth normal form.

**Transactions:** Transaction concept, Transaction atomicity and durability, Concurrent Executions – Serializability, Recoverability, Implementation of isolation, Testing for serializability.

**UNIT- V: CONCURRENCY CONTROL, STORAGE AND INDEXING****(9 Periods)**

**Concurrency Control:** Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols, Multiple Granularity, Deadlock Handling.

**Storage and Indexing:** Data on external storage, File organizations and indexing – Clustered indexes, Primary and secondary indexes; Index data structures – Hash based indexing, Tree based indexing; Comparison of file organizations.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, McGraw Hill, 3<sup>rd</sup> Edition, 2014.
2. Abraham Silberschatz, Henry. F. Korth, S. Sudarshan, *Database System Concepts*, McGraw Hill, 7<sup>th</sup> edition, 2019.

**REFERENCE BOOKS:**

1. Ivan Bayross, *SQL, PL/SQL: The Programming Language of Oracle*, BPB publications, 4<sup>th</sup> Edition, 2017.
2. Ramez Elmasri, Shamkant B. Navathe, *Fundamentals of Database Systems*, 7<sup>th</sup> Edition, Pearson, 2015.

**ADDITIONAL LEARNING RESOURCES:**

- [https://swayam.gov.in/nd1\\_noc19\\_cs46/preview](https://swayam.gov.in/nd1_noc19_cs46/preview)
  - <https://www.classcentral.com/course/swayam-introduction-to-database-systems-17660>

**II B. Tech. - II Semester**  
**(19BT40503) DESIGN AND ANALYSIS OF ALGORITHMS**  
 (Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES:** A course on "Data Structures"

**COURSE DESCRIPTION:** Algorithms and asymptotic notations; Algorithm performance analysis; Amortized analysis; Recurrences; Disjoint sets; Divide and Conquer; Dynamic programming; Greedy algorithms; Back tracking; Branch and bound; NP-hard and NP-complete problems.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Analyze the complexity of algorithms by applying the knowledge of asymptotic notations and recurrence methods.
- CO2. Analyze the given problem and identify appropriate algorithm design technique for problem solving.
- CO3. Perceive and apply different algorithm design paradigms to find solutions for computing problems.
- CO4. Apply the knowledge of NP-hard and NP-Complete complexity classes to classify decision problems.

**DETAILED SYLLABUS:**

**UNIT- I: INTRODUCTION TO ALGORITHMS (10 Periods)**

Algorithm, Algorithm pseudocode conventions, Performance analysis - Space complexity, Time complexity, Asymptotic notations; Amortized analysis - Aggregate analysis, Accounting method, Potential method; Recurrences - Substitution method, Recursion-tree method, Master method.

**UNIT- II: DISJOINT SETS, DIVIDE AND CONQUER (8 Periods)**

**Disjoint Sets:** Operations, Union and Find algorithms.

**Divide and Conquer:** General method, Defective chess board, Binary search, Finding maximum and minimum, Merge sort, Strassen's matrix multiplication.

**UNIT- III: DYNAMIC PROGRAMMING (9 Periods)**

General method, Matrix-chain multiplication, All pairs shortest path, Optimal binary search trees, 0/1 Knapsack problem, Traveling salesperson problem, Flow shop scheduling.

**UNIT- IV: GREEDY METHOD, BACKTRACKING (10 Periods)**

**Greedy Method:** General method, Knapsack problem, Job sequencing with deadlines, Huffman codes, Single source shortest paths, Optimal merge patterns.

**Backtracking:** General method, 8-Queens problem, Sum of subsets, Graph coloring, Hamiltonian cycles.

## **UNIT- V: BRANCH AND BOUND, NP-HARD AND NP-COMPLETE PROBLEMS**

**(8 Periods)**

**Branch and Bound:** LC search, LC branch and bound, FIFO branch and bound, 0/1 knapsack problem, Traveling salesperson problem.

**NP Hard And NP-Complete Problems:** Nondeterministic algorithms, NP-hard and NP-complete classes, Cook's theorem, NP-hard scheduling problems – Scheduling identical processors.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

### **TEXT BOOKS:**

1. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran, *Fundamentals of Computer Algorithms*, 2<sup>nd</sup> Edition, Universities Press, 2008.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, *Introduction to Algorithms*, 3<sup>rd</sup> Edition, MIT Press, 2009.

### **REFERENCE BOOKS:**

1. Michael T. Goodrich and Roberto Tamassia, *Algorithm Design and Applications*, Wiley, 2014.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, *The Design and Analysis of Computer Algorithms*, Pearson, 2006.

### **ADDITIONAL LEARNING RESOURCES:**

- <https://nptel.ac.in/courses/106/106/106106131/>



**II B. Tech. – II Semester**  
**(19BT4HS01) BANKING AND INSURANCE**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Return on Investment.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Demonstrate knowledge in concepts and functions of Banking and Insurance, RBI, bank and customer relationship, types of accounts, types of loans and advances, types of insurance and risk.
- CO2. Develop skills to provide solutions in electronic payment system, business models and insurance claims.

**DETAILED SYLLABUS:**

**UNIT- I: INTRODUCTION TO BANKING (9 Periods)**

Meaning - Importance of banking - Functions of banking - **Reserve Bank of India:** Functions – Role of RBI in sustainable development.

**UNIT- II: BANK-CUSTOMER RELATIONSHIP (9 Periods)**

Debtor-creditor relationship, deposit products or services, payment and collection of cheques. Accounts – Types of accounts, procedure for opening and closing an account - Loans and Advances- Principles of lending and types of loans.

**UNIT- III: ELECTRONIC PAYMENT SYSTEM & BUSINESS MODELS (9 Periods)**

Introduction to Online Banking - types of e-payment system, e-cash, NEFT, RTGS, Credit cards, Debit cards and Electronic Wallet - Business models: B2B, B2C, C2C and B2G.

**UNIT- IV:INTRODUCTION TO RISK AND INSURANCE (9 Periods)**

Concept of risk, risk Vs uncertainty. **Insurance:** Definition, Insurance as risk mitigation mechanism, elements of insurance.

**UNIT- V: INSURANCE OVERVIEW (9 Periods)**

Principles and Functions of Insurance - Types of Insurance - LIC and GIC - IRDA - Insurance Players in India.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. RanganadhaChary,A.V. and Paul, R.R., *Banking and Financial system*, Kalyani Publisher, New Delhi, 3<sup>rd</sup> edition, 2016.
2. Sharma,R.K., Shashi K. Gupta and Jagwant Singh, *Banking and Insurance*, Kalyani Publishers, New Delhi, 17<sup>th</sup> edition, 2014.

**REFERENCES BOOKS:**

1. *Indian Institute of Banking & Finance, Digital Banking*, Taxmann Publications Pvt. Ltd., 2016
2. Jyotsna Sethi and Nishwan Bhatia, *Elements of Banking and Insurance*, PHI Learning Pvt. Ltd., 2<sup>nd</sup> edition, 2012.

**II B. Tech. – II Semester**  
**(19BT4HS03) COST ACCOUNTING AND FINANCIAL MANAGEMENT**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Return on Investment.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Demonstrate knowledge in Costing, Material, Labor, Overheads, Cost control, risk and return, security analysis and portfolio management.
- CO2. Design solutions for effective investment decisions, cost analysis, tenders, quotations, variance analysis, ratio analysis and capital budgeting techniques.

**DETAILED SYLLABUS:**

**UNIT- I: COST ACCOUNTING**

**(9 Periods)**

Meaning of Cost and Cost Accounting, Objectives, Scope, Advantages and disadvantages – Cost Accounting Vs Management Accounting – Elements of Costing – Installation of costing system – Material Control, Labour Control, Overhead Control.

**UNIT- II: COST SHEET & PREPARATION OF COST SHEET**

**(9 Periods)**

Analysis of Cost – Importance of Costing while pricing the products - Preparation of cost sheet, estimate, tender and quotation (Simple problems).

**UNIT- III: STANDARD COSTING & VARIANCE ANALYSIS**

**(9 Periods)**

Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labour variances (Simple Problems).

**UNIT- IV: FINANCIAL MANAGEMENT& RATIO ANALYSIS**

**(9 Periods)**

Meaning, Objectives - Nature and Scope, Importance of FM – **Ratio Analysis:** Solvency ratios, Liquidity ratios, Profitability ratios, Financial Statement Analysis through ratios (Simple Problems).

**UNIT- V: INTRODUCTION TO INVESTMENT**

**(9 Periods)**

Investment – Meaning and Definition- concept of risk and returns-Investment Alternatives- Capital Budgeting techniques – Security Analysis and Portfolio Management (Basic concepts).

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. S.P. Jain and K.L. Narang: *Cost Accounting*, Kalyani Publishers, Ludhiana, 10<sup>th</sup> edition, 2016.
2. I.M. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd., 14<sup>th</sup> edition, 2016.

**REFERENCE BOOKS:**

1. The Institute of Company Secretaries of India, *Cost and Management Study Material*, New Delhi.
2. CA SaravanaPrasath, *Cost Accounting and Financial management*, Wolters Kluwer India Pvt. Ltd., New Delhi, 2018 edition, 2018.

**II B. Tech. - II Semester**  
**(19BT4HS05) GENDER AND ENVIRONMENT**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: --**

**COURSE DESCRIPTION:** Gender and the environment relationship, Gendered Roles in the family & community, Gender and sustainable development, Gender in environmental justice, Gender & environmental security.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Apply the knowledge of gender & environment connections, key issues and topics within global environmental politics in environmental decision-making.
- CO2. Comprehend the concepts of gender and sustainable development through debates, and policy documents.
- CO3. Analyze the concept of environmental security and justice by identifying the sources of insecurity.

**DETAILED SYLLABUS:**

**UNIT- I: GENDER AND ENVIRONMENT RELATIONSHIP (9 Periods)**

Introduction–Gender and Environment–Development of gender roles–Society, gender & environment – Understanding environmental politics – Gender-environment connections–Eco-feminism - Cultural eco-feminism–Social eco-feminism - Feminist political ecology.

**UNIT- II: GENDERED ROLES IN THE FAMILY & COMMUNITY (9 Periods)**

Organization of the household – Domestic division of labour - Food: growing, harvesting, shopping, preparing, and cooking.

Gender & Power- Planning – Politics – NGO – Gendering of environmental protest – Environmental decision-making.

**UNIT- III: GENDER AND SUSTAINABLE DEVELOPMENT (9 Periods)**

Concept of sustainability & its achievement – Concept of sustainable development – Ecological Modernization – Gender & sustainability debates – Gender & sustainable development debates - Gender in policy documents – Gender, poverty & equity in sustainable development.

**UNIT- IV: GENDER IN ENVIRONMENTAL JUSTICE (9 Periods)**

Normative Concerns ( Fairness, Inequality & Justice) - Making sense of Environmental justice – Ecological debt, Transnational harm, & human rights – Ecological justice – Gender & Environmental Justice – Gender, Vulnerability & risk – Women in environmental justice movements – Knowledge & participation – Gender, sustainability & justice as guiding concepts.

## **UNIT-V: GENDER AND ENVIRONMENTAL SECURITY**

**(9 Periods)**

Connections between security & the environment – **Gender, environment & security:** Sustainability as security - poverty & insecurity – Insecurity as injustice – Competing ways of thinking security – Reflecting on sources of insecurity – **Case Study** – Food Security - **Case Study** – The impacts of natural disasters.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

### **TEXT BOOKS:**

1. Nicole Detraz, *Gender and the Environment*, Polity Press, Cambridge, UK, 2017.
2. Susan Buckingham- Hatfield, *Gender and Environment*, Routledge, London, 2000.

### **REFERENCE BOOKS:**

1. Promillakapur (ed). (2000). *"Empowering Indian Women"* Publication Division, Government of India, New Delhi.
2. Ronnie Vernooy, (Ed). (2006). *"Social and gender Analysis Natural Resource Management: Learning studies and lessons from Aisa"* Sage, New Delhi.
3. Swarup, Hemlata and Rajput, Pam. (2000). *Gender Dimensions of Environmental and Development Debate: The Indian Experience* In SturatS. Nagel, (ed). *"India"s Development and Public Policy"*, Ashgate, Burlington.

**II B. Tech. – II Semester**  
**(19BT4HS07) INDIAN ECONOMY**  
(Open Elective-2)  
(Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Introduction; Time Value of Money; Elementary Economic Analysis; Value Analysis/Value Engineering; Economic Planning.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Understand the basic concepts of economics, economic analysis, economic planning and strate.
- CO2. Demonstrate knowledge in capital budgeting, evaluation of engineering projects, depreciation policy and familiarize with the concepts of value analysis vs value engineering.

**DETAILED SYLLABUS:**

**UNIT- I: INTRODUCTION**

**(9 Periods)**

Economics - Flow in an Economy, Law of Supply and Demand; Micro and Macro Economics; Relationship between Science, Engineering, Technology and Economic Development; Concept of Engineering Economics-Types of Efficiency, Definition and Scope of Engineering Economics.

**UNIT- II: ELEMENTARY ECONOMIC ANALYSIS**

**(9 Periods)**

Economic Analysis – Meaning, Significance, Simple Economic Analysis; Material Selection for a Product, Substitution of Raw Material; Design Selection for a Product; Material Selection-Process Planning, Process Modification.

**UNIT- III: ECONOMIC PLANNING**

**(9 Periods)**

Introduction - Need For Planning in India, Five year plans(1951-2012), NITI Aayog (from 2014 onwards); Inclusive Growth-Meaning, Significance, Need for inclusive growth in India, Strategy for more inclusive growth, Challenges and Prospects; Employment and Inclusive Growth in India, Role of engineers in sustaining inclusive growth.

**UNIT- IV: TIME VALUE OF MONEY**

**(12 Periods)**

Concepts and Application; Capital Budgeting-Traditional and Modern Methods; Simple and Compound Interest, Cash Flow Diagram, Principle of Economic Equivalence; Evaluation of Engineering Projects – Present Worth Method, Future Worth Method, Annual Worth Method, Internal Rate of Return Method, Cost-benefit Analysis in Public Projects; Depreciation Policy-Depreciation of Capital Assets, Causes of Depreciation, Straight Line Method and Declining Balance Method.

**UNIT- V: VALUE ANALYSIS/VALUE ENGINEERING****(6 Periods)**

Introduction - Value Analysis, Value Engineering, Functions, Aims; Value Analysis vs Value Engineering; Value Engineering Procedure- Advantages, Application Areas.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. Panneerselvam. R., *Engineering Economics*, PHI Learning Private Limited, New Delhi, 2nd edition, 2013.
2. Jain. T. R., V. K. Ohri, O. P. Khanna. *Economics for Engineers*. VK Publication, 1st edition, 2015.

**REFERENCE BOOKS:**

1. Dutt Rudar and Sundhram K. P. M., *Indian Economy*, S. Chand, New Delhi, 62<sup>nd</sup> revised edition, 2010.
2. Misra. S. K. and V. K. Puri., *Indian Economy: Its Development Experience*, Himalaya Publishing House, Mumbai, 32<sup>nd</sup> edition, 2010.



**II B. Tech. – II Semester**  
**(19BT4HS09) LIFE SKILLS**  
(Open Elective-2)  
(Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Positive attitude; Self-discovery-Interpersonal relationships; Cross-cultural communication; Core thinking-Problem solving and Decision making; Business presentations and Public speaking.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Gain knowledge in strategies involved in developing positive attitude, process of knowing oneself and managing effective interpersonal relationships.
- CO2. Analyse problem solving strategies in Decision Making and SWOT analysis.
- CO3. Communicate effectively with Engineering Community and Society by demonstrating presentation skills in professional arena.

**DETAILED SYLLABUS:**

**UNIT- I: POSITIVE ATTITUDE (9 Periods)**

Introduction, Features of attitudes, Formation of attitudes, Ways of changing attitude in a person, Attitude in a work place, Developing positive attitude, Obstacles in developing positive attitude, Measuring attitude.

**UNIT- II: SELF DISCOVERY AND INTERPERSONAL RELATIONSHIPS (9 Periods)**

Importance of knowing yourself, Process of knowing yourself, SWOT Analysis, Elements of attitude in interpersonal relationships, Methods to deal with different types of interpersonal relationship skills.

**UNIT- III: CROSS-CULTURAL COMMUNICATION (9 Periods)**

Different Communication Styles, Cultural variables, communication sensitivity and variables of national culture, Individual Cultural Variables, Cross-cultural Communication Strategies, Potential hot spots in cross-cultural communication, Cross-cultural communication – Basic Tips.

**UNIT- IV: CORE THINKING, PROBLEM SOLVING AND DECISION MAKING**

**(9 Periods)**

Process of developing core thinking skills, Categories of thinking: Critical & Creative, Understanding problem solving, Cause of problems, Stages of problem solving, Methods of problem solving, Types of decision making.

## **UNIT- V: BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (9 Periods)**

Business presentations and speeches, structuring the material, Types of delivery, Guidelines for delivery, Effective sales presentation, Controlling nervousness and stage fright.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

### **TEXT BOOKS:**

1. Dr. K. Alex (2018) *Soft Skills*, S. Chand and Company Limited, New Delhi.
2. Manmohan Joshi (2017) *Soft Skills*, bookboon.com, Bangalore.

### **REFERENCE BOOKS:**

1. Meenakshi Raman and Prakash Singh (2013), *Business Communication*, Oxford University Press, New Delhi.
2. Jeff Butterfield (2011) *Soft Skills for Everyone*, Cengage Learning India Private Limited, Delhi.

**II B. Tech. – II Semester**  
**(19BT4HS11) PROFESSIONAL ETHICS**  
(Open Elective-2)  
(Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Engineering Ethics; Professional Ideals and Virtues; Engineering as Social Experimentation; Responsibilities and Rights; Global Issues.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Demonstrate knowledge in Engineering Ethics, Responsibilities and Rights.
- CO2. Analyze the concepts of Engineering in Social Experimentation and Global Issues.
- CO3. Apply the nuances of professional ideals at work place and in social context.

**DETAILED SYLLABUS:**

**UNIT –I: ENGINEERING ETHICS (9 Periods)**

Scope and aim of engineering ethics, Senses of engineering ethics, Variety of moral issues, Types of inquiry, Moral dilemmas, Moral autonomy-Kohlberg's theory, Gilligan's theory, Consensus and controversy.

**UNIT-II: PROFESSIONAL IDEALS AND VIRTUES (8 Periods)**

Theories about virtues, Professions, Professionalism, Characteristics, Expectations, Professional responsibility, Integrity, Self-respect, Sense of responsibility, Self-interest, Customs and religion, Self-interest and ethical egoism, Customs and ethical relativism, Religion and divine command ethics, Use of ethical theories, Resolving moral dilemmas and moral leadership.

**UNIT- III: ENGINEERING AS SOCIAL EXPERIMENTATION (10 Periods)**

Engineering as experimentation, Similarities to standard experiments, Learning from the past and knowledge gained, Engineers as responsible experimenters, Conscientiousness, Moral autonomy and accountability, The challenger case, Codes of ethics and limitations, Industrial standards, Problems with the law of engineering.

**UNIT- IV: RESPONSIBILITIES AND RIGHTS (9 Periods)**

Collegiality and loyalty, Respect for authority, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, Rights of engineers, Professional rights, Whistle-blowing, The BART case, Employee rights and discrimination.

**UNIT-V: GLOBAL ISSUES****(9 Periods)**

Multinational corporations, Professional ethics, Environmental ethics, Computer ethics, Engineers as consultants, Witnesses, Advisors and Leaders, Engineers as Managers, Managerial ethics applied to Engineering Profession, moral leadership.

**Total Periods: 45****Topics for self-study are provided in the lesson plan****TEXT BOOKS:**

1. Mike W. Martin and Roland Schinzinger, *Ethics in Engineering*, Tata McGraw-Hill, 3<sup>rd</sup> edition, 2007.
2. Govindarajan, M., Nata Govindarajan, M., Natarajan, S. and Senthil kumar, V. S., *Engineering Ethics*, Prentice Hall of India, 2004.

**REFERENCE BOOKS:**

1. S. Kannan and K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, *Fundamental of Ethics for Scientists and Engineers*, Oxford University Press, 2001.

**II B. Tech. – II Semester**  
**(19BT4HS13) INDIAN TRADITION AND CULTURE**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Basic traits of Indian Culture; Humanistic Reforms under Jainism and Buddhism; Culture in the medieval period; Socio Religious reforms in Indian Culture; Reform movements for harmonious relations.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Demonstrate the knowledge in Vedic culture, cultural aspects of Buddhism, Jainism and cultural conditions in the medieval period.
- CO2. Understand the impact of socio religious reforms and movements on Indian tradition and culture to improve harmonious relations within society.

**DETAILED SYLLABUS:**

**UNIT- I: BASIC TRAITS OF INDIAN CULTURE (9 Periods)**

Meaning and definition and various interpretations of culture, Culture and its features. The Vedic and Upanishadic culture and society. Human aspirations and values in these societies. Chaturvidha purushardhas, Chaturashrma and Chaturvarna theory.

**UNIT- II: HUMANISTIC REFORMS UNDER JAINISM AND BUDDHISM (9 Periods)**

Salient features of Jainism - contributions of Jainism to Indian culture. Contributions of Aachaarya and Mahaapragya. Buddhism as a humanistic culture. The four noble truths of Buddhism. Contributions of Buddhism to Indian culture.

**UNIT- III: CULTURE IN THE MEDIEVAL PERIOD (9 Periods)**

Unifications of India under Mouryas and Guptas and their cultural achievements. Cultural conditions under satavahanas. Contributions to pallavas and cholas to art and cultural achievements of vijayanagara rulers.

**UNIT- IV: SOCIO RELIGIOUS REFORMS IN INDIAN CULTURE (9 Periods)**

Western impact on India, Introduction of western education, social and cultural awakening and social reform movements of Rajaramohan Roy - Dayanandha Saraswathi- Anne Besant (theosophical society).

**UNIT- V: REFORM MOVEMENTS FOR HARMONIOUS RELATIONS (9 Periods)**

Vivekananda, Eswarchandravidyasagar and Veeresalingam - emancipation of women and struggle against caste. Rise of Indian nationalism. Mahatma Gandhi- Nonviolence and satyagraha and eradication of untouchability.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOK(S):**

1. Valluru Prabhakaraiah, *Indian Heritage and Culture*, Neelkamal Publications Pvt. Ltd. Delhi, First Edition, 2015.

**REFERENCE BOOKS:**

1. L. P. Sharma, *History of Ancient India*, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
2. L. P. Sharma, *History of Medieval India*, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
3. L. P. Sharma, *History of Modern India*, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
4. The Cultural Heritage of India Vol-I, II, III, IV, V, The Ramakrishna Mission Institute of Culture, Calcutta.

**II B. Tech. - II Semester**  
**(19BT40106) DISASTER MITIGATION AND MANAGEMENT**  
(Open Elective-2)  
(Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: --**

**COURSE DESCRIPTION:** Disasters; Earthquakes; Floods; Cyclones; Droughts; Landslides; Disaster management.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Analyze the vulnerability of an area to natural and man-made disasters/hazards as per the guidelines to solve complex problems using appropriate techniques ensuring safety, environment and sustainability.
- CO2. Propose appropriate mitigation strategies for earthquake and tsunami impacts as per code of practice using suitable techniques ensuring safety, environment and sustainability besides communicating effectively in graphical form.
- CO3. Analyze the causes and impacts of floods, cyclones and droughts using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability besides communicating effectively in graphical form.
- CO4. Analyze the causes and impacts of landslides using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability.
- CO5. Design disaster management strategies to solve pre, during and post disaster problems using appropriate tools and techniques following the relevant guidelines and latest developments ensuring safety, environment and sustainability besides communicating effectively in graphical form.

**DETAILED SYLLABUS:**

**UNIT- I: DISASTERS**

**(9 Periods)**

Types of disasters - Natural disasters; Impact of disasters on environment, infrastructure and development; Concepts of hazards and vulnerability analysis, Hazard Assessment, Guidelines for hazard assessment and vulnerability analysis, Basic principles and elements of disaster mitigation.

**UNIT- II: EARTHQUAKES**

**(9 Periods)**

Introduction to earthquake, Intensity scale (MSK-64), Seismic zones and activity in India, Action plan for earthquake disaster preparedness, Elements at risk, Recovery and rehabilitation after earthquake, Concepts of Earthquake resistant design and construction of buildings; Tsunami – Onset, Types and causes, Warning, Elements at risk, Typical effects, Specific preparedness and mitigation strategies, Case studies.

### **UNIT –III: FLOODS, CYCLONES AND DROUGHTS (11 Periods)**

**Floods and Cyclones:** Onset, Types, Causes, Warnings, Elements at risk, Typical effects, Indian floods and cyclones, Hazard zones, Potential for reducing hazards, Mitigation strategies and community based mitigation, Case studies.

**Droughts:** Onset, Types and warning; Causes, Impact, Early warning and response mechanisms, Mitigation strategies, Droughts in India, Case studies.

### **UNIT –IV: LANDSLIDES (8 Periods)**

Onset, Types and warning; Causes, Elements at risk, Indian landslides, Hazards zones, Typical effects, Mitigation strategies and community based mitigation, Case studies.

### **UNIT- V: DISASTER MANAGEMENT (8 Periods)**

Disaster management organization and methodology, Disaster management cycle, Disaster management in India – Typical cases and Cost-benefit analysis, Disaster management programs implemented by NGOs and Government of India, Usage of GIS and Remote sensing techniques in disaster management, Leadership and Coordination in Disaster management, Emerging trends in disaster management.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

#### **TEXT BOOKS:**

1. V. K. Sharma, *Disaster Management*, Medtech Publishing, 2<sup>nd</sup> Edition, 2013.
2. Anand S. Arya, Anup Karanth, and Ankush Agarwal, *Hazards, Disasters and Your Community: A Primer for Parliamentarians*, GOI-UNDP Disaster Risk Management Programme, Government of India, National Disaster Management Division, Ministry of Home Affairs, New Delhi, Version 1.0, 2005.

#### **REFERENCE BOOKS:**

1. Donald Hyndman and David Hyndman, *Natural Hazards and Disasters*, Cengage Learning, 3<sup>rd</sup> Edition, 2011.
2. *Disaster Management in India*, A Status Report, Ministry of Home Affairs, Govt. of India, May 2011.
3. Rajendra Kumar Bhandari, *Disaster Education and Management: A Joyride for Students, Teachers, and Disaster Managers*, Springer India, 2014.
4. R. B. Singh, *Natural Hazards and Disaster Management*, Rawat Publications, 2009.

#### **ADDITIONAL LEARNING RESOURCES:**

1. Tushar Bhattacharya, *Disaster Science and Management*, McGraw Hill, 2014.



**II B. Tech. - II Semester**  
**(19BT40107) SUSTAINABLE ENGINEERING**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: --**

**COURSE DESCRIPTION:** Principles of sustainability; Sustainability metrics and assessment tools; Sustainable engineering practices; Sustainable engineering applications; Sustainable urbanization and industrialization.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Analyze the principles of sustainability to solve complex environmental problems following relevant standards/protocols considering society, health, safety and environment.
- CO2. Analyze sustainability metrics and assessment tools to solve complex environmental problems following relevant standards and emerging trends considering society, health, safety, environment and economics besides communicating effectively in graphical form.
- CO3. Analyze sustainable engineering practices to solve complex environmental problems using appropriate tools and techniques following relevant standards considering society, health, safety, environment, economics and management besides communicating effectively in graphical form.
- CO4. Design sustainable engineering applications to solve complex environmental problems using appropriate tools and techniques following relevant standards considering society, health, safety, environment, economics and management besides communicating effectively in graphical form.
- CO5. Analyze sustainable urbanization and industrialization principles to solve complex environmental problems using appropriate tools and techniques following relevant standards considering society, health, safety, environment, economics and management besides communicating effectively in graphical form.

**DETAILED SYLLABUS:**

**UNIT- I: PRINCIPLES OF SUSTAINABILITY (9 Periods)**

Emerging challenges, Sustainability and sustainable engineering; Environmental concerns; Social, economic and legal issues; Availability and depletion of natural resources, Disaster resiliency; Multilateral environmental agreements – Basel convention, Clean development mechanism (CDM), Montreal and Kyoto protocols.

**UNIT- II: SUSTAINABILITY METRICS AND ASSESSMENT TOOLS (9 Periods)**

Sustainability indicators, metrics and assessment tools, Material flow analysis and material budget, Carbon footprint analysis, Life cycle assessment, Streamlined life-cycle assessment (SLCA), Economic input output-life cycle analysis, Environmental health risk assessment, Other emerging assessment tools.

**UNIT- III: SUSTAINABLE ENGINEERING PRACTICES****(9 Periods)**

Sustainable energy engineering, Sustainable waste management, Green and sustainable buildings and infrastructure, Sustainable civil infrastructure, Sustainable remediation of contaminated sites, Climate geoengineering.

**UNIT- IV: SUSTAINABLE ENGINEERING APPLICATIONS****(9 Periods)**

Environmental and chemical engineering projects, Materials engineering projects, Infrastructure engineering projects – Background, Methodology, Goal and Scope, Study area, Technical design, Environmental sustainability, Life cycle assessment, Economic sustainability, Social sustainability, Rating systems – ENVISION, LEED, GRIHA, IGBC; Conclusions.

**UNIT- V: SUSTAINABLE URBANIZATION AND INDUSTRIALIZATION (9 Periods)**

Sustainable urbanization and industrialization, United Nations sustainable development goals – Right to education, Poverty eradication, Social and technological changes; Industrial Processes - Material selection, Energy efficiency, Pollution prevention and control techniques, Industrial Ecology, Industrial symbiosis.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. Reddy, K.R., Cameselle, C., and Adams, J.A., *Sustainable Engineering: Drivers, Metrics, Tools, and Applications*, John Wiley & Sons, Inc., Hoboken, New Jersey, 2019, 544p (ISBN: 978-1-119-49393-8).
2. Allen, D. T. and Shonnard, D. R., *Sustainability Engineering: Concepts, Design and Case Studies*, Pearson Education, 1<sup>st</sup> Edition, 2012.

**REFERENCE BOOKS:**

1. Bradley, A.S; Adebayo, A.O., Maria, P., *Engineering Applications in Sustainable Design and Development*, Cengage Learning, 1<sup>st</sup> Edition, 2016.
2. Purohit, S. S., *Green Technology: An Approach for Sustainable Environment*, Agrobios Publication, 1<sup>st</sup> Edition, 2016.
3. *Energy Conservation Building Code (ECBC) 2007*, Bureau of Energy Efficiency, Govt. of India, New Delhi.
4. Twidell, J. W. and Weir, A. D., *Renewable Energy Resources*, Routledge, Taylor & Francis Group, 3<sup>rd</sup> Edition, 2015.

**ADDITIONAL LEARNING RESOURCES:**

1. Daniel A. Vallero and Chris Brasier, *Sustainable Design: The Science of Sustainability and Green Engineering*, Wiley-Blackwell, 1<sup>st</sup> Edition, 2008.
2. Jorge A. Vanegas, *Sustainable Engineering Practice: An Introduction*, Committee on Sustainability, American Society of Civil Engineers, <https://doi.org/10.1061/9780784407509>, 2004.
3. Mackenthun, K.M., *Basic Concepts in Environmental Management*, CRC Press, Taylor & Francis Group, 1<sup>st</sup> Edition, 1999.
4. *Environment Impact Assessment Guidelines*, Notification of Government of India, 2006.

**II B. Tech. - II Semester**  
**(19BT40108) CONTRACT LAWS AND REGULATIONS**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Construction contracts; Tenders; Arbitration; Legal requirements; Labour regulations.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Develop construction contracts to solve complex contract related problems by following laws and regulations considering project schedule, cost, quality and risk.
- CO2. Prepare tenders as per the specifications by following latest developments, laws and regulations to solve complex tender problems considering project schedule, cost, quality and risk.
- CO3. Analyze arbitration problems to address the contract disputes following the laws and regulations in the context of society.
- CO4. Analyze legal issues pertaining to contracts and tenders considering society.
- CO5. Analyze labour regulations to address labour safety issues.

**DETAILED SYLLABUS:**

**UNIT- I: CONSTRUCTION CONTRACTS**

**(9 Periods)**

Indian contracts act, Elements of contracts, Types of contracts, Features, Suitability, Design of contract documents, International contract document and laws, Standard contract document, Law of torts.

**UNIT- II: TENDERS**

**(9 Periods)**

Prequalification, Bidding, Accepting; Evaluation of tender from technical, contractual and financial points of view; Two cover system, Preparation of the documentation, Contract formation and interpretation, Potential contractual problems, Price variation clause, Comparison of actions and laws, Subject matter, Violations, Latest developments in tendering.

**UNIT-III: ARBITRATION**

**(9 Periods)**

Arbitration, Comparison of actions and laws, Agreements, Appointment of arbitrators, Conditions of arbitration, Powers and duties of arbitrator, Rules of evidence, Enforcement of award, Arbitration disputes, Dispute review board.

**UNIT- IV: LEGAL REQUIREMENTS**

**(9 Periods)**

Legal requirements for planning, Property law, Agency law, Tax laws – Income tax, Sales tax, Excise and custom duties, Local government approval, Statutory regulations,

Insurance and bonding, Laws governing purchase and sale, Use of urban and rural land, Land revenue codes, EMD, Security deposits, Liquidated damages.

#### **UNIT – V: LABOUR REGULATIONS**

**(9 Periods)**

Social security, Welfare legislation; Laws relating to wages, bonus and industrial disputes; Labour administration, Insurance and safety regulations, Workmen's compensation act, Maternity benefit act, Child labour act, Other labour laws.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

#### **TEXT BOOKS:**

1. Subba Rao, G.C.V., *Law of Contracts I & II*, S. Gogia & Co., 11<sup>th</sup> Edition, 2011.
2. Jimmie Hinze, *Construction Contracts*, McGraw Hill, 3<sup>rd</sup> Edition, 2011.

#### **REFERENCES BOOKS:**

1. Kishore Gajaria, *GT Gajaria's Law Relating to Building and Engineering Contracts in India*, Lexis Nexis Butterworths India, 4<sup>th</sup> Edition, 2000.
2. Patil, B. S., *Civil Engineering Contracts and Estimates*, University Press (India) Private Ltd., 4<sup>th</sup> Edition, 2015.
3. Joseph T. Bockrath, *Contracts and the Legal Environment for Engineers and Architects*, McGraw Hill Education, 7<sup>th</sup> Edition, 2010.
4. Akhileshwar Pathak, *Contract Law*, Oxford University Press, 2011.

#### **ADDITIONAL LEARNING RESOURCES:**

1. P.C. Markanda, Naresh Markanda, Rajesh Markanda, *Building and Engineering Contracts- Law and Practice*, Vol-I and II, 5<sup>th</sup> Edition, LexisNexis Publication.

**II B. Tech. - II Semester**  
**(19BT40306) GLOBAL STRATEGY AND TECHNOLOGY**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PREREQUISITES: -**

**COURSE DESCRIPTION:** Introduction to strategic management; Strategic management process; Principles of good strategy; Globalization strategies; Research and Development strategies; Technology Management and Transfer; Elements of Transfer Process; Corporate Governance in the Indian scenario.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Demonstrate the knowledge on strategic management, its approaches, and tools through ethical decision making.
- CO2. Analyze the globalization challenges for scrupulous selection of globalization strategies.
- CO3. Apply the R&D strategies and trends to enhance the technological breakthroughs for new products and applications.
- CO4. Demonstrate the knowledge on technology management and transfer that strengthen the economy and accelerate the application of technology and resources.
- CO5. Analyze the challenges of corporate governance in Indian scenario for the effective development of value oriented organizations.

**DETAILED SYLLABUS:**

**UNIT- I: STRATEGIC MANAGEMENT (9 Periods)**

Introduction, Classes of decisions, Levels of strategy, Core competence, Strategic intent and stretch, Approaches to strategy making, Roles of different strategists, Strategic management-Process, Benefits, Limitations; Ethics in strategic decision making, Principles of good strategy, Strategic Management in India; Common managerial strategy formulation tools.

**UNIT- II: GLOBALIZATION (9 Periods)**

Definition, Stages, Essential conditions for globalization, Globalization strategies, Competitive advantage of Nations and regions, Factors affecting Globalization, Globalization of Indian business.

**UNIT- III: RESEARCH & DEVELOPMENT STRATEGIES (9 Periods)**

Concept, Evolution of R and D Management, R and D as a business, R and D as competitive advantage, Elements of R and D strategies, Integration of R and D, Selection and implementation of R and D strategies, R and D trends and challenges.

#### **UNIT – IV: TECHNOLOGY MANAGEMENT AND TRANSFER (9 Periods)**

**Technology Management:** Introduction, Technology-Definition, Components, Classification Features; Technology Management-Concept, Nature; Drivers of Management of Technology-Significance, Scope, Responding to technology challenges.

**Technology Transfer:** Introduction, Definition, Classification, Significance, Elements of process, Types of Technology Transfer, Package, Modes of Transfer, Routes, Channels and Effectiveness of Technology Transfer.

#### **UNIT - V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO (9 Periods)**

Emergence of corporate governance in India-Landmarks, Models, Codes and status in India, Role and Responsibilities of Regulators, The Board of Directors; Corporate Governance- Specific issues in India, Family owned Business, Corporate Governance and the Indian ethos.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

#### **TEXT BOOKS:**

1. Francis Cherunilam, *Strategic Management*, Himalaya Publishing House, 3<sup>rd</sup> Edition, 2002.
2. C. S. G. Krishnamacharyulu and Lalitha Ramakrishnan, *Management of Technology*, Himalaya Publishing House, Second Edition, 2012.

#### **REFERENCE BOOKS:**

1. White and Bruton, *The Management of Technology and Innovation: A Strategic Approach*, Cengage Learning, 1<sup>st</sup> Edition, 2007.
2. S.K.Mandak, *Ethics in Business and Corporate Governance*, TMH, 2<sup>nd</sup> Edition, 2012.

**II B. Tech. – II Semester**  
**(19BT40307) MANAGEMENT SCIENCE**  
(Open Elective-2)  
(Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Concepts of Management; Concepts Related to ethics and social responsibility; Human Resource Management; Operations Management; Statistical Process Control; Inventory Management; Marketing; Project Management; Project Crashing.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Demonstrate the concepts of management, its functions and processes used in optimum resource utilization within the context of ethics and social responsibility.
- CO2. Apply the concepts of HRM for selection and management of human resources.
- CO3. Analyze different operations management problems using quality management tools to produce effective, efficient and adoptable products/services.
- CO4. Identify different marketing strategies to maximize enterprise profitability and customer satisfaction within the realistic constraints.
- CO5. Develop network models in time-cost tradeoff for effective project management.

**DETAILED SYLLABUS:**

**UNIT- I: MANAGERIAL FUNCTION AND PROCESS (10 Periods)**

Concept and foundations of management, Evolution of management thought; Managerial functions – Planning, Organizing, Directing and Controlling; Decision-making; Role of manager, managerial skills; Managing in a global environment, Flexible systems management; Social responsibility and managerial ethics; Process and customer orientation; Managerial processes on direct and indirect value chain.

**UNIT-II: HUMAN RESOURCE MANAGEMENT (8 Periods)**

Human Resource challenges; Human Resource Management functions; Human Resource Planning; Job analysis; Job evaluation, Recruitment and selection; Training and Development; Promotion and transfer; Performance management; Compensation management and benefits; Employee morale and productivity; Human Resource Information System.

**UNIT-III: OPERATIONS MANAGEMENT (10 Periods)**

Fundamentals of Operations Management, Services as a part of operations management; Facilities location and layout; Line balancing; Quality management – Statistical Process Control, Total Quality Management, Six sigma; Role and importance of materials management, Value analysis, Make or Buy decision, Inventory control, Materials Requirement Planning, Enterprise Resource Planning, Supply Chain Management.

**UNIT – IV: MARKETING MANAGEMENT****(8 Periods)**

Concept, evolution and scope; Marketing strategy formulation and components of marketing plan; Segmenting and targeting the market; Positioning and differentiating the market offering, Analyzing competition; Product strategy; Pricing strategies; Designing and managing marketing channels; Integrated marketing communications.

**UNIT – V: PROJECT MANAGEMENT****(9 Periods)**

Project management concepts; Project planning – Work Breakdown Structure, Gantt chart; Project scheduling – Critical Path Method, Program Evaluation and Review Technique, Crashing the project for time-cost trade off; Resource Levelling.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. MartandT. Telsang, *Industrial Engineering and Production Management*, S. Chand, 2<sup>nd</sup> Edition, 2006.
2. Koontz and Weihrich, *Essentials of Management*, TMH, 6<sup>th</sup> Edition, New Delhi, 2007.

**REFERENCE BOOKS:**

1. O.P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai and Sons, 2010.
2. N.D. Vohra, *Quantitative Techniques in Management*, TMH, 2<sup>nd</sup> Edition, New Delhi.
3. L.M. Prasad, *Principles and practice of Management*, S. Chand and Sons, 2006.



**II B. Tech. – II Semester**  
**(19BT40504) CYBER LAWS AND SECURITY**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Evolution of Cyberspace, Jurisdiction in the borderless Cyberspace, E-Contracting, Models of E-Commerce, Modes of Electronic signatures, E-Money, Intellectual Property Rights, Cybercrimes, Privacy and data security.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Demonstrate knowledge on jurisdiction in cyberspace and the impact of cybercrime to protect privacy on the Internet.
- CO2. Analyze the Indian cyber laws on E-Contracting, E-Commerce, E-signatures and E-money to promote digital law enforcement.
- CO3. Apply the knowledge of digital rights in Indian context to protect intellectual properties in electronic world.
- CO4. Practice ethics and cyber law regulations for leading electronic transactions on the Internet.

**DETAILED SYLLABUS:**

**UNIT-I: EVOLUTION OF CYBERSPACE AND JURISDICTION IN BORDERLESS CYBERSPACE (9 Periods)**

**The Evolution of Cyberspace:** Significance of information technology, Drawbacks in information technology, the digital divide, E-governance, Origin of cyberspace, Legal issues in cyberspace, regulating the Internet.

**Jurisdiction in the Borderless Cyberspace:** Meaning of jurisdiction, Three pre-requisites of jurisdiction, Jurisdictional theories in jurisdiction to prescribe, Tests to determine jurisdiction in Internet law cases, Indian laws to determine personal jurisdiction, Jurisdiction clauses in click wrap agreement.

**UNIT-II: ELECTRONIC CONTRACTING AND ELECTRONIC COMMERCE (9 Periods)**

**Electronic Contracting:** Formation of offline contracts under English common law, Fundamental requirements of an offline contract, Forming an E-contract through website, E-mail contracting, The Indian approach of E-contracts, Contract formation on the Internet and Information Technology Act 2000, B2C E-contracts.

**Electronic Commerce:** Models, Advantages, Restricted activities, Laws, India's information Technology Act 2000, Online customer protection in India (B2B, B2C).

**UNIT-III: ELECTRONIC SIGNATURES AND ELECTRONIC MONEY (9 Periods)**

**Electronic Signatures:** The role of signatures, Significance of electronic signatures, Modes of electronic signatures, UNCITRAL model law on electronic signatures 2001,

Cryptography, Role of certifying authority in PKI, The Indian Information Technology Act and electronic signatures- Electronic signatures, Prescribed authentication mechanisms, Secure electronic record.

**Electronic Money:** E-Money, RBI's guidelines on mobile banking and payments, The current E-payment systems, Earlier E-payment systems, Credit cards, Use of SET in online payment system.

#### **UNIT- IV: INTELLECTUAL PROPERTY RIGHTS AND THE INTERNET WORLD**

**(9 Periods)**

Protecting copyright in the E-world, International organizations protecting Intellectual Property, Copyright issues on the Internet, Digital rights management, Patent protection and computer software, India and copyright protection for computer software, Business method patents- Position of Business methods patents in India, Trademark protection on the Internet, Cybersquatting, The Indian trademark law and legal remedies, Hyper linking and framing.

#### **UNIT - V: CYBERCRIMES AND PROTECTING PRIVACY ON INTERNET (9 Periods)**

**Cybercrimes:** What is cybercrime, Categories, Different kinds of cybercrime, Cybercrimes and Information Technology Act, 2000 - Territorial scope and applicability, India's national cyber security policy.

**Protecting Privacy on the Internet:** Meaning of privacy, Threat to privacy on the Internet, Use of cookies and web bugs, Terms of use and privacy policy, Government right to interception, Employee privacy rights, Indian legal framework for data protection and privacy, Challenges to right of privacy in India.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

#### **TEXT BOOK(S):**

1. Karnika Seth, *Computers Internet and New technology Laws*, LexisNexis, 2013.

#### **REFERENCE BOOKS:**

1. Sarika Gupta, Gaurav Gupta, *Information Security and Cyber Laws*, Khanna Publishing, 2019.
2. Vivek Sood, *Cyber Law Simplified*, McGraw Hill, 2018.
3. Pavan Duggal, *Textbook on Cyber Law*, Universal LexisNexis, 2019.

#### **ADDITIONAL LEARNING RESOURCES:**

- [https://swayam.gov.in/nd2\\_cec20\\_cs09/preview](https://swayam.gov.in/nd2_cec20_cs09/preview)
- [https://swayam.gov.in/nd2\\_nou19\\_cs08/preview](https://swayam.gov.in/nd2_nou19_cs08/preview)

**II B. Tech. – II Semester**  
**(19BT50208) INTELLECTUAL PROPERTY RIGHTS**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: --**

**COURSE DESCRIPTION:** Introduction to Intellectual Property; Trade Marks; Law of Copy Rights; Law of Patents; Trade Secrets; Unfair Competition; New Development of Intellectual Property.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Understand the concepts of intellectual property right and new amendments enforced in filling intellectual property right.
- CO2. Understand the processes and principles of trade mark registration and apply them for registering trade mark.
- CO3. Understand the process and principles of copy rights for registration and judicial consequences for violating laws of copyright/patents.
- CO4. Understand the process and principles of trade secrets and judicial consequences for copying trade secrets.

**DETAILED SYLLABUS:**

**UNIT-I: INTRODUCTION TO INTELLECTUAL PROPERTY (10 Periods)**

Introduction and the need for intellectual property rights (IPR); types of intellectual property- Design, Geographical Indication; International organizations, agencies and treaties.

**UNIT- II: TRADEMARKS (8 Periods)**

Introduction to trademark, 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 (9 Periods)**

Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

**Law of patents:** Foundation of patent law, patent searching process, ownership rights and transfer.

**UNIT- IV: TRADESECRETS (9 Periods)**

Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

**Unfair competition:** Misappropriation right of publicity, false advertising.

**UNIT- V: NEW DEVELOPMENT OF INTELLECTUAL PROPERTY (9 Periods)**

New developments in: trade mark law, copy right law, patent law, intellectual property audits. International overview on intellectual property; international - trade mark law, copy right law, international patent law, international development in trade secrets law.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. Deborah, E. Bouchoux, *Intellectual property: The law of Trademarks, Copyright, Patents, and Trade Secrets*, Cengage learning, 4<sup>th</sup> edition, 2013.
2. PrabuddhaGanguli, *Intellectual property right - Unleashing the knowledge economy*, Tata McGraw Hill Publishing Company Ltd.

**REFERENCE BOOKS:**

1. Neeraj P and Khusdeep D. *Intellectual Property Rights*. India, IN: PHI learning Private Limited. 1<sup>st</sup> edition 2019.

**ADDITIONAL LEARNING RESOURCES:**

1. Subramanian, N., &Sundararaman, M. (2018). *Intellectual Property Rights – An Overview*. Retrieved from <http://www.bdu.ac.in/cells/ipr/docs/ipr-eng-ebook.pdf>
2. World Intellectual Property Organisation. (2004). *WIPO Intellectual property Handbook*. Retrieved from [https://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo\\_pub\\_489.pdf](https://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo_pub_489.pdf)

**II B. Tech. - II Semester**  
**(19BT50409) GREEN TECHNOLOGIES**  
 (Open Elective-2)  
 (Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	-	-	3

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Principles of green engineering; Green communications; Green energy; Green computing; Green construction; Green manufacturing.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Analyze energy efficient communication systems such as Telecommunication systems, ICT, Wireless networks and cellular networks by understanding the principles of green communications.
- CO2. Understand the impact of conventional energy sources on environment and realize the significance and principles of green energy sources for sustainability.
- CO3. Understand the environmental impacts of IT and approaches for Green IT.
- CO4. Analyze concepts of sustainable green construction using appropriate tools and techniques following latest developments and considering safety and environment besides communicating effectively in graphical form.
- CO5. Demonstrate the environmental impact of traditional manufacturing and explore the need for green manufacturing process promoting sustainability.

**DETAILED SYLLABUS:**

**UNIT –I: PRINCIPLES OF GREEN ENGINEERING AND GREEN COMMUNICATIONS**  
**(9 Periods)**

**Principles of Green Engineering:** Introduction, Definition of green engineering, Principles of green engineering

**Green Communications:** Introduction, Origin of Green Communications, Energy Efficiency in Telecommunication systems, Telecommunication system model and energy Efficiency, Energy saving concepts, Quantifying energy efficiency in ICT, Energy efficiency metrics of green wireless networks, Embodied energy of communication devices- Introduction, The extended energy model, Embodied/Operating Energy of a BS in Cellular network- A Case study; Energy efficient standards for wireline communications.

**UNIT- II: GREEN ENERGY** **(9 Periods)**

Introduction, green energy systems - composition, adverse impacts, Green energy and sustainability, the target and solution. Diversification and localization of energy systems, green energy and sustainable development. Energy sources and their availability. Green energy sources - solar energy, wind energy, geothermal energy, ocean energy, biomass and biogas.

**UNIT- III: GREEN IT****(9 Periods)**

Introduction, Awareness to Implementation: Green IT Trends, Green Engineering, Greening by IT: Using RFID for Environmental Sustainability, Smart Grids, Smart Buildings and Homes, Green Supply Chain and Logistics, Enterprise-Wide Environmental Sustainability, A Seven-Step Approach to Creating Green IT Strategy: Balancing the Costs and Benefits of Going Green, Research and Development Directions.

**UNIT- IV: GREEN CONSTRUCTION****(9 Periods)**

**Green Building:** Concept, Necessity, Characteristics, Benefits, Requisites for green building construction, Sustainability, Concept of REDUCE, REUSE, RECYCLE, RETHINK, REPLENISH AND REFUSE (6 R's), Sustainable construction focus point – Site selection, Planning, Water, Energy, Material, Indoor air quality, Construction procedures, case studies of residential and commercial green buildings.

**Vastu:** Concept, History, scientific approach, elements of vastu for selecting a plot.

**Indian Green Building Council:** Introduction to IGBC green homes, Benefits of IGBC, IGBC green home rating system, Introduction to USGBC, LEED rating system, Procedure to get IGBC certification, GRIHA Rating.

**UNIT- V: GREEN MANUFACTURING****(9 Periods)**

Green Manufacturing - Introduction, Background and Definition; Impact of traditional manufacturing in environmental ecology, Need for green manufacturing, Motivation and barriers to green manufacturing, Advantages and Limitations of green manufacturing, Green manufacturing strategies, Green manufacturing and sustainability, Green manufacturing through clean energy supply, Green packaging and Supply chain.

**Total Periods: 45**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. Konstantinos Samdanis, Peter Rost, Andreas Maeder, Michela Meo, Christos Verikoukis, *Green Communications: Principles, Concepts and Practice*, John Wiley & Sons, 2015.
2. G.D. Rai, *Non-conventional Energy Sources*, Khanna Publishers, Delhi, 5th Edition, 2011.
3. San Murugesan, G.R. Gangadharan, *Harnessing Green IT – Principles and Practices*, John Wiley & Sons Ltd., 2008.
4. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison, *Green Building Handbook*, Volume 1, E & FN Spon, an imprint of Thomson Science & Professional.
5. J Paulo Davim, *Green Manufacturing: Processes and Systems*, Springer, 2012.
6. David A Dornfeld, *Green Manufacturing: Fundamentals and Applications*, Springer, 2013.

**REFERENCE BOOKS:**

1. Soli J. Arceivala, *Green Technologies for a better future*, McGraw Hill Education (India) Pvt. Ltd, 2014.
2. Marty Poniatowski, *Foundation of Green Information Technology*, Prentice Hall, 2009.
3. Athanasios V Alavanidis, Thomais Vlachogianni, *Green Chemistry and Green Engineering*, Synchrone Themata, 2012.

**II B. Tech. – II Semester**  
**(19BT3HS31) SOFT SKILLS LAB**  
 (Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	2	1

**PRE-REQUISITES: -**

**COURSE DESCRIPTION:** Body Language; Assertiveness; Goal Setting; Thinking Skills; Team Building; Conflict Management; Technical Report Writing; Résumé Writing; Group Discussions; Interview Skills; Interpersonal Skills; Etiquette.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Demonstrate knowledge of career skills by examining and applying the styles and strategies of Goal Setting, Thinking Skills, and Etiquettes.
- CO2. Analyze the limitations and possibilities of favourable situations by applying the skills of Body Language and demonstrate through Assertiveness, and Interpersonal Skills.
- CO3. Apply appropriate soft skills by analyzing the problem situations that arise in professional career through demonstrating remedies in Conflict Management.
- CO4. Demonstrate ability to function effectively as an individual and as a member in diverse teams examining and applying soft skills in Interviews, Group Discussion and Team Building.
- CO5. Apply appropriate speaking and writing techniques in preparing documents and to communicate effectively by examining and demonstrating knowledge in Technical Report Writing and Résumé Writing.

**\*First TEN exercises are mandatory among the following:**

**LIST OF EXERCISES:**

**1. Body Language**

*Types of Body Language – Parts of Body – Facial Expressions – Eye Contact Insights – Good Posture*

**2. Assertiveness**

*Communications Styles – Benefits – Being Unassertive – Role Playing*

**3. Goal Setting**

*Seven Steps of Goal Setting – Self Motivation – Personal Goal Setting – Setting Career Goals*

**4. Thinking Skills**

*Positive Thinking – Creative Thinking – Lateral Thinking – Logical Thinking – Intuitive Thinking*

**5. Team Building**

*Learning Activities – Management Essentials – Team Building Scenarios*

## **6. Conflict Management**

*Ways of Resolving Conflict – Personality Types and Conflict – Conflict Resolution Process – Team Conflict*

## **7. Technical Report Writing**

*Objectives – Formats – Writing Styles*

## **8. Résumé Writing**

*Structure and Presentation – Planning – Defining Career Objectives – Projecting One's Strengths and Skills – Cover Letter – Formats and Styles*

## **9. Group Discussions**

*Types of GD – Dos and Don'ts – Dynamics of GD – Intervention – Summarization Techniques*

## **10. Interview Skills**

*Planning – Opening Strategies – Answering Strategies – Tele Conferencing – Video Conferencing*

## **11. Interpersonal Skills**

*Starting a Conversation – Responding to a Conversation – Conversation Examples – Body Language – Role Play*

## **12. Etiquette**

*Basic Social Etiquette – Telephone Etiquette – Dining Etiquette – Conference Etiquette*

### **TEXT BOOKS:**

1. Soft Skills Lab Manual, SVEC.

### **REFERENCE BOOKS:**

1. R. C. Sharma & Krishna Mohan, *Business Correspondence and Report Writing*, Tata McGraw-Hill Publishing Company Limited, 3<sup>rd</sup> edition, New Delhi, 2012.

### **SUGGESTED SOFTWARES:**

1. KVAN SOLUTIONS
2. Learning to Speak English 8.1, The Learning Company – 4 CDs.
3. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
4. Language in Use 1, 2 & 3.
5. Cambridge Advanced Learner's Dictionary - 3rd Edition.
6. Let's Talk English, Regional Institute of English South India.



**II B.Tech. – II Semester**  
**(19BT31232) SOFTWARE ENGINEERING LAB**  
 (Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	2	1

**PRE-REQUISITES:** A course on "Software Engineering"

**COURSE DESCRIPTION:** Software Development Life Cycle activities-requirements specification, SRS preparation, Modeling case studies–Online Ticket Reservation system; Point of sales.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Analyse user requirements and prepare software requirements specifications.
- CO2. Apply design principles of UML for software design.
- CO3. Apply tools for developing UML diagrams.
- CO4. Use cost estimation models for project evaluation.
- CO5. Work effectively as an individual to design UML models.
- CO6. Write and present a substantial technical report/document effectively.

**LIST OF EXPERIMENTS:**

1. Identify Functional and Non-Functional Requirements for:
  - i) Online Ticket Reservation for Railways
  - ii) Online Auction Sales
- 2.a) Construct a flow graph for Insertion sort algorithm.
  - b) Write a program to find Cyclomatic complexity for the above flow graph

(**Hint:** McCabe's cyclomatic matrices  $V(G)$  of a graph  $G$  with  $n$  vertices ,  $e$  edges and  $P$  connected components is  $V(G)=e-n+2P$ )

**CASE STUDIES:**

Case studies given below should be Modeled using Visual Modeling tools in different views i.e. Use case view, logical view, component view, Deployment view.

**CASE STUDY 1: ONLINE TICKET RESERVATION FOR RAILWAYS**

**Problem Statement:** Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

## **CASE STUDY 2: A POINT OF SALE (POS) SYSTEM**

**Problem Statement:** A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client – side terminals and interfaces such as browser, PDA's, touch – screens.

## **CASE STUDY 3: RECRUITMENT PROCEDURE FOR SOFTWARE INDUSTRY**

**Problem Statement:** In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company.

The technical skill and the experience of the candidates are reviewed and the short listed candidates are called for the interview. There may be different rounds for interview like the written test, technical interview, and HR interview. After the successful completion of all rounds of interview, the selected candidates' names are displayed. Meanwhile HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

## **CASE STUDY 4: ONLINE AUCTION SALES**

**Problem Statement:** The online auction system is a design about a website where sellers collect and prepare a list of items they want to sell and place it on the website for visualizing. To accomplish this purpose the user has to access the site. Incase it's a new user he has to register. Purchaser's login and select items they want to buy and keep bidding for it. Interacting with the purchasers and sellers through messages does this. There is no need for customer to interact with the sellers because every time the purchasers bid, the details will be updated in the database. The purchaser making the highest bid for an item before the close of the auction is declared as the owner of the item. If the auctioneer or the purchaser doesn't want to bid for the product then there is fixed cutoff price mentioned for every product. He can pay that amount directly and own the product. The purchaser gets a confirmation of his purchase as an acknowledgement from the website. After the transition by going back to the main menu where he can view other items.

## **CASE STUDY 5: TWO FLOOR ELEVATOR SIMULATOR**

**Problem Statement:** The elevator has the basic function that all elevator systems have, such as moving up and down, open and close doors, and of course, pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to Max Floor, where the first floor is the lobby. There are car call buttons in the car corresponding to each floor. For every floor except for the top floor and the lobby, there are two hall call buttons for the passengers to call for going up and down. There is only one down hall call button at the top floor and one up hall call button in the lobby. When the car stops at a floor, the doors are opened and the car lantern indicating the current direction the car is going is illuminated so that the passengers can get to know the current moving direction of the car. The car moves fast between floors, but it should be able to slow down early enough to stop at a desired floor. When an elevator has no requests, it remains at its current floor with its doors closed.

In order to certificate system safety, emergency brake will be triggered and the car will be forced to stop under any unsafe conditions.

## **CASE STUDY 6: HOME APPLIANCE CONTROL SYSTEM**

**Problem Statement:** A home appliance control system (HACS) is a system which provides various services to remotely operate on home appliances, such as microwave oven, TV, and garage door etc through remote devices such as mobile phone, desktop and palm-top. A home appliance control system (HACS) is a system which is controlled by a remote system such as a mobile phone or a palm-top, and at the same time controls, monitors and coordinates home appliances such as air conditioner, microwave oven, garage doors, TV set, VCR, audio controller, indoor/outdoor lights, water sprinkler, home security system, bath tub controller, etc. In order to activate home appliances and to allow for different ways of cooking, the HACS needs mechanisms for communication between the different devices in the system, and for coordination among the various processes running on such devices. The system administrator of the HACS system has the ability to add a new appliance or delete an existing one. The system administrator has the ability to add a new remote device and configure it with HACS or delete an existing one when it is not used. Also the system administrator can create an account for a new user or delete existing account if it is no longer used.

### **REFERENCE BOOKS:**

1. Grady Booch, James Rum Baugh and Ivar Jacobson, "The Unified Modeling Language User Guide," Second Edition, Pearson Education, 2009.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons and David Fado, "UML 2 Toolkit," WILEY-Dreamtech India Pvt. Ltd., 2003.
3. Rajesh Naik and Swapna Kishore, "Software Requirements and Estimation," Tata McGraw Hill, New Delhi, 2001.

### **SOFTWARE/TOOLS USED:**

Visual Paradigm for modeling diagrams

**II B. Tech. - II Semester**  
**(19BT40531) COMPUTER NETWORKS LAB**  
(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	2	1

**PRE-REQUISITES:**A course on "Computer Networks"

**COURSE DESCRIPTION:** Hands on practice with NS3; Packet Tracer network simulation tools; Simulation of network topologies; ARP protocol; CSMA/CD protocol; Distance Vector/Link State Routing protocols; Transmission errors; Sliding window protocol; TCP; UDP.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Apply mathematical foundations to solve computational problems in computer networks.
- CO2. Select and apply network simulation tools like NS3, Packet Tracer to simulate networking protocols.
- CO3. Simulate and analyze network topologies, network protocols to provide efficient networking solutions.
- CO4. Work independently and communicate effectively in oral and written forms.

**LIST OF EXERCISES:**

1. a) Study of network devices and network IP in detail.  
b) Simulate a peer to peer topology of a computer network.  
c) Simulate IPv4 addressing in a computer network (give IP Address of different classes in given Network id).

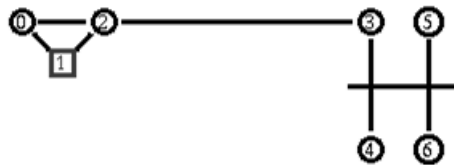
Exercises on Packet Tracer Simulator Tool:

2. Introduction to Packet Tracer
3. a) Study of basic network commands and network configuration commands.  
i) ping ii) nslookup iii) netstat iv) ifconfig  
b) Create a network topology and configure a network topology with four PCs, two switches, and two routers.

Exercises on NS3 Simulator Tool:

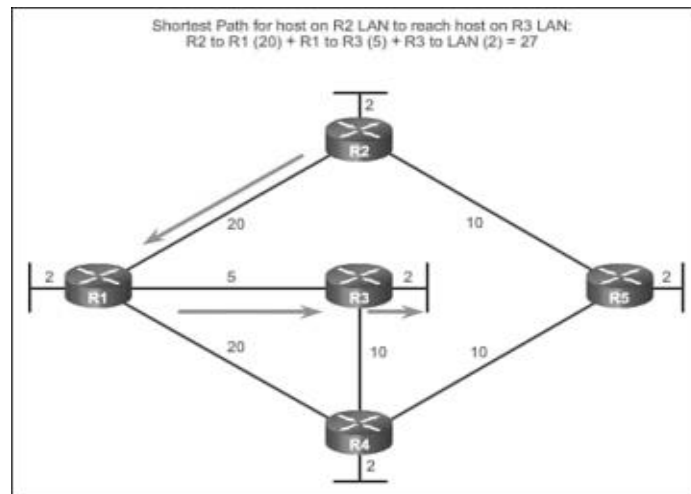
4. a) Introduction to NS3 tool.  
b) Create a network with three nodes namely 0, 1 and 2. Establish a TCP connection between node 0 and node 2 such that node 0 will send TCP packets to node 2 via node 1.
5. a) Create a simple topology of two nodes (Node1, Node2) separated by a point-to-point link. Setup a UDP Client on one Node1 and a UDP Server on Node2. Consider a fixed data rate Rate1.

- i) Measure end to end throughput whilst varying the latency of the link.
    - ii) Add another client application to Node1 and a server instance to Node2. What do you need to configure to ensure that there is no conflict?
    - iii) Repeat step 3 with the extra client and server application instances. Show screenshots of pcap traces which indicate that delivery is made to the appropriate server instance.
  - b) Simulate a Local Area Network. Consider a local area network formed by nodes 3, 4, and 5. This LAN communicates with the external world through a router denoted by node 2. There are two servers connected to the router and represented by nodes 0 and 1. Node 0 is running an application over TCP, which is accessed by node 4. Node 1 is running an application on UDP, which is accessed by node 5. Analyze the trace file.
6. Simulate link errors. Presence of link errors cause one or more packets to be retransmitted. Consider the following topology.



- Node #2 act as a router. Any traffic to or from the LAN passes through it. Consider node #1 running a FTP server, and node #5 is downloading a file of size 4 MB. However, the link between node #2 and #3 is fault. It drops packets with a fixed probability of 0.2. Implement a link error model to reflect this. Try different values of the simulation time to ensure that the file has been entirely transferred. Has the plot of bytes received a linear curve or non-linear? Why?
7. Simulate Address Resolution Protocol (ARP) to associate a logical address with a physical address and Reverse Address Resolution Protocol (RARP) allows a host to discover its Internet address when it knows only its physical address.
  8. Simulate packet transmission over a CSMA/CD based LAN with NS3. Consider the LAN with seven nodes to be an isolated one i.e. not connected to the Internet. Node #0 in the LAN acts as a UDP traffic source, and node #6 is the destination node. Assume CBR traffic to be flowing between the nodes. The simulation lasts for 25 seconds. In Ethernet a packet is broadcasted in the shared medium, and only the destination node accepts the packet. Other nodes simply drop it. What should be the number of hops a packet from node #0 to node # 6 travel? Verify this from the "Hop Count" plot.
  9.
    - a) UDP uses a simple connectionless communication model with a minimum of protocol mechanism. The implementation provides checksums for data integrity, and port numbers for addressing different functions at the source and destination of the datagram. Simulate half duplex chat User Datagram Protocol.
    - b) TCP model supports a full bidirectional TCP with connection setup and close logic. Simulate full duplex chat Transmission Control Protocol.
  10.
    - a) In a typical FTP session, the user is sitting in front of one host (the local host) and wants to transfer files to or from a remote host. Implement File Transfer Protocol to move files between local and remote file systems.

- b) Sliding window protocol supports reliable and efficient transmission between nodes and it also obtains higher throughput than that of stop-n-wait protocol. Simulate sliding window protocol normal operation and timeout operations.
11. Configure the following network to find shortest path between R2 LAN to R3 LAN using Distance Vector / Link State Routing Protocol.



#### REFERENCE BOOKS:

1. Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks*, Pearson, 5<sup>th</sup> Edition, 2015.
2. A. Jesin, *Packet Tracer Network Simulator*, Packt Publishing, 2014.
3. Jack L. Burbank, *An Introduction to Network Simulator 3*, Wiley, 2018.

#### Software/Tools used:

- Network simulator tools - NS3, Packet Tracer
- Virtual Labs (Computer Networks Lab - [http://vlabs.iitb.ac.in/vlabs-dev/labs\\_local/computer-networks/labs/explist.php](http://vlabs.iitb.ac.in/vlabs-dev/labs_local/computer-networks/labs/explist.php))
- Virtual Labs (Advanced Network Technologies Virtual Lab - <http://vlabs.iitkgp.ernet.in/ant>)

**II B. Tech. - II Semester**  
**(19BT40532) DATABASE MANAGEMENT SYSTEMS LAB**  
(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	2	1

**PRE-REQUISITES:** A course on "Database Management Systems"

**COURSE DESCRIPTION:** Design of an ER Models; Hands-on experience on - DDL, DML commands, Query processing using operators, Joins, Views, Synonyms, Indexes, Single row functions, Group functions and Set functions; PL/SQL programming - Basic programs, Exception handling, Triggers, Functions, Cursors and Stored procedures.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Analyze the requirements of a given database problem and design viable ER-Models for implementation of database.
- CO2. Create database schemas, select and apply suitable integrity constraints for querying databases using SQL interface.
- CO3. Develop and interpret PL/SQL blocks to centralize database applications for maintainability and reusability.
- CO4. Develop database applications for societal applications such as ticket reservation system, employee payroll system using modern tools.
- CO5. Work independently and communicate effectively in oral and written forms.

**LIST OF EXERCISES:**

1. Design and analyze an ER Model for the following use case.

Roadway Travels" is in business since 1977 with several buses connecting different places in India. Its main office is located in Hyderabad. The company wants to computerize its operations in the following areas:

- Reservations
- Ticketing
- Cancellations

Reservations:

Reservations are directly handled by booking office. Reservations can be made 60 days in advance in either cash or credit. In case the ticket is not available, await listed ticket is issued to the customer. This ticket is confirmed against the cancellation.

Cancellation and Modification:

Cancellations are also directly handed at the booking office. Cancellation charges will be charged. Waitlisted tickets that do not get confirmed are fully refunded.

2.
  - a) Implement Data Definition Language commands -Create, Alter, Drop, Truncate, and Rename.
  - b) Implement Data Manipulation Language commands - Insert, Select, Update, and Delete.

- c) Implement Single Row functions - Character, Numeric and Date functions.
- 3. Implement various types of integrity constraints - NOT NULL constraint, DEFAULT constraint, UNIQUE constraint, PRIMARY key, FOREIGN key, CHECK constraint.
- 4.
  - a) Implement group functions with different operators such as aggregate operators, group by, having and order by.
  - b) Implement nested and correlated nested queries using set operators and set comparison operators.
- 5.
  - a) Creation of views, synonyms, sequence, indexes and save point.
  - b) Implement various types of joins - outer join and inner join.

#### **Basic PL/SQL:**

- 6. Construct PL/SQL block for the following.
  - a) To determine whether a number is palindrome
  - b) To determine whether a number is an Armstrong number
  - c) To find greatest of three numbers
  - d) To display Fibonacci series

#### **Control Structures:**

- 7.
  - a) Write a program in PL/SQL to update the salary of a specific employee by 8% if the salary exceeds the mid-range of the salary against this job and update up to mid-range if the salary is less than the mid-range of the salary, and display a suitable message.
  - b) Write a PL/SQL program to display the description against a student's grade using CASE statement.

#### **Exception Handling:**

- 8.
  - a) Develop a PL/SQL program that displays the name and address of a student whose ID is given. If there is no student with the given student ID in the database, the program should raise a run-time exception NO\_DATA\_FOUND, which should be captured in the EXCEPTION block.
  - b) Construct the user-defined exceptions to get the salary of an employee and check it with the job's salary range. If the salary is below the range, raise an exception BELOW\_SALARY\_RANGE. If the salary is above the range, raise the exception ABOVE\_SALARY\_RANGE.

#### **Functions:**

- 9.
  - a) Write a function that accepts two numbers A and B and performs the following operations.
    - o Addition
    - o Subtraction
    - o Multiplication
    - o Division



- b) Write a PL/SQL block that updates salary of an employee in Employee table by using incr function which takes employee number as argument and calculates increment and returns increment based on the following criteria.
- If salary  $\leq$  3000, increment = 30% of salary  
If salary  $>$  3000 and  $\leq$  6000, increment = 20% of salary  
else increment = 10% of salary

**Procedures:**

10. a) Write a procedure that accepts two numbers and displays their sum.  
b) Write procedures to demonstrate IN, IN OUT and OUT parameters.

**Cursors:**

11. a) Write a block in PL/SQL to create a Cursor that displays the employee name and number of jobs he or she has done in the past.  
b) Write a program in PL/SQL to create a cursor to display the name and salary of each employee in the EMPLOYEES table whose salary is less than that specified by a passed-in parameter value.

**Triggers:**

12. Develop a suitable student database application by considering appropriate attributes.  
Couple of attributes to be maintained is the attendance of a student in each subject for which he/she has enrolled and internal assessment Using TRIGGERS for the following
- a) Whenever the attendance is updated, check if the attendance is less than 85%; if so, notify the concerned head of the department.  
b) Whenever, the marks in an internal assessment test are entered, check if the marks are less than 40%; if so, notify the concerned head of the department.

**REFERENCE BOOKS:**

1. Satish Ansani, *Oracle Database 11g: Hands-on SQL and PL/SQL*, PHI, 2010.
2. Pranab Kumar Das Gupta, P. Radha Krishna, *Database Management System Oracle SQL and PL/SQL*, PHI, 2<sup>nd</sup> Edition, 2009.

**II B.Tech. – II Semester**  
**(19BT3MC01) ENVIRONMENTAL SCIENCE**  
(Mandatory Course)  
(Common to CE, ME, CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	-	40	2	-	-	-

**PRE-REQUISITES: --**

**COURSE DESCRIPTION:** Natural resources; Ecosystems; Biodiversity; Environment pollution and control; Social issues and environment; Human population and environment.

**COURSE OUTCOMES:** *After successful completion of the course, students will be able to:*

- CO1. Analyze natural resources to solve complex environmental problems and natural resource management considering society, environment and sustainability.
- CO2. Analyze ecosystems and biodiversity to solve complex environmental problems by following environmental ethics considering society, environment and sustainability besides communicating effectively in graphical form.
- CO3. Analyze various types of pollution and their control measures to solve environmental problems through appropriate tools and techniques following latest developments considering society, ethics, environment and sustainability.
- CO4. Analyze social issues and its impact on environment, environmental acts to solve complex environmental problems considering society, environment and sustainability besides communicating effectively in graphical form.
- CO5. Analyze human population and its impact on environment to solve complex environmental problems through team work and using appropriate tools and techniques considering ethics, society, environment and sustainability.

**DETAILED SYLLABUS:**

**UNIT- I: NATURAL RESOURCES**

**(7 Periods)**

Multidisciplinary nature of environment; Natural Resources: Renewable and non-renewable resources; Forest, Water, Mineral, Food and Energy resources -Causes, Effects, Remedies, Case studies; Role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

**UNIT- II: ECOSYSTEMS AND BIODIVERSITY**

**(7 Periods)**

**Ecosystems:** Concept of an ecosystem, Structure and function of an ecosystem - Producers, Consumers, Decomposers; Food chains, Food webs, Ecological pyramids – Types; Characteristic features, Structure and functions of forest ecosystem, Desert ecosystem, Aquatic ecosystem.

**Biodiversity:** Concept and value of biodiversity, Role of biodiversity in addressing new millennium challenges, Hot spots of biodiversity, Threats to biodiversity, Man-wild life conflicts, Endemic, Endangered and extinct species of India, Conservation of biodiversity – In-situ and ex-situ.

**UNIT- III: ENVIRONMENTAL POLLUTION AND CONTROL****(6 Periods)**

Causes, Adverse effects and control measures of pollution - Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear pollution, Solid waste management – Urban waste, industrial waste; Latest developments in pollution control, Hazards and disaster management – Floods, Earthquakes, Tsunamis, Case studies.

**UNIT- IV: SOCIAL ISSUES AND THE ENVIRONMENT****(6 Periods)**

Sustainable development, Urban problems related to energy, Environmental ethics – Issues, Solutions; Global warming, Acid rain, Ozone layer depletion, Nuclear accidents and case studies, Wasteland reclamation, Consumerism and waste products, Concept of green technologies, Environment justice: National Green Tribunal and its importance; Environment protection act, Air act, Water act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation, Public environmental awareness.

**UNIT- V: HUMAN POPULATION AND THE ENVIRONMENT****(4 Periods)**

Population growth, Population characteristics and variation among nations, Population explosion, Family welfare programme, Environment and human health, Human rights, Value education, HIV/AIDS, Women and child welfare, Role of information technology in environment and human health; Case studies - Field Work/Assignment/Seminar on Environmental assets – Water bodies/Forest/Grassland/Hill/Mountain.

**Total Periods: 30**

**Topics for self-study are provided in the lesson plan**

**TEXT BOOKS:**

1. AnubhaKaushik and C. P. Kaushik, *Perspectives in Environmental Studies*, New Age International (P) Ltd. Publications, 6<sup>th</sup> Edition, 2018.
2. Erach Barucha, *Environmental Studies*, Orient Blackswan, 2<sup>nd</sup> Edition, 2013.

**REFERENCE BOOKS:**

1. Cunningham W.P. and Cunningham M.A., *Principles of Environmental Science*, Tata McGraw-Hill Publishing Company, New Delhi, 8<sup>th</sup> Edition, 2016.
2. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2<sup>nd</sup> Edition, 2009.
3. M. Anji Reddy, *Text Book of Environmental Sciences and Technology*, BS Publications, 2014
4. R. Rajagopalan, *Environmental Studies*, Oxford University Press, 2<sup>nd</sup> Edition, 2011.

**ADDITIONAL LEARNING RESOURCES:**

1. B. S. Chauhan, *Environmental Studies*, University Science Press, 2<sup>nd</sup> Edition, 2018.
2. Botkin and Keller, *Environmental Science: Earth as a Living Planet*, John Wiley & Sons, 8<sup>th</sup> International Student Edition, 2011.