

Program: Diploma

Semester: Fifth

Course: Object Oriented Programming

Course Code: 3D.205

L	T	P	C
3	0	0	3

Course Objective:

- Understand the features of C++ supporting object oriented programming
- Understand the relative merits of C++ as an object oriented programming language
- Understand how to produce object-oriented software using C++
- Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
- Understand advanced features of C++ specifically stream I/O, templates and operator overloading

Unit-I :

History & features: Its need & requirement, procedure oriented programming versus object oriented programming, basic concepts object oriented programming, object oriented languages. Beginning with C++: Concepts & structure of C++ programming concepts of structure. Objects & classes: Specifying a class, Defining member functions, Access specifiers (public, private) Arrays within a class, Creating objects, memory allocation for objects, static data & member function, Arrays of objects, objects as function argument.

Unit-II :

Constructors and Destructors.: Concept of Constructor, Types of constructors (Default, Parameterized, copy,) Overloaded Constructors (Multiple Constructor), Constructor with default argument, Destructors. Function overloading, Operator overloading (overloading unary & binary operators), rules for overloading operators.

Unit-III :

Inheritance: Concepts of inheritance, Derived classes, Member declaration (Protected), Types of inheritance (Single, multilevel, multiple, hierarchical, Hybrid inheritance). Polymorphism: Concepts of polymorphism, types of polymorphism, function Overloading & function overriding, Virtual function, Static & dynamic binding.

Unit-IV :

Pointers in C++: Concepts of pointer (Pointer declaration, pointer operator, address operator, pointer expressions, and pointer arithmetic), Pointers & functions (Call by value, call by reference, pointer to functions, passing function to another function), Pointers in arrays (Searching, insertion & deletion), Pointers & objects (Pointers to objects, this pointer, and pointer to derived classes).

Suggested Reading:

- 1 Object Oriented Programming in C++ by E. Balagruswamy*
- 2. Object Oriented Programming in C++ Saurav Sahay Oxford University Press.*
- 3.Object Oriented Programming in C++ R Rajaram New Age International Publishers 2nd Editon.*
- 4. Object Oriented Programming in C++ by Robert Lafore Techmedia Publication.*

Program: Diploma

Semester: Fifth

Course: Object Oriented Programming Lab

Course Code: 3DP.205

L	T	P	C
0	0	2	1

List of Experiments:

1. A C++ program to print the following by reading number of rows to be printed from the user.

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  *
 * *
* * *
* * * *
* * * * *

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2. A C++ program to display "Hello, Welcome to C++ Programming".
3. A C++ program to print details name, roll number in a single and two lines.
4. A C++ program to print your personal details name, surname(single character), total marks, gender(M/F), result(P/F) by taking input from the user.
5. A C++ program to convert centigrade into Fahrenheit. Formula: $C=(F-32)/1.8$
6. A C++ program that prompts the user to enter two integer values in int variables val1, val2 and find largest, sum, difference, product and ratio of these values.
7. Develop a simple calculator using if-else if and switch-case.
8. A C++ program to find all the prime numbers between 1 and 100. Write a function to do this.
9. A C++ program that uses functions to swap two integers.
10. A C++ program to print the Fibonacci series 0 1 1 2 3 5 8 13 By getting number of number to be displayed is given as input. Eg. 5 is input value means it should print first 5 numbers 0 1 1 2 3
11. Create a Structure called employee with the following details as variables within it.
 1. Name of the employee
 2. Age
 3. Designation
 4. Salary

Make a C++ program to create array of objects for the structure to access these and print the name, age, designation and salary
12. A C++ program to find the number of vowels present in the given character array using pointer arithmetic.
13. A C++ program to find the sum of factorial of a given number using recursive function.
14. An inline function to obtain largest of three numbers.
15. A Bank gives 4% interest on current account and 6% interest on savings account. An additional 3% interest is provided for savings duration of 5 years and above. Using dynamic initialization of constructor write banking program using C++.

Program: Diploma

Semester: Fifth

Course: Electrical Power Generation

Course Code: 6D.201

L	T	P	C
3	0	0	3

Course Objective:

- To understand the need of electrical energy and the relative mathematical analysis of it
- To describe the various methods of electrical energy production and to classify and use them from economic and operational point of view
- To understand the relationship between the electrical loads and the respective power production installations.
- To use the methods and criteria of forming the selling price list of electrical energy

UNIT I:

Basics of Power Generation: Importance of electrical power in day today life. Various sources of energy. Overview of method of electrical power generation. Comparison of Sources of power. Thermal Power Stations: List of thermal power station in state and country with their capacities. Selection of site for thermal power stations. Main parts block diagram of thermal power stations. Quality of fuel and its effect on quality of power generation. Operation of following components: Boiler Economizer. Air pre heater .Super-heaters &re-heaters. Steam prime movers. Condensers. Spray ponds &cooling towers.(Block diagrams & description in brief)

UNIT II:

Nuclear Power Stations: Block diagram and working of Nuclear Power Station, Construction and working of Nuclear Reactor, Fuels used in Nuclear Power Station. Economics of Nuclear Power Station, List of Nuclear power stations in state &country with their capacities. Hydro Power Stations: List of Hydro Power stations with their capacities &number of units in state &country. Selection of site and Classification .Layout of hydro Power stations.Types Turbines &generators used. Selection of turbine and alternator according to water head and capacity

UNIT III:

Diesel Power Stations: Applications of diesel power stations. Diesel electric plant-Main components (Block Diagram).Different types of engines & their working. Operation, maintenance & trouble shooting chart of diesel plant.Non-Conventional Energy Sources: Types of non-conventional energy sources. Solar Energy. Potential of solar energy. Photo voltaic effect–for solar energy. Construction &materials used in solar photo-voltaic cells. Working &applications of solar energy. Wind Energy. Selection of site for wind mills. Principle of electricity generation with the help of wind energy. Block diagram and working of Wind energy plant and its applications. List of major wind plants in the state with their approximate capacities

UNIT IV:

Bio-mass & Bio-gas energy: Composition of Bio-gas & its calorific value. Traditional; non-traditional Bio gas plants. Bio-mass based power generation plants & their capacities. Geo-thermal Energy and its Applications. Ocean energy. Ocean thermal Electric conversion. Energy from tides. Site requirements. Advantages and Limitations of Tidal power generation. Fuel Cells: Construction, working and applications, Economics of Power Generation: Terms commonly used in system operation: connected load, firm power, cold reserve, hot reserve, spinning reserve. Curves used in system operation such as Load-curve, load duration curve, integrated duration curve. (Simple numerical based on plotting above curves.). Factors affecting the cost of Generation: Average demand, Maximum demand, plant capacity factor & plant use factor, Diversity factor & load factor. Choice of Size & number of Generator Units, difficulties involved in it. Interconnected Power Systems: Combined operation of power stations. Comparison of various types of power stations. Advantages of Inter connection. Base load & peak loads, load allocation among various types of power stations. Economic loading of inter connected stations. Load sharing and transfer of load between power stations. Interconnection of power stations at state and national level.

Suggested Reading:

- 1. Elements of Electrical Power Station Design – MV Deshpande, Pitman and Sons Ltd.*
- 2. Electric Power Generation, Transmission and Distribution - S.M. Singh, Prentice Hall of India, Delhi.*
- 3. Generation, Distribution and Utilization of Electrical Power – C.L. Wadhwa*

Program: Diploma
Semester: Fifth
Course: Digital Electronics
Course Code: 6D.202

L	T	P	C
3	0	0	3

Course Objective:

- To understand the fundamental concepts and techniques used in digital electronics
- To understand structure of various number systems and its application in digital design
- The ability to understand and analyze various combinational and sequential circuits
- Ability to identify basic requirements for a design application and propose a cost effective solution
- To develop skill to build, and troubleshoot digital circuit

Unit I:

Introduction : Basic difference between analog and digital signals, applications and advantages of analog signals. Number System: Binary and hexadecimal number system, conversion from decimal and hexadecimal number system to binary and vice versa. BCD representation. Binary addition, subtraction, multiplication and division including binary points, BCD addition. 1's and 2's Compliment method for addition and Subtraction. Codes and Parity: Concept of codes, weighted and non weighted codes , examples of 8421, BCD, excess-3 and gray codes. Concept of parity, single and double parity and error detection, Alpha numeric codes.

UNIT II :

Logic Gates : Concept of negative and positive logic, definition, symbols and truth tables of NOT, AND, OR, NAND, EXOR gates. NAND and NOR Gates. Logic Simplification :Postulates of Boolean Algebra, DeMorgan's theorem, various identities. Formulation of truth table and Boolean equation for simple problem.. Implementation of Boolean (logic) equation with gates. Karnaugh's Map (up to 4 variables) and simple applications in developing combinational logic circuits. Logic Families: Logic family Classifications : Definition of SSI, MSI,LSI,VLSI. TTL and MOS families and their sub classification. Characteristics of TTL and MOS digital gates, delay, speed , noise margin, logic levels, power dissipation, fan in, fan out, power supply requirement and comparison between TTL and MOS families. Interfacing TTL and MOS IC's. Logic Circuits : Open collector, wired OR and totem pole output circuit operation for a TTL NAND gate. MOS circuit operation for standard gate.

UNIT III :

Arithmetic Circuits : Half adder and full adder circuit, design and implementation. Half and full subtractor circuit, design and implementation. Basic function and block diagram of MUX and DEMUX. Latches and Flip flops : Concept and types of latch with their working and applications. Operation using waveforms and truth tables of RS,T,D, JK, Master/Slave JK flip flops. Counters: Binary counters: Divide by N ripple counters (including Design), Decade counter. Resettable and programmable counters, Down Counters, up/ down Counter. Synchronous Counter. Difference between Asynchronous and Synchronous counters : Ring Counter with timing diagram.

UNIT IV :

Shift Register and Memories: Introduction and basic concepts including shift left and shift right. Serial in parallel out, serial in serial out, parallel in serial out, parallel in parallel out. Universal shift register. Buffer register, Tristate Buffer register, Basic RAM cell, N X M bit RAM, static and dynamic RAM, basic idea of ROM, PROM, EPROM, AND EEPROM. A/D and D/A Convertors :General principle of A/D and D/A conversion and brief idea of their applications. Binary resistor network and resistor ladder network methods of D/A conversion. Dual slope and successive approximation types of ADCs.

Suggested Reading:

1. *“Microelectronic Circuits”, Sedar and Smith.*
2. *“Operational Amplifiers and Linear Integrated Circuits” by R. A. Gayakwad, PHI.*

Program: Diploma

Semester: Fifth

Course: Digital Electronics Lab

Course Code: 6DP.202

L	T	P	C
0	0	2	1

List of Experiments:

1. To illustrate the working of AND, OR and NOT gate
2. To illustrate De Morgan's theorem using Basic Logic gates.
3. To illustrate the working of full adder and half adder using various logic gates.
4. To illustrate the working of full subtractor and half subtractor using various logic gates.
5. To illustrate the working of Exclusive OR and Exclusive NOR gate.
6. To illustrate the working of four to one multiplexer and verify the truth table.
7. To study IC7404, IC7432 and IC 7408 and verify the NOT gate, OR gate and AND gate present in it.

Program: Diploma

Semester: Fifth

Course: Electrical Circuit and Network

Course Code: 6D.203

L	T	P	C
3	0	0	3

Course Objective:

- To prepare the students to have a basic knowledge in the analysis of Electric Circuit & Networks.
- To solve the given circuit with various theorems and methods
- To analyze the various three phase circuits star and delta connections
- To distinguish between tie set and cut set methods for solving various circuits
- To relate various two port parameters and transform them

UNIT I:

Review of Basic concepts of electrical Circuit: Electric Circuit Elements R, L, C. Energy Sources. A.C. waveform and definition of various terms associated with it. Response of pure R, L, and C to AC supplies. Vector Representation of alternating quantity.

UNIT II:

Single phase AC Circuits: Series AC circuits R-L, R-C and R-L-C circuits. Impedance, reactance, phasor diagram, impedance triangle, power factor, Average power, Apparent power, Reactive power, Power triangle (Numerical). Series Resonance, quality factor (Numerical). Parallel AC circuits R-L, R-C and R-L-C circuits. admittance, Susceptance, Solution by admittance method, phasor diagram and complex Algebra method. (Numerical) Parallel resonance, quality factor. Comparison of series and Parallel circuits.

UNIT III:

Poly phase AC Circuits: Generation of three phases e.m.f. Phase sequence, polarity marking. Types of three-phase connections. Concept of unbalanced load and balanced load. Line, phase quantities and power in three phase system with balanced star and Delta connected load & their interrelationship. Advantages of poly phase circuits over single phase circuits.

UNIT IV:

Principles of circuit Analysis (ONLY DC circuits): Mesh analysis. (Numerical). Node analysis with voltage current source (Numerical) Star/delta & Delta/star transformations. (Simple Numerical). Network Theorems (Statement, procedure, applications and areas of applications, Simple Numerical on DC Circuits): Superposition Theorem (for also AC but no numerical on AC). Thevenin's Theorem. Norton's Theorem. Source conversion/ideal voltage and current source. Maximum power transfer Theorem

Suggested Reading:

1. M.E. Van Valkenberg, *Introduction to Modern Network Synthesis*

2. *Balabanian, N. and T.A. Bickart, "Electric Network Theory", John Wiley & Sons, New York, 1969.*
3. *C. L. Wadhwa, Network Analysis and Synthesis*

Program: Diploma

Semester: Fifth

Course: Electrical Devices and Circuit I

Course Code: 6D.205

L	T	P	C
3	0	0	3

Course Objective

- To understand the fundamental knowledge in basic electronics principles.
- To understand ideas about the practical implementation of electronic circuits.
- To discover design and conduct experiments in the field of electronics engineering.
- Students will acquire new knowledge in electronics engineering discipline and to link it with electrical concepts.

UNIT I:

Introduction: Introduction to active and passive components. The specification of passive components, fixed and variable resistors their various types and specialization including thermistors , LDR and VDR and colour codes fixed and variable capacitors, their various types and important specifications and colour codes. Semiconductor Physics: Intrinsic semiconductors - Conductivity, atomic and crystal structure of germanium and silicon, covalent bonds, generation and recombination, effect of temperature on conductivity of intrinsic semiconductors, energy levels diagram of conductor, insulators and intrinsic semiconductors, Extrinsic semiconductor materials- Doping of impurity and N type semiconductors and their conductivity, Minority and majority carriers; Drift and Diffusion currents.

UNIT II:

Semiconductor Diode :P-N junction diode, mechanism of current flow in P-N junction, drift and diffusion current, depletion layer, potential barrier, behavior of P-N junction characteristics, zener and avalanche breakdown, concept of junction capacitance in forward and reverse bias conditions. Semiconductor diode characteristics, static and dynamic resistances and their calculation from diode characteristics. Dynamic resistance of diode in terms of diode current. **Diode (P-N junction)** as rectifier, half wave rectifier, full wave rectifier, including bridge rectifier, relationship between D.C. Output voltage and A.C. input voltage, rectification efficiency and ripple factor for rectifier circuits, filter circuits: Shunt capacitor, series inductor, capacitor input, filter bleeder resistance, physical explanations of the working of the filters and typical applications of each type. Different types of diodes; Brief idea and typical applications of power diodes, zener diodes; Varactor diodes and point contact diodes. Important specifications of rectifier diode and zener diode.

UNIT III:

Introduction to Bipolar Transistor: Concept of bipolar transistor as two junction three terminal device having two kinds of current carriers ; PNP and NPN transistors, their symbols and mechanisms of current flow: explanation of fundamental current relations. Concept of leakage current , effect of temperature on leakage current; CB, CE and CC configurations. Common base configuration (CB): Input and output characteristics; Determination of transistor parameters input and output dynamic resistance, current amplification factor. Common emitter configuration:

current relations in CE configuration, collector current in terms of base current and leakage current (ICBO) input and output characteristics, determination of dynamic input and output resistance and current amplification factor B from its characteristics. Common collector configuration; expression of emitter current in terms of the base current and leakage current in CC configuration. Comparison of CB and CC configuration with regard to dynamic input and output resistance, current gain and leakage current, preference of CE configuration over CB configuration. Transistor as an amplifier in CE configuration, DC load line, its equation and drawing it on collector characteristics. Determination of small signal voltage and current gain of a basic transistor amplifier using CE output characteristics and DC load line; concept of power gain as product of voltage gain and current gain.

UNIT IV:

Transistor Biasing and stabilization of Operating Point: Different transistor biasing circuits for fixing the operating point, temperature and „BDC“ on operating point, need for stabilization of operating point, effect of fixing operating point in cut off and saturation region on performance of the amplifier. Calculation of operating point for different biasing circuits, Simple design problems on potential divider biasing circuit. Single Stage Transistor amplifier :Single stage CE amplifier circuit with proper biasing components. AC load line and its use in: Calculation of current and voltage gain of a single amplifier circuit. Explanation of phase reversal of the output voltage with respect to input voltage. Transistor hybrid low frequency model in CE configuration, „h“ parameters and their physical significance, typical values of the parameters. Expressions for voltage gain, input and output impedance for a single stage CE amplifier Circuit in „h“ parameters, appropriate approximation. Field Effect Transistor (FET):-Construction, operation, characteristics and equivalent circuit of JFET and its circuit application. Construction, operation, characteristics and equivalent circuit of MOSFET in depletion, enhancement modes and its circuit applications. Comparison of JFET, MOSFET, BJT. Simple FET amplifier circuit and its working principles.

Suggested Reading:

1. *Electronics Fundamentals and Applications*, D. Chattopadhyay & P. C. Rakshit, New Age International.
2. *“Electronic Devices and Circuits”*, Allan Mottershed, PHI.

Program: Diploma

Semester: Fifth

Course: Electrical Devices and Circuit I Lab

Course Code: 6DP.205

L	T	P	C
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List of Experiments:

1. Forward and Reverse bias characteristics of PN junction diode.
2. To verify V-I characteristics of a Zener diode .
3. Set up the circuit and verify the waveforms of Half Wave Rectifier.
4. Set up the circuit and verify the waveforms of Full Wave Rectifier.
5. Input and Output characteristics of transistor in CE configuration
6. Input and Output characteristics of transistor in CB configuration
7. Input and Output characteristics of transistor in CC configuration
8. FET characteristics.

Program: Diploma

Semester: Fifth

Course: Applied Mathematics

Course Code: 9D.204

L	T	P	C
3	0	0	3

Course Objective:

- To introduce the fundamental ideas of the functions of complex variables and developing a clear understanding of the fundamental concepts of Complex Analysis such as analytic functions, complex integrals and a range of skills which will allow students to work effectively with the concepts.
- To solve nonlinear differential equations by numerical methods.
- Students will solve nonlinear equations using analytic methods.
- Students will use mathematics concepts in real world situations.
- Students will simplify and perform operations with nonlinear expressions.

Unit I:

Complex Variable: Continuity, Differentiability, and analyticity of a function of a complex variable, Cauchy – Riemann equations in Cartesian and Polar form, Harmonic Function.

Unit II:

Ordinary Differential Equation :Formation of Ordinary differential equation ,Variable Separable ,Homogeneous Equation ,Solution of Bernoulli's Equation ,Exact-Differential Equation.

Unit III:

Graph Theory and Laplace Transform: Graph, Sub graph, Walk travel and Path, Connected and Disconnected graph. Handshaking theorem or Edge and Vertex of a graph. Matrix representation of graph (Incidence and Adjacency Matrices). Spanning Tree. Kruskal's Algorithms for minimal Spanning tree. Laplace Transform: Definition of Laplace Transform, Inverse Laplace Transform.

Unit IV:

Numerical Solution of Algebraic Equation and Simultaneous Equation: Bisection Method, Regula –Falsi Method, Newton-Raphson Method, and Gauss elimination Method, Iterative Method –Gauss Siedal and Jacobi's Method.

Suggested Reading:

1. *Higher Engineering Mathematics –Dr.B.S.Grewal Khanna Publication*
2. *Higher Engineering Mathematics –H.K.Das*
3. *Engineering Mathematic -N.P.Bali Laxmi Publication*
4. *Advance Engineering Mathematics –Erwin Kreyszig Wiley Publication.*
5. *Graph Theory: Prabhakar Gupta and Vineet Agarwal Pragati Prakashan*

Program: Diploma

Semester: Fifth

Course: Communication and Soft Skills

Course Code: 40D.201

L	T	P	C
2	0	0	2

Course Objective

The aim is to develop students' soft skills, communication, leadership and teamwork skills; and personal development skills using practical approach and exposure of students to the realities of the world.

- To enhance Leadership – assessing the requirements of a task, identifying the strengths/weaknesses within the team, utilising the diverse skills of the group to achieve the set *objectives*.
- To improve *Communication* – demonstrating clear briefing and listening /speaking skills.
- To make them realize that effective *communication* and interpersonal skills are crucial to increase employment opportunities and to compete successfully in the business environment.
- The *course* aims to cause a basic awareness about the significance of *soft skills* in professional and inter-personal *communications and* facilitate an all-round development of personality. Hard or technical skills help securing a basic position in one's life and career. But only *soft skills* can ensure a person retain it, climb.

UNIT-I

COMMUNICATION SKILLS

- Introduction
- Role of Communication in Today's World
- Objective of Communication
- Process of Communication
- Elements of Communication
- Essentials of Communication
- Barriers/ Factors Inhibiting Communication
- Flow of Communication
- Verbal Mode of Communication

Unit -II

COMMUNICATION NETWORK

- Non Verbal Mode of Communication
- Kinesics/Body Language, proxemics , chronemics, para lingual
- Style in Technical Communication
- Communication Skills; Reading, Writing, Speaking, Listening & Talking

Unit -III

GRAPHICS

- Introduction
- Planning of Graphics

- Placing of Graphics
- Construction of Graphics
- Types of Graphics(textual ,visual, tables, bar Charts, pie charts, line charts, organizational charts, flow charts, maps & Pictographs)

Unit -IV

TELEPHONIC CONVERSATION SKILLS

- Introduction
- Stages in Telephonic Conversation
- Listening & Speaking Skills
- Telephonic Skills
- Problems in Telephonic Conversation
- Intensive Listening

Suggested Reading:

- Monippally, Matthukutty. M. 2001. *Business Communication Strategies*. 11th Reprint. Tata McGraw-Hill. New Delhi
- Swets, Paul. W. 1983. *The Art of Talking So That People Will Listen: Getting Through to Family, Friends and Business Associates*. Prentice Hall Press. New York
- Lewis, Norman. 1991. *Word Power Made Easy*. Pocket Books
- Sen , Leena .Communication Skills ; Eastern Economy Edition
- Ghanekar , Dr. Anjali . Essentials of Business Communication Skills ; Everest Publishing House
- David Green . *Contemporary English Grammar, Structure & Composition* ; MacMillan
- Dictionary; Oxford
- Dictionary ; Longman

Websites

- www.tatamcgrawhill.com/digital_solutions/monippally
- www.dictionary.cambridge.org
- www.wordsmith.org
- www.edufind.com
- www.english_the_easy_eay.com
- www.englishclub.com
- www.english_grammar_lessons.com
- www.wikipedia.org/wiki/english_grammar

Program: Diploma

Semester: Fifth

Course: Disaster Management

Course Code: 14D.201

L	T	P	C
3	0	0	0

Course Objective:

- Develop an understanding of the key concepts, definitions a key perspectives of All Hazards Emergency Management
- Understand the Emergency/Disaster Management Cycle
- Have a basic understanding for the history of Emergency Management
- Develop a basic under understanding of Prevention, Mitigation, Preparedness, Response and Recovery
- Develop a basic understanding for the role of public a private partnerships.

Unit I:

Understanding Disasters: Understanding the concepts and definitions of disaster, hazard, vulnerability, risk, importance, dimensions & scope of Disaster Management, Disaster Management cycle and disaster profile of India.

Unit II:

Types, Trends, Causes, Consequences and Control of Disaster: Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves); Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear, bomb threat, explosion) and Man-made Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters; terrorist attack, , sudden shooting); Global Disaster Trends–Emerging Risks of Disasters–Climate Change and Urban Disasters; Financial emergency(risk of eviction, risk in arrears, sudden health emergency, family emergency, unexpected loss of income).

Unit III:

Prevention and Mitigation of Disaster :Disaster Mitigation: meaning and concept, Disaster Mitigation Strategies Emerging Trends in Disaster Mitigation, Mitigation management, Role of Team and Coordination. Disaster Preparedness: Concept & Nature, Disaster Preparedness Plan, Preventions. Roles & Responsibilities of Different Agencies and Government, Technologies for Disaster Management. Early Warning System; Preparedness, Capacity Development; Awareness during Disaster.

Unit IV:

Applications of Science and Technology for Disaster Management & Mitigation: Geo-informatics in Disaster Management (RS, GIS, GPS and RS) Disaster Communication System (Early Warning and Its Dissemination) Land Use Planning and Development, Regulations, Disaster Safe Designs and Constructions, Structural and Non Structural Mitigation of Disasters.

Suggested Reading:

1. *Disaster Management- J. P. Singhal, Laxmi Publications.*

2. *Disaster Management - Dr. Mrinalini Pandey, Wiley India Pvt. Ltd.*
3. *Disaster Science and Management- Tushar Bhattacharya, McGraw Hill Education (India) Pvt. Ltd.*
4. *Disaster Management: Future Challenges and Opportunities - Jagbir Singh, K W Publishers Pvt. Ltd.*