

# **Maharishi University of Management & Technology, Bilaspur (Chhattisgarh)**



**DEPARTMENT OF COMPUTER SCIENCE & INFORMATION  
TECHNOLOGY (CSIT)**

**SYLLABUS**

**Masters of Science in Information Technology  
(M.Sc. IT)**

**2021-2022**

MSCIT-Semester 1							
S.NO	Subject Code	Subject	External		Internal		Total Marks
			Max	Min.	Max	Min.	
1	MSCIT-101	Introduction to Information Technology	70	28	30	12	100
2	MSCIT-102	Data Structures	70	28	30	12	100
3	MSCIT-103	Introduction to Programming Language Through 'C'	70	28	30	12	100
4	MSCIT-104	Computer Based Numerical Methods	70	28	30	12	100
5	MSCIT-105	Digital Electronics	70	28	30	12	100
6	MSCIT-106	LAB1: - C Programming	100	50			100
7	MSCIT-107	LAB2: - Unix & Shell Programming	100	50			100
		<b>TOTAL</b>					<b>700</b>
MSCIT-Semester 2							
1	MSCIT-201	E- Commerce	70	28	30	12	100
2	MSCIT-202	RDBMS with Oracle	70	28	30	12	100
3	MSCIT-203	Principles of Operating System	70	28	30	12	100
4	MSCIT-204	Computer System Architecture	70	28	30	12	100
5	MSCIT-205	Object Oriented Programming Through C++	70	28	30	12	100
6	MSCIT-206	LAB1: - C++ Programming	100	50			100
7	MSCIT-207	LAB2: - ORACLE	100	50			100
		<b>TOTAL</b>					<b>700</b>
MSCIT-Semester 3							
1	MSCIT-301	Introduction to JAVA	70	28	30	12	100
2	MSCIT-302	Software Engineering	70	28	30	12	100
3	MSCIT-303	Artificial Intelligence	70	28	30	12	100
4	MSCIT-304	Theory of Computation	70	28	30	12	100
5	MSCIT-305	Computer Network	70	28	30	12	100
6	MSCIT-306	LAB1: - JAVA Programming	100	50			100
7	MSCIT-307	LAB2: - VB & VC++ Programming	100	50			100
		<b>TOTAL</b>					<b>700</b>
MSCIT- Semester 4							
1	MSCIT- 401	Major Project ( Viva Voce)					400

# MSCIT- 1<sup>ST</sup> SEMESTER

## MSCIT-101

### Introduction to Information Technology

**Introduction to computers:** Computer system concept, characteristics of computer, generations and types of computer, components of computer system, Booting process, classification of digital computer system, organization of computers.

**Computer software and hardware - Software:** System Software, application Software, firmware, Programming languages classification: machine language, assembly language & high-level language. Evolution of programming languages: first generation, second generation, third generation & fourth generation. Language, Language translator: Compiler, Interpreter, Assembler.

**Hardware:** Input and Output devices, Storage devices

**Operating System -** Definition, Job, Objective and evolution of operating system, Types of operating system, Network operating system (NOS).

**Network Communication and Internet :** Definition, Criteria ,advantages and limitations of computer networking, Communication process ,Communication types, Electronic data interchange (EDI) ,Types of computer network ,Network topology, LAN and other network related protocols, OSI model, TCP/IP model , Networking Hardware & Software.

**Internet:** Introduction, Internet basic, Internet protocols, Internet addressing, Browser WWW,E-mail, telnet, ftp, application, benefits and limitation of internet, electronic conferencing, and teleconferencing.

**Latest IT Trends and Role of IT - IT Trends:** E-Commerce, M-Commerce, Artificial Intelligence, Computational Intelligence, Geographic Information System (GIS) ,Data Mining .

**Role of IT:** Role of IT in different Area – Education, Industry, Banking, Marketing, Public Services and others.

#### Suggested Books:

1. Computer fundamentals: By V.Rajaram; PHI
2. Fundamentals of IT: Leon and Leon; Leon Tec World

## MSCIT-102 Data Structures

**Basics :** Basic terminologies; introduction to basic data Structures: Arrays, linked list, trees, stack, queue, Graph; Data structure operations; time complexity; Records and Pointers; Pointers to structures; Functions; Parameter Passing.

**Stacks, Queues and Recursion:** Stacks; Array representation of stack; Linked representation of stack; Various polish notation's-Prefix, Postfix, infix; Evaluation of a postfix & Prefix expression; Conversion from one another; Application of stack; Recursion; Towers of Hanoi; Implementation of recursive procedures by stacks; Queues; Linked representation of queues; D queues; Circular queue; Priority queue; Singly Linked list- Operation on it; Doubly linked list- Operation on it; Circular linked list.

**Trees:** Binary trees; Representation of binary tree in memory; Traversing binary tree; Traversing using stack; Header nodes; Binary search trees; Searching and inserting in binary search trees; Deleting in a binary search tree; AVL search trees; Insertion and deletion in binary search trees; m-way search trees: searching, insertion , deletion; B trees: searching, insertion, deletion; Heap.

**Searching And Sorting:** Searching algorithm: linear search, binary search; Sorting algorithms: Bubble sort, Insertion sort, Selection sort, Quick Sort, Merge sort and Heap sort , Hashing , Hash function.

**Graphs:** Terminology & representation; Warshall algorithm; Shortest path; Minimum spanning tree; Kruskal & Dijkstara algorithm; Linked representation of graph; Operation on graph; Traversing a graph; poset.

### Suggested Books:

- (1) Lipshutz, Data Structure, McGraw Hill.
- (2) Standish, Data Structure, Addison-Wesley.
- (3) A. M. Tennenbaum, Y. Langsam and M. J. Augenstein, Data Structures using C, PHI, 1991.
- (4) S. Lipschutz, Data Structure, Schaum Series.
- (5) Rajni Jindal

## MSCIT-103

### Introduction to Programming Language Through 'C'

Basic Programming Concepts: Introduction to the basic ideas of problem solving and programming using principles of top-down modular design, Flowcharts, Compilation of a Program.

Introduction to Programming Language C: Data Types, Instruction and its Types, Storage Classes, Operators and Hierarchy of Operations, Expressions in C, Control and Repetitive Statements, break, continue, Functions: User Defined Functions and Library Functions, Local and Global Variables, Parameter Passing, Pointers, Arrays, Strings, C Preprocessors, Structures, Input and Output in C, C-Library.

#### Suggested Books:

1. A K Saxena , Programming Language C : Anamaya Publishers, New Delhi,
2. Cooper, Siprit of C: Jayco Publishers
3. Y. Kanetkar, Let Us C, BPB Publications.
4. B.S.Gottfried, Schaum's Outline of Theory and Problems of Programming with C, McGraw-Hill.
5. H.Schildt, C Made Easy, Osborne McGraw-Hill.

## **MSCIT-104**

### **Computer Based Numerical Methods**

Computer Arithmetic – Floating point Numbers- Operations Normalization and their consequences.  
Iterative Methods – Roots of a Single transcendental equations and roots of Polynomials using Bisection Methods , False position Method , Newton Raphson Method, Comparison of alternative methods.

Interpolations – Polynomials interpolation Newton Method. Languages method and difference tables.  
Least Square Approximations- Linear regression only.

Differentiation And Integration- Formula for Numerical Differentiation and Numerical integration (Trapezoidal Rule) and Simpson's rule only.

Numerical Solution of Differential Equation :- Euler's Method, Tylor series Method, Runge-Kutta Method

#### **Suggested Books:**

- 1.Numerical Methods By V. Rajaraman
- 2.Numerical Methods By S.S. Shastri



**MSCIT-105**  
**Digital Electronics**

**Number System-** Binary, Octal, and Hexadecimal number system, Conversion from one number system to another, Binary arithmetic, Representing negative numbers, BCD codes, ASCII codes, EBCDIC codes, Excess- three code, Gray code, Floating point representation, 1's complement and 2's complement arithmetic representation of signed binary numbers.

**Digital Devices:** Logic Gates, Flip-Flops, Latches, Registers, Shift registers, Buffers/ Drivers, Encoders, Decoders, code converters, Counters, Multiplexer, De multiplexers.

**Logic Design:-** Boolean algebra, Minimum Boolean expression, Karnaugh map method of simplification of logic expression , Arithmetic circuits: Half-adder, Full- Adder, n-bit adder, Adder- subtractor, Multiplication of binary number.

**Memory Unit** -Elementary idea of semiconductor memories, ROM, PROM, EPROM, EEPROM, RAM, SRAMS, DRAMS, and Memory cells, A to D and D to A converters.

**Application of electronics in computers:** Register transfer logic, Processor Logic design, Control Logic design, Digital Integrated Circuits.

**Suggested Books:**

1. Digital Principle and Applications- By ALBERT PAUL, MALVINO AND LEECH ( TMH)
2. Digital Logic and Computer Designing- By M.MORRIS MANO

## MSCIT- 2<sup>ND</sup> SEMESTER

### MSCIT-201

#### E- Commerce

Introduction, Definition, Objectives, Advantages and disadvantages, Forces driving E-Commerce, Traditional commerce Vs. E-Commerce, E-Commerce opportunities for industries, Growth of E-Commerce.

E-Commerce Models: Business to consumer, Business to Business, Consumer to Consumer, other models – Brokerage Model, Aggregator Model, Info-mediary Model, Community Model and value chain Model.

Electronic Payment Systems: Special features required in payment systems, Types of E-payment systems, E-Cash, E-cheque, credit card, Smart Card, Electronic Purses.

E-Marketing, E-Customer Relationship Management, E-Supply Chain Management.

Security Issues in E-Commerce: Security risk of E-Commerce, Types of threats, Security tools and risk management approach. Cyber laws, Business Ethics, IT Acts.

#### **Suggested Books:**

- (1) Bharat Bhaskar, Electronic Commerce – Frameroork Technologies and Applications, Tata McGraw Hill.
- (2) Ravi Kalakota & A.B. Whinston, Frontiers of Electronic Commerce, Pearson Education.
- (3) Ravi Kalakota & A.B. Whinston, Electronic Commerce – A Manager's Guide, Pearson Education.
- (4) Agarwala Kamlesh, N and Agarwala Deeksha, Business on the Net Introduction to the E-Com., Macmillan India.
- (5) P. T. Joseph, E-Commerce: A Managerial Perspective, PHI, 2002



## **MSCIT-202**

### **RDBMS with Oracle**

**Overview of Database Management :** Data processing versus data management , File oriented approach versus database oriented approach to data management ,Data independence , Database administration,DBMS architecture,Importance of data dictionary ,Contents of data dictionary,Data Models,Object oriented databases

**Design Theory for Relational Database-R Model,** Concept of Keys, Normalization, Functional Dependencies, Decomposition of Relation schemes, Normal Forms for Relations, Multivalued and other kinds of Dependencies.

**Query Optimization:** Simple SQL commands, Basic Optimization Strategies, Algebraic Manipulation, Optimization of Selections in System, Exact Optimization for a Subset of Relational Queries, Optimization under Weak Equivalence.

**Database Protection:** Protecting the database- Integrity, Security and recovery Security in query-by-Example, Domain constraints, Referential integrity, Assertion,Triggers,Security and authorization in SQL.

**Concurrent Operations on the Database:** Basic Concepts, A simple Transaction Model, Model with Read-and Write-Locks, Read-only, Write-only Model, Concurrency for Hierarchically Structured Items, Protection against Crashes, Optimistic Concurrency Control.

**Principles of Distributed Data Bases:** Framework for distribution. Translation of global queries into fragment queries. Query optimization and management of distributed transaction. Concurrency control and reliability in distributed databases. Administration of Distributed Data Bases.

#### **Suggested Books:**

- (1) Principles of Database Systems J.D.Ullman, Galgotia, New Delhi.
- (2) Database system concepts By H.Korth and A. Silberschatz ,TMH Publication
- (3) Distributed Databases ,S.Ceri and G. Relagatti, McGraw-Hill.
- (4) The Theory of Database concurrency Control C.Papadimitriou , , Computer Science Press.
- (5) Principles of Distributed Database Systems ,T. Ozsu and P. Valduriez, , Prentice-Hall.

## **MSCIT-203**

### **Principles of Operating System**

**Introduction:** Definition, Design Goals, Evolution; Concept of User, job and Resources; Batch processing, Multi-programming, Time sharing; Structure and Functions of Operating System.

**Process Management:** Process states, State Transitions, Process Control block, Context Switching, Process Scheduling, Scheduling algorithm, Threads.

**Inter process synchronization and communication:** need, Mutual exclusion, semaphore, hardware support for mutual exclusion ,queuing implementation ,classical problem in concurrent programming, critical region and conditional critical region, Monitors ,Messages, Deadlock

**Memory Management (Contiguous and non contiguous) :** Address Binding, Dynamic Loading and Linking Concepts, Logical and Physical Addresses, Contiguous Allocation, Fragmentation, Paging, Segmentation, Combined Systems, Virtual Memory, Demand Paging, Page fault, Page replacement algorithms, Global Vs Local Allocation, Thrashing, Working Set Model, Paging.

**File and Secondary Storage Management:** File Attributes, File Types, File Access Methods, Directory Structure, File System Organization and Mounting, Allocation Methods, Free Space management; Disk Structure, Logical and Physical View, Disk Head Scheduling, Formatting, Swap Management. Protection & Security., UNIX/ LINUX and WINDOWS as an example of Operating systems.

#### **Suggested Books:**

- (1) Silberschatz and Galvin, Operating System Concepts 6/ed, Addison Wesley.
- (2) William Stalling, Operating Systems: Internals and Design Principles 5/ed, PHI.
- (3) Tanenbaum, Modern operating Systems, PHI.
- (4) Peterson and Silberschatz, Operating System Concepts, Addison Wesley.
- (5) P. B. Hansen, Operating System Principles, PHI.
- (6) K. Christian, The UNIX Operating System, John Wiley.

## **MSCIT-204**

### **Computer System Architecture**

**Register Transfer and Micro Operation:** Register transfer language, Bus and memory transfer, Arithmetic micro operation, Logic micro operation, Shift micro operation, Arithmetic logic shift unit

**Computer Organization and Design:** Instruction codes, Computer registers, Computer instructions, Timing and control, Instruction cycle, Memory reference instruction, I/O and interrupt, Design of basic computer and accumulator logic.

**Programming Basic Computer:** Machine language, assembly language, Assembler, Programming arithmetic and logic operation, I/O programming.

**Control Unit and C.P.U:** Micro programmed and hardwired control unit, General register organization of C.P.U, Stack organization, Instruction format, Addressing modes, Program control, RISC.

**Pipeline and Vector Processing:** Parallel processing, Pipelining, Arithmetic pipelining, Instruction pipeline, RISC pipeline, Vector processing, Memory interleaving, Array processor, multiprocessor.

**Input-output Organization:** Peripheral devices, I/O interfaces, Asynchronous Data transfer DMA, Priority interrupt, I/O processor, Multiprocessor system organization and Data communication processor.

**Memory Organization:** Auxiliary memory, Microcomputer, memory, Memory hierarchy, Associative memory, Virtual memory, Cache memory, Memory management hardware.

#### **Suggested Books:**

1. D. Sima, T. Fountain, P. Kacsuk, "Advanced Computer Architectures: A Design Space Approach", Addison Wesley, 1997.
2. J. Flynn, "Computer Architecture: Pipelined and Parallel Processor Design", Narosa Publishing House/ Jones
3. K. Hwang, "Advanced Computer Architecture: Parallelism, Scalability, Programmability", McGraw-Hill, Inc
4. Hwang and Briggs, "Computer Architecture and Parallel Processing, McGraw Hill.
5. B. Barnes, Modeling and Performance Measurement of Computer Systems, MIT Press.

## MSCIT-205

### Object Oriented Programming Through C++

#### Principal of OOP

Procedure oriented Vs Object oriented, OOP paradigm, Features of OOP ,Basic Data types Tokens, Keywords, Constant ,Variables, Operator I/O statements , Structure of C++ program, Arrays, pointers, Object modeling technique (OMT)

#### Function, Object and Class

Defining class, Abstract class ,Function prototype, Function with parameter ,Passing object as a parameter, Constructor function ,Types of constructor, Destructor Friend function , Friend class, Dynamic allocation operator new and delete.

#### Polymorphism and Inheritance

Types of polymorphism, Constructor overloading, Operator overloading, Template function Template class, Types of inheritance, Private, protected and public derivation of class, Resolving ambiguity Pointer to object, This pointer, Virtual class, virtual function

#### Input - output and File handling

I/O classes File and stream classes, Opening and closing file Detecting end of file, String I/O, Char I/O, Object I/O, I/O with multiple object, File pointer, Disk I/O.

#### Exception handling, Name spaces and Standard Template library (STL)

Need of Exception handling, try, catch and throws keywords, defining namespace, benefit of namespace, Component of STL.

#### Suggested Books:

1. C++ programming by E.Balagurusami
2. Mastering C++ by Venugopal
3. C++ Complete reference.
4. Object Oriented programming and C++ By R. Rajaram

# MSCIT- 3<sup>RD</sup> SEMESTER

## MSCIT-301

### Introduction to JAVA

**Overview of JAVA :** The genesis of java, An overview of java, java virtual machine (JVM) ,Java development kit (JDK) ,Java Vs C++, Data types, Literals, Variables, and Arrays, Operators, Control statements, Introducing Class, closer look at Methods and class ,Nested and inner class ,Exploring Java.lang, String handling ,Constructor ,Garbage collection and finalize() method.

**Inheritance, Packages and interface-** Types of inheritance, Access specifiers class inheritance, using super, method overriding, Abstract class, constructor in multilevel inheritance, using final with inheritance, Dynamic method dispatch

Defining package, CLASSPATH, Access protection, Importing package, Defining and implementing interface ,Extending interface, Nested interface.

**Exception handling and Multithreading:** Using try and catch, multiple catch classes, Nested try statements, throw , throws and finally, Built in exception, Uncaught exception, Creating own exception class, Java Thread Model – Main thread, Creating own Thread, Life cycle of thread, Thread priorities, Synchronization and messaging, Intertribal communication, Suspending, Resuming and stopping thread.

**Input Output and Networking:** Byte stream and character stream, Predefined stream, reading console input, writing consol output, PrintWriter class, Reading and writing files

Networking – classes and interfaces ,Socket and overview, TCP/IP client socket and server ,Inet address,URL Connection,Datagram.

**Applet, AWT and Event handling** – Applet life cycle, Creating an applet, Using image and sound in applet, passing parameter.

AWT- Overview of java.awt package, Component and Containers , control component and layout manager

Event handling –The delegation-event model , Event classes ,Source of event, Event listener interfaces ,handling mouse and keyboard event ,Adapter class.

**Advance JAVA :** JDBC- JDBC architecture, Establishing connection.

Servlet – Overview of servlet,Life cycle of servlet, JAVA servlet architecture , Generic servlet and http servlet ,The servlet interface, Request and response

### Suggested Books:

1. Naughton P and schildt H. Java: The complete reference, Osborne Mcgra-Hill, Berkeley, USA, 1997.
2. Simply JAVA :An Introduction to JAVA programming By James R. Levenick ,Firewall Media publication New,Delhi
3. Balguruswami : Java Programming
4. Core JAVA for beginners by Rashmi Kanta Das ,Vikas Publication.

## **MSCIT- 302**

### **Software Engineering**

Overview of System Analysis & Design , Business System Concept, System Development Life Cycle, Waterfall Model , Prototyping Model, RAD Model Feasibility Analysis, Technical Feasibility, Cost- Benefit Analysis COCOMO model.

System Requirement Specification – DFD, Data Dictionary, ER diagram, Process Organization & Interactions.

System Design – Problem Partitioning, Top-Down and Bottom-Up design; Decision tree, decision table and structured English; Functional vs. Object- Oriented approach. [5L]

S/W Quality Assurance: Quality Concepts, Matrix for Software Quality, Quality Movement, S/W Q A, S/W Review, Formal Technical Reviews, Formal Approaches to Sqa, S/W Reliability, ISO 9000quality Standards

S/W TESTING MODELS: S/W Testing Fundamentals, Test Case Design, White and Black Box Testing, Basic Path Testing, Control Structure

S/W TESTING STRATEGIES: Strategic Approach To S/W Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging

COMPUTER AIDED S/W ENGINEERING: Introducing of Case, Building Block For Case, Taxonomy Of Case Tools, Integrating Case Environment, Integrating Architecture, Case Repository

#### **Suggested Books:**

1. R. G. Pressman – Software Engineering, TMH
- 2.Pankaj Jalote – An Integrated Approach to Software Engineering, NAROSA.
- 3.Sommerville, Ian – Software Engineering, Pearson Education
- 4 IEEE Standards on Software Engineering.
- 5Kane, Software Defect Prevention, SPD
- 5 Software Engineering – Pressman
- 6 Analysis and Design of Information System – James Seann
- 7 System Analysis and Design – Parthsarthy – Khalkar.

## **MSCIT-303**

### **Artificial Intelligence**

**Introduction:** Definitions and approaches, Foundations of A.I., History of AI, Areas and state of the art in A.I., A.I. Programming languages, Concept of Intelligent Agents.

**Problem Solving:** Problem solving as state space search, production system, control strategies and problem characteristics; Search techniques: Breadth First and Depth-first, Hill-climbing, Heuristics, Best-First Search

**Knowledge Representation and Reasoning:** Syntactic and Semantic representations, Predicate and propositional logic, Resolution, Unification, Semantic Net, Frames

**Pattern Recognition:** Meaning of pattern, Pattern Recognition, Classification, Supervised & Unsupervised Learning of classification, K-NN, K-MEANS,

**Expert Systems:** Introduction only

#### **Suggested Books:**

1. E. Rich and K. Knight, Artificial Intelligence, Tata McGraw Hill.
2. Nilsson, Artificial Intelligence: A New Synthesis, Morgan Kaufmann.
3. R.O. Duda, Hart, Stork (2001) Pattern Classification 2<sup>nd</sup> Edition, John wiley, New York.
4. Shinghal (2006) Pattern Recognition : Technique and Applications, Oxford University Press, New Delhi

## MSCIT-304 Theory of Computation

**Theory of Automata:** Definition of an automaton, Transition system, Acceptability of a string by FA, Nondeterministic finite state machine, equivalence of DFA and NFA, Mealy and Moore models, Minimization of Finite Automata.

**Formal Languages, Regular Sets and Regular Grammars:** Definition, Languages and their relation, Chomsky classification of language, Recursive and recursively enumerable sets, Regular expression, and Finite automaton, Pumping Lemma for regular sets, Application of Pumping lemma, Closure property of regular sets, Regular sets and regular grammar.

**Context-free Language:** Context free language and derivation trees, ambiguity in context free languages, Simplification of context free languages: (left recursion, unit production elimination, eliminating null values), Normal forms of context free languages, Pumping lemma.

**Pushdown Automation:** Definition, Acceptance by pda, Push down automation and Context- free languages, Parsing and Pushdown automata.

**Turing Machine:** Turing Machines model, Representation of TM, Languages acceptability by TM , design of TM, Universal Turing Machines (UTM), Turing machine and type ) grammars, Halting problem, Linear bounded automata and languages.

### Suggested Books:

1. J.E.Hopcraft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education
2. Cohen, "Introduction to Computer Theory", John Wiley.
3. M. Sipser, Introduction to Theory of Computation, PWS Publishing Corporation, 1997.
4. J.E. Hopcroft, J.D. Ullman, Introduction to Automata Theory, Languages and Computation, Addison- Wisley, 1979.
5. T.C. Martin, Theory of Computation, Tata McGraw-Hill
6. H.R. Lewis, C.H. Papadimitrou, Elements of the Theory of Computation, PHI.



## MSCIT-305 Computer Networks

### Introduction

Goal and application Network Hardware and Software , Protocol Hierarchies, Design Issue of the layers, Interfaces and services, Connection oriented and connection less services, Service Primitives,

Reference Models – The OSI Reference model, The TCP/IP Reference Model ,Types of computer Network :LAN,MAN,WAN, Topologies, Transmission mode .

### Physical Layer

Transmission Media ,Concept of data transmission

Switching Techniques, Communication Satellites – Geosynchronous Satellite – VSAT, Low Orbit Satellites, ISDN and ATM.

### Data Link Layer

Data Link Layer design issues, Framing, Flow control, Error Detection and Correction

DLC protocol: Stop and Wait Protocol, Sliding window protocol, A Simplex protocol for noisy channel, Medium access sublayer: Channel allocation –static and dynamic ,Multiple access protocol FDDI, Data Link Layer in the Internet – SLIP,PPP.

### Network Layer

The Network Layer Design Issue, comparison of virtual circuits and datagram subnets, connectionless internetworking, Tunneling, Internetwork routing, Routing algorithm , Fragmentation, The Network Layer in the Internet – The IP Protocol, IP Address, subnets, Internet control protocols, internet multicasting.

### Transport Layer

The Transport layer services, The concept of client and server in terms of socket addressing Quality of service, Transport service primitives and buffering, Multiplexing, Crash Recovery.

The Internet Transport Protocols (TCP/IP) – The TCP Service Model, The TCP protocol, The TCP segment header, TCP connection management, TCP transmission policy, TCP congestion control, TCP timer management, UDP.

### Presentation and Application Layer

Network Security – Traditional Cryptography, Two fundamental Cryptographic Principles, Secret Key Algorithms, Authentication protocols,DNS ,SNMP,E-mail.

### Suggested Readings :

1. Computer Networks : A.S. Tanenbaum
2. Data Communications and Networking : Forouzan, Tata McGraw Hill Company
3. Computer Network By S.S.Shinde ,New Age International Publisher.
4. Data and computer Communication by Shashi banzal ,Firewall media .

# **MSCIT- 4<sup>TH</sup> SEMESTER**

**MSCIT- 401**

**Major Project & Viva Voce**

