

Master of Science (Information Technology)

Two Year (Four Semesters) Course

The course of study of M.Sc. IT shall extend over a period of **four semesters** spread over two years. On satisfactory completion of the course and after passing the examinations, a candidate will be awarded the Master of Science (Information Technology) degree.

Every academic year shall be divided into two semesters. First semester starts from July and ends in December. Second semester starts from January and ends in June and so on. There shall be an examination at the end of each semester. The examinations shall consist of theory papers, practical papers.

Medium of instructions and examination will be **English** only.

Eligibility for Admission:

The admission of the students for M.Sc(IT) I and III Semester will be taken for July to December session and II and IV Semester will be from January to June session.

A candidate who has qualified graduate degree with at least 50% marks (48% for SC/ST/OBC/SOBC category) of Rajasthan University or any other university recognized as equivalent shall be admitted to the first year of M.Sc. (Information Technology) Course .

Semester	Course Duration	Examination Time
I, III	July to December	December
II, IV	January to June	June

Examination Scheme:

Each theory paper shall be of 100 marks (70 marks for written examination of 3 hrs duration and 30 marks for internal assessment).

Each practical paper shall be of 100 marks (60 for practical exam and 40 for internal assessment).

The basis for internal evaluation in theory shall be home assignment, internal test and regularities in the attendance.

The basis for internal assessment in the laboratory courses shall be timely submission of the lab. records, performance in the lab., internal tests etc.

Each theory paper examination will be of three-hour duration and shall carry 70 marks. Theory paper shall contain three parts.

- Part-A will contain 12 very short questions of 1 mark each (student will attempt any 10).
- Part B will contain 4 short descriptive types of questions each carrying 5 marks, all are compulsory.
- Part C will contain 4 long descriptive types of questions each carrying 10 marks, all questions are compulsory with internal choice.

Each practical examination (Maximum marks 100) will be of four- hour duration on one day and carry 60 marks for exercise(s) assigned in the examination and Viva , and 40 marks for the Internal Assessment.

S.No.	Question Pattern	Max. Marks (Theory)		Max. Marks (Practical)	
		ESE	CIA	ESE	CIA
1	Part A: 12 Very Short Questions (attempt any 10)	10 X 1=10			
2	Part B: 4 Short Question from all Units (Compulsory)	4 X 5 =20			
3	Part C: 4 Questions from each Unit with Internal Choice	4 X 10=40			
	Sub Total	70	30	60	40
		100		100	

Attendance:

A candidate shall be required to put in a minimum of 75% attendance at the lectures and 75% attendance at the practical's separately in each paper.

Examination Scheme:

Sr. No.	Paper	ESE	CIA	Total
1	Theory	70%	30%	100
2	Practical	60%	40%	100

Number of Units in Syllabus:

Sr. No.	Stream	No. of Units
1	M.Sc.(IT)	4

Maximum Marks for the Course and Number of Units of Each subject 2 Years / 4 Semesters:

Sr. No	Stream	Semester	Number of Papers per semester		Total Marks (Credits) of 1 Semester	Sub Total	Grand Total
			Theory (Credits)	Practical (Credits)			
1	M. Sc. (IT)						
		I,II, III Sem	5 X 100 (5 X 4)	3 X 100 (3 X 4)	500 +300 = 800 (20 + 12 = 32)	800 X 3 = 2400 (32 X 3 = 96)	2400 (96)
		IV Sem, Project	2 X 100 (2 X 4)	1 X 200 (1 X 8)	300+300 = 600 (8 +8 =16)	600 X 1 =600 (16)	600 (16)
							3000 (112)

Programme Outcomes

PO1: The program equips students with essential domains of computer science and Information Technology (IT). It empowers them to apply core concepts in the development of domain-specific applications.

PO2: The program fosters critical thinking, cultivates problem-solving skills, encourages evaluative learning of various techniques, and deepens comprehension of problem essence.

PO3: The program educates students about the latest industry technologies. The continuous review of syllabi adds value to graduates, preparing them to address dynamic industry demands.

PO4: The program instructs students in applying advanced tools to address real-world challenges.

PO5: The program trains students in designing and conceptualizing software architecture, managing complex product development processes, and making informed decisions for project management selection.

PO6: Real-world projects expose students to challenging industry environments, making them employable and industry-ready through hands-on project development training.

PO7: The program hones students' teamwork skills and nurtures their ability to lead project management teams

Semester Structure:

M.Sc. Information Technology Semester I

S.No.	Subject Code	Course Title	Course Category	Credit	Contact Hours			EoSE Duration (Hrs.)	
					Per Week	L	T	P	Thy
1.	MSIT101	Programming Fundamentals	DSC	4	4			3	
2.	MSIT102	Database Management System	DSC	4	4			3	
3.	MSIT103	Fundamentals of Information Technology	DSC	4	4			3	
4.	MSIT104	Computer Architecture	DSC	4	4			3	
5.	MSIT105	Operating System	DSC	4	4			3	
6.	MSIT151	'C' Programming Lab	DSCP	4			6		2
7.	MSIT152	DBMS Lab	DSCP	4			6		2
8.	MSIT153	Office Management Lab	DSCP	4			6		2

M.Sc. Information Technology Semester II

S.No.	Subject Code	Course Title	Course Category	Credit	Contact Per Week			Hours		EoSE Duration (Hrs.)	
					L	T	P	Thy	P		
1.	MSIT201	Object Oriented Programming Concepts using java Programming	DSC	4	4			3			
2.	MSIT202	Data Structure and Algorithms	DSC	4	4			3			
3.	MSIT203	Web Designing and development	DSC	4	4			3			
4.	MSIT204	Management Information System	DSC	4	4			3			
5.	MSIT205	Data Communication and Networking	DSC	4	4			3			
6.	MSIT251	Java Programming Lab	DSCP	4			6			2	
7.	MSIT252	Data Structure Lab	DSCP	4			6			2	
8.	MSIT253	Web Designing Lab	DSCP	4			6			2	

M.Sc. Information Technology Semester III

S.No.	Subject Code	Course Title	Course Category	Credit	Contact Per Week			Hours		EoSE Duration (Hrs.)
					L	T	P	Thy	P	
1.	MSIT301	.Net Technologies	DSC	4	4			3		
2.	MSIT302	Python Programming	DSC	4	4			3		
3.	MSIT303	PHP	DSC	4	4			3		
4.	MSIT304	E-Commerce Application Development	DSC	4	4			3		
5.	MSIT305	Software Engineering and Testing	DSC	4	4			3		
6.	MSIT351	.Net Lab	DSCP	4			6		2	
7.	MSIT352	Python Lab	DSCP	4			6		2	
8.	MSIT353	PHP Lab	DSCP	4			6		2	

M.Sc. Information Technology Semester IV

S.No.	Subject Code	Course Title	Course Category	Credit	Contact Per Week			Hours		EoSE Duration (Hrs.)
					L	T	P	Thy	P	
1.	MSIT401	Elective Paper-I Artificial Intelligence and Expert Systems Information Protection and Security Research Methodology Swayam MooC IT related course*	DSC	4	4			3		
2.	MSIT402	Elective Paper-II a) Open Source Operating System b) Cloud Computing d) Mobile Application Development e) Swayam MooC IT related course*	DSC	4	4			3		
3.	MSIT451	Project(Project, Report, Viva) (12 Weeks)	DSCP	8					2	

M.Sc. – IT First Semester

MSIT101: Programming Fundamentals

Course Outcomes:

CO1: Understand the concept of Algorithms and different symbols used in flowcharts

CO2: Develop conditional and iterative statements to write C programs.

CO3: Utilize user-defined functions to solve real-time problems.

CO4: Create C programs that utilize pointers to access arrays, strings, and functions.

CO5: Apply user-defined data types, including structures and unions, to solve problems.

CO6: Demonstrate the concept of file handling to showcase input and output operations in C programs.

Unit-I

Problem Solving with Computers: Algorithms, and Flowcharts.

Basic Structure of C Programs: Creating, Compiling, Linking and Execution of a C program Header Files, C Tokens (Keywords, Identifiers, Constants, and Special symbols), Data types, and Variable declaration, Operators, Expressions, Managing Data Input and Output Operations. Decision Making and Branching, Looping and Jumping Statements.

Unit-II

Arrays: Declaration, Definition, One and Two Dimensional Arrays, Character Arrays and Strings.

Functions: Definition, Need for Functions, Standard and User-Defined Functions, Function Calls, Category of Functions, Recursion, Storage Class Specifiers

Unit-III

Structures and Unions: Array of Structures, Nesting of Structures.

Pointers: Declaration, Definition and Use of Pointers, Difference between Pointers and Structures.

Unit-IV

File Management in C: Creating, Opening and Closing a File, I/O Operations on Files, Command Line Arguments. Dynamic Memory Allocation, Pre-Processor.

Recommended Books:

1. Kerighan & Richie the C programming language (PHI Publication)
2. Byron Gottorfried Schaum's outline of programming with C
3. E.Balaguruswamy Programming in Ansi 'C' (Tata McGraw Hill)
4. Kanetkar "Let Us C", BPB Publications. (Tata McGraw Hill)

MSIT102: Database Management System

Course Outcomes:

CO1: Gain a solid understanding of the fundamental concepts of database management systems, including data models, data independence, database architecture, and components.

CO2: Learn the principles and techniques involved in relational database management systems.

CO3: Ability to transform user requirements into efficient and well-structured database schemas.

CO4: Develop proficiency in SQL

Unit-I

Introduction to Database Concepts: Database and Need for DBMS ,Characteristics of DBMS, Database Users, 3-tier architecture,(its advantages over 2- tier) Data Models, Views of data-schemes and instances, Independence, Data modeling using the Entity-Relationship approach, Entities, Relationships, Representation of entities, attributes, relationship set, Generalization , Aggregation.

Unit-II

Relational model: Overview of database models, Relational Model, Structure of relational database, different types of keys, Expressing M: N relation, relational algebra, Constraints.

Relational Database Design: Functional dependencies, Normalization Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF) Lossless joins and dependency preserving decomposition.

Unit-III

SQL: Introduction to SQL, SQL Data types and Literals, Types of SQL commands, SQL Operators and their procedures, Tables, Views and Indexes, queries and sub-queries, aggregate function, insert, delete and update operations, Joins, Unions, Intersections, Minus in SQL.

Query Processing: Query Processing Stages, Estimation of Query Processing Cost, Introduction to Transactions, States of Transactions, ACID Properties

Unit-IV

Concurrency Control: Concurrency Control, Lock Based Protocols, Two Phase Locking protocol, Timestamp-based Protocol, multiple granularity, Deadlock Handling, Deadlock Prevention, Deadlock Detection and Recovery.

Recovery: Failure classification, recovery concepts, database backup, recovery concepts based on deferred update and on immediate update. Shadow paging, check points, an overview of Distributed database and client-server Database

Recommended Books:

1. Fundamental of Database Systems by R. Elmasri, S. Navate; Benjamin Cummings
2. Introduction to database systems by C. J .Date
3. Database system concept by Korth
4. Principles of Database Management by James Martin
5. Relational database design for Micro computers Application by Prentice Hall (Jackson)
6. Database Management Systems by Bipin Desai

MSIT103: Office Management Tools (For Session 2013-14 only)

Course Outcomes:

CO1: Gain a comprehensive understanding of the working principle of computers and their memory systems.

CO2: Acquire knowledge about the functions and uses of input and output devices.

CO3: Differentiate between software types and hardware components and comprehend their interaction.

CO4: Understand various mediums of data transmission and evaluate their respective advantages and disadvantages.

CO5: Comprehend the internet, its applications, and the importance of internet security.

Unit-I

Word Processing Software : Creating and Saving documents, Entering, Editing, Moving, Copying and Formatting Text, Page formatting, Finding and replacing text, Spell checking and Grammar checking, Indexing, Columns, Tables and feature there in, Inserting (Objects, picture, files etc.), Using Graphics, templates and wizard, using mail merge, using WordArt, customizing, MS Word. Editing Fills and recoloring pictures.

Unit-II

Spreadsheet Software : Spreadsheet terminology, organization of the worksheet area, entering information, editing cells using commands and functions, moving copying, inserting and deleting rows and columns, formatting worksheet, printing worksheet, creating charts, modifying charts, using date, time and addressing modes, macro.

Unit-III

Presentation Software : Anatomy of a PowerPoint Presentation, Creating and Viewing a presentation, Managing Slide Shows, Navigating through a presentation, Using hyperlinks, adding graphics, multimedia and special effects.

Unit-IV

Data Base Management Software : Planning a database (tables, queries, forms, reports), Creating and editing database, customizing tables, linking tables, designing and using forms, modifying database structure, maintaining database, Sorting and Indexing database, Querying a database and generating Reports, modifying a Report, exporting a report to another format.

Recommended Books:

1. Microsoft; 2007 Microsoft Office System; PHI
2. Microsoft; Microsoft Office 2003: Plain & Simple; PHI
3. Microsoft; Microsoft Office XP: Plain & Simple; PHI
4. Sanjay Saxena; A First Course in Computers 2003 Edition; Vikas Pub.

MSIT103: Discrete Mathematics (From Session 2014-15 till 2021-22)

Course Outcomes:

CO1: Demonstrate the application of discrete mathematics knowledge relevant to the discipline.

CO2: Analyze and solve problems related to matrices and determinants.

CO3: Comprehend statistics and its practical applications, including the ability to calculate measures such as mean, median, and mode.

CO4: Apply and comprehend sequences, series, and progressions.

CO5: Understand different types of matrices and their properties.

Unit-I

Number Systems: natural numbers, integers, rational numbers, real numbers, complex numbers, arithmetic modulo a positive integer (binary, octal, decimal and hexadecimal number systems), floating point notation.

Binary Arithmetic: 2's complement arithmetic, conversion of numbers from one of binary/ octal/ decimal /hexadecimal number system to other number systems, Codes (Natural BCD, Excess-3, Gray, Octal, Hexadecimal, Alphanumeric- EBCDIC and ASCII), Excess-3, Gray, Octal, Hexadecimal, Alphanumeric- EBCDIC AND ASCII), Error Codes.

Unit-II

Logic and Proofs: Proposition, Conjunction, Disjunction, Negation, Compound proposition, Conditional propositions (Hypothesis, conclusion, necessary and sufficient condition) and Logical equivalence, De Morgan's law, quantifiers, universally quantified statement, generalized De Morgan's Laws for Logic, component of Mathematical system (axiom, definitions, undefined terms, theorem, lemma and corollary), proofs (direct proofs, indirect proofs, proof by contrapositive), valid argument, deductive reasoning, modus ponens (rules of inference), universal instantiation, universal generalization, existential instantiation, universal generalization resolution, principle of mathematical induction, structural induction.

Unit-III

Sets, Venn diagrams: ordered pairs, sequences and strings, relation (reflexive, symmetric, anti-symmetric, transitive, partial order), inverse relation and composition of relations, relational database, functions (injective, surjective, bijective), composition of functions, equivalence relations interpretation using digraphs, cardinals.

Unit-IV

Graph: Graph theory undirected graph, digraph, weighted graph, similarity graphs, paths and cycles, Hamiltonian cycles, shortest path algorithm. Isomorphism of graphs, planar graphs.

Trees: characterization of trees, spanning trees, breadth first search and depth first search method, minimal spanning trees, binary trees, traversals.

Recommended books:

1. C.I.Liu elements of Discrete Mathematics Tata McGraw Hill publishing Company Ltd., 2000
2. Richard Johnsonbaugh discrete mathematics Pearson Asia 2001 .
3. John Truss: Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.
4. Robert J.McEliece : Introduction to Discrete Mathematics, Tata Mc. Graw Hill, India.

5. Lipschutz : Discrete Mathematics, Tata Mc. Graw Hill India.
6. Kenneth H. Rosen, Discrete mathematics and Applications, Tata Mc. Graw Hill, India.

MSIT103: Fundamentals of Information Technology (From Session 2022-23 onwards)

Course Outcomes:

CO1: Gain a comprehensive understanding of the working principle of computers and their memory systems.

CO2: Acquire knowledge about the functions and uses of input and output devices.

CO3: Differentiate between software types and hardware components and comprehend their interaction.

CO4: Understand various mediums of data transmission and evaluate their respective advantages and disadvantages.

CO5: Comprehend the internet, its applications, and the importance of internet security.

UNIT- I

Information Technology: Defining IT, Data and Information, Elements of Electronic data processing system, Transaction processing, Modes of transactions, IT Applications.

Introduction to Computers: Generation of computers, classification of computers. Input and Output Devices: Keyboard, pointing devices, speech recognition, digital camera, scanners, optical scanners, printers, plotters, computer output microfilm (COM), monitors, audio output, projectors, and terminals.

UNIT- II

Computer System: Central processing unit (CPU), memory, instruction format, instruction set. Primary and Secondary Memory: Memory hierarchy, random access memory (RAM), types of RAM, read only memory (ROM), types of ROM. Classification of secondary storage devices, magnetic tape, magnetic disk, optical disk. Number Systems: Number systems, conversion between number bases.

UNIT- III

Computer Program: Introduction, developing a program, algorithm, flowchart, pseudo code.

Computer Languages: Introduction, classification of programming languages, generations of Programming languages features of a good programming language.

Computer Software: Software definition, relationship between software and hardware, software categories, system software, application software.

UNIT-IV

Internet Basics: Introduction, evolution of Internet, basic Internet terms, getting connected to Internet, Internet applications, electronic mail, Web Browsers, searching the web (search engines), Internet Service Providers.

Security issues in Internet: Bugs, Viruses, Anti-viruses, Firewalls, Internet threats to the society, Cyber laws and Legal issues.

Reference Books:

1. Introduction to computer Science, IITL Education solution Limited, R & amp; D Wing, PEARSON Education.
2. Rajaraman V. – Fundamental of Computers, Prentice Hall of India Pvt. Ltd., New Delhi.
3. Computer Fundamentals by P.K. Sinha; BPB Publication, New Delhi 8.
4. Peter Norton's Introduction to Computers, Third Edition, McGraw Hill

MSIT104: Computer Architecture

Course Outcomes:

CO1: Gain a comprehensive understanding of the components of a digital computer system

CO2: Proficient in converting data between different digital number systems (binary, octal, decimal, hexadecimal)

CO3: Design and analyze combinational circuits, such as multiplexers, demultiplexers, encoders, and decoders

CO4: Familiar with the anatomy of a computer system, including components like motherboards, microprocessors (CISC and RISC), different types of memory modules (RAM, Cache), and expansion slots

CO5: Develop a strong grasp of input and output devices, including printers, plotters, and voice output devices.

Unit -I

Introduction to Digital Computer: Overview of the Digital Computer System (Processor, Memory, Input and Output Devices, Storage Devices, Representation of Data: Digital versus Analog, Digital number system (binary, octal, decimal and hexadecimal numbers,) conversion from one form to another, fractional numbers and signed numbers, 1'S, 2'S Complements, Fixed point and floating point representations, Boolean algebra (addition, subtraction, multiplication and division), Logic Gates (NOT, OR, AND, NAND, NOR, XOR, XNOR) types Codes (ASCII, EBCDIC, Unicode) Combinational Circuits(Multiplexer, Demultiplexer, coder, Encoder)Sequential Circuits(Flip flops, registers, Counters).

Unit-II

Anatomy of a Computer: Mother Board (Special reference to Intel 810 Chipset motherboard), CISC Micro Processors (Special reference to Pentium, AMD, Cyrix), RISC, types of RAM, Flash, Cache, types of memory modules (SIMM, DIMM), System clock, Bus (Data, Address, Control), Expansion slots (ISA, MCA, EISA, PCI, AGP).

Unit-III

I/O and Storage Devices: Input devices, Output devices, Printers (Dot-Matrix, Line, Label, Ink-Jet, Laser, Color Laser, thermal wax, dye sublimation, fiely, IRIS), Plotters (Pen, Ink-jet, electrostatic), Voice output], Storage devices I Storage types (Magnetic, Optical, Magneto-optical, Solid state), random versus sequential access, formatting, tracks and sectors, speed, storage capacity, Floppy Disk (5.25 inch, 3.5 inch; 2HD, zip, Superdisk, HiFD) Hard Disk (tracks, cylinders, sectors; Hard Drive Interfaces (IDE, EIDE, Fast SCSI, Fast/wide SCSI, Uitra SCSI; Hard Disk Cartridges, RAID), Optical Disks [pits and lands, CD-ROM, R, RW, DVD-ROM, R, RAM)], Magnetic tape (reels, streamers, DAT,DLT, stripe, Smart card), Modem (Fax/Data/Voice).

Unit-IV

Computer Memory Systems: Architecture of Digital Computer, Processor Design Principles, Control Unit Design: Conventional and Micro programmed, Input- Output System. Memory and I/O Organization: Interfacing with CPU; Main Memory, Auxiliary Memory, Cache Memories, Associative Memory and Virtual Memory. I/O Interfacing with CPU, Addressing Data Transfer Techniques.

Recommended Books:

1. Computer Architecture And Organization: Mcgraw Hill, 2nd Edition, John Hyaes.
2. Computer System Architecture: PHI, 3rd Edition, M.Morries Mano.
3. Computer Organization And Design: Prentice Hall Of India, Chaudhari P.P.
4. Perspective In Computer Architecture: Prentice Hall Of India, Rao P.V.S.
5. Computer System Architecture: Prentice Hall, Tannenbaum A.
6. Parallel Computer Architecture: A Hardware/Software Approach by David Culler

MSIT105: Operating System

Course Outcomes:

CO1: Analyze various scheduling algorithms.

CO2: Understand deadlock, prevention and avoidance algorithms.

CO3: Compare and contrast various memory management schemes.

CO4: Understand the functionality of file systems. CO5: Understand the Open source operating system and basic Linux commands

Unit-I

Introduction to Operating System: Types of software (System/Application), Translators (Assemblers/ Interpreters/ Compilers), Operating system as a resource manager, Operating system need and services, Classification and Evolution of OS, Hierarchical/Layered Organization of OS.

Unit-II

Process Management: Process concept, Process Control Block, Process Life cycle, Type of Scheduler, Scheduling criteria, multiple processor scheduling, scheduling Algorithm, FCFS, SJF, Priority and round robin scheduling, critical section, semaphores. Asynchronous parallel process, multithreading at system/user level, Inter process communication, Process Synchronization & Deadlock, Monitors, Deadlock prevention & avoidance, Deadlock Detection and deadlock Recovery.

Unit-III

Memory Management: Memory Management Techniques; Single partition allocation, multiple partition allocation, Swapping, paging and segmentation, segmented-paged memory management techniques; logical and physical address space; address mapping. Demand paging, Virtual memory, protection and address mapping hardware, page fault, Page replacement and page removal algorithms.

Unit-IV

Device Management and I/O Programming: Disk structure, disk scheduling, access method and storage capacity; sharable and non sharable devices and their management.

Information Management & File System: File organization and access methods, logical and physical file structure; physical file system realized with device management function; file allocation methods, linked and index allocation, logical file implemented on physical file system. File protection and security, Directory structure, single level, two level, tree structure, Free Space Management, Allocation Methods.

Recommended Books:

1. James L. Peterson & A. Silberschatz: Operating System Concepts; 2nd Edn., Addison Wesley, World Student Edition
2. Andrew S. Tenenbaum : Modern Operating Systems; Prentice Hall, India
3. Dietel H.M.: An Introduction To Operating Systems; Addison Wesley, World Student Edition
4. Systems Programming & Operating Systems, 2nd Edn., Tata Mc Graw Hill

MSIT151: 'C' Programming Lab

Course Outcomes:

CO1: Develop a C program based on a given task or algorithm.

CO2: Read, comprehend, and trace the execution of C programs.

CO3: Implement C programs using arrays, pointers, decision-making statements, and looping statements.

CO4: Write programs that perform operations utilizing derived data types.

CO5: Develop and implement modular applications in C by effectively utilizing functions.

CO6: Develop applications in C that leverage structures and pointers.

Examination: Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper.

MSIT152: DBMS Lab

Course Outcomes:

CO1: Write both simple and complex SQL queries to retrieve information from databases with many tables to support business decision making.

CO2: Write SQL DDL to create, modify and drop objects within a relational database.

CO3: Retrieve and store information in a relational database using SQL in a multi-user environment.

Examination: Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper.

MSIT153: Office Management Lab

Course Outcomes:

CO1: Able to use MS Office (word processor, spreadsheet and power point) professionally. CO2: Develop understanding about the writing of effective business letters in computer through word processing.

CO3: Able to use spreadsheet program for business data processing.

CO4: Acquire skills for development and presentation of power point report.

Examination: Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper.

M.Sc. – IT Second Semester

MSIT201: Object Oriented Programming Concepts using Java Programming .

Course Outcomes:

CO1: Understand the concepts of OOPs

CO2: Knowledge of basic programming constructs of Java

CO3: Understand and Implement the concepts of Classes and Objects

CO4: Implement Polymorphism, Inheritance, and Multithreading

CO5: Enlighten the use of Interfaces, Packages and Exception Handling

CO6: Perform Database Connectivity through JDBC

CO7: Understand String & Math Classes and their functions

Unit-I

Introduction: Object Oriented Concepts, Introduction to Java, Features of Java, Java virtual machine.

Programming Fundamentals of Java: Java Tokens, Operators, Data types, Control Structures, Array

Unit-II

Classes and Objects: Object References, Method Overloading, Constructors, Constructor Overloading, Inheritance. Static, Final, Abstract Keywords

Packages and Interfaces: Access Specifiers, Package Creation, Use of packages, Basics of Interfaces, Use of Interfaces

String Handling: String Class, String methods.

Unit-III

Exception handling in Java: Exception classes, Exception raising & handling, use of Try, Catch and finally, Throwing Exceptions, User Defined Exceptions.

Applets: Introduction to Applets, Applet life cycle, Creating Applets, Applet Viewer

Graphics: Graphics Components, Color, Font, Drawing Objects

Unit-IV

Threading in Java: Concepts of Multi-threading, Thread Life Cycle, Thread class, Runnable Interface, Thread Management in Java

JDBC: JDBC Drivers, Two Tier and Three Tier client server Architecture, Setting up a connection to database, Creating and executing SQL statements

Reference Books:

1. C. Thomas Wu, An Introduction to OOP with Java, Mc Graw Hill.
2. Deitel and Deitel, Java, How to Program, Pearson Education Asia.
3. E. Balaguruswamy, Programming with Java, Tata McGraw Hill.
4. Zukowski: Mastering Java 2, BPB Publications.
5. Herbert Schildt, Java 2, Tata Mc Graw Hill.

MSIT202: Data Structure and Algorithms

Course Outcomes:

CO1: Analyze the concepts of algorithm evaluation and find time and space complexities for searching and sorting algorithms.

CO2: Implement linear data structure such as stacks, queues, linked lists and their applications.

CO3: Implement basic operations on binary trees

CO4: Demonstrate the representation and traversal techniques of graphs and their applications

Unit-I

Introduction, Types of Data Structures, Algorithm, Pseudocode, Characteristics of Algorithms, Algorithm Analysis, Algorithm Complexity – Space Complexity, Time Complexity, Abstract Data Types.

String Processing – Basic Terminology, Storing Strings, String Operations, Pattern Matching Algorithms.

Arrays: Representation in Memory, Operations - Insertion, Deletion, Searching – Linear Search, Binary Search, Sorting – Bubble Sort, Multidimensional Arrays, Pointers, Pointer Arrays.

Unit-II

Sorting: Internal and External Sorting Techniques, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Quick Sort, Radix Sort.

Linked lists: Linked List Vs. Arrays, Representation in Memory, Types of linked List - Singly Linked list, Doubly Linked list, Circular Linked list, Doubly Circular Linked list., Operations on Singly Link List – Insertion, Deletion, Traverse, Searching.

Unit-III

Stacks: Array and Linked List representation of Stacks, Operations – Insertion, Deletion, Traverse, Application of Stack – Recursion, Polish Notation.

Queues: Array and linked list representation in Memory, Type of Queues – Simple Queue, Circular Queue, Priority Queue, Double Ended Queue. Operations on Simple and Circular Queue – Insertion, Deletion, Traverse. Applications of Queues.

Unit-IV

Trees: Basic Tree Concepts, Representation of Binary Tree in memory, Binary Tree Traversals, Binary Search Trees, Heapsort.

Graphs: Representations, sequential representation, Warshall's Algorithm, Linked Representation of graphs, Operations on Graph, Traversing Graph.

Reference Books:

1. S. Lioschutz: Data Structures, Mc Graw Hill International Edition.
2. A.V. Aho., J.E. Hopcroft, and J.D. Ullman, Data Structures and Algorithms, Pearson Education Asia.
3. A. Michael Berman: Data Structures via C++, Oxford University Press.
4. Sara Baase and Allen Van Gelder: Computer Algorithms, Pearson Education Asia.
5. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data structures with applications, TMH Publishing Co. Ltd.

MSIT203: Web Designing and Development

Course Outcomes:

CO1: Understand the fundamentals of Internet, and the principles of web design.

CO2: Able to construct websites using HTML and Cascading Style Sheets.

CO3: Able to build dynamic web pages with validation using Java Script objects CO4: Implement the event handling mechanisms.

Unit-I

The Internet: History of the World Wide Web, Hardware and Software Trend, Web Server, Web Client.

Creating Web Pages: Introduction to HTML, Types of tags, Formatting Tags, Common Tags, Hyperlinking, Images, Image Maps, Marquee Tag, Horizontal Rules, Lists.

Unit-II

Advance Concepts of HTML: HTML Tables, HTML Forms, Frames

Dynamic HTML: CSS : introduction, inline styles, creating style sheets with the style element, conflicting styles, linking external style sheets, positioning elements, backgrounds, element dimensions, text flow and the box model, user style sheets, Filters and Transitions.

Unit-III

Java Script: Introduction to scripting language, Client side versus Server side scripting , Advantages of Java Script, Features of Java Script, Keywords, Variables, Data Types, Constants, Comments, Java script control structures, Arrays, Array Library Methods, Java script Methods

Unit-IV

DOM: Introduction, Window, History, Navigator, Form, Frames, Location Objects.

Event Handling in Java Script: Different types of events, key events, mouse events, loading events, Event Handlers,

Recommended Books:

1. M.L. Young: Complete Reference b: Internet; 2nd Edition; Tata Mc Graw Hill, 2006.
2. Thomas A. Powel ; Web Design : C.R.; Second Edition; TMH, 2009.
3. Thomas A. Powel ; HTML & XHTML : C.R.; Fourth Edition; TMH, 2008.
4. Harely Hahn: The Internet, Tata Mc Graw Hill.
5. G. Robertson: Hands on HTML, BPB Publications.
6. D.A. Tauber, B. Kienan: Microsoft From Page ; BPB Publications.
7. PHP The Complete Reference, Steven Holzer, Tata McGraw Hill

MSIT202: Management Information System

Course Outcomes:

CO1: To understand the basic principles and working of information Technology

CO2: Describe the role of information technology and information systems in business

CO3: To contrast and compare how internet and other information technologies support business processes

CO4: To give an overall perspective of the importance of application of internet technologies in business administration

Unit-I

Introduction to systems and Basic systems concepts: Types of systems, The systems Approach, **Information systems:** Definition and characteristics, types of Information, role of Information in Decision – Making, Sub – systems of information systems: EDP and MIS, management levels, EDP/MIS/DSS.

Introduction to MIS: Meaning and role of MIS, Definition of MIS, Systems approach to MIS, MIS organization within a company. Effectiveness and efficiency criteria. Overview of system analysis and design, feasibility analysis, design, implementation, testing and evaluation, Introduction to Systems Development Life Cycle and its phases.

Unit-II

MIS Planning: MIS structure and components, MIS features, Problem and Derivation of MIS plans, Prioritization and developmental strategies.

Conceptual Design of MIS: Definition of the problem, System objectives and system constraints. Analysis of information source, Alternative system design and selection of optimal system. Conceptual system design document.

Unit-III

Detailed System Design and Implementation: Application of basic system design concepts to MIS, Involvement of end-user and role of MIS department and System Analyst, Role of Top Management during design an implementation. Management and control of MIS function.

Unit-IV

Advanced MIS System Concept and Controls: Transaction processing systems, Office automation systems, Decision Support System, Executive information system, AI and Expert systems. Pitfalls in MIS Planning, Designing and Implementation. MIS in Operation : MIS for Accounting and Finance Function, MIS for Personnel Systems, MIS for Marketing Systems, Production & Inventory system.

Recommended Books:

1. Murdick R.G. Ross J.E. & Claggett J.R. : Information System for Modern Management, 3rd Edn., PHI, 2009.
2. Jawadekar W.S; MIS; Third Edition, TMH,2008.
3. Prasad ML; Prasad Usha; MIS; First edition;Sultan Chand & Sons,2007.
4. Awad Elias M.: System Analysis and Design; 2nd edition; Galgotia Pub., 2004.
5. James A.O Brien : Management Information Systems, Galgotia Pubn.
6. Wigarders K., Svensson A., Sehong L.: Structured Analysis & Design of Information Systems,Mcgraw-Hill Book Co..
7. Locus: Anlaysia, Design and Implementation of Information System, 3rd Edn., McGraw-Hill Book Co.
8. Newman: Designing Integrated Systems for the Office Environment, McGraw-Hill Company

MSIT205: Data Communication and Networking

Course Outcomes:

CO1: Able to understand network communication using the layered concept, Open System Interconnect (OSI) and TCP/IP Model.

CO2: Understand various types of transmission media, network devices; and parameters of evaluation of performance for each media and device.

CO3: Understand the concept of flow control, error control and LAN protocols

CO4: Understand the working principles of LAN and the concepts behind physical and logical addressing, sub netting and supernetting.

CO5: Understand the functions performed by a Network Management System and to analyze connection establishment and congestion control with respect to TCP Protocol.

Unit-I

Data Communication Concepts: Introduction, Communication System, And Communication mode, Data encoding: Analog and Digital data, digital and analog signal, Communication Channels, Synchronous and asynchronous transmission. Bandwidth concepts, channel capacity.

Introduction to Networking: Computer network, Characteristic & advantages of networking, types of network, LAN, MAN, WAN.

Unit-II

Transmission media & Network Topologies: Guided & Unguided media, Twisted pair, coaxial cable, Fiber optics, Radio. VHF and microwaves, Satellite link. Network topology, bus, star, ring, tree, mesh & hybrid topology. Advantages and disadvantages of these topology. Multiplexing Channels and Concept of multi channeling and modulation, pulse code modulation (PCM) Frequency Division multiplexing, Time Division multiplexing, CODECS.

Unit-III

Digital Data Communication Techniques: Asynchronous and Synchronous Transmission - Types of Errors, Error Detection and error Correction methodologies.

Network Standards: Introduction, Layered approach, OSI model functions & responsibilities of each layer.

Unit-IV

Internetworking: Principles of internetworking, Connectivity Devices, Switches, Bridges, Routers, Routing with bridges. Internet and e-mail protocols: SMTP, SLIP, POP, PPP, FTP, HTTP, Wi-Fi Network, Bluetooth, Broadband.

Recommended Books:

1. Introduction to Digital and Data Communications, Michal A Miller, JAICO pub.
2. Data and Computer Communication – Willam Staling, PHI pub.
3. Data Communication & Network – Forouzan (TMH)
4. Computer Networks – A. Tanenbaum, (PHI pub.)
5. Internetworking with TCP/IP Vol-I – Comer (PHI pub.)
6. Data Communications and distributed Networks-V.B, Black, (Prentice Hall pub.)

MSIT251: Java Programming Lab

Course Outcomes:

CO1: Able to implement the basic concepts such as function Overloading, array and string manipulation in Java

CO2: Use utility classes in the real time applications

CO3: Understand the types of inheritance

CO4: Implement packages, manipulate threads and exception handling techniques

CO5: Connect databases with Java programs

Examination: Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper

MSIT252: Data Structure Lab

Course Outcomes:

CO1: Understand the concept of data structures, and apply algorithm for solving problems like Sorting, searching, insertion and deletion of data through C language.

CO2: Understand linear data structures for processing of ordered or unordered data.

CO3: Implement various operations in C program on dynamic data structures like single linked list, circular linked list and doubly linked list.

CO4: Explore the concept of nonlinear data structures such as trees and graphs through C programming.

Examination: Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper

MSIT253: Web Designing Lab

Course Outcomes:

CO1: Creating webpages using basic HTML tags

CO2: Styling Webpages using CSS

CO3: Creating dynamic web pages using Javascript

CO4: Implementation of DOM objects

CO5: Creating web pages implementing event handling, form Validation etc.

Examination: Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper

M.Sc. – IT Third Semester

MSIT301: .Net Technologies

Course Outcomes:

CO1: Understand how to create dynamic web pages using ASP.NET.

CO2: Configure an ASP.NET application using .config files.

CO3: Create a user interface on an ASP.NET page using standard and advanced web server controls.

CO4: Add a user control and a custom server control to an ASP.NET page.

CO5: Create and enhance websites with master pages and themes.

CO6: Identify and fix bugs in an ASP.NET application.

CO7: Display dynamic data from a data source using ADO.NET and data binding.

CO8: Deploy an ASP.NET application to a production web server.

Unit -I

Introduction to .NET: Concept and Features, Microsoft Intermediate Language, Meta Data, .net name spaces, Common Language Runtime, Common Type System, Common Language Specification, .Net Applications. Introduction to C# Programming with respect to ASP.NET.

Unit- II

Basics of ASP. NET: Creating and deploying ASP .NET applications, Web forms, Web controls, working with events, Rich web controls, Custom web controls, Validation controls, Debugging, Master Page .

Unit- III

Introduction to web services: Web services Infrastructure, Web Services: Building, Deploying, publishing, Finding, Consuming.

Unit -IV

Basics of ADO .NET: ADO Objects, (Data Table – Data Views – Data Set, Data Adapter), ADO .NET Providers(OLEDB and SQL Providers). Introduction to XML.

Recommended Books:

1. Herbert Schildt, The Complete Reference C# 3.0, Tata McGraw-Hill
2. ASP.NET 4 Unleashed by Stephen Walther, Kevin Scott Hoffman, Sams Publishing
3. Bill Evjen, Professional ASP.NET 3.5 in C# and VB, Wrox Publication
4. Kogent Solutions, C# 2008 Programming covers. NET 3.5 (Black Book), Dreamtech Press.

MSIT302: Python Programming (From session 2021-22 onwards)

Course Outcomes:

CO1: Understand and use Python control flow statements with ease, as well as the language's basic syntax and semantics.

CO2: Ability to understand of how to handle strings and functions.

CO3: Learn how to use data structures like lists, dictionaries, tuples, and sets to develop and manipulate Python programs.

CO4: Determine the regular expression and file system operations that are most frequently used.

CO5: Understand the Python-specific terms for Object-Oriented Programming, such as encapsulation, inheritance, and polymorphism.

Unit – I

Introduction and Overview

Introduction, Comments, Keywords and Identifiers , Variables and Assignment statements, Standard Types, Other Built-in Types, Internal Types, Operators, Built-in Functions. Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Sequences: Strings, Sequences, Strings, String-only Operators, String Built-in Methods, Special Features of Strings, Conditionals and Loops: if statement, else Statement, elif Statement, while Statement, for Statement, break Statement, continue Statement, pass Statement

Unit – II

Lists and Dictionaries

Functions, Lists, List type built in Methods, Special Features of Lists, Tuples, Tuple Operators and Built-in Functions, Special Features of Tuples, Introduction to Dictionaries, Built-in Functions, Built-in Methods, Dictionary Keys, Sets, Comparing Sets, Mathematical set operations, set comprehensions.

Unit – III

Regular Expression and Exception Handling

Regular Expression: Introduction, Special Symbols and Characters for REs, REs and Python, Exceptions in Python, Detecting and Handling Exceptions, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions

Unit – IV

OOPs in Python

Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods, Class variables, Inheritance, Polymorphism, Type Identification

Recommended Books:

1. Python, The Complete Reference , Martin C Brown, Mac Graw Hill
2. Core Python Programming, Dr. R Nageshwara Rao, Dreamtech Press India Pvt. Ltd
3. Python Programming: Using Problem Solving Approach, Reema Thareja
4. Let us python, Yashvant kanetkar, Aditya Kanetkar, BPB Publications

MSIT303: PHP Programming

Course Outcomes:

CO1: Understand the differences between Server-side and Client-Side Scripting

CO2: Learn basic programming constructs of PHP

CO3: Understand differences between get and post methods and use of superglobal variables

CO4: Able to implement cookies and manage session

CO5: Understand various functions of arrays and strings

CO6: Able to understand Database handling concepts

UNIT-I

Introduction to PHP: Server side scripting vs Client Side Scripting, Evaluation of PHP, Features of PHP

Programming Fundamentals of PHP: Basic Syntax, Variables and constants, Data types, Operators and Expressions

Control Statements: Conditional Statements, Looping Statements (while, do...while, for loop, foreach), Nested Loops, Jumping Statement.

UNIT-II

Arrays: Numeric, Associative and Multidimensional Arrays

Functions: Defining a Function, Calling a Function, Parameter passing, Returning value from function

Strings: Creating and Accessing Strings, String Related Library functions, Searching, Replacing, Formatting, Pattern matching

UNIT-III

Form Data Handling: \$_GET, \$_POST, \$_REQUEST Variables

Cookies: Introduction to Cookies, Need of Cookies, Setting up a Cookie, Deleting a Cookie

Session Management: Introduction to Session Management, Creating Session Variables, Retrieving Session Variables

Exception Handling: Understanding Exceptions and errors, Handling Exceptions in PHP, User Defined Exceptions

UNIT-IV

File Handling: Opening and Closing a file, Copying, Renaming and Deleting a file, File opening Modes, Reading and Writing in Files

Database Handling: Connection with MySql Database, Performing basic database Operations (Insert, Delete, Update, Select), Query Handling.

Reference Books:

1. PHP, The CompleteReference, Steven Holzner, TMH
2. Beginning PHP 5.3, Matt Doyle, John Wiley & Sons
3. PHP Beginner's Practical Guide, Pratiyush Guleria, BPB Publications

MSIT304: E-Commerce Application Development

Course Outcomes:

CO1: Determine the constituent elements of electronic commerce.

CO2: Recognize the advantages of conducting online sales.

CO3: Acquire knowledge on optimizing and ensuring safety during online selling.

CO4: Develop a comprehensive e-commerce strategy tailored to your business.

CO5: Comprehend the risks associated with cyber security in online trading and business transactions.

CO6: Familiarize yourself with methods to safeguard your online business, including securing your accounts and being vigilant about cybercrime.

Unit-I

Introduction to E-Commerce: Definition of e-Commerce, objectives, advantages, disadvantages, scope of e-commerce, Traditional Commerce V/s E-Commerce.

Unit-II

E-Commerce Models: Business to consumer, Business to Business, Consumer to Consumer, Other models-Brokerage Model, Aggregator Model, Info-Mediary Model, Community model, Value chain model, Supply Chain Model. Competitive advantage, Business strategy.

Unit-III

Electronic Data Interchange: Definition of EDI, Types of EDI, EDI standards, EDI Security and Privacy Issues, EDI Implementation, Format of EDI, Electronic-Catalogs, Digital Libraries. E-Governance, E-Buying, E-Selling, E-Banking, E-Retailing.

Network Security: Network Security and Firewalls, Client Server Network, Security Threats, Cyber Law, E-mail.

Unit-IV

E-Payment System: Types of E-Payment Systems (EFT, E-Cash, ECheque, Credit/Debit Card, Smart Card, Digital Tokens and Electronic Purses/ Wallets) Payment Gateways.

Recommended Books:

1. Davis Whiteley: E-Commerece, TataMcHill, Delhi
2. P. T. Joseph: E-Commerece, Addis Anwesley, Delhi
3. R. Kalakola and A.B. Whiston : Frontiers of Electronic Commerce; Addison Wisley , 1996
4. Greensein, Feinman : Electronic Commerce Security, Risk management and Control; TMH, 2000
5. Saily Chan: Electronic Commerce Managment; John Wisley; 1998.
6. David kosiur ; Understanding E-commerce , The cutting edge of business, Tata-McGraw Hill
7. Kamlesh K. Bajaj & Debjani Nag, E-Commerce, The cutting edge of business, Tata-MCGraw Hill
8. Pete Losuin and A.Murphy, Electronic Commerce, A Jaico Book
9. Green Stein "Electronic Commerce", TMH.

MSIT305: Software Engineering and Testing

Course Outcomes:

CO1: Ability to break down a given project into multiple phases within its lifecycle.

CO2: Select the most suitable process model based on user requirements.

CO3: Demonstrate proficiency in executing diverse lifecycle activities, including analysis, design, implementation, testing, and maintenance.

CO4: Acquire knowledge about the multitude of processes employed throughout each stage of product development.

Unit-I

Software Engineering Fundamentals: Definition of Software, Software Engineering, Software Development Life Cycle, Process Models: Definition, Water Fall Model, Incremental Process Models [Incremental Model, RAD Model], Evolutionary Process Models [Prototyping, Spiral Model, Concurrent Development Model], Specialized Process Models, Specialized Process Models [Component-Based Development Model, Formal Methods Model]

Unit-II

Project Management: Concepts, Software Process and Project Metrics; Software Project Estimation: Project Planning, Software Scope and Resources. Software Project Estimation, Decomposition Techniques. Empirical Estimation Models: COCOMO Model, Software Equation. Project Scheduling and Tracking.

Unit-III

Software Requirements and Analysis: Requirement Engineering Tasks, Requirement Analysis, Analysis Modeling Approaches: Data Modeling, Flow-Oriented Modeling, Object Oriented Analysis.

System Design: Design Concepts, Design Models: Data Design, Architectural Design, Interface Design and Component-Level Design.

Unit-IV

Software Testing: Software Testing Fundamentals, Testing Strategies: Unit Testing, Integration Testing, Validation Testing, System Testing. Testing Approaches: Black-Box Testing and White-Box Testing. Difference between Black Box Testing and White Box Testing Approaches.

Software Quality Assurance: Quality Concepts, Software Quality Assurance, Software Reliability.

Advance Topics in Software Engineering: Computer Aided Software Testing Tools, Software Reengineering.

Recommended Books :

1. Software Engineering – A Practitioners Approach Roger S. Pressman, 3rd /4th Edition, Mcgraw Hill, International Education.
2. An Integrated Approach To S/w Engineering, Pankaj Jolote, 1st / 2nd Edition, Narosa.
3. Software Engineering – A Programming Approach, D. Belie I. Moray, J. Rough, PHI.
4. Software Testing Techniques, Barrios Bier, 2nd Edition, Van N Ostrand Reinhold.

MSIT351: .Net Lab

Course Outcomes:

CO1: Create a user interface on an ASP.NET page using standard and advanced web server controls.

CO2: Add a user control and a custom server control to an ASP.NET page.

CO3: Implementation of master pages and themes for enhancing websites

CO4: Perform Database operations using ADO.NET and data binding.

CO8: Deploy an ASP.NET application to a production web server.

Examination: Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper.

MSIT352: Python Lab

Course Outcomes:

CO1: Understand core programming basics and program design using Python language.

Understand the basic concepts of scripting and the contributions of scripting language.

CO2: Write, Test and Debug Python Programs.

CO3: Implement Conditionals and Loops for Python Programs.

CO4: Use functions and represent Compound data using Lists, Tuples and Dictionaries.

CO5: Understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.

CO6: Understand the high-performance programs designed to strengthen the practical expertise

Examination: Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper.

MSIT353: PHP Lab

Course Outcomes:

CO1: Learn installation of Xampp Server and execution of PHP scripts

CO2: Implement different programming constructs of PHP

CO3: Create PHP scripts for arrays and string handling

CO4: Perform file and database handling in PHP

CO5: Implement cookies through PHP scripts

CO6: Manage sessions in PHP

Examination : Practical

Exercises to be framed so as to cover the topics and tools covered in theory paper.

M.Sc – IT Fourth Semester

MSIT401 Elective Paper I: Artificial Intelligence and Expert Systems

Course Outcomes:

CO1: Understanding of the concept of intelligence and how it relates to artificial intelligence (AI)

CO2: Proficient in various search techniques used in AI, including depth-first and breadth-first search methods

CO3: Skilled in heuristic search methods such as hill climbing, best-first search, and graph search

CO4: Acquire knowledge of various reasoning techniques used in AI and understand semantics nets, frames, conceptual dependency, scripts, and various forms of reasoning like monotonic reasoning, logical reasoning, default reasoning, and statistical reasoning

CO5: Well-versed in the concept of expert systems and their significance

Unit – I

Concept of intelligence, Artificial intelligence, definition turning test, areas of application. Search techniques, state space, Production rules, problem characteristics. Production system characteristic, depth first, breadth first search methods.

Unit – II

Heuristic search method, generate and test, hill climbing, best first method, graph search, AND OR search methods, constraint satisfaction, backtracking. Introduction to list and string processing, concept of knowledge, Logic, propositional and predicate calculus, resolution.

Unit – III

Semantics nets, frames, conceptual dependency, scripts, Monotonic reasoning, logical reasoning induction, default reasoning, minimalist reasoning, statistical reasoning, Baye's theorem, certainty factors, Dempster Shafer theory, Fuzzy logic.

Unit – IV

Concept of learning, Knowledge acquisition, rote learning, discovery, analogy. Concept of expert system, need for an expert system, Component and categories of an expert system, Stages in the development of an expert system.

Recommended Books:

1. Elaine Rich & Kevin Knight: Artificial Intelligence and Expert System, PHI.
2. Charniak, E.: Introduction of Artificial Intelligence, Narosa Publishing House.
3. Winton. P.H. : LISP, Narosa Publishing House.
4. Marcellus: Expert System Programming in TURBO PROLOG Prentice-Hall Inc. 1989.
5. Clark, K. L. & McCabe, F.G.: Micro-Prolog Prentice-Hall Inc. 1987.

MSIT401 Elective Paper II: Information Protection and Security

Course Outcomes:

CO1: Comprehensive understanding of the fundamental concepts in cryptography and security

CO2: Proficient in conventional encryption algorithms, including Triple DES, Blowfish, IDEA, and RC algorithms

CO3: Have a strong grasp of public-key cryptography and its principles

CO4: Understand the requirements and functions of authentication, message authentication codes, and security considerations of hash functions and MACs.

CO5: Well-versed in network and system security concepts

Unit – I

Introduction to Cryptography and Security: Attacks, Services & Mechanisms, Security, Attacks, Security Services. Conventional Encryption, and Steganography Symmetric and Asymmetric Cipher Schemes, Stream Cipher and Block Cipher, DES and AES

Unit – II

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, RC2 Placement & Encryption Function, Key Distribution, Random Number Generation

Public Key Encryption: Public-Key Cryptography: Principles of Public-Key Cryptosystems, RSA Algorithm, Key Management, Fermat's & Euler's Theorem, Primarily, The Chinese Remainder Theorem.

Unit – III

Hash Functions: Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Birthday Attacks, Security Of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Authentication Protocol, Digital Signature Standard (DSS).

Unit – IV

Network & System Security: Authentication Applications: Kerberos X.509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP), S / Mime, Web Security: Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (SET), System Security: Intruders, Viruses, Firewall Design Principles, Trusted Systems.

Recommended Books:

1. Kaufman, c., Perlman, R., and Speciner, M., Network Security, Private Communication in a public world, 2nd ed., Prentice Hall.
2. Stallings, W, Cryptography and Network Security: Principles and Practice, 3rd ed., Prentice Hall PTR.
3. Pieprzyk Josef and et.al; Fundamentals of Computer Security, Springer-Verlag, 2008.
4. Trappe & Washington, Introduction to Cryptography, 2nd Ed. Pearson.

5. Johannes A. Buchmann, "Introduction to cryptography", Springer- Verlag.

MSIT401 Elective Paper III: Research Methodology

Course Outcomes:

CO1: Understanding of the foundational aspects of research, including its meaning, objectives, motivation, and utility

CO2: Proficient in comprehending the importance and features of a good research design

CO3: Understanding of the concept of measurement and the challenges it presents in research

CO4: Acquire skills in data preparation and analysis

CO5: Have the ability to structure a research paper effectively, considering the layout, style, and content

Unit – I

Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process Problem Identification & Formulation – Research Question – Investigation Question – Measurement Issues – Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance

Unit – II

Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs –concept, types and uses. Experimental Design: Concept of Independent & Dependent variables. Qualitative and Quantitative Research: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches.

Unit – III

Measurement: Concept of measurement– what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio. Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample– Practical considerations in sampling and sample size.

Unit – IV

Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association.

Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, When and where to publish? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline.

MSIT402 Elective Paper I: Open Source Operating System

Course Outcomes:

CO1: Possess a comprehensive understanding of Linux system architecture, including the kernel and shell components.

CO2: Grasp the concepts of process management, signal handling, and system calls.

CO3: Able to create shell scripts, utilize control statements such as if-then-else, case-switch, loops (while, until, for), and handle variables effectively.

CO4: Gain familiarity with various types of shells in Linux and understand the basics of the vi editor

CO5: Have a solid understanding of system administration tasks on Linux systems

Unit – I

Introduction to open source system software, Linux Architecture (Kernel & shell), Linux file system (inode, Super block, Mounting and Unmounting), Essential Commands (cal, date, echo, printf, bc, script, mailx, passwd, who, uname, tty, sty, man), File and Directory types, Managing Files (pwd, cd, mkdir, rmdir,).

Unit – II

Handling ordinary Files, Basic File Attributes (Ownership and Access Permissions of files and directories). Process Management in Linux, Signal Handling, System call. I/O Redirection and Piping. Simple Filters (pr, head, tail, cut, paste, sort, uniq, tr), Filters using Regular Expressions (grep, sed).

Unit – III

Introduction to Shell, Types of Shell, Editors(basics of vi), Shell Programming-Shell scripts, Shell control statements, Variables, if-then-else, case-switch, While, Until, For, Set and Shift, Trap, Find, string handling, Shell Meta characters, Shell Scripts, Shell keywords, Built in Commands, Shell Procedures and Reporting, Handling documents.

Unit – IV

System Administration– root, administrator privileges, security, Booting and Shutting down, managing disk space, device files, Advanced System Administration (partitions and file system, fdisk, mkfs, mounting and unmounting filesystems)

Recommended Books :

1.Linux: The Complete Reference, Sixth Edition by Richard Petersen

2.A Practical Guide to Linux Commands, Editors, and Shell Programming (3rd Edition) by Mark G. Sobell (Author)

3. Your UNIX/Linux: The Ultimate Guide by Sumitabha Das

MSIT402 Elective Paper II: CLOUD COMPUTING

Course Outcomes:

CO1: Possess a solid understanding of cloud computing and its origins.

CO2: Able to explain the various cloud deployment models, including private, public, hybrid, and community clouds.

CO3: Having an in-depth understanding of different cloud service models.

CO4: Analyze virtual machine provisioning, migration services, and scheduling techniques for resource reservation.

CO5: knowledgeable about cloud applications, challenges, security, and privacy issues.

Unit 1

Introduction: Introduction to Cloud Computing, Roots of Cloud Computing: Fundamental concepts of Distributed Systems, Cluster Computing, Grid Computing, and Mobile Computing.

Unit 2

Cloud Models Basics of Cloud Computing Concepts, Characteristics of Cloud Computing, Need for Cloud, Cloud Deployment models: private, public, hybrid and community cloud, Cloud Services: Resource-as-a-Service (RaaS), Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS), Examples of each service.

Unit 3

Cloud Services RaaS: Usage of Physical resources like servers, networks, data center etc, IaaS: Virtualization,. PaaS: Integrated lifecycle platform: Google App Engine, Microsoft Azure, Anchored life cycle platform: Salesforce platform, SaaS: Characterizing SaaS, Salesforce's software environment.

Unit 4

Resource Scheduling for Cloud Computing: - Introduction, Virtual Machine provisioning and Migration Services, Scheduling techniques of Virtual machines for resource reservation, Cloud Service Scheduling hierarchy, Economic models for Resource-allocation scheduling , Heuristic Models for task –execution scheduling : Static Strategies , Dynamic Strategies , Heuristic Schedulers. Cloud Applications Cloud Applications, Cloud challenges, Cloud Security and privacy issues, Mobile Cloud Computing, Integration of Cloud with Wireless Sensor Network and its application.

Reference Books:

1. Cloud Computing Bible by Barrie Sosinsky, Wiley Publication, 2011.
2. Cloud Computing: A Practical Approach by Anthony T. Velte Toby J. Velte, Robert Elsenpeter, The McGraw-Hill Publication, 2010.
3. Cloud Computing: Concepts, Technology and Architecture by Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, 1st Edition, Prentice Hall.
4. Cloud Computing: Data-Intensive Computing and Scheduling by Frederic Magoules , Jie Pan, and Fei Teng. CRC Press. Taylors & Francis Group.

MSIT402 Elective Paper III: Mobile Application Development

Course Outcomes:

CO1: Understanding of the history of mobile software development and the emergence of the Android platform.

CO2: Proficient in comprehending the components of Android applications, including Activities, Services, and Intents.

CO3: Identify and utilize various UI screen elements and create layouts that enhance the user experience

CO4: Possess the skills to work with common Android APIs related to data management and networking.

CO5: Able to leverage various Android APIs to add functionality to their applications

Unit – I

Introduction to Android: History of Mobile Software Development, The Open Handset Alliance, The Android Platform, Android SDK, Building a sample Android application.

Unit – II

Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions, Managing Application resources in a hierarchy, Working with different types of resources.

Unit – III

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

Unit – IV

Using Common Android APIs: Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data Between Applications with Content Providers, Using Android, Networking APIs, Using Android Web APIs, Using Android Telephony APIs.

Recommended Books :

1. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, Pearson Education, 2nd ed. (2011)
2. Reto Meier, “Professional Android 2 Application Development”, Wiley India Pvt Ltd (2011)
3. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd(2009)
4. Sayed Y Hashimi and Satya Komatineni, “Pro Android”, Wiley India Pvt Ltd(2009)

MSIT451: Project(Project, Report, Viva)

Course Outcomes:

CO1: Apply acquired technical skills to real-world IT or CS projects effectively.

CO2: Demonstrate proficiency in project planning, organization, and execution, including setting milestones and managing resources.

CO3: Work collaboratively with professionals in an industrial setting, showcasing strong communication and teamwork skills.

CO4: Analyze complex problems, apply critical thinking skills, and develop innovative solutions in the IT or CS field.

CO5: Gain hands-on experience in the complete software development lifecycle, from requirements gathering to deployment, following industry best practices.

Two typed and duly bound copies of project report shall be submitted at least 3 weeks before commencement of the Theory/Practical examination which ever commences earlier.

General instructions about preparation of training report

1. The Power Point Presentation has to be prepared for the project report.
2. The Power Point Presentation will be around 10-15 mins, and then question answers. So prepare the number of slides accordingly.
3. The binding for reports will be spiral binding.
4. The format for the reports should be adhered with exactly.
5. The Coding of the Project should not be included in the report.
6. Contents of Index page should include the following parts:
 - a. Project Requirements.
 - b. Feasibility Study.
 - c. Detailed Designing:
 - d. List of Figures.
 - e. List of DFD.
 - f. List of ER-Diagram.
 - g. List of Tables.
 - i. Testing.
 - j. Future Scope.

Page Format of Project Report should be as follows.

Paper: A4

Font: Times New Roman, Bookman Old Style

Chapter Heading: 16pt, Sub heading: 14pt.

Running Matter: 12 pt

All topics will be numbered accordingly.

Paragraph Gap: 6 Pt Maximum

Line Gap: 1.5

Margins: Left 1.5, Right, Top and Bottom 1 inch

Please Note: Project report of live project in the given format has to be prepared in 3 sets. These reports should have CD containing the soft copy and Power Point Presentation of Project report.

Format of Front Page of Project Report.

Project Report

Submitted to the S. S. Jain Subodh P.G.(Autonomous) College,

University of Rajasthan, Jaipur

Logo of college

UOR logo

in Partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE (INFORMATION TECHNOLOGY)

Submitted by
(your name)

Name of Internal Guide

**Name of Training Incharge
(from the company, where you
have undergone training)**

MSc-IT (Academic Session)
(month of deposition and year)

CERTIFICATE

This is to certify that “**your name, S/D/O-----** ” is/was under training from (start date) to (end date) in my supervision for partial fulfillment of the requirement for the award of the Degree of Master of Science (Information Technology).

During this period he /she has worked on.....(description of training) project as -----.
I wish for his/her good future.

Date:

Name of Training Incharge
Designation