PROGRAMME TITLE: Master of Science (Information Technology) M.Sc. (IT)

PROGRAMME OBJECTIVES:

The objective of the M.Sc.-IT programme is to prepare graduate students for productive careers in the software industry and academia by providing an outstanding environment for teaching and research in the core and emerging areas of the discipline.

This Master's Degree Program has been designed with a semester approach in mind. The first year courses are aimed at skills development in computers using various technologies, the second year, provides the specialization and the project work.

The main objectives of the Msc-IT programme includes:

- Learn various programming languages to solve real world problems from diversified python and Machine learning domain.
- To develop in depth understanding of the key concepts of computer science and to impart knowledge of problem solving techniques, database management and software engineering.
- Develop problem solving skills in interdisciplinary domains.
- Focus on development of advanced knowledge and specific skills required for IT industry working in the domain of python and Machine learning.
- To make sustained efforts for holistic development of the students and empower them to analyze, develop, configure IT solutions keeping in view the challenges posed by changing industrial requirements.
- To develop competent computer professionals with strong ethical values.

PROGRAMME OUTCOMES (POs)
PROGRAMME SPECIFIC OUTCOMES (PSO's)

At the end of this programme, M.Sc.(IT) student will be able to:

- Explore software, hardware, application systems and their interplay in Machine learning systems.

- Employ tools and technologies to implement Machine learning applications.

- Acquire experimental learning of algorithms and tools required for capturing, storing, managing and analyzing new language.
- Gain understanding of the key technologies Machine learning, Computer Organization, Computer Architecture, Data Communication, Web Technology, Cloud Computing, Soft computing, Artificial Intelligence, and Advance Data Structures.
- Understanding the key concepts of Information Technology to improvise organizational performance.

After Completion of the programme students are able to work as-
- Language Programmer
-IT Manager
-Software Testing
-Data Analyst
-Web Application Developer

Vikram University, Ujjain

Board of studies in Computer science (Faculty of Engineering Science)

SYLLABUS of M.Sc. (Information Technology) Programme

[Choice Based Credit System & Grading System (CBCS& GS)]

Exclusively for University Teaching Department (ICS,VUU)

TWO YEAR M.Sc. in Information Technology

(FULL TIME) PROGRAMME of UTD (ICS,VUU)

[Modified as according to the provision of "Ordinance 14 : Choice Based Credit System"

(Effective the Academic Session 2020-2021)

VIKRAM UNIVERSITY,UJJAIN

COURSE STRUCTURE

M.Sc. (Information Technology)-First Semester

SN	Course type	Paper Code	Paper Name	End term Sem Exam	Internal	Max Marks	Credits*	Distribution of Credits			
								C	L	T	P
1	Core Course	MSIT101	Discrete Mathematical structure	60	40	100	6	4			2
		MSIT102	Operating system & system software	60	40	100	6	4	2		
2	Course for Ability Enhancement and Skill Development (AE & SD)	MSIT103	Communication Skills	60	40	100	6	4	2		
	Choose any one from MSIT14-E1 and MSIT14-E2										
3	Elective Discipline Centric	MSIT104-E1	Computer organization & Architecture	60	40	100	6	4	2		
		MSIT104-E2	Techniques Of Operation Research	60	40	100	6	4	2		
	Choose any one from MSIT15-E1, MSIT15-E2 and MSIT15-E3										
4	Elective Generic Categories	MSIT105-E1	Object oriented programming using C++	60	40	100	6	4			2
		MSIT105-E2	Data Communication and Computer Network	60	40	100	6	4	2		
		MSIT105-E3	Any Course from Massive Open Online Course(MOOCs)available at SWAYAM	60	40	100	6	4	2		
5		MSIT106	Comprehensive viva-voce	50	-	50	04Virtual (VR)				
			Total			550	30+4	20	06	04	

(C=Credit Per Week) / (L = Lectures Per Week)/ (T & PW =Tutorials & Practical Work per week)

*One Credit is equivalent to one hour (60 minutes) of teaching (lecture or tutorial) and two hours (120 minutes) for practical

COURSE STRUCTURE

M.Sc. (Information Technology)-Second Semester

SN	Course type	Paper Code	Paper Name	End term Sem Exam	Internal	Max Marks	Credits*	Distribution of Credits			
							C	L	T	P	
1	Core Course	MSIT201	Data Structure Using C++	60	40	100	6	4		2	
		MSIT202	Data Base Management System	60	40	100	6	4	2		
2	Course for Ability Enhancement and Skill Development (AE & SD)	MSIT203	Computer Hardware and Networking	60	40	100	6	4	2		
	Choose any one from MSIT14-E1 and MSIT14-E2										
3	Elective Discipline Centric	MSIT204-E1	Theory of Computation	60	40	100	6	4	2		
		MSIT204-E2	Internet Programming	60	40	100	6	4	2		
	Choose any one from MSIT15-E1, MSIT15-E2 and MSIT15-E3										
4	Elective Generic Categories	MSIT205-E1	Programming with VB.Net	60	40	100	6	4		2	
		MSIT205-E2	Computer System Architecture and parallel Processing	60	40	100	6	4	2		
		MSIT205-E3	Any Course from Massive Open Online Course(MOOCs) available at SWAYAM	60	40	100	6	4	2		
5		MSIT206	Comprehensive viva-voce	50	-	50	04Virtual (VR)				
			Total			550	30+4	20	06	04	

(C=Credit Per Week) / (L = Lectures Per Week)/ (T & PW =Tutorials & Project Work per week)

*One Credit is equivalent to one hour (60 minutes) of teaching (lecture or tutorial)and two hours (120 minutes) for practical

COURSE STRUCTURE

M.Sc. (Information Technology)-Third Semester

SN	Course type	Paper Code	Paper Name	End term Sem Exam	Internal	Max Marks	Credits*	Distribution of Credits			
								C	L	T	P
1	Core Course	MSIT-301	Advance Data Structures	60	40	100	6	6	4		2
		MSIT-302	Design and Analysis of Algorithm	60	40	100	6	6	4	2	
2	Course for Ability Enhancement and Skill Development (AE & SD)	MSIT-303	System Analysis and Design	60	40	100	6	6	4	2	
	Choose any one from MSIT14-E1 and MSIT14-E2										
3	Elective Discipline Centric	MSIT 304-E1	Artificial Intelligence	60	40	100	6	6	4		
		MSIT 304-E2	Data Mining and Data Warehousing	60	40	100	6	6	4	2	
	Choose any one from MSIT15-E1, MSIT15-E2 and MSIT15-E3										
4	Elective Generic Categories	MSIT 305-E1	Web Development with PHP	60	40	100	6	6	4		2
		MSIT 305-E2	Cloud Computing	60	40	100	6	6	4	2	
		MSIT 305-E3	Any Course from Massive Open Online Course(MOOCs) available at SWAYAM	60	40	100	6	6	4	2	
5		MSIT 306	Comprehensive viva-voce	50	-	50	04Virtual (VR)				
			Total			550	30+4	30+4	20	06	04

C=Credit Per Week) / (L = Lectures Per Week)/ (T & PW =Tutorials &Practical Work per week)

*One Credit is equivalent to one hour (60 minutes) of teaching (lecture or tutorial)and two hours (120 minutes) for practical

Note: (1) The students will have the choice to opt a course under the category of Elective Courses available within the UTD (ICS, VUU) or in other UTDs but from same level of the programmes. (2)An alternative choice will also be available to the students to opt a course in each semester under elective-generic category including skill development course from Massive Open Online Courses (MOOCs) available at SWAYAM plate form. (3) The student can also opt a course under Elective- Discipline Centric category from Massive open online courses (MOOCs) available at SWAYAM plate form. In such cases, the provisions "Ordinance 14 : Choice Based Credit System" shall be applicable and the conditions mentioned therein will need to be satisfied by the student if they opt courses from Massive Open Online Courses (MOOCs) available at SWAYAM plate form.
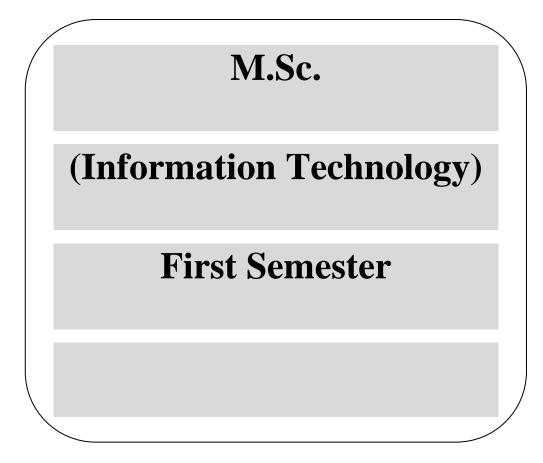
COURSE STRUCTURE

M.Sc. (Information Technology)-Fourth Semester

SN	Course type	Paper Code	Paper Name	End term Sem Exam	Internal	Max Marks	Credits*	Distribution of Credits			
							C	L	T	P
1	Core Course	MSIT 401	Programming with Python	60	40	100	6	4		2
		MSIT 402	Soft computing	60	40	100	6	4	2	
2	Course for Ability Enhancement and Skill Development (AE & SD)	MSIT 403	Software Engineering and Project Management	60	40	100	6	4	2	
Choose any one from MSIT14-E1 and MSIT14-E2											
3	Elective Discipline Centric	MSIT 404-E1	Advance Java	60	40	100	6	4		2
		MSIT 404-E2	Network security	60	40	100	6	4	2	
Choose any one from MSIT15-E1, MSIT15-E2 and MSIT15-E3											
4	Elective Generic Categories	MSIT 405	Final presentation/ seminar	30	20	50	3			3
		MSIT 405	Valuation of dissertation	30	20	50	3			3
		MSIT 405	Final viva-voce	50	-	50	04 Virtual (VR)			
			Total			550	30+04	16	04	10

(C=Credit Per Week)/(L=Lecture Per Week)/(T & PW=Tutorials & Practical Work Per Week)

*One Credit is equivalent to one hour(60 minutes)of teaching (lecture or tutorial)and two hours (120 minutes) for practical.

M.Sc.

(Information Technology)

First Semester

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P

MSIT101	Discrete Mathematical structure	60	40	100	6	4		2

UNIT 1

Set Theory: Introduction, Sets and Elements, Universal Set and Empty Set, Subsets, Venn Diagrams. Relations: Introduction, Product Sets, Relations, Pictorial Representation of Relations, Composition of Relations, Types of Relations, Partial Ordering Relations.

UNIT 2

Functions: Introduction, One-to-One, Onto, and Invertible Functions, Cardinality. Logic and Propositional Calculus: Introduction, Propositions and Compound Propositions, Basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions.

UNIT 3

Counting: Introduction, Basic Counting Principles, Factorial Notation, Binomial Coefficients, Permutations and Combinations. Pigeon hole Principle.

UNIT 4

Graph Theory: Introduction, Graphs and Multigraphs, Subgraphs, Paths, Connectivity, Weighted Graphs, Complete, Regular and Bipartite Graphs. Directed Graphs: Introduction, Rooted Trees, Graph Algorithms: Depth first and Breadth-First Searches.

UNIT 5

TREES AND CUT - SETS : Paths and Circuits, Shortest Paths, Eulerian Paths and Circuits, Hamiltonian Paths and Circuits. Rooted Trees, Path Lengths in Rooted Trees, Binary Search Trees. Spanning Trees, Minimum Spanning Trees.

References:

1. Elements of Discrete Mathematics, C.L.Liu, Second Edition, TMH
2. Discrete Mathematics and its applications, Kenneth H. Rosen, (Fifth Edition), Tata McGraw Hill Publishing Company.
3. Theory and Problems of Discrete Mathematics, Semmour Lipschutz, Marc Lipson,
4. Second Edition, Schaum's Outline, T.M.H.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits *	Distribution of Credits

					C	L	T	P
MSIT102	**Operating system & system software**	60	40	100	6	4	2	

UNIT 1

Introduction to System Programs & Operating Systems, Evolution of Operating System (mainframe, desktop, multiprocessor, Distributed, Network Operating System, Clustered & Handheld System), Operating system services, operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling. Types of Operating System: Bare machine, Batch Processing, Real Time, Multitasking & Multiprogramming, timesharing system.File: concepts, access methods, free space managements, allocation methods, directory systems, protection, organization,sharing & implementation issues.

UNIT 2

Process: Concept, Process Control Blocks(PCB), Scheduling criteria Preemptive & non Preemptive process scheduling, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling, operations on processes, threads, inter process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock: Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock Process Management in Linux.

UNIT 3

Memory Hierarchy, Concepts of memory management, MFT & MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Structure & implementation of Page table.Concepts of virtual memory, Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.

UNIT 4

Mass Storage Structure: Disk Structure, Disk Scheduling- FCFS, SSTF, SCAN Scheduling, Disk Management, Swap-Space Management. Distributed operating system:-Types, Design issues, File system, Remote file access, RPC, RMI, Distributed Shared Memory(DSM), Basic Concept of Parallel Processing & Concurent Programming.

UNIT 5

System software and application software, layered organization of system software. Assemblers, Macros, Compilers, Cross compilers, Linking and loading, Relocation. Case study of Unix, Linux & Windows

References:

1. Operating Systems Concepts, A. Silberschatz, P.Galvin, G.Gagne, John Wiley & Sons, Inc.
2. Systems Programming and Operating Systems (Part II - Operating Systems), Dhamdhere, 2nd Edition, TMH
3. Donovan, J.J. : System programming, Mcgraw Hill,1972.
4. Dhamdhere. D.M.: Introduction to system software, Tata Mcgraw Hill Publ.comp. 1986

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
						C	L	T	P
						C	L	T	P
MSIT103	**Communication Skills**	60	40	100	6	4	2	

UNIT 1

Definition of Language, nature of language, Characteristics of Human Language. Varieties of English Language: British, American, Indian, Australian etc., English for specific and special purposes.

UNIT 2

Meaning and process of communication, importance of effective communication, communication skills, barriers to communication, Animal and human communication, Methods of communication (Verbal & Non-Verbal).

UNIT 3

Objectives of communication, types of communication, principles of communication, essentials of effective communication. Media of communication: written, oral, face-to-face, visual, audio-visual, merits and demerits of written and oral communication, preparing for oral presentation.

UNIT 4

Basic skills of communication, listening to and Understanding, Extended natural speech in business situations (Both face to face and on the telephone), Understanding standard American, British and Indian accents, speaking with correct, Pronunciation, English Consonants, English Vowels, Speaking with right accent.

UNIT 5

Developing communication skills, interview- how to face and how to conduct. Planning and preparing to speak, Strategies for making powerful openings in presentations and conducting presentations, Body Language, Voice Modulations.

References:

1. Essentials of Business Communication by Rajendra Pal and J.S.Korilahalli, Sultan Chand & Sons Publishers, New Delhi.
2. Business Communications by U.S. Rai & S.M.Rai, Himalaya Publishing House.
3. Writing a Technical Paper by Menzal and D.H.Jones, McGraw Hill, 1960.
4. Business Communication : Strategy and Skill, Prentice Hall New Jersey, 1987.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P

MSIT104-E1	Computer organization & Architecture	60	40	100	6	4	2	

UNIT 1

Binary Systems: Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Binary Codes. Boolean Algebra and Logic Gates: Boolean Functions, Digital Logic Gates.Simplification of Boolean Functions: The Map Method, Two and Three Variable Maps, Four Variable Map, Product of Sums Simplification, NAND and NOR Implementation, Don't-Care Conditions.

UNIT 2

Combinational Logic: Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure. Combinational Logic with MSI and LSI: Binary Parallel Adder, Decoders, Multiplexers. Sequential Logic: Introduction, Flip-Flops, Triggering of Flip-Flops.

UNIT 3

Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Design of Counters. Processor Logic Design: Introduction, Processor Organization, Arithmetic Logic Unit, Design of Arithmetic Circuit, Design of Logic Circuit, Design of Arithmetic Logic Unit, Status Register, Design of Shifter, Processor Unit.

UNIT 4

Microcomputer System Design: Introduction, Microprocessor Organization, Basic Concept of Instruction, Instruction Types, Micro Instruction Formatsand Addressing Modes, Subroutines Interrupt, Fetch and Execution cycle, Hardwired control unit, Micro-programmed Control unit- microprogram sequencer Control Memory, Sequencing and Execution of Micro Instruction.

UNIT 5

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory. Input Output Organization: Peripheral Devices, Input-Output Interface, Direct Memory Access (DMA), Input-Output Processors (IOP), Structure of Multiprocessor- Inter-processor Arbitration, InterProcessor Communication and Synchronization. Memory in Multiprocessor System, Concept of Pipelining, Vector Processing, Array Processing, RISC And CISC,Study of Multicore Processor – Intel, AMD.

Referencess:

1. Digital Logic and Computer Design, M. Morris Mano, P.H.I., Eastern Economy Edition.
2. Computer System Architecture (3rd ed..), M.Morris Mano, P.H.I., Eastern Economy Edition.
3. Computer Architecture and Organization, J.P. Hays, McGraw Hill.
4. Digital Principle and Applications, Malvino and Leach
5. Digital Computer Fundamentals, Thomas C. Bartee
6. William stalling ,"Computer Architecture and Organization" PHI

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
						C	L	T	P

MSIT104-E2	Techniques Of Operation Research	60	40	100	6	4	2	

UNIT 1

Introduction: nature and meaning of O.R. Modelling in operations research, features of operation research, scope of operations research. Linear Programming Problem: formulation of L.P.P. solution of L.P.P. graphical method, simplex methods, duality.

UNIT 2

Assignment problems: Mathematical formulation, Reduction theorem, methods of solving the assignments problems, Unbalanced assignment problem, Transportation problem: formulation, basic feasible solution: North-West-Corner method, least cost method, Vogel's approximation method, Optimum solution: Modi method.

UNIT 3

Project management: introduction, network diagram representation, time estimates and critical path in network analysis, project evaluation and review techniques. Job sequencing: processing n jobs through 2 machines, processing n jobs through 3 machines, processing 2 jobs through m machines.

UNIT 4

Queuing Theory: introduction, queuing system Transient and steady traffic inlets, Distribution of arrival distribution of departure, M/M/I: ∞/ FCFS model. Replacement problems: replacement policy for items whose maintenance cost increases with time and money value is constant.

UNIT 5

Deterministic Inventory Models, what is inventory, types of inventory, inventory decisions, how to develop n variables model, costs involved in inventory problems, variables in inventory problem, classification of characteristics of inventory systems, EOQ model without shortage.

References :

1. Operations Research by Taha.
2. Operations Research by S D Sharma.
3. Introduction to Operations Research (Sixth Edition) by F.S. Hillier and G.J. Lieberman, Mc Graw Hill International Edition, Industrial Engineering Series, 1995.
4. Linear Programming by G. Hadley, Narosa Publishing House, 1995.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
						C	L	T	P

MSIT105-E1	Object oriented programming using C++	60	40	100	6	4		2

UNIT 1

Object Oriented Systems Development : Introduction to traditional programming with C. Objectives of OOP, Object Oriented Analysis, Object Oriented Programming in C++: Concepts of Objects, Classes, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding and Message passing.

UNIT 2

Object modeling, Dynamic modeling, Events, Status, Scenarios, Event hate diagrams, Operations, State diagrams, Functional Models, Dataflow diagrams, Constraints specification, Relation of object, Functional and Dynamic models.

UNIT 3

Tokens, Expressions and Control Structures, Classes and Objects, Overloading and information hiding, Function overloading, Operator overloading in C++, Memory Management: Constructors, Overloading of constructors, copy constructors, destructors.

UNIT 4

Inheritance : Inheritance, Derived and base classes, Single, Multilevel, Hierarchical, Hybrid Inheritance, Protected member, overriding member function, class hierarchies, multiple inheritance, Containership

UNIT 5

Polymorphism : virtual functions, late binding, pure virtual functions, abstract classes, friend functions, friend classes, static functions, this pointer, templates, function templates, Class templates.

References:

1. Object-Oriented Programming with C++: E. Balagurusamy, TMH, 2005
2. Object Oriented Programming in C++, Robert Lafore, Galgotia Publication.
3. Object Oriented Programming, Tomothy Budd, Pearson education.
4. Object Oriented Modelling and Design, J. Rambaugh, M. Blaha, W. Premerlani, F. Eddy, W. Lorensen, P.H.I.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT105-E2	Data Communication and Computer Network	60	40	100	6	4	2	

UNIT 1

Data Communication networks and system standards : Data Communication networks and open system standards: Data communication networks, Standards. ISO reference model. The Electrical Interface: Transmission media. Attenuation and distortion sources.

UNIT 2

Data Transmission: Data transmission basics. Asynchronous transmission. Synchronous transmission, Error detection methods. Data compression. Transmission control circuits. Communications control devices. Protocol basics: Error Control, Idle RQ, Continuous RQ, Link management.

UNIT 3

Local Area Networks : Topology Transmission Medium , Medium Access Control Methods, ICSMA/CD Bus, Token Ring , Performance , Wireless LANs , Wireless Media, Protocols, Network Layer, Bridges, Bridges, Source Routing Bridges Transparent , Internetworking with different types, Introduction to WAN.

UNIT 4

Transport Protocol : User Data Gram Protocol, TCP, Reliable Stream Service , Protocol Operations, Application support protocol, Session Layer, Token Concept, Presentation Layer, Data Encryption, Terminology, Message Authentication.

UNIT 5

TCP/IP Application protocols: Introduction to TELNET , FTP , SMTP , SNMP , World Wide Web, Directory Services, Domain Name system.

References:

1. Data Communications and Networking, Behrouz A. Forouzan, Tata McGraw Hill, 3rd Edition, ISBN 0-07-058408-7.
2. Data Communications and Networks, Godbole A, Tata McGraw-Hill Publications.
3. Data Communications, Gupta P., PHI, 2004, ISBN 81 - 203 - 1118 - 3
4. Understanding Data Communications and Networks, Shay W., Third Edition, Brooks Kale Thomson Learning/Vikas Publishing House, ISBN 981-254-966-8

M.Sc.

(Information Technology)

Second Semester

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT201	Data Structures Using C++	60	40	100	6	4		2

UNIT 1

Stack and Queue: Introduction –Common operations on data structures, Types of data structures, Data structures & Programming,contiguous implementations of stack, various operations on stack, various polish notations-infix, prefix, postfix, conversion from one to another-using stack; evaluation of post and prefix expressions. Contiguous implementation of queue: Linear queue, its drawback; circular queue; various operations on queue; linked implementation of stack and queue- operations

UNIT 2

General List: list and it's contiguous implementation, it's drawback; singly linked list-operations on it; doubly linked list-operations on it; circular linked list; linked list using arrays.

UNIT 3

Trees: definitions-height, depth, order, degree, parent and child relationship etc; Binary Trees- various theorems, complete binary tree, almost complete binary tree; Tree traversals-preorder, in order and post order traversals, their recursive and non recursive implementations; expression tree- evaluation; linked representation of binary tree-operations. Threaded binary trees; forests, conversion of forest into tree. Heap-definition.

UNIT 4

Searching, Hashing and Sorting: requirements of a search algorithm; sequential search, binary search, indexed sequential search, interpolation search; hashing-basics, methods, collision, resolution of collision, chaining; Internal sorting- Bubble sort, selection sort, insertion sort, quick sort, merge sort on linked and contiguous list, shell sort, heap sort, tree sort.

UNIT 5

Graphs: related definitions: graph representations- adjacency matrix, adjacency lists, adjacency multilist; traversal schemes- depth first search, breadth first search; Minimum spanning tree; shortest path algorithm; kruskals & dijkstras algorithm. Miscellaneous features Basic idea of AVL tree- definition, insertion & deletion operations; basic idea of B-tree- definition, order, degree, insertion & deletion operations; B+-Tree- definitions, comparison with B-tree; basic idea of string processing.

Reference Books:

1. Introduction to Data Structures and Algorithms with C ++, GLENN W.ROWE, Prentice Hall India, 2003
2. Data Structures and Algorithms, Alfred V. Aho, John E. Hopecraft, Jaffrey D. Ullman, Pearson education
3. M. Tenenbaum, "Data Structures using C & C++", Pearson Pub
4. Venkatesan , Rose, "Data Structures" Wiley India Pvt.Ltd
5. Pai; Data structure and algorithm , TMH Publications
6. T.H.Coreman,"Introduction to algorithm",PHI.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT202	Database Management System	60	40	100	6	4	2	

UNIT 1

DBMS Concepts and architecture Introduction, Database approach v/s Traditional file accessing approach, Advantages, of database systems, Data models, Schemas and instances, Data independence, Data Base Language and interfaces, Overall Database Structure, Functions of DBA and designer, ER data model:Entitles and attributes, Entity types, Defining the E-R diagram,Concept of Generalization, Aggregation and Specialization. transforming ER diagram into the tables. Various other data models object oriented data Model, Network data model, and Relational data model, Comparison between the three types of models.

UNIT 2

Relational Data models: Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints. Referential integrity, Intension and Extension, Relational Query languages:SQL-DDL, DML, integrity constraints, Complex queries, various joins, indexing, triggers, ssertions,Relational algebra and relational calculus, Relational algebra operations like select, Project,Join, Division, outer union. Types of relational calculus i.e. Tuple oriented and domain oriented relational calculus and its operations.

UNIT 3

Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multivalued dependencies.Query Optimization: Introduction, steps of optimization, various algorithms to implement select, project and join operations of relational algebra, optimization methods: heuristic based, cost estimation based.

UNIT 4

Transaction Processing Concepts: - Transaction System, Testing of Serilizability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures. Log based recovery. Checkpoints deadlock handling. Concurrency Control Techniques: - Concurrency Control, locking Techniques for concurrency control, time stamping protocols for concurrency control, validation based protocol, multiple granularity. Multi version schemes, Recovery with concurrent transaction. Introduction to Distributed databases, data mining, data warehousing, Object Technology and DBMS, Comparative study of OODBMS Vs DBMS . Temporal, Deductive, Multimedia, Web & Mobile database.

UNIT 5

Study of Relational Database Management Systems through Oracle/Postgres SQL/MySQL: Architecture, physical files, memory structures, background process. Concept of table spaces, segments, extents and block. Dedicated server, multi threaded server. Distributed database, database links, and snapshot. Data dictionary, dynamic performance view.Security, role management, privilege management, profiles, invoker defined security model. SQL queries, Data extraction from single, multiple tables equi-join, non equi-join, self-join, outer join. Usage of like, any, all, exists, in Special operators. Hierarchical queries, inline queries, flashback queries. Introduction of ANSI SQL, anonymous block, nested anonymous block, branching and looping constructs in ANSI SQL. Cursor management: nested and parameterized cursors, Oracle exception handling mechanism. Stored procedures, in, out, in out type parameters, usage of parameters in procedures. User defined functions their limitations. Triggers, mutating errors, instead of triggers

Reference Books:

1. Date C J, "An Introduction To Database System", Pearson Educations
2. Korth, Silbertz, Sudarshan, "Fundamental of Database System", McGraw Hill
3. Rob, " Data Base System:Design Implementation & Management", Cengage Learninig
4. Elmasri, Navathe, "Fundamentals Of Database Systems", Pearson Educations

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits *	Distribution of Credits		
					C	L	T	P
MSIT203	Computer Hardware and Networking	60	40	100	6	4	2	

UNIT 1

Introduction to computers, classification, generations, applications. Basic blocks of a digital computer. Hand Tools Basics and Specifications. Types of cabinets, relation with mother board form factor. Precautions to be taken while opening and closing PC cabinet. Main devices, components, cards, boards inside a PC(to card or device level only). Types and specifications of the cables and connectors used for interconnecting the devices, boards, cards, components inside a PC. Precautions to be taken while removing and/or reconnecting cables inside a PC

UNIT 2

Types of I/O devices and ports on a standard PC for connecting I/O devices. Function of keyboard, Function of Mouse, Function of monitor, Function of Speakers and Mic, Function of serial port, parallel port, brief principle of communication through these ports, types of devices that can be connected, interface standards, connectors, cable. Method of ensuring firm connection, Types of Processors and their specifications Memory devices, Semiconductor memories, Principle of working of Hard disk drive, cylinder, capacity, read write head, HDD interface IDE, SCSI-I/2/3 comparative study. Partitioning hard disk (primary and extended partitions) Precautions to be taken while fitting drives into bays and bay inside PC cabinet. CMOS setting(restrict to drive settings only).

UNIT 3

Installing UNIX / LINUX - Preparing functional system UNIX/LINUX - Adding new users, software, material components - Making back-up copies of the index and files - Dealing with the files and indexes, Basic Linux commands. - Linux file system, The Shell, Users and file permissions, VI editor, X window system, Filter Commands, Processes, Shell Scripting.Types of software. Functions of an operating system. Disk operating system. Version of a software, Service pack, Updating of OS, Different configurations of Computer system and its peripherals. Software Installation – Pre-installation - Prerequisites, Install procedure, Rollback or Uninstall procedure, Tests. Post-installation – Backup procedure & specifications, Restore procedure, Periodical view check. Awareness of legal aspects of using computers such as copyright, patent etc.

UNIT 4

OSI Model - The functions of different layers in OSI model, Network Components – Modems, Firewall, Hubs, Bridges, Routers, Gateways, Repeaters, Transceivers, Switches, Access point, etc. – their types, functions, advantages and applications. IP Routing in Network RIP IGRP Protocols, TCP/IP, FTP, Telnet etc., Theory on Setting IP Address(IP4/IP6) & Subnet Mask, Classes of IP Addressing.

UNIT 5

Concept of Internet. Architecture of Internet. DNS Server. Internet Access Techniques, ISPs and examples(Broadband/Dialup/ Wifi). Concept of Social Networking Sites, Video Calling & Conferencing. UTM and Firewall. Concept of Server, client, node, segment, backbone, host etc. Analog and Digital transmission, Network Interface Card, Crimping tools and Color standards for Straight crimping and Cross crimping Functions of NIC, Repeaters, Hub, Switches, Routers, Bridges, Router etc.

Reference Books:

1. PC Hardware: The Complete Reference Paperback – 2017 by Craig Zacker and John Rourke
2. "Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance" by James K L

Paper Code	Paper Name	End term Sem Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT204-E1	Theory of Computation	60	40	100	6	4	2	

UNIT 1

Automata: Basic machine, FSM , Transition graph, Transition matrix, Deterministic and nondeterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore machines, minimization of finite automata, Two-way finite automata. Regular Sets and Regular Grammars: Alphabet, words, Operations, Regular sets, Finite automata and regular expression, Myhill- Nerode theorem Pumping lemma and regular sets, Application of pumping lemma, closure properties of regular sets.

UNIT 2

Regular Expressions, Two-way Finite Automata, Crossing Sequence of Two way Finite Automata Finite Automata with Output, Applications of Finite Automata, Closure Properties of Regular Sets.

UNIT 3

Context Free Grammars: Motivation and Introduction, Context-free Grammars, Derivation trees and Ambiguity,Normal Forms (Chomsky Normal Form and Greibach Normal forms), Unit Production Chomsky Normal Forms, The existence of inherently ambiguous context-free languages, Closure properties of Context Free Languages, Construction of Reduced Grammars, Elimination of null production.
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UNIT 4

Pushdown Automata: Definition of PDA, Deterministic Pushdown Automata, PDA corresponding to given CFG, CFG corresponding to a given PDA. Context Free Languages: The pumping lemma for CFL's, Closure properties of CFL's, Decision problems involving CFL's.

UNIT 5

Turing Machines: Introduction, TM model, representation and languages acceptability of TM Design of TM,Universal TM & Other modification, Church's hypothesis, composite & iterated TM. Turing machine as enumerators.Properties of recursive & recursively enumerable languages, Universal Turing Machine.

Reference Books:
1. Introduction to Automata Theory, Languages & Computation, J E Hopcraft & JD Ullman, Narosa Publications.
2. Theory of Computer Science, KLP Mishra & N Chandra Sekhar, PHI
3. Mathematical Foundations of Computer Science, Beckman
4. John C Martin, "Introdution to languages and theory of computation", McGraw Hill
5. Anami & Aribasappa , " Formal Languages and Automata Theory",Wiley India

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT204 -E2	Internet Programming	60	40	100	6	4	2	

UNIT 1

Introduction to Internet Programming- Client-Server model, Browsers-Graphical and Hypertext Access to the Internet, HTTP–Hyper Text Transfer Protocol (how it actually works), The Phases of Web Site Development

UNIT 2

Creating Internet World Wide Web pages- HTML - Hypertext Markup Language , Basic HTML Concepts, HTML: Structured Language ,headers, body, html tags, tables , Text, graphics, sounds, video clips, multi- media ,Client side image mapping

UNIT 3

HTML forms programming: Building a form, Text fields and value, size, max length html buttons, radio, checkboxes, Selection lists.
CSS: Introduction To Style sheet, types of style sheets- Inline, External, Embedded CSS, text formatting properties, CSS Border, margin properties, Positioning Use of classes in CSS, color properties, use of <div>&<span>

UNIT 4

Intro to script, types, intro of JavaScript, JavaScript identifiers, operators, control & Looping structure, Intro of Array, Array with methods, Math, String, Date Objects with methods User defined & Predefined functions, DOM objects, Window Navigator, History, Location, Event handling, Validations On Forms

UNIT 5

Intro & features of XML, XML writing elements, attributes etc. XML with CSS, DSO, XML Namespaces XML, DTD, XML Schemas, Writing Simple sheets using XSLT, SAX & DOM Parsers, SOAP Introduction.

Reference Books:
1. Joe Fawcett,Danny Ayers,Liam R.E. Quin, "Beginning XML" Wrox Press, 5th Ed., 2012
2. Deitel & Deitel, "XML how to program", Pearson, 2000
3. Hofstetter fred , "Internet Technology at work", Osborne pub. , ISBN : 9780072229998, 2004
4. Ivan Bayross , "HTML, DHTML, JavaScript, Perl & CGI" ,BPB pub. 3rd Ed.,2004
5. Ivan Bayross, "Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI", BPB pub., 2nd Ed., 2000

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
						C	L	T	P
MSIT205-E1	Computer Graphics and Multimedia	60	40	100	6	4		2

UNIT 1

Overview of Graphic Systems: Display Devices, Refresh Cathode-Ray Tubes, Random-Scan and Raster-Scan Monitors, Color CRT Monitors, Direct-View Storages Tubes, Plasma-Panel Displays, LED and LCD Monitors. Hard-Copy Devices: Printers, Plotters. Interactive Input Devices.

UNIT 2

Output Primitives: Points and Lines, Line-Drawing Algorithms, DDA Algorithm, Bresenham's Line Algorithm, Antialiasing Lines, Circle-Generating Algorithms, Circle Equations, Bresenham's Circle Algorithm, Character Generation. Attribute of Output Primitives: Line Styles, Line Types, Line Width, Line Color. Color and Intensity: Color Tables, Gray Scale. Area Filling: Scan-Line Algorithm.

UNIT 3

Two Dimensional Transformations: Basic Transformations, Translation, Scaling, Rotation. Matrix Representations and Homogeneous Coordinates. Composite Transformations: Translations, Scalings, Rotations, Scaling Relative to a Fixed Point, Rotation about a Pivot Point, General Transformation Equation. Windowing and Clipping: Windowing Concepts, Cliiping Algorithms, Line Clipping, Polygon Clipping, Area Clipping, Text Clipping, Window to Viewport Transformation.

UNIT -4

Viewing in 3D: Three dimensional transformation, Translation, Scaling, Rotation. Matrix Representations projections : Parallel, prospective, view points . Colour Model.

UNIT 5

Introduction to Multimedia, Multimedia Components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia Data and File Formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation Tools, Authoring Tools. Computer Aided Design. Graphs Charts and Models. Computer Art, Computer Animation, Graphical User Interface, Graphics for Home use, Image Processing.

References:

1. Computer Graphics, Donald Hearn and M.Pauline Baker, PHI 2nd Edition
2. Multimedia Making it Works, Third Edition: Tay Vaughan, Tata-McGraw-Hill
3. Procedural Elements of Computer Graphics, Rogers, McGraw Hill
4. Principles of Interactive Computer Graphics, Newman and Sproull, McGraw Hill
5. Mathematical Elements of Computer Graphics, Rogers, McGraw Hill

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT205 -E2	**Programming with Visual Basic.Net**	60	40	100	6	4	2	

UNIT 1

Introduction to .NET, .NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser.

UNIT 2

The VB.NET Language- Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable, Number of Argument, Optional Argument, Returning value from function. Control flow statements: conditional statement, loop statement. Msgbox & Inputbox.

UNIT 3

Working with Forms : Loading, showing and hiding forms, controlling One form within another. Using MDI form. Windows Form Control (with Properties, Methods and events): Textbox, Rich Text Boxes, Label, Link Label, Button, Checkbox, Radio Button, Panel, Group Box, Picture Box, Listbox, Combobox, Check Listbox, scroll bar, Timer. Advance Controls: Menus, Context Menus , Built-in Dialog Box: OpenFileDilog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog, Printing. ListView, TreeView, toolbar, StatusBar..

UNIT 4

Object oriented Programming: Classes & objects, constructor, destructor, inheritance. Access Specifiers, Interfaces, Polymorphism. Exception Handling: using Try, Catch, Finally, Throw Keywords. Graphics Handling: Using Graphics & Pen classes for drawing colors and figures. File Handling: Opening or Creating a File, Writing & Reading Text.

UNIT 5

Database programming with ADO.NET – Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid. Generate Reports Using CrystalReportViwer.

Reference Books:
1. VB.NET Programming Black Book by steven holzner –dreamtech publications
2. Mastering VB.NET by Evangelos petroutsos- BPB publications
3. Introduction to .NET framework-Worx publication

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Third Semester

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT-301	Advance Data Structures	60	40	100	6	4		2

UNIT 1

Introduction: Basic concepts of OOPs – Templates – Algorithm Analysis – ADT - List (Singly, Doubly and Circular) Implementation - Array, Pointer, Cursor Implementation

UNIT 2

Basic Data Structures: Stacks and Queues – ADT, Implementation and Applications - Trees – General, Binary, Binary Search, Expression Search, AVL, Splay, B-Trees – Implementations - Tree Traversals.

UNIT 3

Advanced Data Structures: Set – Implementation – Basic operations on set – Priority Queue – Implementation - Graphs – Directed Graphs – Shortest Path Problem - Undirected Graph - Spanning Trees – Graph Traversals

UNIT 4

Memory Management ; Issues - Managing Equal Sized Blocks - Garbage Collection Algorithms for Equal Sized Blocks - Storage Allocation for Objects with Mixed Sizes - Buddy Systems - Storage Compaction

UNIT 5

Searching, Sorting And Design Techniques: Searching Techniques, Sorting – Internal Sorting – Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Bin Sort, Radix Sort – External Sorting – Merge Sort, Multi-way Merge Sort, Polyphase Sorting - Design Techniques - Divide and Conquer - Dynamic Programming - Greedy Algorithm – Backtracking - Local Search Algorithms

References :

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson P
2. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education P
3. Drozdek, Data Structures and algorithm in Jawa, Cengage (Thomson)
4. Gilberg, Data structures Using C++, Cengage
5. Horowitz, Sahni, Rajasekaran, "Computer Algorithms", Galgotia,

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT-302	Design and Analysis of Algorithm	60	40	100	6	4	2	

UNIT 1

Introduction and Review: What is an Algorithm? **Performance Analysis of Algorithms and Recurrences:** Time and Space Complexities; Asymptotic Notation, Recurrence Relations.

UNIT 2

Divide and conquer: Structure of divide-and –conquer algorithms: examples, Binary search, quick sort, Analysis of divide and conquer, run time recurrence relations.

Graph Algorithms: Breadth-First Search, Depth-First Search, Shortest Paths, Maximum Flow, Minimum Spanning Trees.

UNIT 3

Greedy Method: Overview of the greedy method, Minimum spanning trees, Single source shortest paths.

Dynamic Programming: The general method, principle of optimality, difference between dynamic programming and greedy method, Applications: optimal binary search trees,

UNIT 4

Back Tracking: The general method, 8-queens problem.

Branch And Bound Algorithm: The Branch and bound method, FIFO and LIFO branch and bound, LC (Least Cost) search, Traveling Salesman Problem, LCBB on Traveling Salesman Problem.

UNIT5

Complexity Theory: P and NP Class Problems; NP-completeness and Reducibility.

Selected Topics: Number Theoretic Algorithms, Polynomial Arithmetic, Fast Fourier Transform, String Matching Algorithms.

Advanced Algorithms: Parallel Algorithms for Sorting, Searching and Merging, Approximation Algorithms, Randomized Algorithms.

References:

1. Fundamentals of Computer Algorithms By Ellis Horowittz and Sartaj Sahni, Galgotia Publications.
2. Ullman "Analysis and Design of Algorithm" TMH
3. Goodman " Introduction to the Design & Analysis of Algorithms, TMH-2002
4. Sara Basse, A.V. Gelder, " Computer Algorithms, " Addison Wesley
5. T.H. Cormen, Leiserson, Rivert and stein, " Introduction of Computer algorithm, " PHI
6. E. Horowitz, S. Sahni, and S. Rajsekaran, "Fundamentals of Computer Algorithms, " Galgotia Publication.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT-303	**System Analysis and Design**	60	40	100	6	4	2	

UNIT 1

Overview of system analysis and design, system development life cycle, project selection, feasibility analysis, design, implementation, testing and evaluation.

UNIT 2

Feasibility study: Technical and economical feasibility, cost and benefit analysis.

UNIT 3

System requirement specification and analysis: Fact finding techniques, Data flow diagrams, Data dictionaries, process organisation and interactions, decision analysis, decisin trees and tables.

UNIT 4

Detailed design- Modularisation, module specification, file design, system development involving data bases. System Control and Quality Assurance- reliability and maintenance.

UNIT 5

Software design and documentation tools, top-down, bottom-up and variants. Units and integration testing, testing practices and plans. System controls , Audit trails.

References:

1. James,A.S.: Analysis of design of Information systems,Mcgraw Hill 1986.
2. Ludeberg, M., Golkuhl, G. and hilsson,A. : Information systems development, Asystematis approach, Prentice Hall international 1981.
3. lesson,M.: System analysis and design, science research associates,1985
4. Sempriv,P.C.: System analysis-Definition Process and Design,1982
5. Richard,D.: System analysis design,Irwin Inc.1979.
6. Awad,E. Homewood : System analysis and design,Awad,Irwin 1979.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*		Distribution of Credits		
					C		L	T	P
MSIT 304-E1	**Artificial Intelligence**	60	40	100	6		4		

UNIT 1 :

Introduction of Artificial Intelligence: What is AI ? The Importance of AI. AI and related fields. **Approaches to AI:** Turing Test and Rational Agent Approaches; State Space Representation of Problems, Heuristic Search Techniques, Game Playing, Min-Max Search, Alpha Beta Cutoff Procedures.

UNIT 2 :

Knowledge Representation: Logic, Semantic Networks, Frames, Rules, Scripts, Conceptual Dependency and Ontologies; Expert Systems, Handling Uncertainty in Knowledge.

Planning: Components of a Planning System, Linear and Non Linear Planning; Goal Stack Planning, Hierarchical Planning, STRIPS, Partial Order Planning.

UNIT 3

Natural Language Processing: Grammar and Language; Parsing Techniques, Semantic Analysis and Pragmatics.

Lisp and AI Programming Languages : Introduction to LISP : Syntax and Numeric Functions, Basic List Manipulation Functions in LISP , Functions, Predicates, and Conditionals, Input, Output, and Local Variables, Iteration and Recursion, Property List and arrays, PROGLOG and Other AI Programming Languages.

UNIT 4

Formalized Symbolic Logics: Introduction, Syntax and Semantics for Propositional Logic, Syntax and Semantics for FOPL, Properties of Wffs, Conversion to Clausal Form, Inference Rules, The Resolution Principle, Representations Using Rules.

UNIT 5

Multi Agent Systems: Agents and Objects; Agents and Expert Systems; Generic Structure of Multi-agent System, Semantic Web, Agent Communication, Knowledge Sharing using Ontologies, Agent Development Tools.

Neural Network: Basic structure of neuron, perception, feed forward and back propagation, Hopfield network.

References:

1. Dan W. Patterson: Introduction to Artificial Intelligence and Expert System, Prentice Hall.
2. Peter Norvig: Artificial Intelligence: A Modern Approach, Pearson New International Edition
3. Elaine Rich and Kevin Knight: Artificial Intelligence
4. Charniak, E. : Introduction of Artifical Intellegence, Narosa publ. House.
5. Winston,P.H. : LISP, NArosa publ. House.
6. clark, K.L. : Micro Prolog , Prentice Hall india.1987.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT 304-E2	Data Mining and Data Warehousing	60	40	100	6	4	2	

UNIT 1

Introduction : Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas. Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules.

UNIT 2

Clustering paradigms; Partitioning algorithms like K-Medioid, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS. Other DM techniques & Web Mining: Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

UNIT 3

Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis. Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

UNIT 4

Data Mining of Image and Video: A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT 5

The vicious cycle of Data mining, data mining methodology, measuring the effectiveness of data mining data mining techniques. Market baskets analysis, memory based reasoning, automatic cluster detection, link analysis, artificial neural networks, generic algorithms, data mining and corporate data warehouse, OLA

References:

1. Data Mining Techniques ; Arun K.Pujari ; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT 305-E1	Web Development with PHP	60	40	100	6	4		2

Unit-1

HTML and Graphics : HTML Tag Reference, Global Attributes, Event Handlers, Document Structure Tags, Formatting Tags, Text Level formatting, Block Level formatting, List Tags, Hyperlink tags, Image and Image maps, Table tags, Form Tags, Frame Tags, Executable content tags. **Imagemaps :** What are Imagemaps? Client-side Imagemaps, Server-side Imagemaps, Using Server-side and Client-side Imagempas together, alternative text for Imagemaps.

Unit-2

Tables : Introduction to HTML tables and their structure, The table tags, Alignment, Aligning Entire Table, Alignment within a row, Alignment within a cell, Attributes, Content Summary, Background color, Adding a Caption, Setting the width, Adding a border, Spacing within a cell, Spacing between the cells, spanning multiple rows or columns, Elements that can be placed in a table, Table Sections and column properties, Tables as a design tool.

Frames : Introduction to Frames, Applications, Frames document, The <FRAMESET> tag, Nesting<FRAMESET> tag, Placing content in frames with the <FRAM> tag, Targeting named frames, Creating floating frames, Using Hidden frames,

Unit-3

Forms: Creating Forms, The <FORM> tag ,Named Input fields, the input <INPUT> tag, Multiple lines text windows, Drop down and list boxes, Hidden, Text, Text Area, Password, File Upload, Button, Submit, Reset, Radio, Checkbox, Select, Option, Forms and Scripting, Action Buttons, Labelling input files, Grouping related fields, Disabled and read-only fields, Form field event handlers, Passing form data.

Unit-4

PHP : Why PHP and MySQL?, Server-side web scripting, Installing PHP, Adding PHP to HTML, Syntax and Variables, Passing information between pages, Strings, Arrays and Array Functions, Numbers, Basic PHP errors / problems.

Unit-5

Advanced PHP and MySQL : PHP/MySQL Functions, Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, Type and Type Conversions, E-Mail.

XML : Introduction to XML, Anatomy of an XML, document, Creating XML Documents, Creating XML DTDs, XML Schemas, XSL.

References:

1. Web Design The complete Reference, Thomas Powell, Tata McGrawHill
2. HTML and XHTML The complete Reference, Thomas Powell, Tata McGrawHill
3. JavaScript 2.0 : The Complete Reference, Second Edition by Thomas Powell and Fritz Schneider
4. PHP : The Complete Reference By Steven Holzner, Tata McGrawHill

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT 305-E2	Cloud Computing	60	40	100	6	4	2	

UNIT-1

Historical development, Vision of Cloud Computing, Characteristic of Cloud Computing As Per NIST, Cloud Computing Reference Model, Cloud computing Environments, Cloud service requirements, cloud and dynamic infrastructure, cloud adaptation and rudiments. **Overview of cloud application:** ECG Analysis in the cloud, Protein Structure prediction, Gene Expression Data Analysis, Satellites Image Processing, CRM and ERP, Social networking.

UNIT-2

Cloud Computing Architecture: Cloud Reference model types of cloud, cloud interpretability and standards, scalability and fault tolerance, cloud solutions, cloud eco- system, cloud business process management, cloud service management, cloud offerings, cloud analytics, testing under control, virtual desktop infrastructure.

UNIT-3

Cloud Management and virtualization and technology Resiliency, Provisioning, Asset Management, Concepts of MAP reduce, Cloud governance, High availability and disaster recovery, virtualization, fundamentals concepts of compute storage, networking, desktop and application virtualization, virtualization benefits, sever virtualization, block and file level storage virtualization, hypervisor management software, infrastructure requirements, virtual LAN (VLAN), and virtual SAN (VSAN) and their benefits.

UNIT-4

Cloud security: Cloud information security fundamentals, cloud security services, design principles, Secure cloud software requirements, policy implementations, cloud computing security challenges, virtualization security management, cloud computing security architecture.

UNIT-5

Market based Management of clouds, federated clouds/ inter cloud: Characterization and definition, Cloud federation status, third party cloud services. Case study: Google App Engine, Hadoop, Amazon, Aneka.

References:
1. Tomar Saurabh, Cloud Computing, Wiley Pub.
2. Selvi : Mastermind Cloud Computing, TMH, Pub.

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Fourth Semester

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT 401	**Programming with Python**	60	40	100	6	4		2

UNIT 1

Introduction: check icon History, Features, Setting up path, Variable and Data Types, Operator. **Conditional Statements:** if, if-else, if-elif, nested if-else and Looping: for, while, nested loops with break, continue and pass keyword.

String Manipulation: Accessing Strings, Basic Operations, String slices, Function and Methods. **Functions:** Defining and Calling of a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables.

UNIT-2

Collection: list, tuple , Dictionaries. Introduction, Accessing values, Working, Properties, Functions and Methods.

Modules: Importing module, Math module, Random module, os module, date-time module, calendar module, Packages, user defined module, introduction of pip. **IO:**Printing on screen and Reading data from keyboard, Opening and closing file, Reading and writing files, Functions.

UNIT-3

Exception Handling: Except, Try, else, finally clause, User Defined Exceptions, raise user- defined exception, nested try-except.

OOPs concept: Class and object, Attributes, Inheritance, Overloading, Overriding, Data hiding, final and abstract class.

Database: Introduction, Connections with MYSQL, Executing queries, Transactions) web-designing: HTML, CSS and JAVA SCRIPT.

UNIT-4

CGI: Introduction, Architecture, CGI environment variable, GET and POST methods. Application using CGI: signup, login and session tracking with server side programming.

UNIT-5

DJANGO: working of MVT, Environment setting and installation, creating a Project, Apps Life Cycle, Admin Interface, Views, URL Mapping,

Template System: DTL and JINJA. Models, Page Redirection, Form Processing, project with signup and login.

References:

1. Programming and Problem Solving with Python (Ashok Namdev Kamthane and Amit Ashok Kamthane) McGraw Hill publication
2. Let Us Python (Kanetkar Yashavant) BPB Publication
3. Python Complete Refernce (Brown Martin C.) McGraw Hill publication
4. Python Programming A Modular Approach (Naveen and Kumar and Taneja Sheetal) PEARSON
5. Beginning Django (Rubio Daniel) Apress

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT 402	Soft computing	60	40	100	6	4	2	

UNIT 1

Introduction: production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first search. A* algorithm, AO* algorithms.

UNIT 2

Knowledge Representation: Problems in representing knowledge, knowledge representation using prepositional and predicate logic, Resolution, Refutation, theorem proving, monotonic and nonmonotonic reasoning.

UNIT 3

Artificial Neural Networks (ANN): Supervised, Unsupervised and Reinforcement Learning; Single Perceptron, Multi Layer Perceptron, Self Organizing Maps, Hopfield Network.

UNIT 4

Fuzzy Sets: Notion of Fuzziness, Membership Functions, Fuzzification and Defuzzification; Operations on Fuzzy Sets, Fuzzy Functions and Linguistic Variables; Fuzzy Relations, Fuzzy Rules and Fuzzy Inference; Fuzzy Control System and Fuzzy Rule Based Systems.

UNIT 5

Genetic Algorithms (GA): Encoding Strategies, Genetic Operators, Fitness Functions and GA Cycle; Problem Solving using GA.

References:

1. Rajsekaran & Pai – Neural Networks, fuzzylogic & Genetic algorithms, PHI
2. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
3. Hagan, Dernuth & Beale, Neural network design, Thomson learning, VP.
4. Philip D. Wasserman, Neural Computing, Van Nostrand Reinhold Pub.
5. Kecman: Learning & soft Computing, Pearson Edu.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT 403	Software Engineering and Project Management	60	40	100	6	4	2	

UNIT-1

The Software Product and Software Process: Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process customization and improvement, CMM, Product and Process Metrics.

UNIT-2

Requirement Elicitation, Analysis, and Specification Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability

UNIT-3

Software Design The Software Design Process, Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics

UNIT-4

Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, Test Oracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit Testing Frameworks, Integration Testing, System Testing and other Specialized Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis.

UNIT-5

Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA). Project Plan, Project Metrics.

References:

1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning
3. R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill. 4. Sommerville,"Software Enginerring",Pearson Education.
5. Richard H.Thayer,"Software Enginerring & Project Managements",Willey India

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits *	Distribution of Credits		
					C	L	T	P
MSIT 404-E1	Advance Java	60	40	100	6	4	2	

UNIT-1

The Java Environment: History of Java: Comparison of Java and C++; **Java as an object oriented language:** Java buzzwords; A simple program, its compilation and execution; the concept of CLASSPATH; Basic idea of application and applet; Basics: Data types; Operators- precedence and associativity; Type conversion; The decision making – if, if ..else, switch; loops – for, while, do…while; special statements–return, break, continue, labeled break, labeled continue; Modular programming methods; arrays; memory allocation and garbage collection in java keywords. Object Oriented Programming in Java: Class; Packages; scope and lifetime; Access specifies; Constructors; Copy constructor; this pointer; finalize () method; arrays; Memory allocation and garbage collection in java keywords **Inheritance :** Inheritance basics, method overriding, dynamics method dispatch, abstract classes.

UNIT-2

Interfaces: defining an interface, implementing & applying interfaces, variables in interfaces, extending interfaces. Multithreading and Exception Handling: Basic idea of multithreaded programming; The lifecycle of a thread; Creating thread with the thread class and runnable interface; Thread synchronization; Thread scheduling; Producer-consumer relationship; Daemon thread, Selfish threads; Basic idea of exception handling; The try, catch and throw; throws Constructor and finalizers in exception handling; Exception Handling.

UNIT-3

Applets: Applet security restrictions; the class hierarchy for applets; Life cycle of applet; HTML Tags for applet. The AWT: The class hierarchy of window fundamentals; The basic user interface components Label, Button, Check Box, Radio Button, Choice menu, Text area, Scroll list, Scroll bar; Frame; Layout managersflow layout, Grid layout, Border layout, Card layout. **The Java Event Handling Model:** Java's event delegation model – lgnoring the event, Self contained events, Delegating events; The event class hierarchy; The relationship between interface, methods called, parameters and event source; Adapter classes; Event classes action Event, Adjustment Event, Container Event, Focus Event, Item Event, Eey Event, Mouse Event, Text Event, Window Event.

UNIT-4

Input/Output : Exploring Java i.o., Directories, stream classes The Byte stream : Input stream, output stream, file input stream, file output stream, print stream, Random access file, the character streams, Buffered reader, buffered writer, print writer, serialization. JDBC: JDBC-ODBC bridge; The connectivity model; The driver manager; Navigating the resultset object contents; java.sql Package; The JDBC exception classes; Connecting to Remote database.

UNIT-5

Networking & RMI: Java Networking : Networking Basics : Socket, Client server, reserved sockets, proxy servers, Inet address, TCP sockets, UDP sockets. ; RMI for distributed computing; RMI registry services; Steps of creating RMI Application and an example. Collections: The collections framework, collection interfaces, collection classes.

References:

1. Naughton & Schildt "The Complete Reference Java 2", Tata McGraw Hill
2. Deitel "Java- How to Program:" Pearson Education, Asia
3. Horstmann & Cornell "Core Java 2" (Vol I & II) , Sun Microsystems
4. lvan Bayross "Java 2.0" : BPB publications

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT 404-E2	Network security	60	40	100	6	4	2	

UNIT 1

Convention Encryption : Conventional Encryption Model , Steganography , Classical Encryption Techniques, Simplified DES , Block Cipher Principles , The Data Encryption Standard, The Strength of DES , Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation, Conventional

UNIT 2

Network Security: Malwares, Cryptography and Steganography; Secret-Key Algorithms, Public-Key Algorithms, Digital Signature, Virtual Private Networks, Firewalls.

UNIT 3

Encryption algorithms: Public Key Encryption And Hash Functions Public Key Cryptography , Principles of Public Key Cryptosystems , The RSA Algorithm , Key Management , Diffie Hellman Key Exchange , Elliptic Curve Cryptography.

UNIT 4

Message Authentication and Hash Functions Authentication Requirements, Authentication Functions, Message Authentication Codes , Hash Functions , Security of Hash Functions

Hash And Mac Algorithms MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA-I) , RIPEMD ,HMAC

UNIT 5

Digital Signatures and Authentication Protocols Digital Signatures , Authentication Protocols -Digital Signature Standard Authentication Applications , IP Security , Web Security Intruders, Viruses and Worms Intruders , Viruses and Related Threats Firewalls Firewall Design Principles , Trusted Systems

References:

1. William Stallings, " Cryptography and Network Security", Second edition, Prentice Hall, 1999.
2. Atul Kahate, " Cryptography and Network Security," TMH
3. William Stallings,"Cryptography and Network Security",Third Edition, Pearson Ed
4. Introduction to network security, Krawetz, Cengage

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits*	Distribution of Credits		
					C	L	T	P
MSIT 405-E1	**Internet of Things**	60	40	100	6	4		2

UNIT 1:

Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.

UNIT 2:

Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.

UNIT 3:

Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.

UNIT 4:

Sensor Technology , Participatory Sensing, Industrial IOT and Automotive IOT , Actuator, Sensor data Communication Protocols ,Radio Frequency Identification Technology, Wireless Sensor Network Technology.

UNIT 5:

Cloud Computing and IoT: SaaS, PaaS, IaaS, Public and Private Cloud; Virtualization, Virtual Server, Cloud Storage, Database Storage, Resource Management, Service Level Agreement, Basics of IoT.

References:

1. Rajkamal,"Internet of Things", Tata McGraw Hill publication
2. Vijay Madisetti and Arshdeep Bahga, "Internet of things(A-Hand-on-Approach)" 1st Edition ,Universal Press
3. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.
4. Charless Bell "MySQL for the Internet of things", Apress publications.
5. Francis dacosta "Rethinking the Internet of things:A scalable Approach to connecting everything", 1st edition, Apress publications 2013.

Paper Code	Paper Name	End term Semester Exam	Internal	Max Marks	Credits *	Distribution of Credits		
					C	L	T	P
MSIT45-E2	Mobile Computing	60	40	100	6	4	2	

UNIT 1

Overview of the emerging fields of mobile computing; Historical perspectives (mainly from theperspective of radio), Mobile applications, Limitations, Health Concerns, Cordless phone, Landmobile vs. Satellite vs. In-building communications systems, Frequencies for radio transmission.Characteristics of Cellular Systems, Mobility support in cellular telephone networks.

UNIT 2

Mobile communication: Fiber or wire based transmission, Wireless Transmission - Frequencies, Signals, Antennas and Signal Propagation, Modulation Techniques, Multiplexing techniques, Coding techniques. Cellular structure, Voice Oriented Data Communication GSM, CDMA. GSM Architecture, Authentication & security, frequency hopping.

UNIT 3

Satellite Systems: History, Application, and Basics of Satellite Systems: LEO, MEO, GEO, Routing, Handover, VSAT, installation & Configuration. Cyclic repetition of data, Digital Audio Video Broadcasting, Multimedia object transfer Protocol, Wireless LAN topologies, requirements. Physical layer, MAC sub-layer, IEEE802.11.

UNIT 4

Basics of Discrete Event Simulation, Application and Experimentation, Simulation models. Case Study on Performance Evolution of IEEE 802.11 WLAN configuration using Simulation, Mobile IP, goals, assumptions requirements, entities and terminology, IP packet delivery, tunneling and encapsulation, Feature and format of IPv6, DHCP, TCP over Wireless.

UNIT 5

Mobile Technology: GSM and CDMA; Services and Architecture of GSM and Mobile Computing; Middleware and Gateway for Mobile Computing; Mobile IP and Mobile Communication Protocol; Communication Satellites, Wireless Networks and Topologies; Cellular Topology, Mobile Adhoc Networks, Wireless Transmission and Wireless LANs; Wireless Geolocation Systems, GPRS and SMS.

References:

1. Mobile Communications author Jochen Schiller, publication John Willy & Sons, Ltd.
2. Wireless And Mobile Systems, D. P. Agrawal,Qing-An zeng, Thomson publication