

Vikram University, Ujjain

Board of studies in Computer science (Faculty of Science)

SYLLABUS of M.Sc. (Information Security) Programme

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

Exclusively for University Teaching Department (ICS, VUU)

TWO YEAR M.Sc. (FULL TIME) PROGRAMME of UTD (ICS, VUU)

(Effective from Academic Session 2020-21)

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

(Effective from Academic Session 2020-21)

COURSE STRUCTURE

M.Sc. (Information Security) FIRST SEMESTER

S N	Course Type	Course code	Title	End term sem Exam	Inter nal	Max Marks	Credits*	Distribution of Credits		
								C	L	T
1	Core Course	MSIS-101	Discrete Mathematical Structure	60	40	100	6	4	2	
		MSIS-102	Operating system & system software	60	40	100	6	4		2
2	Course for Ability Enhancem ent & skill Developme nt (AE & SD)	MSIS-103	Entrepreneurship Development	60	40	100	6	4	2	
Choose any one From MSIS 104- E1 and 104- E2										
3	Elective Discipline Centric	MSIS 104- E1	Computer organisation & Architecture	60	40	100	6	4	2	
		MSIS 104- E2	Techniques of Operation Research	60	40	100	6	4	2	
Choose any one From MSIS 105-E1, 105-E2 and 105-E3										
4	Elective Generic Categories	MSIS 105- E1	Object oriented programming using C++	60	40	100	6	4		2
		MSIS 105- E2	Data Communication and Computer Network	60	40	100	6	4	2	
		MSIS 105- E3	Any Course from Massive Open Online Courses (MOOCs)available at SWAYAM	60	40	100	6	4	2	
5		MSIS-106	Comprehensive Viva Voce	50	-	50	04 <u>Virtual (VR)</u>			
			Total			550	<u>30+4</u>	<u>20</u>	<u>06</u>	<u>04</u>

(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

M.Sc. IS (Information Security) SECOND SEMESTER

S N	Course Type	Course code	Title	End term sem Exam	Inter nal	Max Marks	Credits*	Distribution of Credits		
								C	L	T
			Core Courses				C	L	T	P
1	Core Course	MSIS-201	Data Structure Using C++	60	40	100	6	<u>4</u>		<u>2</u>
		MSIS-202	Data Base Management System	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
2	Course for Ability Enhancem ent & skill Developme nt (AE & SD)	MSIS-203	Communication Skill	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
Choose any one From MSIS 204- E1 and 204- E2										
3	Elective Discipline Centric	MSIS 204- E1	Theory of Computation	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
		MSIS 204- E2	Internet Programming	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
Choose any one From MSIS 205-E1 , 205-E2 and 205-E3										
4	Elective Generic Categories	MSIS 205- E1	programming with VB.Net	60	40	100	<u>6</u>	<u>4</u>		<u>2</u>
		MSIS205- E2	Computer System Architecture and parallel Processing	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
		MSIS 205- E3	Any Course from Massive Open Online Courses (MOOCs)availabl e at SWAYAM	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
5		MSIS-206	Comprehensive Viva Voce	<u>50</u>	-	50	<u>04</u> <u>Virtual</u> <u>(VR)</u>	<u>20</u>	<u>06</u>	<u>04</u>
			Total			550	<u>30+04</u>			

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M.Sc. (Information Security) THIRD SEMESTER

S N	Course Type	Course code	Title	End term sem Exam	Internal	Max Marks	Credits*	Distribution of Credits		
								C	L	T
1	Core Course	MSIS-301	Advanced Computer Network	60	40	100	6	<u>4</u>	<u>2</u>	
		MSIS-302	Information Security	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
2	Course for Ability Enhancement & skill Development (AE & SD)	MSIS-303	Personality Development	60	40	100	<u>6</u>	<u>4</u>		<u>2</u>
Choose any one From MSIS 304- E1 and 304- E2										
3	Elective Discipline Centric	MSIS 304-E1	Python Programming	60	40	100	<u>6</u>	<u>4</u>		<u>2</u>
		MSIS 304-E2	Network Security and cryptography	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
Choose any one From MSIS 305-E1, 305-E2 and 305- E3										
4	Elective Generic Categories	MSIS 305- E1	Machine Learning	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
		MSIS 305- E2	Cloud Computing	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
		MSIS 305-E3	Any Course from Massive Open Online Courses (MOOCs)available at SWAYAM	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
5		MSIS-306	Comprehensive Viva Voce	<u>50</u>	-	50	<u>04</u> <u>Virtual (VR)</u>			
			Total			550	<u>30+04</u>	<u>20</u>	<u>06</u>	<u>04</u>

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.

M.Sc. (Information Security) FOURTH SEMESTER

S N	Course Type	Course code	Title	End term sem Exam	Inter nal	Max Mark s	Credits*	Distribution of Credits		
								C	L	T
1	Core Course	MSIS-401	Network Management	60	40	100	6	<u>4</u>	<u>2</u>	
		MSIS-402	Internet of Things	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
2	Course for Ability Enhanceme nt & skill Developme nt (AE & SD)	MSIS-403	Tourism Management	60	40	100	<u>6</u>	<u>4</u>		<u>2</u>
Choose any one From MSIS 404- E1 and 404- E2										
3	Elective Discipline Centric	MSIS 404- E1	Mobile & Wireless Systems	60	40	100	<u>6</u>	<u>4</u>	<u>2</u>	
		MSIS 404- E2	Advanced Algorithm Design	60	40	100	<u>6</u>	<u>4</u>		<u>2</u>
4		MSIS 405	Final presentation/ Seminar	30	20	50	<u>3</u>			<u>3</u>
		MSIS 405	Valuation of Dissertation	30	20	50	<u>3</u>			<u>3</u>
		MSIS 405	Final Viva-voce examination	<u>50</u>	-	50	<u>04</u> <u>Virtual</u> <u>(VR)</u>			
			Total			550	<u>30+04</u>	<u>16</u>	<u>04</u>	<u>10</u>

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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 thereinwill need to be satisfied by the student if they opt courses from Massive Open Online Courses (MOOCs) available at SWAYAM plate form.

MSIS 101: Discrete Mathematical Structure

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.

Reference Books:

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, SemmourLipschutz, Marc Lipson, Second Edition, Schaum's Outline, T.M.H.

MSIS 102: Operating System and System Software

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 & Concurrent 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

Reference Books:

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

MSIS 103: ENTREPRENEURSHIP DEVELOPMENT

Course Objectives: To prepare the budding entrepreneurs and to provide the students seedbeds of entrepreneurship at the entry level and enhance their entrepreneurial skills.

Unit I:

Introduction: Entrepreneurship - meaning, nature, importance, specific traits of Entrepreneurs, Role of entrepreneurs in Indian Economy.

Unit II:

Analysis of Entrepreneur opportunities :Defining, objectives, identification, process of sensing, accessing the impact of opportunities and threats.

Unit III:

Search of Business Idea: Preparing for business plan, legal requirements for establishing of a new unit- procedure for registering business, starting of new venture, product designing / branding, research and development, selection of forms of business organization.

Unit IV:

Role of Supportive Organizations: D.I.C and various government policies for the development of entrepreneurship, Government schemes and business assistance; subsidies, Role of Banks.

Unit V:

Market Assessment :Meaning of market assessment, components and dimensions of market assessment, Questionnaire preparations, survey of local market, Visit to industrial unit, business houses, service sector etc. Submission of Survey based report on one successful / one unsuccessful entrepreneur.

Suggested Readings:

1 Entrepreneurship Development	Dr.C.B.Gupta
2 Dynamics of Entrepreneurial Development and Management	Vasant Desai
3 Innovation and Entrepreneurship	Peter F.Drucker
4 Entrepreneurship Development	G.A.Kaulgud
5 Entrepreneurship-Need of the Hour	Dr.Vidya Hattangadi
6 Entrepreneurship Development	Dipesh D. Uike

MSIS 104 E1: Computer Organization and Architecture

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 Formats and 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.

Reference Books:

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

MSIS 104 E2: Techniques of Operation Research

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/1: ∞ / 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.

Reference Books:

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.

MSIS 105 E1: Object Oriented Programming Using C++

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.

Reference Books:

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.

MSIS 105 E2: Data Communication & Computer Network

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.

Reference Books:

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

MSIS 201: Data Structures Using C++

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. Hopcraft, 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.

MSIS 202 : Database Management System

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: Entities 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, assertions, 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 Serializability, 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 granularities. 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 Learning
4. Elmasri, Navathe, "Fundamentals Of Database Systems", Pearson Educations

MSIS 203: COMMUNICATION SKILLS

Course objective:

The objective of this paper is to make students aware of the practical significance of good communication skills and help them in acquiring competence in reporting ,drafting and development of negotiation skills.

Unit I: Introduction:

Definition, nature, objects, elements and importance of communication, principles and practices, models of communication, types of communication,.

Unit II:

Communication Skills and Soft Skills Interviewing and group discussion, resume preparation , etiquette and manners, self-management, body and sign language, presentation skills, feedback & questioning technique: objectiveness in argument (Both one on one and in groups).

Unit III:

Concept to Effective Communication Dimensions and directions of communication, means of communication, 7C's for effective communication.

Unit IV:

Listening Skills Importance of listening skills, good & bad listening , communication channels, types of communication medium- audio, video, digital, barriers of communication.

Unit V:

Public Speaking and Reporting Effective Public Speaking and its principles, interpretation and techniques of report writing, letter writing, negotiation skills.

Suggested Reading:

Business Communication- Royan and V.lesikar, John D. Pettit, JR.Richard D.Irwin, INC

Business communication- K.K. Sinha

Business Etiquettes – David Robinson

Business communication – Dr. Nageshwar Rao and Dr. R.P. Das

Effective business communication- Morphy Richards

MSIS 204 E1: Theory of Computation

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.

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, "Introduction to languages and theory of computation", McGraw Hill
5. Anami & Aribasappa, "Formal Languages and Automata Theory", Wiley India

MSIS 204 E2: Internet Programming

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>&

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. Hofstetterfred, “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

MSIS 205 E1: Programming with Visual Basic.Net

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: OpenFileDialog, 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 stevenholzner –dreamtech publications
2. Mastering VB.NET by Evangelospetroutsos- BPB publications
3. Introduction to .NET framework-Worx publication

MSIS 205 E2: Computer System Architecture and parallel Processing

UNIT 1

Flynn's Classification, System Attributes to Performance, Parallel computer models Multiprocessors and multicomputer, Multi vector and SIMD Computers. Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks

UNIT 2

Instruction set architecture, CISC Scalar Processors, RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleaved memory organization- memory interleaving, pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

UNIT 3

Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling – score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscalar pipeline design, Super pipeline processor design.

UNIT 4

Cache coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, deadlock and virtual channel. Vector Processing Principles, Vector Instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD organization: distributed memory model and shared memory model. Principles of Multithreading: Multithreading Issues and Solutions, Multiple-Context Processors

UNIT 5

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments

Reference Books:

1. Kai Hwang, "Advanced computer architecture", TMH. 2013 - 14
2. J.P.Hayes, "computer Architecture and organization"; MGH.
3. V.Rajaraman&C.S.R.Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning
5. M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing.
6. Hwang and Briggs, "Computer Architecture and Parallel Processing"; MGH.

MSIS 301: Advanced Computer Network

UNIT 1

Review of Basic Network Architectures: OSI reference model, TCP/IP reference model, ATM reference model; Applications (WWW, Audio/Video Streaming, Video conference, Networked Games, Client/Server); Traffic Characterization (CBR, VBR); Switching Paradigms; Multiplexing; Error Control; Flow Control, SONET, Optical Networks.

UNIT 2

Local Area Network Technologies: Wired LANS: Ethernet Protocol, Fast Ethernet, Gigabit Ethernet, Wireless LANs, IEEE 802.11 Project, Bluetooth, Connecting LANs.

UNIT 3

Internetworking: Interdomain Routing, Border Gateway Protocol version 4, IPv6, Multicast Routing Protocols, Multi-Protocol Label Switching, Virtual Private Networks, High speed transport protocols, Quality of Service Mechanisms, Improving QoS in Internet.

UNIT 4

Distributed Systems: Naming, DNS, DDNS, Paradigms for Communication in Internet, Caching, Issues of Scaling in Internet and Distributed Systems, Caching Techniques for Web, Protocols to Support Streaming Media, Multimedia Transport Protocols, Content Delivery Networks, Overlay and P2P Networks.

UNIT 5

Applications and Other Networking Technologies: RTP, RTSP, SIP, VoIP, Security Systems, SSH, PGP, TLS, IPSEC, DDoS Attack, Mitigation in Internet, Security in MPLS; Introduction to Cellular, Satellite and Ad hoc Networks.

Reference Books:

1. Behrouz A. Forouzan, Data Communications and Networking, Fourth Ed., Tata McGraw Hill
2. Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Fourth Ed., Morgan Kaufmann
3. Jean Walrand and Pravin Varaiya, High performance Communication Networking, 2nd Ed., Morgan Kaufmann, 1999.
4. Markus Hoffmann and Leland R. Beaumont, Content Networking: Architecture, Protocols, and Practice, Morgan Kaufmann, 2005.

MSIS 302: Information Security

UNIT-1

System Security: Desktop Security, Programming Bugs and Malicious code, Database Security, Operating System Security, OS Security Vulnerabilities.

UNIT-2

Security Management: Disaster Recovery, Digital Signature, Ethical Hacking, Penetration Testing, Computer Forensics

UNIT-3

Network Security: Network Security Model, Network Security Threats, Firewalls: Overview, Types, Features, User Management, Intrusion Detection System, Intrusion Prevention System, Public Key Infrastructure, Digital Signature Schemes

UNIT-4

Internet and Web Application Security-I: Email security: PGP and SMIME, Web Security: Web authentication, Injection Flaws, SQL Injection, Web Browser Security, E-Commerce Security

UNIT-5

Wireless Network Security: Wireless Network Components, Security issues in Wireless Networks, Securing a Wireless Network, Mobile Security

Reference Books:

1. Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security", Prentice Hall, 2nd edition, 2002, ISBN-10: 0130460192, ISBN-13: 978-0130460196.
2. Charles Pfleeger, "Security in Computing", Prentice Hall, 4 th Edition, 2006, ISBN-10: 0132390779, ISBN-13: 978-0132390774.
3. Ulysess Black, "Internet Security Protocols: Protecting IP Traffic", Prentice Hall PTR; 1st edition, 2000, ISBN-10: 0130142492, ISBN-13: 978-0130142498.
4. Amir Ranjbar 2007, CCNP ONT Official Exam Certification Guide, Cisco Press [ISBN: 978-1- 58720-176-3].

MSIS 303: PERSONALITY DEVELOPMENT

Course Objectives: To prepare student with the aim of developing personality for leadership & awareness to develop an ideal citizenship values

Course Contents:

Unit I:

Introduction: Personality development- concept, types, role and impact, developing self-awareness, projecting a winning personality.

Unit II:

Personality Assessment Personality assessment and testing- resume writing- types, contents, formats, interviewing skill, group discussion, JAM sessions, persuasive communication.

Unit III:

Communication Skill Practice on oral/spoken communication skill and testing-voice and accent, feedback and questioning techniques, objectives in an argument.

Unit IV:

Presentation Skills Skills and techniques, etiquette, project/assignment presentation, role play and body language, impression management.

Unit V:

Personality Development Activities Leadership activities, motivation activities, team building activities, stress and time management techniques, creativity and ideation.

Suggested Readings:

Business Communication- Royan and V.lesikar, John D. Pettit, JR.Richard D.Irwin, INC.

Personality Development and soft skills- Barun K. Mitra, Oxford Publisher.

Personality Development –Rajiv K.Mishra, Rupa Publisher

MSIS 304-E1 Python Programming

UNIT I

Introduction to Python: Python versus Java, Python Interpreter and its Environment, Python installation, Python basics: variables, operators, Strings, Conditional and Control Statements, loops; Data structures: lists and dictionaries; functions: global functions, local functions, lambda functions and methods.

UNIT II

Object Oriented Programming Concepts: Class, object, constructor, destructor and inheritance; Modules & Packages, File Input and Output, catching exceptions to deal with bad data, Multithreading, Database Connectivity.

UNIT III

Numpy: Creating Arrays, Arrays Operations, Multidimensional Arrays, Arrays transformation, Array Concatenation, Array Math Operations, Multidimensional Array and its Operations, Vector and Matrix.

UNIT IV

Visualization: Visualization with matplotlib, Figures and subplots, Labelling and arranging figures, Outputting graphics.

UNIT V

Pandas: Manipulating data from CSV, Excel, HDF5, and SQL databases, Data analysis and modelling with Pandas, Time-series analysis with Pandas, Using Pandas, the Python data analysis library, Series and Data Frames, Grouping, aggregating and applying, Merging and joining.

Reference Books:

1. McKinney Wes, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly Media, 2012.
2. Hauck Trent, "Instant Data Intensive Apps with Pandas How-To", Packt Publishing Ltd, 2013.
3. Beazley David M., "Advanced Python Programming", Pearson Education, 2009.
4. Chun Wesley, "Core Python Programming, 3rd Edition", Prentice Hall Professional, 2012.
5. Telles Matt "Python Power!: The Comprehensive Guide", Cengage Learning, 2008.

MSIS 304-E2 Network Security and Cryptography

UNIT-1

A Definition of Computer Security, The Challenges of Computer Security, The OSI Security Architecture. Security Attacks (Passive Attacks, Active Attacks). Security Services (Authentication, Access Control, Data Confidentiality, Data Integrity, Nonrepudiation, Availability Service).

UNIT-2

Symmetric Encryption Principle (Cryptography, Cryptanalysis) Symmetric Block Encryption Algorithms (Data Encryption Standard, Triple DES, Advanced Encryption Standard). Stream Ciphers and RC4 (Stream Cipher Structure, The RC4 Algorithm). Cipher Block Modes of Operation (Electronic Codebook Mode, Cipher Block Chaining Mode, Cipher Feedback Mode, Counter Mode).

UNIT-3

Public-Key Cryptography Principles (Public-Key Encryption Structure, Applications for Public-Key Cryptosystems, Requirements for Public-Key Cryptography). Public-Key Cryptography Algorithms (The RSA Public-Key Encryption Algorithm, Diffie-Hellman Key Exchange, Other Public-Key Cryptography Algorithms). Digital Signatures.

UNIT-4

Approaches to Message Authentication: Secure Hash Functions (Hash Function Requirements, Security of Hash Functions, Simple Hash Functions, The SHA Secure Hash Function). Message Authentication Codes (HMAC, MACs Based on Block Ciphers).

UNIT-5

Security Threats and Vulnerability: Types of attacks on Confidentiality, Integrity and Availability. Vulnerability and Threats, Malware: Viruses, Worms, Trojan horses, Security Counter Measures; Intrusion Detection Systems, Antivirus Software

Reference Books:

1. W. Stallings, Cryptography and Network Security Principles and practice, 3/e, Pearson Education Asia, 2003. 2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security: Private Communication in a public world", Prentice Hall India, 2nd Edition, 2002.
2. Charles P. Pleegeer, "Security in Computing", Pearson Education Asia, 5th Edition, 2001.
3. William Stallings, "Network Security Essentials: Applications and standards", Person Education Asia, 2000.
4. W. Mao, Modern Cryptography: Theory & Practice, Pearson Education, 2004

MSIS 305- E1 Machine Learning

UNIT I

Learning Problems - Perspectives and Issues - Concept Learning - Version Spaces and Candidate Eliminations - Inductive bias - Decision Tree learning - Representation Algorithm- Heuristic Space Search.

UNIT II

Neural Network Representation - Problems - Perceptrons – Multilayer Networks and Back Propagation Algorithms - Advanced Topics - Genetic Algorithms - Hypothesis Space Search Genetic Programming - Models of Evaluation and Learning.

UNIT III

Bayes Theorem - Concept Learning - Maximum Likelihood – Minimum Description Length Principle - Bayes Optimal Classifier - Gibbs Algorithm - Naïve Bayes Classifier – Bayesian Belief Network - EM Algorithm - Probability Learning - Sample Complexity - Finite and Infinite Hypothesis Spaces - Mistake Bound Model.

UNIT IV

K- Nearest Neighbour Learning - Locally weighted Regression - Radial Bases Functions - Case Based Learning.

UNIT V

Learning Sets of Rules - Sequential Covering Algorithm - Learning Rule Set - First Order Rules - Sets of First Order Rules - Induction on Inverted Deduction - Inverting Resolution -Analytical Learning - Perfect Domain Theories - Explanation Base Learning – FOCL Algorithm- Reinforcement Learning - Task - Q-Learning - Temporal Difference Learning

TEXT BOOKS:

1. Machine Learning - Tom M. Mitchell, - MGH

REFERENCE BOOKS:

1. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

MSIS 305-E2 Cloud Computing

UNIT 1

Cloud Computing: Definition, Cloud Architecture, Cloud Storage, Advantages and Disadvantages of Cloud Computing, Companies in the Cloud Today, Cloud Services, Cloud Types: The NIST Model, The Cloud Cube Model, Deployment Models, Service Models Cloud Computing, Service Models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS).

UNIT 2

Web-Based Application– Pros and Cons of Cloud Service Development–Types of Cloud Service Development–Software as a Service– Platform as a Service–Web Services– On-Demand Computing– Discovering Cloud Services Development Services and Tools–AmazonEc2–Google App Engine–IBM Clouds.

UNIT 3

Centralizing Email Communications– Collaborating on Schedules–Collaborating on To-Do Lists– Collaborating Contact Lists–Cloud Computing for the Community–Collaborating on Group Projects and Events–Cloud Computing for the Corporation.

UNIT 4

Collaborating on Calendars, Schedules and Task Management–Exploring Online Scheduling Applications–Exploring Online Planning and Task Management–Collaborating on Event Management–Collaborating on Contact Management–Collaborating on Project Management– Collaborating on Word Processing–Collaborating on Databases–Storing and Sharing Files.

UNIT 5

Cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control Identity management, Access control, Autonomic Security Cloud computing security challenges: Virtualization security management virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud.

Reference Books:

- 1.Barrie Sosinsky,“Cloud Computing Bible”,Wiley India pub.
- 2.Dinakar Sitaram,“MovingtoTheCloud”,Elsevier,2014.
- 3.Danc.Marinercus,“CloudComputingTheoryAndPractice”,Elsevier,2013.

MSIS - 401 Network Management

UNIT 1

Introduction: - Computer Network, Goals and Applications, Data Communications and Network Management Overview: Communications protocols and Standards. Case Histories of Networking and Management, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

Fundamentals of computer network technology: Network Topology, LANs. Network node components Hubs, Bridges, Routers, Gateways, Switches, WAN, ISDN Transmission Technology. Network Management Standards, Network Management Model, Organization Model, Information Model, Communication Model, ASN.1, Encoding Structure.

UNIT 2

SNMPV1 Network Management: Managed network: Case Histories and Examples, The History of SNMP Management. The SNMP Model, The Organization Model, System Overview. The Information Model, The SNMP Communication Model, Functional Model.

SNMP Management: SNMPv2: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information. The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMPv1.

UNIT 3

Broadband Network Management-ATM Networks: Broadband Networks and Services, ATM Technology, ATM Network Management.

Broadband Network Management: Broadband Access Networks and Technologies, HFC Technology, HFC Management, DSL Technology, ADSL Technology, ADSL Management.

Telecommunication Management Network: Introduction, Operations Systems, TMN conceptual Model, TMN Architecture, TMN Management Service Architecture, An integrated view of TMN.

UNIT 4

Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management. Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.

UNIT 5

Network Management Applications: Configuration management, Fault management, performance management. Event Correlation Techniques, security Management, Accounting management, Report Management, Policy Based Management Service Level Management.

Required Text(s)

- Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.

Essential References

- Network management, Morris, Pearson Education.
- Principles of Network System Administration, Mark Burges, Wiley Dreamtech.
- Distributed Network Management, Paul, John Wiley.
- Computer Networks, Andrew S. Tanenbaum, Addison-Wesley, 4th Ed.

MSIS – 402 Internet of Things

UNIT 1

Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

UNIT 2

IoT & M2M Machine Machine, Difference between IoT and M2M, Software defined Network.

UNIT 3

Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.

UNIT 4

Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges. **Domain specific applications of IoT** Home automation, Industry applications, Surveillance applications, Other IoT applications

UNIT 5

Developing IoTs Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python

Reference Books:

1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things": A Hands-On Approach
2. Walteneus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

MSIS – 403: TOURISM MANAGEMENT

Course Objective: The course is of utmost importance when the industry is poised to take a leap forward and therefore, the cause assumes greater significance for understanding the resources development, modernization syndrome in the field of tourism.

UNIT I:

Introduction Concept of tourism & importance in economy, types of tourism, tourism in Madhya Pradesh history and development ,Geography, Climate, Forest , River and Mountain.

UNIT II:

Overall Scenario Present scenario, planning, development and opportunities. Social and Economic impact of tourism, role of public and private sector in the promotion of tourism.

UNIT III:

Tourism Resources Physical and Biographical ,Tourist satisfaction and service quality-Transport accommodation, other facilities and amenities available in Madhya Pradesh. Role of tourist service provider, heritage site in M.P.

UNIT IV:

Financial aspects of Tourism Requirements of capital investment, sources of finance, Madhya Pradesh State Tourism Development Corporation Limited - funds, finance, policies, packages and its role for the development of tourism in Madhya Pradesh.

UNIT V:

Practical training Case studies of popular tourist places and tourist statistics in Madhya Pradesh, Analytical studies of tourist arrivals trends.

Suggested Readings:

Ancient Geography of M.P-Bhattacharya D.K All

district Gazettes of M.P

Tourism planning –Gunn. Clare A

MSIS 404 – E1 Mobile & Wireless Systems

UNIT 1

Overview of the emerging fields of mobile computing; Historical perspectives (mainly from the perspective of radio), Mobile applications, Limitations, Health Concerns, Cordless phone, Land mobile vs. Satellite vs. In-building communications systems, Frequencies for radio transmission. Characteristics of Cellular Systems.

UNIT 2

Mobile communication: Fibre or wire-based transmission, Wireless Transmission - Frequencies, Signals, Antennas and Signal Propagation, Modulation Techniques, Multiplexing techniques, Coding techniques.

UNIT 3

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

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, MobileIP, goals, assumptions requirements, entities and terminology, IP packet delivery, tunnelling and encapsulation, Feature and format of IPv6, DHCP, TCP over Wireless.

UNIT 5

Economics Benefits of Wireless Networks, Wireless Data Forecast, charging issues, Role of Government, Infrastructure manufacturer, Enabling Applications Mobile operating System.

Text Book(s):

1. Mobile Communications author Jochen Schiller, publication John Willy & Sons, Ltd.

Reference Book(s):

1. Wireless And Mobile Systems, D. P. Agrawal, Qing-An zeng, Thomson publication.
2. Wireless Networks, P Nicopotidis, Addison –Wesley-An zeng publication

MSIS 404- E2 Advanced Algorithm Design

UNIT 1

Order Analysis: Objectives of time analysis of algorithms; Big-oh and Theta notations. Master Theorem and its proof, solution of divide and conquer recurrence relations. Searching, Sorting and Divide and Conquer Strategy: Linear Search, Binary Search.

UNIT 2

Searching, Sorting and Divide and Conquer Strategy: Merge - sort; Quick - sort with average case analysis. Heaps and heap - sort. Lower bound on comparison - based sorting and Counting sort. Dynamic Programming: methodology and examples (Fibonacci numbers, Knapsack problem and some other simple examples) Dynamic Programming: Longest integer subsequence, Longest common subsequence, Weighted interval scheduling.

UNIT 3

Greedy Method: Methodology, examples (lecture Scheduling, process scheduling) and comparison with DP (more examples to come later in graph algorithms) Greedy Method: Knapsack problem and some other simple examples. Graph Algorithms: Basics of graphs and their representations. BFS. DFS. Topological sorting.

UNIT 4

Minimum spanning trees (Kruskal and Prim's algorithms and brief discussions of disjoint set and Fibonacci heap data structures). Shortest Paths (Dijkstra, Bellman - Ford, Floyd - Warshall). Hard problems and approximation algorithms. Problem classes P, NP, NP - hard and NP - complete, deterministic and nondeterministic polynomial - time algorithms, Approximation algorithms for some NP - complete problems.

UNIT 5

Backtracking, Branch and Bound technique, String Matching, Naive algorithm, KMP algorithm, Parallel Algorithms.

Text Book:

Cormen, Leiserson, and Rivest. Algorithms, MIT Press 2011.