CURRICULUM AND SYLLABI FOR

MASTER OF SCIENCE – INFORMATION TECHNOLOGY

(For the students joining in 2015 - 2016 and afterwards)

Department of Computer Science and Applications
Gandhigram Rural Institute - Deemed University
Gandhigram - 624 302
Dindigul District
Tamil Nadu

THE GANDHIGRAM RURAL INSTITUTE - DEEMED UNIVERSITY

MASTER OF SCIENCE – INFORMATION TECHNOLOGY
(Under Choice Based Credit System)

SUBJECTS OF STUDY AND SCHEME OF EXAMINATION
(For the students joining in 2015 – 2016 and afterwards)

Code No.	Subject	Credit (s)	Lecture Hrs/ Week	Lab Hrs/ Week	CFA %	ESE %	Total
SEMESTER – I							
15MITP0101	Programming in C	4	4	-	40	60	100
15MITP0102	Computer Organisation	4	4	-	40	60	100
15MITP0103	Mathematical Foundation of Computer Science	4	4	-	40	60	100
15MITP0104	Database Management Systems	4	4	-	40	60	100
15MITP0105	Visual Programming	4	4	-	40	60	100
15MITP0106	Lab – I: C Programming	1	-	3	60	40	100
15MITP0107	Lab – II: GUI & RDBMS	1	-	3	60	40	100
15GTPP0001	Gandhi in Everyday Life	-	2	-	50	-	50
	Total Credits	**22**					
SEMESTER – II							
15MITP0208	Web Programming	4	4	-	40	60	100
15MITP0209	Data Structures & Algorithms	4	4	-	40	60	100
15MITP0210	Object-Oriented Programming in C++	4	4	-	40	60	100
15GEOP02A1	Fundamentals of GIS	4	4	-	40	60	100
15MITP0211	Lab – III: Data Structures & Algorithms in C++	1	-	3	60	40	100
15MITP0212	Lab – IV: Web Programming	1	-	3	60	40	100
15MITP02MX	Modular Course – I	2	2	-	50	-	50
15ENGP00C1	Communication and Soft Skills	-	2	-	50	-	50
15MITP02F1	Extension/Field Visit	-	-	2	50	-	50
	Total Credits	**20**					
SEMESTER – III							
15MITP0313	Java Programming	4	4	-	40	60	100
15MITP0314	Principles of Operating Systems	4	4	-	40	60	100
15MITP0315	Software Engineering	4	4	-	40	60	100
15MITP0316	Computer Networks	4	4	-	40	60	100
15MITP03EX	Major Elective – I	4	4	-	40	60	100
15MITP03MX	Modular Course – II	2	2	-	50	-	50
15MITP0317	Lab – V: Java Programming	1	-	3	60	40	100
15MITP0318	Lab – VI: Shell Programming & Networks	1	-	3	60	40	100
15MITP0319	Mini Project on IT for Rural Development	2	-	-	50	-	50
15EXNP03V1	Village Placement Programme	2	-	-	50	-	50
	Total Credits	**28**					
SEMESTER – IV							
15MITP0420	Dissertation**	**12**	-	–	75	125	200
	TOTAL	**80**					

CFA – Continuous Formative Assessment (Internal Evaluation)

ESE – End Semester Examination (External Evaluation)

** Evaluated for 200 marks as below:
    75 marks for the valuation of the Dissertation by the Internal Examiner
    75 marks for the valuation of the Dissertation by the External Examiner
    50 marks for the Viva-Voce examination jointly by the Internal and External Examiners

List of Major Electives

Major Elective – I (15MITP03EX)
    15MITP03E1 Information Security
    15MITP03E2 Data Mining
    15MITP03E3 Computer Graphics

List of Modular Courses

Modular Course – I (15MITP02MX)
    15MITP02M1 Computer Animation*
    15MITP02M2 Network Administration*
    15MITP02M3 Computer Aided Design*

Modular Course – II (15MITP03MX)
    15MITP03M1 Advanced Computing Techniques for Rural Applications
    15MITP03M2 Computer Hardware and Troubleshooting*
    15MITP03M3 Accounting Software*

* Syllabus under preparation

15MITP0101	PROGRAMMING IN C	Credits: 4

OBJECTIVES:
- To impart the principles of Programming in C Language
- To lay the foundation for the students to learn other advanced programming languages
- To motivate the students to develop projects in C

UNIT	CONTENTS	Lecture Schedule
I	**C Language Fundamentals**	**12**
	• Program Structure	2
	• Identifiers – Data Types – Integer – Float – Character – Constants – Variables	4
	• Operators and Expressions	4
	• Managing Input and Output Operations.	2
II	**C Control Structures**	**13**
	• Decision making with if Statement – if … else Statement – Nested If … else Statements	6
	• Loop Statement: for Statement – do… while Statement – while … do Statement – goto Statement – switch Statement	7
III	**C Functions**	**13**
	• Mathematical Functions – sin – cos – tan – asin – acos –atan – sqrt – pow – log	3
	• String Functions – strcpy – strcat – strcmp –strlen – strlwr – strupr	4
	• User–Defined Functions	6
IV	**Arrays And Structures**	**14**
	• Arrays – Definition – Declaration – Entering Values in Arrays – Manipulating Arrays – Passing an Array	7
	• Structure and Union: Definition – Assigning Structure Variable – Assigning Initial Values – Using a Structure – Structure Arrays – Structures and Functions- Union	7
V	**Pointers And File Operations**	**14**
	• Understanding Pointers – Pointers and Functions	6
	• File Operations: Understanding Files – Declaring a File – Opening a File – Closing a File – File Input and Output Functions	4
	• Formatted Input and Output – Working With Structures – Adding Data to a File – Reading and Printing a Disk File	4

	Total Contact Hours	64

Text Book:

1. Programming in ANSI C, E. Balagurusamy, Tata McGraw Hill, 2011.

References:
1. The C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 2006.
2. Understanding Pointers in C, 4/e, Yashavant Kanetkar, BPB Publications, 2008

LEARNING OUTCOMES

- Thorough knowledge on the essentials of C Programming
- Ability to use the Control and Decision making concepts of C in problem solving
- Comprehensive understanding on the concepts of Functions in C and their application in real-time problem solving
- Develop analytical ability in the usage of Arrays and Structures, Pointers, Files and Command-line arguments
- On completion of this course, the students are expected to be proficient in developing simple projects using C language

15 MITP0102	COMPUTER ORGANISATION	Credits: 4

OBJECTIVE:

- This course imparts knowledge on the hardware basics of a computer system and their working principles.

UNIT	CONTENTS	Lecture Schedule
I	**Digital Logic Circuits,Components and Data Representation**	**15**
	• Digital Logic Circuits:Digital Computers – Logic Gates – Boolean Algebra	2
	• Map Simplification – Combinational Circuits	2
	• Flip–Flops – Sequential Circuits.	2
	• Digital Components: Integrated Circuits – Decoders – Multiplexers	2
	• Registers – Shift Registers – Binary Counters	2
	• Memory Unit.	1
	• Data Representation: Data Types – Complements – Fixed Point Representation	2
	• Floating Point Representation – Error Detection Codes.	2
II	**Register Transfer And Micro Operations & Basic Computer Organisation and Design**	**11**
	• Register Transfer Language – Register Transfer – Bus and Memory Transfers	1
	• Arithmetic Micro Operations – Logic Micro Operations	2
	• Shift Micro Operations – Arithmetic Logic Shift Unit.	2
	• Basic Computer Organisation and Design: Instruction Codes – Computer Registers – Computer Instructions – Timing and Control	3
	• Instruction Cycle – Memory Reference Instructions – Input–Output and Interrupt	3
III	**Central Processing Unit**	**13**
	• Central Processing Unit: General Register Organisation	4
	• Stack Organisation	2
	• Instruction Formats – Addressing Modes	4
	• Data Transfer And Manipulation – Program Control	2
	• Reduced Instruction Set Computer (RISC)	1
IV	**Input–Output Organisation**	**12**
	• **Input–Output Organisation** : Peripheral Devices	2
	• Input– Output Interface	2
	• Asynchronous Data Transfer	2
	• Modes of Transfer	2
	• Priority Interrupts	2

	•	Direct Memory Access.	2
V		**Memory Organisation**	**13**
	•	Memory Hierarchy – Main Memory – Auxiliary Memory	3
	•	Associative Memory	2
	•	Cache Memory	2
	•	Virtual Memory	3
	•	Memory Management Hardware	3
		Total Contact Hours	**64**

Text Book:

1. Computer System Architecture, 3/e, M. Moris Mano, Prentice Hall of India, New Delhi, 2003.

References:
1. Computer Architecture and Organisation, J.P.Hayes, Tata McGraw–Hill, 1993.
2. Computer Organisation, Hamachar V.C., Vanesic Z.G., Zaky S.G., Tata McGraw–Hill, 1978.

LEARNING OUTCOMES
• It helps to identify the basic components of a computer, basic circuits and their construction procedures and to be familiar wit the computer number systems and their representation
• Describe the hardware implementation of a registers and their usage
• Understand the functional details of CPU and other processors
• Visualize he nature of data transfer among peripherals and computer through interface units
• Identify the different forms of memory management units and their working principles

15MITP0103	MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	Credits: 4

OBJECTIVES:
- To teach the fundamental concepts of Mathematics which are essential for mathematical thinking.
- To correlate the logical thinking in application development with mathematics

UNIT	CONTENTS	Lecture Schedule
	SET THEORY	**14**
	• Basic set operations	2
	• Relations and functions	3
I	• Relation matrices	3
	• Transitive closure relation	3
	• Principle of mathematical induction	3
	FUNCTIONS	**12**
	• Definition and introduction	3
II	• Composition of functions	3
	• Inverse functions	3
	• Binary and n-ary operations	3
	MATRICES	**12**
	• Properties and determinants	3
III	• Inverse of matrix	3
	• Eigen values and Eigen vectors	3
	• Cayley Hamilton theorem	3
	PROBABILITY	**12**
	• Introduction to probability	2
	• Sample space and events	2
IV	• Axioms of probability	2
	• Conditional Probability	2
	• Bayes theorem	2
	• Independence of events	2
	LOGIC	**14**
	• Mathematical Logic	1
	• Connectives	1
	• Functionally complete set of connectives	2
V	• Logical networks	2
	• Principle conjunctive and disjunctive normal forms	2
	• Equivalence of statement	2
	• Formulae derivations-conditional proof	2
	• Indirect method of proof	2

	Total Contact Hours	64

Text Books:

1. J.B. Tremblay and R.Manohar , Discrete Mathematical Structures with Application to Computer Science, McGaw-Hill International Edition, 2001.**Unit: 1, 2, 5.**
2. M.K. Venkataraman, Engineering Mathematics, Vol II. National Publishing Company, Chennai 2001.
3. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Chand and Sons, New Delhi 2001. **Unit: 4.**

References:

1. D. Alan, L. Lenneth, Applied Discrete Structures for Computer Science, Galgotia Publications, New Delhi, 1983.

2. J.E. Hopcroft and J.D. Ullman, Formal Languages and their relations to automata, Addison-Weslay Publishing Company, 1969.

LEARNING OUTCOMES
- Able to demonstrate understanding of the mathematical basis of common algorithms, and the ability to calculate accurately and efficiently.   - Demonstrate the ability to solve problems, including applications outside of mathematics, by means of intuition, creativity, guessing, and the experience gained through the study of particular examples and mathematical models.   - Gain knowledge on the applications of Mathematical concepts.

15MITP0104	DATABASE MANAGEMENT SYSTEMS	Credits: 4

OBJECTIVES:
- To teach the concepts of database management systems
- To make them familiar with various data models and database systems
- Ability to manipulate real-time data and elicit useful information using database concepts

UNIT	CONTENTS	Lecture Schedule
	Introduction	**12**
	• Introduction: Database System Applications – Purpose of Database Systems	1
	• View of Data – Database Languages	1
	• Relational Databases – Database Design – Object Based and Semi structured Databases	1
	• Data Storage and Querying	1
	• Transaction Management	1
I	• Data Mining and Analysis – Database Architecture	1
	• Database Users and Administrators	1
	• Relational Model: Structure of Relational Databases	1
	• Fundamental Relational Algebra Operations	1
	• Additional Relational Algebra Operations	1
	• Extended Relational Algebra Operations	1
	• Null Values – Modification of the Database	1
	SQL	**12**
	• SQL: Backgrounds– Data Definition	1
	• Basic Structure of SQL Queries	1
	• Set Operations	1
	• Aggregate Functions	1
	• Null Values – Nested Subqueries	1
II	• Complex Queries	1
	• Views – Modification of the Database	1
	• Joined Relations	1
	• **Other Relational Languages**: Tuple Relational Calculus	1
	• Domain Relational Calculus	1
	• Query–By–Example	2
	ER Model	**15**
	• ER Model: Overview of the Design Process	1
	• The Entity Relationship Model–Constraints	1
	• ER Diagrams	2
III	• ER Design Issues	1
	• Weak Entity Sets – Extended ER Features	1
	• Reduction to Relational Schemas	2
	• Relational Database Design: Features of Good Relational Design	1

	• Atomic Domains and First Normal Form	1
	• Decomposition using Functional Dependencies	2
	• Functional Dependencies Theory	2
	• Decomposition using Multivalued Dependencies	1
	Transactions	**13**
IV	• Transactions: Transaction Concepts– Transaction States	1
	• Implementation of Atomicity and Durability	2
	• Concurrent Executions – Serializability	1
	• Recoverability – Implementation of Isolation – Testing of Serializability	2
	• Recovery Systems: Failures Classification – Storage Structure	2
	• Recovery and Atomicity – Log–based Management	2
	• Failure with Concurrent Transactions	1
	• Buffer Management	1
	• Failure with Loss of Nonvolatile Storage	1
	Object-Based Databases	**12**
V	• Object–Based Databases: Overview – Complex Data Types	1
	• Structured Types and Inheritance in SQL	1
	• Table Inheritance	1
	• Array and Multiset Types in SQL	1
	• Object Identity and Persistent Programming Languages	1
	• Distributed Databases: Homogeneous and Heterogeneous Databases	1
	• Distributed Data Storage	1
	• Distributed Transaction– Commit Protocols	1
	• Concurrency Control in Distributed Databases	2
	• Availability – Distributed Query Processing	1
	• Heterogeneous Distributed Databases – Directory Systems	1
	Total Contact Hours	**64**

Text Book:
1. Database System Concepts, 5/e, Abraham Silberchartz, Henry F. Korth and S.Sudarshan, McGraw–Hill Higher Education, International Edition, 2006.

References:
1. Fundamentals of Database Systems, 6/e, Ramez Elamassri and Shankant B–Navathe, Pearson Education Delhi, 2010.
2. Database System Concepts, Peter Rob, Carlos Coronel, Cengage Learning, 2008.
3. Database Development and Management, Lee Chao, Auerbach Publications, 2010.

LEARNING OUTCOMES
- The students understand the components, functions and various database design techniques used for modeling the databases management system.   - They learn the clauses and functions of SQL and other relational languages like Tuple Relational Calculus, Domain Relational Calculus and Query-By-Example and can write optimal queries in the above languages.   - They can design entity-relationship diagrams to represent simple database application scenarios and can understand the database schema normalization rules and techniques to criticize and improve the database design.   - They thoroughly understand the basic concept of transaction processing, concurrent transaction processing and recovery procedures   - They understand some of the advanced topics in database management such as object-relational databases and distributed databases

15 MITP0105	VISUAL PROGRAMMING	Credits: 4

OBJECTIVES:

- To teach the concepts of Visual Programming in the context of Visual Basic

- To train on GUI event programming.

UNIT	CONTENTS	Lecture Schedule
	Visual Basic Overview	**13**
I	• Visual Basic Overview – The Visual Basic Development Environment – The Visual Basic language: Declaring Constants, Variables – Selecting Variable Types – Converting between Data types – Setting variable scope – Verifying Data types	3
	• Declaring Arrays and Dynamic Arrays - Declaring subroutines – Declaring functions – Preserving variables Values between calls to their procedures –	3
	• Handling String – Converting Strings to Numbers and Back again – Handling operators and Operator Precedence	3
	• Using IF..Else Statements – Using Select…case – Making Selections with Switch( ) and Choose( ) – Looping – Using Collections – Handling Dates and Times – Ending a Program at any Time.	4
	Managing Forms In Visual Basic	**13**
II	• Visual Basic Menus: Adding a Menu to a Form – Modifying and Deleting Menu Items – Adding a Menu Separator – Adding access characters – Adding shortcut keys	3
	• Creating sub Menus – Creating immediate bang Menus – Using the Visual Basic Predefined Menus – Adding a check Mark to a Menu Item – Disabling Menu Items	3
	• Creating and Displaying Popup Menus – Adding and Deleting Menu Items at Runtime – Adding bitmaps to Menus.	3
	• Handling MDI Form and MDI child Menus – Adding a list of Open Windows To an MDI form"s Window Menu – Making Menus and Menu Items Visible or Invisible	4
	Controls	**13**
III	• Text Boxes and Rich Textboxes, Command buttons, Checkboxes and Option buttons	3
	• List boxes and Combo boxes- Picture Boxes and Image Controls	3
	• The Timer Control – The Frame Control	3
	• The Label Control – The Shape Control.	4
	Databases	**13**
IV	• Using DAO, RDO, And ADO: Creating and Managing Databases with the Visual Data Manager	3
	• Creating a Table, Filed with the Visual Data Manager – Entering a Data in Database with the Visual Data Manager	3
	• Adding a Data control – Opening a Database with the Data control, Remote Data Control, ADO Data Control – Connecting a Data bases using controls	4

	• Working with Database Objects in Code.		3
	ACTIVEX and OLE Concepts		**12**
V	• Creating ActiveX controls and Documents – OLE : Adding an OLE control to Form – Creating, Linking and Embedding an OLE Object at Design		3
	• Time –Auto sizing an OLE Control – Using the OLE Control‟s Pop-Up Menus at Design Time – Inserting an OLE Object into an OLE Control at Runtime – Deactivating OLE Objects		3
	• Activating OLE Objects with a Pop-Up Menu that lists All OLE Verbs – Activating OLE Objects from Code		3
	• Handling Multiple OLE Objects – Using OLE Control Arrays to handle Multiple OLE Objects.		3
	Total Contact Hours		**64**

Text Books

1. Steven Holzner, 2002, Visual Basic 6 Programming Black Book, 16th Reprint Edition, Dreamtech Press Publications, New Delhi

References:

1. Petroutsos, E., 1998, Mastering Visual Basic 6, First Edition, Edition Reprint 2001,BPB Publications, New Delhi.
2. Jerke, N., Nineteenth Reprint 2004, Visual Basic 6.0: The Complete reference, Tata-McGraw Hill Publishing Company Ltd., New Delhi.
3. Gary Cornell, Second Reprint 1999, VB 6 from Ground Up, Tata Mc Graw Hill Private Ltd, NewDelhi.
4. Brown, S., 1998, Visual Basic 6 in Record Time, BPB Publications, New Delhi

LEARNING OUTCOMES
• Comprehensive knowledge on the programming constructs like data types, variables, operators, arrays, functions, control statements and looping structures.
• Familiar with the designing constructs like Forms, Menus and its varieties.
• Ability to create controls, to interact with the GUI applications.
• Gain knowledge on creating database and its connectivity with GUI applications.
• Understand the usage of objects created by other applications through linking and embedding processes

15MITP0106	**Lab – I: C PROGRAMMING LAB**	**Credits: 3**

I. C Programs with
   1. Control Structures: while, do…while, for, if…else, switch, continue, break
2. Array Handling: Single dimensional, Multidimensional
3. Pointers
4. Functions: Simple and Recursive Functions, Functions and Pointers
5. File Handling
6. Simple Graphics

15MITP0107	**Lab – II: GUI & RDBMS**	**Credits: 3**

I. GUI (Visual Basic)
   1. Simple programs using Basic Controls
   2. Programs for Launching Applications using OLE Objects
   3. Working with Menus, Dialog Boxes, Drag and Drop Events and ActiveX Controls
   4. Programs to Handle Databases

II. RDBMS (Oracle)
   1. Tables : Creations, Sorting, Setting relation between tables
   2. Queries using single and multiple tables
   3. Exception Handling, Cursor and Triggers
   4. Importing Tables from Electronic Spreadsheet and Text File
   5. Report from usage

15GTPP0001	**GANDHI IN EVERYDAY LIFE**

SEMESTER II

15MITP0208	WEB PROGRAMMING	Credits: 4

OBJECTIVES:
- To provide insight into the basics of the Web Programming
- To teach how to design and implement complete applications over the web.

UNIT	CONTENTS	Lecture Schedule
I	**Introduction To Html**	**12**
	• **Introduction to HTML:** Headings - Linking- Internal linking Images- Special Characters and horizontal Rules	3
	• Lists- Tables- Forms- Meta elements	3
	• **Cascading Style sheets:** Inline Styles-Embedded Style Sheets-Conflicting Styles - Linking External Style Sheets.	3
	• **XML:** Introduction -XML Basics-Structuring Data Document Type Definitions	3
II	**Java Script**	**12**
	• **Java Script:** Introduction to Scripting -Control Statements Functions	3
	• **Objects:** Math object –Array Object-String Object	3
	• Document object - Boolean and Number objects -.Window object	3
	• **Dynamic HTML:** Events-Using cookies	3
III	**PHP Scripting**	**16**
	• **PHP Scripting:** Create a Simple PHP Program -Using Variables in PHP- Operators and Expressions -Conditional and Branching Statements	4
	• Loops and Arrays - HTML Form fields and PHP	4
	• **Working with Files :** File Modes- Reading and Writing Characters in Files - Reading Entire Files - Random Access to File - Getting information on Files - Working with Directories - Uploading Files	4
	• PHP - MySQL Database Connectivity	4
IV	**An Introduction To TCP/IP**	**12**
	• **An Introduction to TCP/IP:** TCP/IP Basics - Addressing -Concept of IP address	6
	• Address Resolution -Protocol(ARP) -Reverse Address Resolution Protocol(RARP) -Bootstrap Protocol – DHCP– ICMP	6
V	**Domain Name System (DNS)**	**12**
	• **Domain Name system (DNS):** Introduction -Domain Name System - DNS Namespace -DNS server	6
	• **Email:** Introduction -SMTP -POP and IMAP -MIME -FTP -TFTP-Basics of WWW and HTTP.	6
	Total Contact Hours	**64**

Text Books:

1. Internet and World Wide Web – How to Program, Deitel , 4/e, Pearson Prentice Hall,2009
2. Beginning PHP5, Dave W.Mercer, Allen Kent, Steven, Wiley– Dreamtech Publications 2004.
3. Web Technologies, TCP/IP Architecture and Java Programming, Achyut S Godole & Atul Kahate, 2/e, Tata Mc Graw Hill, 2010

References:

1. Internet Programming, Kris jamsa and Ken cope, Galgotia Publications Pvt Ltd, 1995.
2. HTML – The Complete Reference, Powell, Tata Mc Graw Hill, 1998.
3. Mastering XML, Ann Navarre,Chuck White, BPB Publications, 2000.

LEARNING OUTCOMES

- Learn to design webpages using HTML and Have practical experience in working with XML
- Add dynamic content to webpages using JavaScript
- Develop online web applications with database connectivity using PHP and MySQL
- Understand the basics of TCP/IP Protocols
- Have Clear idea on the Domain Name System and its implementation.

15MITP0209	DATA STRUCTURES AND ALGORITHMS	Credits: 4

OBJECTIVES:
- To provide a broad understanding of representation of data structures and their applications
- To teach the fundamental strategies of algorithm design and performance analysis

UNIT	CONTENTS	Lecture Schedule
I	**Linked Lists**	**12**
	• Single linked list - Circular linked list -Double linked lists -Circular and Doubly linked list -	9
	• Applications of linked list	3
II	**Stacks And Queues**	**12**
	• **Stack:** Definition -Representation of a stack - Operations on stack - Applications of stacks	6
	• **Queue:** Definition - Representation of a queues -Various queue structures -Applications of queues	6
II	**Binary Trees**	**12**
	• Definition and Concepts -Representations of Binary tree	6
	• Operations on a Binary tree -Binary tree traversals -Types of Binary trees	6
IV	**Introduction- What Is An Algorithm?**	**14**
	• Algorithm Specification: Recursive Algorithms, Performance Analysis: Space Complexity,Time Complexity	8
	• **Sorting:** Heap Sort -Merge Sort -Quick Sort	6
V	**The Greedy Method**	**14**
	• **The Greedy Method:** General Method -Knapsack Problem- Minimum Cost Spanning Tree	6
	• **Dynamic Programming:** Multistage Graphs -All Pairs Shortest Paths -Travelling Salesperson problem	4
	• **Backtracking:** 8 Queens Problem -Sum of Subsets	4
	Total Contact Hours	**64**

Text Books:
1. Classic Data Structures , Debasis Samanta, PHI Learning Pvt. Ltd., Second Edition, 2009.
2. Fundamentals of Computer Algorithms, 2/e, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Universities Press, 2007.

References:
1. Fundamentals of Data Structures in C++, Horowitz, Shani,Dinesh Mehta, Galgotia Publications, 2008.
2. Data Structures using C and C++, Yedidhayah Langsam, Moshe J.Augenstien, Aaron M.Tanebaurm, 2/e, PHI, 1999
3. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, AWL publications, 1994.

LEARNING OUTCOMES

- Describe the data representation of linked list and its variants
- Demonstrate the representation and primitive operations of Stacks and Queues
- Understand the representation of binary trees and its various types and describe the binary tree traversals with algorithms and examples
- Analyze the time and space complexities of standard algorithms and comprehend the fundamental principles of recursion through examples
- Describe the process of Greedy method, Dynamic programming and Backtracking algorithms with examples

15MITP0210	OBJECT ORIENTED PROGRAMMING IN C++	Credits: 4

OBJECTIVES:
- To prepare object-oriented design for small/medium scale problems
- To demonstrate the differences between traditional imperative design and object-oriented design
- To explain class structures as fundamental, modular building blocks
- To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code

UNIT	CONTENTS	Lecture Schedule
	Principles of Object–Oriented Programming	**13**
I	• Principles of Object–Oriented Programming : Basic Concepts of Object– Oriented Programming - Benefits	4
	• Object–Oriented Languages – Applications of OOP	2
	• Beginning with C++ – Tokens	3
	• Expressions and Control Structures	4
	Functions & Classes and Objects	**13**
	• Functions in C++	2
	• Classes and Objects – Specifying a Class – Declaring Objects – Defining Member Functions	4
II	• Static Data Members and Member Functions – Array of Objects - Friendly functions –const Member Functions, Data Members and Objects	4
	• Constructors – Constructor Types, Destructors.	3
	Operator Overloading and Inheritance	**13**
	• Operator Overloading and Inheritance: Defining Operator Overloading – Overloading Unary Operators	3
III	• Overloading Binary Operators – Manipulation of String using Operators	3
	• Inheritance – Defining Derived Class – Protected Derivation - Single Inheritance-Multilevel Inheritance – Multiple Inheritance	3
	• Hierarchal Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Class – Constructors in Derived Class.	4
	Pointers & Virtual Functions	**13**
	• Pointers – new and delete operators	3
IV	• Pointers to Objects – this Pointer	4
	• Pointers to Derived Classes	3
	• Virtual Functions – Pure Virtual Functions.	3
	Files	**12**
	• Working with Files: Classes for File Stream Operations – Opening and Closing a File	3
V	• File Pointers and their Manipulations	3
	• Sequential Input and Output Operations – Error Handling during File Operations	4

	• Command Line Arguments.	2
	Total Contact Hours	**64**

Text Book:
1. Object Oriented Programming with C++, E. Balagurusamy, 4/e, Tata McGraw Hill publishing Company Limited, New Delhi, 2008.

References:
1. The C++ Programming Language, Bjarne Stroustrup, Addision– Wesly Publishing Company, New York, 1994.
2. C++ How to Program, HM Deitel and PJ Deitel, 7/e, Prentice Hall, 2010.
3. Let Us C++, Yashavant P. Kanetkar, BPB Publications, 1999.

LEARNING OUTCOMES

- Understand the basics of OOPs, OOP languages, Applications of OOP and C++ programming constructs.
- Understand the role of functions in C++ and defining the C++ user defined data type class and its usage to create objects.
- Familiarize the reusability of existing class and providing new meaning to existing operators.
- Familiarize the efficient usage of memory through operators and virtual function usage among inherited objects
- Understand the storage of data into file forms.

15GEOP02A1	**FUNDAMENTALS OF GIS**	**Credits: 4**

OBJECTIVES:
- To introduce the fundamentals, concepts spatial and non-spatial structure in Geographical Information System and make them familiar in handling and managing GIS database

UNIT	CONTENTS	Lecture Schedule
	Geographical Information System	**10**
I	• Geographical Information System: Definition - maps and spatial information - computer assisted mapping and map analysis	2
	• Components of GIS	2
	• People and GIS	2
	• Thematic characteristics of spatial data	2
	• Other sources of spatial data: census, survey, air photos, satellite images and field data.	2
	Spatial and Non Spatial Data Modeling	**15**
II	• Spatial and non spatial data modeling: Spatial entities - Raster and Vector data structures - comparison of vector and raster methods	2
	• Raster and vector approach to digital terrain modeling	2
	• Modeling network	2
	• Layered approach and object oriented approach	2
	• Modeling third and fourth dimensions	2
	• Problems of data management	2
	• Database management system - relational database model	1
	• Linking spatial and attributes data - GIS database development	2
	Data Input and Editing	**12**
III	• Data input and editing: - Encoding methods of data input: electronic/transfer	2
	• Data Editing: methods of correcting errors in attribute and spatial data	4
	• Transformation and generalization.	2
	• Edge Matching and rubber sheeting	2
	• Integrated database	2
	Data Analysis Operation in GIS	**15**
IV	• Data Analysis Operation in GIS: Terminologies - measurements of length, perimeter and area in GIS	2
	• Queries - reclassification - buffering and neighbourhood functions	2
	• Integrated Data	2
	• Raster and Vector Overlay Method: Point-in-polygon, Line-in-Polygon, Polygon-on-Polygon- problems of Raster and Vector overlays	6
	• Spatial interpolation – GIS for surface analysis - Network analysis: Shortest path problem – Route Tracing.	3

	OUTPUT	12
V	• Maps as output	2
	• Alternative cartographic outputs	2
	• Non-Cartographic outputs-Spatial multimedia	2
	• Delivery mechanism	2
	• GIS and spatial decision supports	2
	• Maps as decision tool	2
	Total Contact Hours	**64**

Text Books:

1. An Introduction to Geographical Information System, Ian Heywood, Sarah Cornelivs and Steve Carver, Pearson Education Pvt .Ltd., New Delhi, 2007.

References:

1. Principles of Geographical Information Systems, Peter A. Burrough and Rachael A. McDonnell, Oxford University Press Inc., New York, 2004.
2. M. Anji Reddy, Geoinformatics for Environmental Management, BS Publications, Hyderabad, 2004.
3. Geographic Information Systems, Routledge, David Martin, London, 2002.
4. Introduction to Geographic Information systems, Kang-tsung chang, Tata McGraw – Hill Publishing Company Limited,New Delhi,2006.
5. Concepts and Techniques of Geographic Information Systems, C.P.LO, Albert K.W.Yeung, Prentice-Hall of India, New Delhi – 2006.

LEARNING OUTCOMES
• Understand basic concepts and components of GIS.
• Ability to design Spatial and non-spatial data structure.
• Acquire skills create and manage spatial data in GIS.

15MITP0211	LAB III: DATA STRUCTURES AND ALGORITHMS IN C++	Credits: 3

I. C++ Programs

- Operator Overloading
- String Manipulation
- Inheritance
- Pointers
- Virtual Functions
- Files and Streams

II. Data Structures

- Stack – Creation, Push and Pop, Conversion and evaluation of prefix and postfix expression
- Queues – Creation, Insertion, Deletion
- Linked list – Creation, Insertion and Deletion using Singly Linked List, Circular List and Doubly - Linked List.
- Trees – Creation, Tree traversals, Binary Search Tree – Creation, Searching and deleting an element

III. Algorithms

- Sorting – Heap, Merge, Selection, Quick
- Knapsack problem
- Prim's algorithm
- Multistage graphs
- All pairs shortest paths
- 8 Queens problem
- Sum of Subsets

15MITP0212	Lab – IV: WEB PROGRAMMING	Credits: 3

I. Web page design using HTML Tags
- Creation – Ordered List, Unordered List, Tables, Frames, Links, Image Anchor, Image Maps
- Using Form Controls with Input Tag, Cascading Style Sheets

II. XML – Creating XML Document with Internal DTD and External DTD

III. JavaScript
- Simple Programs in Javascript Using Control Structures, Arrays, Strings, Objects, Event Handlers, Form Validation

IV. PHP
- Programs on Arrays using PHP Array Functions
- Validation of HTML Form Inputs and Processing Using Global Variables
- Programs based on PHP and MySQL Database Connectivity

V. Simple Project on Web Designing

15MITP02MX	MODULAR COURSE – I	Credits: 2

15ENGP00C1	COMMUNICATION AND SOFT SKILLS

OBJECTIVES:

- To develop inter personal skills and be an effective goal oriented team player.
- To develop professionals with idealistic, practical and moral values.
- To develop communication and problem solving skills.
- To re-engineer attitude and understand its influence on behavior.

UNIT	CONTENTS	Lecture Schedule
	Self Analysis	**4**
I	SWOT Analysis, Who am I, Attributes	2
	Importance of Self Confidence, Self Esteem	2
	Attitude	**4**
II	Factors influencing Attitude, Challenges and lessons from Attitude	2
	Change Management Exploring challenges, Risking Comfort Zone, Managing Change	2
	Motivations	**6**
III	Factors of motivation, Self-Talk	3
	Intrinsic & Extrinsic Motivators	3
	Goal Setting	**6**
	Wish List, SMART Goals, Blue print success, Short Term, Long Term	2
IV	Life time Goals, Time Management Value of time, Diagnosing Time Management	2
	Weekly Planner to do list, Prioritizing work.	2
	Creativity	**10**
V	Out of box Thinking	5
	Lateral Thinking Presentation	5
	Total Contact Hours	**30**

LEARNING OUTCOMES

Students should be able to

- Good communication and soft skills.
- Improved inter personal skills.
- Ability of self-analysis.

15MITP02F1	EXTENSION/FIELD VISIT

15MITP0313	JAVA PROGRAMMING	Credits: 4

OBJECTIVES:
- Provide the foundation to the object oriented programming concepts.
- Discuss the implementation of OOP concepts in Java language
- To make learners a good Java programmers
- To import skills and knowledge to create and run Java programs for solving real time problems.

UNIT	CONTENTS	Lecture Schedule
	Introduction	**13**
I	• Introduction – Object-Oriented Programming Concepts, encapsulation, inheritance, polymorphism, features of Java, types of Java programs, Java architecture	2
	• Literals - integer, floating point, character, string and boolean literals. data types - integer, floating point , character and Boolean Variables	2
	• The structure of a Java program – comments, expressions and statements, type conversion, block statements and scope	2
	• Operators –arithmetic, bitwise relational, boolean logical and ternary. Operator precedence	3
	• Control statements – if...else, switch, while , do...while, for..., break, continue and comma statement.	2
	• Arrays - one-dimensional and multi-dimensional arrays	2
II	**Classes**	**12**
	• Classes – defining a class, the new operator and objects, the dot operator, method declaration and calling	3
	• Constructors, instance variable hiding, this in constructor, method overloading, passing objects as parameters to methods	3
	• Inheritance – creating subclasses, method overriding, final class, final method, final variables	3
	• Package, the import statement, access modifier, interfaces, defining interfaces, implementing an interface	3
III	**Wrapper Classes**	**13**
	• Wrapper classes – the number class - Byte, Short, Integer, Long, Float, Double, Character and Boolean classes.	2
	• Mathematical methods - exceptions -types of exceptions	1
	• Catching exceptions, nested try blocks, hierarchy of multiple catch blocks, throw statement, creating your own exceptions, throws statement, the finally block, checked and unchecked exceptions.	2

	•	Input and Output classes - i/0 streams, the file class, byte stream, InputStream, OutputStream, disk file handling, FileInputStream, FileOutputStream, ByteArrayInputStream	3
	•	ByteArrayOutputStream, filtered byte streams, BufferedInputStream, BufferedOutputStream, DataInputStream, DataOutputStream,	2
	•	SequenceInputStream, ObjectOutputStream, ObjectInputStream, random access file, character stream, CharArrayReader CharArrayWriter, InputStreamReader, OutputStreamWriter	2
	•	FileWriter, FileReader, BufferedReader, BufferedWriter.	1
	Strings		**12**
	•	Strings – the String class, equality operator(==) and equals method, string concatenation with + , the StringBuffer class.	2
	•	Threads - multitasking, creating a thread, states of a thread	3
IV	•	Multithreaded programming, thread priorities, join method	3
	•	Controlling the threads	2
	•	Synchronizing methods, inter–thread communication – wait, notify and notify All	2
	Applets		**12**
	•	Applets – applet basics, methods of building an applet, some general methods of applet, displaying text in status bar, embedding applet information	2
	•	The html applet tag, reading parameters into applets, colors in applet, getting document base and codebase	2
V	•	Interfaces in applet, multimedia in applet, playing audio clips, images in applet, applet showing other html pages	2
	•	Graphics - drawing lines, rectangles, ovals and circles, arcs, polygons and polyline	2
	•	Creating a graphics clip, colors in graphics, constructors for Color class	2
	•	Color methods, setting paint modes, Fonts in graphics, determining fonts available in the system - setting fonts	2
	Total Contact Hours		**62**

Text Book:

1. Programming in Java2, Dr.K.Somasundaram, Jaico Publishing House, New Delhi, 2009.

References:

1. Introduction to JAVA Programming, K. Somasundaram, Jaico Publishing House, New Delhi, 2013.
2. Java2: The Complete Reference, 4/e, H.Schildt, TMH Publishing Company, New Delhi,2001. Foundation Classes, Mathew T.Nelson, McGraw–Hill, 1998.
3. Do 'n' Learn JAVA – A Practical Approach, K.Somasundaram, Anuradha Publications, Chennai, 2013.

LEARNING OUTCOMES

Upon completion of this course, students:

- Understand the concepts of OOP.
- Have knowledge on the basic Java language features, types, control statements and array.
- Grasp the idea of inheritance, package and identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- Solve engineering and scientific problems.
- Know exception handling, threads and usage of Wrapper classes.
- Use methods in String. Knows how threads are used to perform subtasks and Inter-thread communication.
- Develop the client side programming using an applet will be able to graphics objects using AWT.

15MITP0314	PRINCIPLES OF OPERATING SYSTEMS	Credits: 4

OBJECTIVES:
- To provide in-depth knowledge on basic design and working principles of operating system
- To learn the internal structure of some common operating systems

UNIT	CONTENTS	Lecture Schedule
	Introduction	**12**
	• Introduction: What is OS?	1
	• Mainframe Systems, Desktop Systems,	1
	• Multiprocessor Systems	1
	• Distributed Systems	1
	• Clustered Systems	1
I	• Real–Time Systems	1
	• Handheld Systems	1
	• Feature Migration and Computer Environments.	1
	• Computer–System Structures: Computer–System Operation	1
	• I/O Structure	1
	• Storage Structure, Storage Hierarchy	1
	• Hardware Protection and Network Structure	1
	Operating System Structures	**12**
	• System Components	2
	• Operating System Services	2
II	• System Calls, System Programs	2
	• System Structures	2
	• Virtual Machines	2
	• System Design and Implementation, System Generation.	2
	Processes	**12**
	• Concept	1
	• Scheduling, Operations	1
III	• Cooperating Processes	2
	• Inter-process Communication	2
	• Communication in Client– Server Systems	2
	• Threads: Overview	2
	• Multithreading Models and Threading Issues.	2
	CPU Scheduling	**12**
	• Basic Concepts	1
	• Scheduling Criteria	1
	• Scheduling Algorithms	1
	• Multiple Processor Scheduling	1
IV	• Real Time Scheduling	1
	• Algorithm Evaluation and Process Scheduling Models	1
	• Deadlocks: System Model	1
	• Deadlock Characterization	1
	• Methods for Handling Deadlocks	1
	• Deadlock Prevention	1

	• Deadlock Avoidance		1
	• Deadlock Detection and Recovery from Deadlock.		1
	Memory Management		**12**
	• Background		1
	• Swapping		1
	• Contiguous Memory Allocation		1
	• Paging		1
	• Segmentation		1
V	• Segmentation with Paging.		1
	• Virtual Memory: Background		1
	• Demand Paging		1
	• Process Creation		1
	• Page Replacement		1
	• Allocation of Frames and Thrashing.		1
	• Introduction to Mobile Operating Systems.		1
	Total Contact Hours		**60**

Text Books:
  1. Operating System Concepts, 6/e, Silberschatz & Galvin, Addison– Wesley Publishing Company, 2003.

References:
  1. Operating System Design and Implementation, Andreaw S. Tanenbaum and Albert S. Woodhull, Prentice Hall, 2006.
  2. Operating Systems, 3/e, H M Deital, P J Deital and D R Choffnes, Pearson Education, 2011.
  3. Smartphone Operating System Concepts with Symbian OS: A Tutorial Guide, Michael J. Jipping, 2007.

LEARNING OUTCOMES

 At the end of the course students will be able to:
  • Understand the basic structure, functions, main principles and techniques of operating system
  • Quantitatively discuss the behavior of different CPU scheduling algorithms
  • Understand the cause and effect of deadlocks and able to analyze them related to common circumstances in operating systems
  • Know deadlock prevention, avoidance, detection and recovery techniques
  • Understand the basics of memory management, the use of virtual memory in modern operating systems as well as the various page replacement algorithms

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15MITP0315	**SOFTWARE ENGINEERING**	**Credits: 4**

OBJECTIVES:
 Students should be able to understand
  • The various processes and models in software development
  • The metrics and estimates of software

•	Risk management	
•	Various testing techniques and strategies.	

UNIT	CONTENTS	Lecture Schedule
I	**The Process**	**12**
	• THE PROCESS: Software engineering: A layered technology	2
	• The Software process – Software process models	2
	• The linear sequential model – The prototyping model	2
	• The RAD model – Evolutionary software process models	2
	• Component based development – The formal methods model	2
	• Fourth generation techniques – Process technology	1
	• Product and process	1
II	**Software Process And Project Metrics & Software Project Planning**	**12**
	• SOFTWARE PROCESS AND PROJECT METRICS: Measures, metrics and indicators	1
	• Metrics in the process and project domains – Software measurement	1
	• Reconciling different metrics approaches – Metrics for software quality	1
	• Integrating metrics within the software engineering process	2
	• Managing variation: statistical quality control – Metrics for small organizations	1
	• Establishing a software metrics program	1
	• SOFTWARE PROJECT PLANNING: Observations on estimating	1
	• Project planning objectives – Software scope	1
	• Resources – Software project estimation – Decomposition techniques	1
	• Empirical estimation model – Automated estimation tools	2
III	**Risk Analysis And Management & Software Quality Assurance**	**12**
	• RISK ANALYSIS AND MANAGEMENT: Software risks	1
	• Risk identification	1
	• Risk projection	1
	• Risk refinement – Risk mitigation, monitoring and management	2
	• SOFTWARE QUALITY ASSURANCE: Quality concepts	2
	• The quality movement – Software quality assurance	2
	• Software reviews – Formal technical reviews	2
	• Software reliability – The ISO 9000 quality standards	1
	System Engineering & Design Concepts And Principles	**12**
	• SYSTEM ENGINEERING: Computer based systems	1
	• The system engineering hierarchy	1
	• Business process engineering: an overview	1

IV	• Product engineering: An overview – Requirements engineering	2
	• System modelling	1
	• DESIGN CONCEPTS AND PRINCIPLES: Software design and software engineering	2
	• The design process – Design principles	1
	• Design concepts – Effective modular design	1
	• Design heuristics for effective modularity	1
	• The design model – Design documentation	1
V	**Software Testing Techniques & Software Testing Strategies**	**16**
	• SOFTWARE TESTING TECHNIQUES: Software testing fundamentals	2
	• Test case design – White-box testing – Basis path testing	2
	• Control structure testing – Black box testing	2
	• Testing for specialized Environments, Architectures and applications	2
	• SOFTWARE TESTING STRATEGIES: A strategic approach to software testing	2
	• Strategic issues – Unit testing	2
	• Integration testing – Validation testing	2
	• System testing – The art of debugging	2
	Total Contact Hours	**64**

Text Book:

1. Software Engineering – A Practitioner's Approach, 6/e, Roger S. Pressman, McGraw Hill Inc., 2001

References:

1. Agile Software Development, Alistair Cockburn, 2/e, Pearson Education, 2007
2. Software Engineering concepts, Richard E.Fairley, McGraw Hill, 1984.
3. Software Engineering, Ian Sommervillie, 9/e, Addison Wesley, 2011.

LEARNING OUTCOMES
Students acquire knowledge on:

- The various processes and models in software development
- The metrics and estimates of software
- Risk management and review mechanisms
- Requirement and design engineering
- Various testing techniques and strategies

15MITP0316	**COMPUTER NETWORKS**	**Credits: 4**

OBJECTIVES:

Students should be able to understand

- The types of Computer Networks and Models
- Working of different layers
- Some routing and security algorithms

UNIT	CONTENTS	Lecture Schedule
I	**Computer networks & Models**	**12**
	• Uses of computer networks	2
	• Network hardware	2
	• Network software	2
	• Reference models	2
	• Example networks	2
	• Network standardization	2
II	**Communication Media**	**16**
	• Guided transmission media	4
	• Wireless transmission	4
	• Communication satellites	4
	• The public switched telephone network	4
III	**Data link layer**	**12**
	• Data link layer design issues	2
	• Error detection and correction	2
	• Elementary data link protocols	2
	• Sliding window protocols	3
	• Multiple access protocols	3
IV	**Network Layer**	**12**
	• Network layer design issues	2
	• Routing algorithms	3
	• Congestion control algorithms	3
	• Quality of service	2
	• Internetworking	2
V	**Transport Service**	**12**
	• Transport service	5
	• Elements of transport protocols	5
	• Electronic mail	2
	Total Contact Hours	**64**

Text Book:
1. Computer Networks, Andrew S.Tanenbaum,4/e,Prentice – Hall of India Private Ltd., 2003.

References:
2. Design and Analysis of Computer Communication Networks, Vijay Ahuja, McGraw– Hill International Ed., 1987.
3. Data Communications, Computer Networks and Open Systems, Fred Halsall, 4/e, Addison– Wesley, 1999.
4. Inside Networks, James K. Hardy, Prentice– Hall of India, 1999.

LEARNING OUTCOMES
Students should be able to explicate

- The different types of Computer Networks and Models
- Different types of communication media
- Working of Data Link layer
- Working of Network layer
- Transport services and simple security algorithms

15MITP03EX	**MAJOR ELECTIVE - I**	**Credits: 4**

15MITP03MX	**MODULAR COURSE - II**	**Credits: 2**

15MITP0317	Lab – V: JAVA PROGRAMMING	Credits: 3

Simple programs using

    1. Control statements, arrays

    2. Classes, Inheritance

    3. Exception handling

    4. Input / Output classes

    5. Strings

    6. Threads

    7. Applets

    8. Graphics

    9. Event handling

   10. Applications using the above concepts

15MITP0318	LAB – VI: SHELL PROGRAMMING & NETWORKS	Credits: 3

I. OS Lab

    1. Operations on Directories and Files

    2. Working with Editors

    3. GUI Operations

    4. Shell Programming

    5. Implementing Scheduling Algorithms

II. Networks

    1. Host Identification and Details

    2. Ping and Echo Commands

    3. Client/ Server Implementation

    4. File Transfer

    5. Framing Techniques

    6. Encoding

    7. Multi– Client and Server

    8. Error Control

    9. Routing Algorithms

    10. Encryption Techniques

15MITP0319	MINI PROJECT ON IT FOR RURAL DEVELOPMENT	Credits: 2

15EXNP03V1	VILLAGE PLACEMENT PROGRAMME

15MITP0420	**DISSERTATION AND VIVA–VOCE**	**Credits: 12**

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15MITP03M1	ADVANCED COMPUTING TECHNOLOGIES FOR RURAL APPLICATIONS	Credits: 2

OBJECTIVES:

- To provide a basic overview of Advanced Computing Technologies
- To investigate the different types of Informatics and their rural applications

UNIT	CONTENTS	Lecture Schedule
	Grid Computing	**7**
I	• Introduction to Grid Computing, Anatomy and Physiology of Grid	2
	• Early Grid Activities	1
	• Current Grid Activities	1
	• Grid Standards	1
	• Grid Challenges and Application area	1
	• Grid Computing Organization, roles	1
	Cloud Computing Overview	**8**
II	• Cloud Computing Overview, History, Key Terms and Definitions	2
	• Applications, Intranets and the Cloud	1
	• Cloud Today, Cloud Computing Services	1
	• On Demand Computing, Discovering Cloud Services	1
	• Software engineering fundamentals for Cloud Computing	1
	• Development Services and Tools	2
	Ubiquitous Computing	**7**
III	• Ubiquitous Computing: Introduction - Basics	2
	• Applications and Requirements	1
	• Smart Devices and Services	1
	• Smart Mobiles	1
	• Cards and Device Networks	2
	Informatics And Rural Applications	**10**
IV	• Informatics and Rural Applications: Informatics: Health	2
	• Agriculture	2
	• Education	2
	• Governance	2
	• Finance and other services Rural applications	2
	Total Contact Hours	**32**

Text Books:

1. Grid Computing, Joshy Joseph, Craig Fellenstein, IBM Press, Pearson Education, 2004.
2. Cloud Computing: Web based Applications that change the way you work and Collaborate Online, Michael Miller, Que Publishing, 2008.
3. Ubiquitous Computing Fundamentals, John Krumm, CRC Press, 2010

References:

1. Agricultural and Environmental Informatics, Governance and Management: Emerging Research Applications, Zacharoula Andreopoulou , Basil Manos, Nico Polman and Davide Viaggi. IGI GLOBAL, June 2011
2. Health Informatics: Practical Guide for Healthcare and Information Technology Professionals , Robert E. Hoyt , Ann K. Yoshihashi, lulu.com, Feb 2014

LEARNING OUTCOMES

- Understand the basic concepts of Grid Computing
- Gain knowledge on the implementation and applications of Cloud Computing
- Have a clear insight into Ubiquitous Computing
- Explore how ICT can support and improve management of Health care, Education Agriculture, Public Governance and Rural decision-making.

15MITP03E1	INFORMATION SECURITY	Credits: 4

OBJECTIVES:

Students should be able
- To Understand the basics of Information Security
- To Identify Risk and Management of Risks
- To become aware of various standards in Security

UNIT	CONTENTS	Lecture Schedule
	Introduction	**14**
	• Introduction: History, What is Information Security?	2
	• Critical Characteristics of Information	2
	• NSTISSC Security Model	2
I	• Components of an Information System	2
	• Securing the Components	2
	• Balancing Security and Access	2
	• The SDLC, The Security SDLC	2
	Security Investigation	**12**
	• Security Investigation: Need for Security	2
	• Business Needs	2
II	• Threats	2
	• Attacks, Legal	3
	• Ethical and Professional Issues	3
	Security Analysis	**12**
	• Security Analysis	4
III	• Risk Management: Identifying and Assessing Risk	4
	• Assessing and Controlling Risk	4
	Logical Design	**14**
	• Logical Design: Blueprint for Security	2
	• Information Security Policy	2
	• Standards and Practices	2
IV	• ISO 17799/BS 7799, NIST Models	2
	• VISA International Security Model	2
	• Design of Security Architecture	2
	• Planning for Continuity	2
	Physical Design	**12**
	• Physical Design: Security Technology	2
	• IDS	2
	• Scanning and Analysis Tools	2
V	• Cryptography	2
	• Access Control Devices	2
	• Physical Security	1
	• Security and Personnel	1
	Total Contact Hours	**64**

Text Book:

1. Principles of Information Security, Michael E Whitman and Herbert J Mattord, vVikas Publishing House, New Delhi, 2003

Revised Curriculum and Syllabi for M.Sc-IT – 2015

References:
1. Handbook of Information Security Management, Micki Krause, Harold F. Tipton, Vol 1– 3 CRC Press LLC, 2004.
2. Hacking Exposed, Stuart Mc Clure, Joel Scrambray, George Kurtz, Tata McGraw– Hill, 2003.
3. Computer Security Art and Science, Matt Bishop, Pearson/Prentice Hall of India, 2002.

LEARNING OUTCOMES
Students should be able to explain • The basics of Information Security • Various Security Threats and Attacks • Risk Management • Various standards in Security • The technological aspects of Information Security

15MCAP03E2	DATA MINING	Credits: 4

OBJECTIVES:
- To educate the students on the concepts of database technology evolutionary path which has led to the need for data mining and its applications
- To teach the basic concepts of Data Warehousing and its Architecture
- To teach the basic algorithms and techniques used in data mining

UNIT	CONTENTS	Lecture Schedule
	Introduction	**14**
I	• **Introduction:** What is Data Mining-On What Kind of Data-Data Mining functionalities-Classification of Data Mining Systems	7
	• Integration of a Data Mining System with a Database or a Data Warehouse system-Major issues in data mining.	7
	Data Warehouse and OLAP Technology for Data Mining	**14**
II	• Data Warehouse and OLAP Technology for Data Mining: What is a Data Warehouse? -Multidimensional data model -Data Warehouse Architecture.	7
	• Association Rule Mining: The Apriori Algorithm-Generating association Rules from Frequent Itemsets -Improving the efficiency of Apriori-Mining Frequent Itemsets without Candidate Generation	7
	Classification and Prediction	**13**
III	• Classification and Prediction: What is Classification? -What is Prediction?-Comparing Classification and Prediction Methods	5
	• Classification: Decision Tree Induction-Attribute Selection Measures	6
	• Prediction: Linear regression -Non–Linear Regression	2
	Cluster Analysis	**12**
IV	• Cluster Analysis: What is Cluster Analysis? -Types of Data in Cluster Analysis	3
	• A Categorization of Major Clustering Methods: Partitioning Methods: K-means,CLARA,CLARANS, K-Medoids.	5
	• Hierarchical Methods: BIRCH, ROCK Density based Methods :DBSCAN • Grid based Method : STING	4
	Mining Multimedia Databases	**11**
V	• Mining Multimedia Databases: Similarity Search in Multimedia Data, Sequential Pattern Mining	4
	• Text mining: Keyword-Based Association and Document Classification	4
	• Mining the Worldwide Web: Mining the Web's Link Structures to Identify Authoritative Web Pages -Web Usage Mining	3
	Total Contact Hours	**64**

Text Book:
1. Data Mining Concepts and Techniques, 2/e, Jiawei Han, Micheline Kamber,Morgan Kaufman Publisher(Elsevier), 2006.

Reference Books:
1. Data Mining Techniques, Arun K Pujari, Universities Press (India) Private Limited, 2001.
2. Insight into Data Mining Theory and Practice, K.P. Soman , Shyam Diwakar, V.Ajay, Prentice Hall of India Pvt. Ltd – New Delhi, 2006.

LEARNING OUTCOMES
- Compare and contrast Data Mining and Traditional DBMS and major issues in Data mining
- Understand the Data Warehouse architecture and apply On-line Analytical Processing (OLAP) operations for manipulating data cube, a multidimensional view of data and have a clear idea about the fundamental algorithms and techniques used in mining association rules.
- Illustrate the use of decision tree induction algorithm for mining classification rules and methods used for Prediction.
- Explain the various clustering methods used in Cluster Analysis
- Gain insight into the various applications and current research areas in data mining, such as Web mining, Sequential Pattern Mining and Text mining

15MITP03E3	COMPUTER GRAPHICS	Credits: 4

OBJECTIVES:
- This course helps the students to learn about the creation and manipulation of images with aids of computers and its available hardware and software. This course encourages the students to generate their own computer generated imagery (CGI) applications.

UNIT	CONTENTS	Lecture Schedule
I	**Overview of Graphics Systems**	**13**
	• Overview Of Graphics Systems	1
	• Video Display Devices	2
	• Raster Scan And Random Scan Systems	3
	• Input Devices	1
	• GUI and Interactive Input Methods: Logical Classification of Input Devices	2
	• Input Functions	2
	• Interactive Picture Constructive Techniques.	2
II	**Output Primitives**	**13**
	• Output Primitives : Points and Lines – Line Drawing Algorithms – DDA and Bresenham's	4
	• Loading the Frame Buffer – Line Function – Circle Generating Algorithms	4
	• Filled Area Primitives – Fill Area Functions – Cell Array	4
	• Character Generation.	1
III	**Attributes Of Output Primitives**	**12**
	• Attributes Of Output Primitives : Line Attributes	3
	• Curve Attributes- Colour and Gray Scale	2
	• Area Fill Attributes – Character Attributes	2
	• Bundled Attributes – Inquiry Functions	2
	• Antialiasing	3
IV	**Two Dimensional Geometric Transformations**	**13**
	• Two Dimensional Geometric Transformations: Basic Transformations – Matrix Representation	2
	• Composite Transformations – General Fixed Point – Scaling – Other Transformations	3
	• Two Dimensional Viewing : The Viewing Pipeline – Window– To– Viewport Coordinate Transformation —	2
	• Clipping Operations – Point Clipping – Line Clipping – Cohen – Sutherland Line Clipping	3
	• Sutherland – Hodgeman Polygon Clipping – Curve Clipping – Text Clipping	3
	Three Dimensional Concepts	**13**
	• Three Dimensional Concepts: Three Dimensional Methods – Three Dimensional Geometric and Modeling Transformations	4

V	• Translation – Rotation – Scaling – Other Transformations.	3
	• Visible – Surface Detection Methods – Classification – Depth Buffer Method	1
	• Scan Line Method – Depth Sorting Method	3
	• BSP Tree Method – Area Subdivision Method.	2
	Total Contact Hours	**64**

Text Book:
1. Computer Graphics C Version, Donald Hearn, M. Pauline Baker, 2/e. Pearson Education, New Delhi, 2005

References:
2. Principles of Interactive Computer Graphics, W.M.Newman and R.F.Sproull, 2/e, Tata McGraw– Hill Publishing Co. Ltd, 1997.
3. Procedural Elements for Computer Graphics, D.F.Rogers, 2/e, Tata McGraw– Hill Publishing Co. Ltd., 2001.
4. Computer Graphics, V. Xiang and R.A. Plastock, Schaum's Outline Series, Tata McGraw– Hill Publishing Co., 2002.

LEARNING OUTCOMES
• Identify the types of graphics monitors, workstations, input devices and input techniques available to work with graphics.
• Understand the mathematical and heuristic algorithms behind the graphics object generation
• Familiarize the attributes to control the object shape and antializing techniques for accurate display.
• Understand the forms of 2D transformations, mapping process from world view to display view and clipping process to select the visible portion.
• construct the algorithms for 3D objects processing and familiarize the 3D scene handling based on view plane direction

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