

Course:	M.Sc.	CORE – I	Semester	I
Major :	Computer Science	WEB TECHNOLOGY	Hours	5
			Credits	4

Scope & Objective : To study the basic concepts of web technologies, design and development of web applications.

Unit 1 Basic concepts – The hypermedia systems – Summary of web technologies – The client server computing model – Setting up a web server WAMP and APACHE HTTP on windows – HTML Basics – HTML forms – HTML frames – HTML canvas.

Unit 2 Introduction to CSS – CSS Rules – Style Types – CSS Selectors – CSS Cascade Measurements – Fonts Text Styles – Colors – Positioning elements – Box Model and Layout – Advanced CSS.

Unit 3 Exploring JavaScript – JavaScript and HTML Text – variables – Operators – Functions – DOM – Expressions – Using try & catch – Conditionals – Looping.

Unit 4 Event Handling – JavaScript Functions - JavaScript Objects JavaScript Arrays – Validating user input with JavaScript Regular Expressions.

Unit 5 PHP – Adding PHP to HTML, Syntax and Variables, Passing information between pages, Strings – Arrays and Array Functions – Numbers – Basic PHP errors / problems – Sessions and Cookies and Database Connectivity. Introduction to MYSQL – Accessing MySQL using PHP.

Text Books:

1. MIT Web technology notes, <http://ocw.mit.edu>
UNIT: 1
2. Learning PHP, MYSQL, JavaScript, CSS&HTML5, Robin Nixon, O' Reilly.
UNIT: 2 – 5

Reference Books:

1. Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, And AJAX, Black Book, Kogent learning solution Inc, Dream tech Press, 2012.
2. Internet & World Wide Web How to Program, 4th Edition, Harvey M. Deitel and Paul J. Deitel, Pearson Education, 2008.
3. The complete Reference HTML & CSS, Thomas A. Powell, MGH, 2010.
4. JavaScript 2.0 The complete Reference, Thomas A. Powell and Fritz Schneider, MGH, 2004.

Course:	M.Sc.	CORE – II	Semester	I
Major :	Computer Science	SOFTWARE PROJECT MANAGEMENT	Hours	5
			Credits	4

Scope & Objective : To learn the concepts of planning, monitoring and managing resources in executing the software project.

Unit 1 Introduction – Project – Software Project Vs. other projects – Activities – Plan, Methods and Methodologies – Management – Problems – Requirement Specification – Management control – Overview of project planning and the steps involved.

Unit 2 Programme management and project evaluation: Programme Management – Managing the allocation of resources – Benefits – Evaluation methods and techniques, Risk evaluation – Technologies – Process Models.

Unit 3 Software Effort Estimation – basis for software estimation – Estimation techniques: Expert Judgement, Analogy, Function Points – COCOMO – Activity Planning.

Unit 4 Risk Management - Resource Allocation – Monitoring and Control.

Unit 5 Managing People and Organizing teams – Software Quality concepts – Small Projects – Problems – contents of a project plan.

Text Book:

1. Bob Hughes and Mike Cotterell, Software Project Management, 4th ed., Tata McGraw Hill Publishing Co., New Delhi, 2006.

Reference Book:

1. Software Project Management – A Practitioners Approach, Bennatan, TMH, New Delhi, 1995.

Course:	M.Sc.	CORE – III	Semester	I
Major :	Computer Science	MULTIMEDIA SYSTEMS AND DESIGN	Hours	5
			Credits	4

Scope & Objective : To provide knowledge in the various components of multimedia development and presentation and its applications.

Unit 1 Introduction: Definition – Multimedia presentation and production – characteristics of multimedia presentation – Multiple media – Uses of multimedia – Steps for creating a multimedia presentation.

Unit 2 Text: Font and faces – cases – serif vs sans-serif – designing with text – choosing text fonts – symbols and icons – menus for navigation – Buttons for interaction – The character sets and alphabets – ASCII character set – extended character set – Unicode
 Audio: Power of sound – digital audio – making digital recordings – file size/quality – MIDI audio – audio file formats.

- Unit 3 Image: Image types – Color models – Basic steps for image processing – Scanner – Digital camera – Specifications of digital images – Device dependent Color models – Image processing – File formats.
- Animation: Introduction – Uses of animation – Key frames and tweening – Types of animation – Creating movement – Principles of animation – Techniques of animation – Special effects – Animation software – File formats.
- Unit 4 Video: Introduction – Video signal formats – TV broadcasting standards – Video file formats – AVI, MOV, MPEG and Cinepak – Video editing software.
- Making multimedia – stages of multimedia project – hardware – input and output devices – software – text editing and word processing tools – OCR systems – painting and drawing tools – image editing tools – sound editing tools.
- Unit 5 Types of Authoring tools – Process of making multimedia – designing – designing the structure – navigation – Producing – delivering.

Text Books:

1. Principles of Multimedia, First Edition, Ranjan Parekh, Tata McGraw Hill Publishing Company, 2006.
2. Multimedia: Making it work, Eighth Edition, Tay Vaughan, Tata McGraw Hill.

UNIT: 1: Principles of Multimedia	1.1 – 1.4, 1.7, 1.9
UNIT: 2: Multimedia: Making it work	53 – 54, 56 – 59, 104 – 118, 121 – 123
UNIT: 3: Principles of Multimedia	5.1 – 5.2, 5.4 – 5.7, 5.9, 5.11, 5.13 – 5.14, 9.1, 9.3, 9.4 – 9.5, 9.7 – 9.9, 9.13, 9.16, 9.17
UNIT: 4: Principles of Multimedia:	8.1, 8.4 – 8.5, 8.12
UNIT: 4: Multimedia: Making it work	196 – 197, 200 – 203, 209 – 212, 212 – 217, 220 – 221, 22 – 230
UNIT: 5: Multimedia: Making it work	53 – 54, 56 – 59, 104 – 118, 121 – 123, 260 – 272, 295 – 302, 318 – 323, 423 – 436

Course:	M.Sc.	CORE – IV	Semester	I
Major :	Computer Science	CRYPTOGRAPHY AND NETWORK SECURITY	Hours	5
			Credits	4

Scope & Objective : To provide knowledge on fundamental concepts and techniques of Cryptography and Network Security and also expose some algorithms.

Unit 1 Introduction: – Security goals – cryptographic attacks – services and mechanisms – Techniques – Traditional Symmetric key Cipher: – Introduction – Kerchoff’s principle – crypt analysis – substitution ciphers – monoalphabetic cipher – additive – Ceaser cipher – multiplicative cipher – poly alphabetic cipher – Play fair cipher – one time pad – Transposition cipher : – keyed and keyless transposition – stream and block cipher.

Unit 2 Modern symmetric block cipher: DES – AES – Mathematics of Asymmetric key cryptography: – prime numbers – cardinality – checking for primeness – Euler phi function – Fermat’s little theorem – Euler theorem – application of theorems – Chinese remainder theorem – Asymmetric key cryptography: RSA (Proofs of theorems not included).

- Unit 3 Message Integrity and Authentication: Message Integrity – Message Authentication – Hash function: – Iterated hash function – compression function – SHA 512 – Digital Signature: – Introduction – process – services – attacks – Entity Authentication: – Introduction – Password – Biometrics.
- Unit 4 Network Security: Security at Application layer: – Email architecture – S/MIME – Security at Transport layer: – SSL – Security at Network layer: – IPSec modes – protocol AH – ESP.
- Unit 5 System Security: Definition – system – users – trust – trusted systems – malicious programs – worms – viruses – intrusion detection system – firewall.

Text Book:

1. Cryptography and Network Security, Special Indian Edition – Behrouz A Forouzan – TMGH, 2007.

UNIT: 1: 1.1 to 1.4, 3.1, 3.2, 3.3.1, 3.3.2, 3.4, 6.1, 6.2.1, 6.2.2, 6.2.3 (key generation alone), 6.3.1, 7.1.1 – 7.1.5, 7.2(algorithms are not included), 7.3.1

UNIT: 2: 9.1.1 to 9.1.6, 9.4, 10.1.1 to 10.1.4, 10.2.1 to 10.2.3

UNIT: 3: 11.1 to 11.3 – 12.1.1, 12.1.2, 12.4, 13.1 – 13.4, 14.1, 14.2, 14.5

UNIT: 4: 16.1, 16.3, 17.1, 17.2, 17.3, 18.1, 18.2.1, 18.2.2

UNIT: 5: 19.1, 19.2, 19.4 – 19.8

Reference Books:

1. Cryptography and Network Security Principles and Practices, William Stallings, PHI Learning Private Limited, New Delhi, 2008.
2. Cryptography and Network Security, Atul Kahate, Tata McGraw Hill Publications, New Delhi, 2008.

Course:	M.Sc.	CORE – V	Semester	I
Major :	Computer Science	PRACTICAL – I: WEB TECHNOLOGY LAB	Hours	5
			Credits	4

Scope & Objective : To develop Internet programming skills in web designing using HTML, JavaScript and PHP.

- 1 Design a Web page using HTML.
 - a. Lists.
 - b. Tables.
 - c. Links.
 - d. Frames and Framesets.
 - e. Form Design.

- 2 Format a web page using Cascading style sheets.
 - a. Embedded Style Sheets.
 - b. Inline Style Sheets.
 - c. External Style Sheets

- 3 Implement Java Script Programming using
 - a. Input and Output Dialog box.
 - b. Arrays.
 - c. Functions.
 - d. Number Object.
 - e. Date Object.
 - f. String Object.
 - g. Event Handling

- 4 Implement PHP program using

- a. Arrays.
- b. Date and Time Functions.
- c. Form handling
- d. File Handling.
- e. Using MySQL.

Reference Books:

1. MIT Web technology notes, <http://ocw.mit.edu>
2. Learning PHP, MYSQL, JavaScript, CSS&HTML5, Robin Nixon, O' Reilly.
3. Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, And AJAX, Black Book, Kogent learning solution Inc, Dream tech Press, 2012.
4. Internet & World Wide Web How to Program, 4th Edition, Harvey M. Deitel and Paul J. Deitel, Pearson Education, 2008.
5. The complete Reference HTML & CSS Thomas A. Powell, MGH, 2010.
6. JavaScript 2.0 The complete Reference, Thomas A. Powell and Fritz Schneider, MGH, 2004.

Course:	M.Sc.	CORE – VI	Semester	I
Major :	Computer Science	DISTRIBUTED OPERATING SYSTEMS	Hours	5
			Credits	4

Scope & Objective : To provide a clear description of the fundamental concepts and design principles of distributed operating systems.

Unit 1 Distributed Computing Systems: Evolution – Models – Distributed Operating System – Issues in designing DOS – Distributed computing environment.

Unit 2 Communication issues in distributed system: Protocols – features of a good message passing system – Issues in IPC by message passing – synchronization – buffering – process addressing – failure handling – group communication.

Unit 3 Synchronization: Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithms.

Unit 4 Process management: Process migration – Threads.

Unit 5 Security: Potential Attacks to Computer Systems – Cryptography – Authentication – Access control mechanisms – Digital Signatures – Design Principles.

Text Book:

1. Distributed System Concepts and Design, Pradeep K. Sinha, PHI Pvt. Ltd, 1998.
(Chapters: 1.2, 1.3, 1.5 – 1.7, 2.5, 3.2 – 3.5, 3.8 – 3.10, 6, and 11)

Reference Book:

1. Distributed Operating System, Andrew S.Tanenbaum, Addison Wesley Longman, (Singapore) Pvt. Ltd.

Course:	M.Sc.	CORE – VII	Semester	II
Major :	Computer Science	DATABASE SYSTEM CONCEPTS	Hours	5
			Credits	4

Scope & Objective : To understand concepts and organization of database with specific reference to relational database.

Unit 1 Introduction – Database system applications – purpose of database systems – View of data: data Abstraction – Instances and Schema – Data Model – Data base languages – data manipulation languages – Data definition language – Relational databases – database design.

Unit 2 Structure of relational databases – Database schema – keys Schema diagram – Relational Query languages – relational operations.
Formal Relational Query Language: The Relational Algebra – The Tuple relational Calculus – The domain relational Calculus.

Unit 3 Normalization: Introduction – Non loss Decomposition and Functional Dependencies – First, Second and Third Normal form – Dependency Preservation – BOYCE/CODD Normal form – Fourth Normal form – Fifth Normal form.

Unit 4 Transaction: – transaction concepts – transaction atomicity and durability – transaction isolation – Serializability – Concurrency Control: Lock – based protocol – timestamp based protocols – validation based protocols.

Unit 5 Recoverability: Failure Classification – Recovery and Atomicity
– Remote backup systems.
Distributed databases: Homogeneous and Heterogeneous
databases – Distributed data storage – Distributed Transactions –
Heterogeneous Distributed Databases.

Text Books:

1. Database System Concepts, 6th Edition, Abraham Silberschatz, Henry F.Korth & S. Sudharshan, McGraw Hill International (Indian Edition), 2014.

UNIT: 1: 1.1 – 1.6

UNIT: 2: 2.1 – 2.6, 6.1 – 6.3

UNIT: 4: 14.1, 14.2, 14.4, 14.6, 15.1, 15.4, 15.5

UNIT: 5: 16.1, 16.3, 16.9, 19.1, 19.2, 19.3, 19.8

2. An Introduction to Data Base Systems, C.J. Date, A Kannan & S.Swamynathan, Pearson Education India, Eighth Edition, 2009.

UNIT: 3

Course:	M.Sc.	CORE – VIII	Semester	II
Major :	Computer Science	MATHEMATICAL FOUNDATION	Hours	5
			Credits	4

Scope & : To provide knowledge on Mathematical foundation.

Objective

Unit 1 Measures of central tendency: – Mean – Median – Mode – Measures of dispersion – Range – Mean deviation – Quartile deviation – Standard deviation – Moments – Skewness and Kurtosis.

Unit 2 Linear correlation – Karl Pearson’s coefficient of Correlation – Rank correlation – Linear Regression – Logistic Regression – Sample space – Events – Probability axioms (statement) – Independence of events – Conditional probability – Bayes’ rule.

Unit 3 Mathematical logic: Statements and Notations – Connectives – Tautology – Contradiction – Conditional and Biconditional – Duality Law – Tautological Implications – Functionally complete sets of connectives – Equivalence of Formulas – Theory of Inference for statement calculus – predicate calculus – Inference theory of predicate calculus.

- Unit 4 Relations and Ordering: Relations – Properties of Binary relation – Equivalence relation – Composition of Binary Relations – Partial ordering – Functions – Composition of functions – Inverse function – Introduction to recursion (Theorems and Proofs are excluded)
- Unit 5 Algebraic Structures: Definition – properties – semi group – monoids – homomorphism – Groups – subgroups(Theorems and Proofs are excluded).

Text Books:

1. Fundamentals of Statistics, 6th revised and enlarged edition, S.C Gupta, April 2004, Himalaya Publications.
2. Probability and Statistics with Reliability, Queuing and Computer Science Application, Kishore S. Trivedi, 1988, Prentice Hall of India Private Limited.
3. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay and R. Manohar, Tata McGraw Hill Education Private Limited, 1987. UNIT: 3 – 5

Reference Books: :

1. Mathematical Foundations of Computer Science, G. Shankar Rao, I. K. International Pvt. Ltd, 2006.
2. Statistics and Mathematical logic courses – NPTEL.

Course:	M.Sc.	CORE – IX	Semester	II
Major :	Computer Science	DATA MINING AND WAREHOUSING	Hours	5
			Credits	4

Scope & Objective : To study the concepts of data mining techniques, algorithms and the concepts and design of data warehousing.

Unit 1 Introduction – Data mining – On What kind of data – Data mining functionalities – Classification of Data Mining systems – Data mining task primitives – integration of a data mining systems – Major issues in Data Mining.

Unit 2 Data Pre-processing – Why pre-process the Data – Descriptive summarization – Data Cleaning – Data Integration and Transformation – Data Reduction – Data cube aggregation and attribute subset selection.

Mining Frequent Patterns – Basic concepts – Apriori algorithm – Generating association rules from frequent itemsets – Improving the efficiency of apriori – Mining various kinds of association rules – Mining multilevel, multidimensional and quantitative association rules.

Unit 3 Definition of Classification and Prediction – Issues regarding classification and prediction – Classification by decision tree induction Bayesian classification – Rule – based classification Bayesian Classification – Naïve Bayesian Classification Prediction – linear regression prediction – Accuracy and error measures – Evaluating the accuracy of a classifier and predictor.

- Unit 4 Cluster analysis – Types of data in cluster analysis – Major clustering methods – partitioning methods: Classical partitioning methods – K Means and k – Medoids – Hierarchical methods: Agglomerative, Divisive and BIRCH Hierarchical methods – Outlier analysis.
- Unit 5 Data Warehousing: An introduction – characteristics of a data warehouse – Datamarts – other aspects of data mart. Online analytical processing: OLTP & OLAP systems.
Developing a data warehouse: Why and how to build a data warehouse – Data warehouse architectural strategies and organizational issues – Design consideration – Data content – meta data – distribution of data – tools for data warehousing – Performance considerations.

Text Book:

1. Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers.

UNIT: 1: Chapter 1

UNIT: 2: Chapter 2 up to 2.5.2 & Chapter 5.1, 5.2.1 – 5.2.3 and 5.3

UNIT: 3: Chapter 6.1 – 6.5 6.11, 6.12 and 6.13

UNIT: 4: Chapter 7.1 to 7.4, 7.5.1 – 7.5.2 and 7.11

2. Data Warehousing concepts, techniques, products & applications, Second Edition, C.S.R. Prabhu, PHI.

UNIT: 5: Chapters 1, 2 and 4

Reference Books:

1. Data Mining, Pieter Adriaans, Dolf Zantinge, Pearson Education, 1998.
2. Data Mining Techniques, Arun K Pujari, Universities Press (India) Pvt., 2003.
3. Data Mining Introductory and Advanced Topics, Margaret H. Dunham, Pearson Education, 2003.

Course:	M.Sc.	CORE – X	Semester	II
Major :	Computer Science	DESIGN AND ANALYSIS OF ALGORITHMS	Hours	5
			Credits	4

Scope & Objective : To introduce different algorithmic design strategies and to impart knowledge on selection of efficient algorithms.

Unit 1 Introduction – Algorithm – Specification – Performance Analysis – Divide and Conquer – General Method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort.

Unit 2 The Greedy Method – General Method – Knapsack Problem – Tree Vertex Splitting Dynamic Programming – General Method – Multistage Graphs – All pairs shortest paths – Single – Source Shortest paths – The travelling salesperson problem.

Unit 3 Basic Traversal and Search Techniques – Binary Trees – Graphs – Connected Components and Spanning Trees – Biconnected Components.

Unit 4 Backtracking – General Method – 8 Queens Problem – Graph Colouring – Hamiltonian Cycle – Branch and Bound Method – 0/1 Knapsack Problem – TSP problem.

Unit 5 NP – Hard and NP – Complete Problem – Basic Concepts – Cook’s Theorem – NP – Hard Problems – Clique Decision Problem – Case study.

Text Book:

1. Computer Algorithms, Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Galgotia Publications Pvt. Ltd., 2002.

Reference Books

1. Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Sara Baase and Allen Van Gelde, Pearson Education, Delhi, 2002.
2. The Design and Analysis of Computer Algorithm, Aho, Hopcroft and Ullman, Pearson Education, Delhi, 2001.
3. Design Methods and Analysis of Algorithms, Basu S.K., PHI, 2006.

Course:	M.Sc.	CORE – XI	Semester	II
Major :	Computer Science	PRACTICAL – II: SQL LAB	Hours	5
			Credits	4

Scope & Objective : To provide knowledge on SQL and PL/SQL to create and access databases.

- 1 Data Definition Language: Create, Alter, Drop, Rename, Truncate
Data Manipulation Language: Insert, Update, Delete, Select.
- 2 Constraints: Not Null, Unique Key, Primary Key, Foreign Key, Check, Dropping a Constraint, Enabling & Disabling.
- 3 Data Control Language: Grant, Revoke, Roles Transaction Control: Commit, Rollback, Savepoint.
- 4 SQL SELECT Statements: Selecting All Columns, Selecting Specific Columns, Column Alias, Concatenation Operator, Arithmetic Operators, Comparison Conditions, Logical Conditions, ORDER BY Clause.
- 5 Functions: Single Row Functions, Character Functions, Number Functions, Date Functions, Conversion Functions, General Functions, Multiple Row Functions, Group Function Subquery: Subquery, Types of Subquery, Group Function, Having Clause.
- 6 Joins: Equijoins, Non – Equijoins, Joining Three Tables, Self Joins, Left Outer Joins, Right Outer Joins, Full Outer Joins, Cross Joins, Natural Joins Other Concepts: View, Index.
- 7 Programming: Variables, Identifiers, Comment, PL/SQL Block Structure IF Statements: Simple IF Statements, Compound IF Statements IF – THEN – ELSE Statements Loop: Basic Loop, WHILE.

- 8 DML Operations Using PL/SQL: Insert, Update, Delete, and Merge.
- 9 Cursor: Types of Cursor, Explicit Cursor, Explicit Cursor Attributes, Trigger: Trigger, Statement Trigger, Row Trigger, Using Conditional Operations, DML Operations.

Reference Book:

1. SQL, PL/SQL – The Programming Language of SQL, Third Edition, Ivan Bayross, BPB Publications, New Delhi, 2008.

Course:	M.Sc.	CORE BASED ELECTIVE – I	Semester	II
Major :	Computer Science	FUNDAMENTALS OF MOBILE AND PERVASIVE COMPUTING	Hours	5
			Credits	4

Scope & Objective : To introduce the basic concepts of Mobile computing and to impart knowledge on implementation of Pervasive computing applications.

Unit 1 Mobile adaptive computing: Introduction to mobile computing – Adaptability – The Key to mobile computing – Mechanisms for Adaptation – Development or incorporation of adaptations in applications – Support for building adaptive mobile applications – Mobility management: Concept of Mobility management – Location management principles and techniques – Location management case studies.

Unit 2 Context – Aware computing: Ubiquitous or pervasive Computing – Context defined – Various definitions and types of contexts – Context aware computing applications – middleware support – Introduction to mobile middleware: definition of mobile middleware – Adaptation – Agents – Service discovery.

Unit 3 Introduction to Ad – hoc and Sensor Networks: Overview – Properties of an Ad – hoc Network – Unique features of sensor Networks – Proposed Applications – Challenges – Constrained resources – Security – Mobility.

Unit 4 Wireless Security: Traditional security issues – Mobile and wireless security issues – Mobility: Problems and Ad – hoc

Networks – Additional issues: Commerce – Additional type of attacks – Approaches to security: Limit the signal – Encryption – Integrity codes – IPSec – Other security related mechanisms.

Unit 5 Security in wireless personal area networks – Basic idea – Bluetooth security Modes – Basic Security Mechanisms – Encryption: Authentication – Limitation and problems.

Text Book:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep K.S. Gupta, Golden G. Richard III, Loren Schwiebert.

Course:	M.Sc.	CORE – XII	Semester	III
Major :	Computer Science	COMPILER DESIGN	Hours	5
			Credits	4

Scope & Objective : To enlighten the students on the various phases of the compilation process from high level language into its low level counterpart.

Unit 1 Introduction to compilers – compilers and translators – assembly language – macros – structure of a compiler – compiler writing tools – bootstrapping.

Lexical analysis – role of lexical analyzer – regular expression – finite automata – implementation of lexical analyzer – context free grammars – derivation and parse trees.

Unit 2 Parsers – shift reduce parsing – operator precedence parsing – top down parsing – predictive parsers – simple precedence parser – LR parsers – constructing SLR parser tables.

Unit 3 Syntax directed translation schemes – implementation of syntax Directed translation schemes – intermediate code – postfix notation – parse trees and syntax trees – three address code, quadruples and tuples.

Unit 4 Symbol table – contents of a symbol table – data structures for symbol tables – Errors – Lexical phase errors – syntactic phase errors – Time of detection – Panic mode – Error recovery in operation precedence parsing – Handling errors during reduction – handling shift reduce errors – semantic errors.

Unit 5 Code optimization – principle sources of optimization – loop optimization – DAG representation of basic blocks.

Code generation – problems in code generation – a simple code generator – Peephole optimization.

Text Book:

1. Principles of Compiler Design, Aho & Ullman, Narosa Publishing House.

Course:	M.Sc.	CORE – XIII	Semester	III
Major :	Computer Science	PARALLEL PROCESSING	Hours	5
			Credits	4

Scope & Objective : To provide basic knowledge on parallel processing systems with its architecture and software implementation procedure.

Unit 1 Parallel Computer Models: The state of computing – Multiprocessors and Multicomputers – Multivector and SIMD Computers.

Unit 2 Program and Network properties: Conditions of Parallelism – Program Partitioning and Scheduling – Program flow mechanisms – System Interconnect architectures.

Unit 3 Pipelining and Superscalar Techniques: Linear Pipeline Processors – Non – Linear Pipeline Processors – Instruction Pipeline Design.

Unit 4 Multiprocessors and Multicomputers: Message Passing Mechanisms – Multivector and SIMD Computers: SIMD Computer organizations.

Unit 5 Software for Parallel Programming: Parallel Programming models – Parallel Languages and Compilers – Dependence Analysis of Data Arrays.

Text Book:

1. Advanced Computer Architecture, Parallelism, Scalability, Programmability, Kai Hwang, TMGH, New Delhi, 2001.

UNIT: 1: Pages: 1 – 32

UNIT: 2: Pages: 51 – 96

UNIT: 3: Pages: 265 – 297

UNIT: 4: Pages: 375 – 393 & 446 – 457

UNIT: 5: Pages: 545 – 578

Reference Books:

1. Computer Architecture and Parallel Processing, Kai Hwang and Baye A. Briggs, McGraw Hill International Editions, Singapore, 1985.
2. Parallel Computing, Theory and Practice, Michael J.Quinn, McGraw Hill International Edition, Singapore 1994.

Course:	M.Sc.	CORE – XIV	Semester	III
Major :	Computer Science	ADVANCED JAVA PROGRAMMING	Hours	5
			Credits	4

Scope & Objective : To impart knowledge on writing programs using advanced Java concepts.

Unit 1 File and I/O streams: Byte streams and Character streams – Reading and writing files – Serialization – JDBC Introduction – Establishing Connection – Creation, Insertion and Updation of Tables – Prepared Statement – Meta Data Function – Transactions – Result Sets – Stored Procedures.

Unit 2 MultiThread programming: Java Thread Model – Thread priorities – Synchronization – Swing: Japplet – Icons – JLabel – JText field – JButton – JCheckbox – JRadio Button – JMenu – JCombo Box – JTabbed Pane – JScroll Pane – JTables.

Unit 3 Java Networking: Networking Basics – Inet Address – TCP/IP client sockets – TCP/IP server sockets – URL – URL Connection – Datagrams – RMI – overview of RMI – developing applications – Declaring, implementing, registering RMIs – Client / Server Application using RMI.

Unit 4 Java Bean: Bean Developing Kit – Jar Files – Introspection – Design Pattern for properties, events and methods – Constrained Properties – Persistence – Customizers.

Unit 5 Server side Java: Life Cycle of a Servlet – Simple Servlet – Retrieving values of parameters and Initialization parameters – Cookies – Session Tracking – JSP: Introduction to JSP – Scripting elements and directives of JSP – Programming Java in JSP – Applying MVC principles using JSP and JavaBeans.

Text Books:

1. The Complete Reference: JAVA 2, Seventh Edition, Herbert Scheldt, Tata McGraw Hill, 2007.
2. Java Programming Advanced Topics, Core Technology, Joe Wigglesworth, Paula Lumby, Thomson Learning, First reprint 2001.

Reference Books:

1. Programming with Java, C. Muthu, Vijay Nicole Imprints Pvt. Ltd., 2004.
2. Java – Programmer’s Reference, Herbert Schildt with Joe O’ Neil, TMH, 2004.

Course:	M.Sc.	CORE – XV	Semester	III
Major :	Computer Science	PRACTICAL – III: ADVANCED JAVA PROGRAMMING LAB	Hours	5
			Credits	4

Scope & Objective : To develop the programming skill in client/server communications and server side applications.

- 1 Program to insert, delete and update database using JDBC.
- 2 Program to design a simple calculator for basic arithmetic operations using Swing.
- 3 Echo server program to demonstrate TCP/IP based communication between client and server.
- 4 Program to demonstrate UDP based communication between Client and Server.
- 5 Program to read a webpage using URL class.
- 6 Program to display the IP address of local host using Inet Address class.
- 7 Program to handle multiple threads.
- 8 Program to demonstrate RMI.
- 9 Demonstrate server side programming using Java servlet.
- 10 Program to demonstrate JSP.
- 11 Program to demonstrate JavaBean.

Reference Books:

1. The Complete Reference: JAVA 2, Seventh Edition, Herbert Scheldt, Tata McGraw Hill, 2007.
2. Java Programming Advanced Topics, Core Technology, Joe Wigglesworth, Paula Lumby, Thomson Learning, First reprint 2001.
3. Programming with Java, C. Muthu, Vijay Nicole Imprints Pvt. Ltd., 2004.
4. Java – Programmer’s Reference, Herbert Schildt with Joe O’ Neil, TMH, 2004.

Course:	M.Sc.	CORE BASED ELECTIVE – II	Semester	III
Major :	Computer Science	ARTIFICIAL INTELLIGENCE AND SOFT COMPUTING	Hours	5
			Credits	4

Scope & Objective : To introduce the heuristic technique, neural network and fuzzy system with reasoning.

Unit 1 Introduction: AI Problems – AI techniques – Tic – tac – toe problem – Problems, Problem Spaces, Search: defining the problem as a State space search – Production Systems – Problem characteristics – Production System Characteristics.

Unit 2 Heuristic Search techniques: Generate and Test – Hill Climbing – Best – First Search – Problem reduction – Constraint Satisfaction – Means – end analysis.
Knowledge representation issues: Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations.

Unit 3 Using Predicate logic: Representing simple facts in logic – Representing Instance and Is a relationships – Computable functions and predicates – Resolution.

Unit 4 Neural Network Systems: – Introduction to Artificial Neural Network – Biological neurons versus artificial neural network – Neuron models: McCulloch – Pitts Neuron – Hebb Network – Learning in neural networks: Supervised Learning Network – Unsupervised Learning Network.

Unit 5 Fuzzy Logic Systems: – Introduction to Fuzzy logic – classical sets vs fuzzy sets – Membership functions and its features – Properties and operations on Fuzzy sets – classical relations versus Fuzzy relation – Operations of Fuzzy relation – Defuzzification – Fuzzy rule base and approximate reasoning – Fuzzy Inference.

Text Books:

1. Artificial Intelligence, Third Edition, Elaine Rich, Kevin Knight, Shivshankar B Nair, McGraw Hill, 2009.
UNIT: 1 : 1.1, 1.3, 1.3.1, 2.1, 2.2 – 2.4
UNIT: 2: 3.1, 3.2, 3.2.1, 3.2.2, 3.3, 3.3.1, 3.3.2, 3.4, 3.4.1, 3.4.2, 3.5, 3.6
UNIT: 3: 4.1, 4.2, 4.3, 5.1 – 5.4
2. Principles of soft computing, S. N. Sivanandam, S. N. Deep, Wiley India Edition.
3. An introduction to Fuzzy Control, Drinkov, Narosa Publication.

Course:	M.Sc.	CORE BASED ELECTIVE – III	Semester	III
Major :	Computer Science	PRACTICAL – IV: MACHINE LEARNING LAB USING PYTHON	Hours	5
			Credits	4

Scope & : To expose practical knowledge on Machine Learning concepts.

Objective

- 1 Simple Programs using Python.
- 2 Programs using Central Tendencies
- 3 Linear Regression.
- 4 Logistic Regression.
- 5 Decision Tree.
- 6 Naïve Bayesian Theorem.
- 7 KNN Algorithm.
- 8 K Means Algorithm.
- 9 Fuzzy Membership Function.
- 10 Fuzzy decision making.

Reference Books:

1. Python: The Complete reference, Martin C. Brown, MGH, 2001.
2. Learning Python, Mark Lutz, O'Reily, 2013.

Course:	M.Sc.	CORE BASED ELECTIVE – IV	Semester	IV
Major :	Computer Science	ADVANCED COMPUTING CONCEPTS	Hours	5
			Credits	4

Scope & : To learn the current trends in computing.

Objective

Unit 1 Genetic Algorithm: Introduction to Genetic Algorithm – Working principle of GA – Differences between Genetic Algorithm and Traditional Methods – Terminology used in Genetic Algorithm – Genetic Operators – Selection – Crossover – Mutation – Parameters of GA – Designing the Genetic Structures – Applications of Genetic Algorithm for Simple Optimization Problem – Travelling Sales Man Problem – Other Applications.

Unit 2 CLOUD COMPUTING: Introduction – characteristics of cloud models—Cloud services examples – cloud based services & Applications – Cloud concepts and technologies – Cloud services and platforms: Compute services – Storage services – Database services – Application services.

- Unit 3 BIOMETRICS: Authentication – Biometric Authentication – Key elements of Biometric Systems – Different types of Biometrics: Fingerprint and Hand geometry and their uses – Facial and Voice Recognition – Eye Biometrics: Iris and Retina scanning and applications – Signature Recognition and Keystroke Dynamics with diagraph representations (on all biometrics – intro and applications) – Liveness Testing: Properties of living body.
- Unit 4 EMBEDDED SYSTEM: Definition – Classification – applications – purpose – Embedded system core – Microprocessor versus Microcontroller – DSP – RISC versus CICS – Harvard architecture – Von Neumann architecture – Memory – Sensors and Actuators. Communication interface: UART – USB – Bluetooth – WiFi – GPRS – Embedded Firmware – Other Components: RTC – Watch dog Timer – Characteristics and quality of embedded system – Interrupt – embedded firmware design approaches – RTOS based approach – task, process and threads basics – RTOS task scheduling – Non pre emptive SJF – preemptive scheduling : – PSJF – RTOS Task communication: shared memory and dead lock handling.(only basics of task scheduling and task synchronization).

Unit 5 INTERNET OF THINGS: Internet of Things vision – IOT definition – Strategic research and innovation direction – functional view – application areas – Smart Cities – Smart Transport – Smart Home – Smart Health – Food and Water tracking security – Smart Logistics – Related future Technology: Data collection and analysis – Big Data – Semantic Sensor Networks – Virtual sensors.

Text Books:

1. Genetic Algorithms in Search, Optimization and Machine Learning, David E. Goldberg, Addison Wesley.
2. Cloud computing A hands on approach, Archdeep Bahga Vijay Madisetti Universities Press(India) Limited, 2014.
3. Biometrics – The Ultimate Reference, John D. Woodward, Jr., Nicholas M. Orlans, Peter T. Higgins, Dreamtech Press, 2003.
4. Introduction to Embedded System, Shibu K V, TMGH, 2009.
5. Internet of Things – From Research Innovation to Market Deployment by Ovidiu Vermesan and Peter Friess, River Publishers, 2014.

Course:	M.Sc.		Semester	IV
Major :	Computer Science	PROJECT	Hours	25
			Credits	14