

M.Sc. COMPUTER SCIENCE – MCBCS SYLLABUS – 2015-2016 ONWARDS

PERIYAR E. V. R. COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620023

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. COMPUTER SCIENCE DEGREE COURSE – MCBCS SYLLABUS – 2015-2016 ONWARDS

Sl. No.	COURSE TITLE		Hours	Credits	Int.	Ext.
SEMESTER – I						
1	Core I	Internet Programming with JavaScript	5	4	25	75
2	Core II	Biometrics	5	4	25	75
3	Core III	Multimedia Systems and Design	5	4	25	75
4	Core IV	Cryptography and Network Security	5	4	25	75
5	Core V	Practical – I: HTML and JavaScripting Lab	5	4	25	75
6	Core VI	Distributed Operating Systems	5	4	25	75
Total			30	24	150	450
SEMESTER – II						
7	Core VII	Advanced Data Base Systems	5	4	25	75
8	Core VIII	Embedded Systems	5	4	25	75
9	Core IX	Data Mining	5	4	25	75
10	Core X	Design and Analysis of Algorithms	5	4	25	75
11	Core XI	Practical – II: SQL Lab	5	4	25	75
12	CBE I	Fundamentals of Mobile and Pervasive Computing	5	4	25	75
Total			30	24	150	450
SEMESTER – III						
13	Core XII	Compiler Design	5	4	25	75
14	Core XIII	Parallel Processing	5	4	25	75
15	Core XIV	Advanced Java Programming	5	4	25	75
16	Core XV	Practical – III: Advanced Java Lab	5	4	25	75
17	CBE II	Dynamic Web Development Technology	5	4	25	75
18	CBE III	Practical – IV: .NET Technology Lab	5	4	25	75
Total			30	24	150	450
SEMESTER – IV						
19	CBE IV	Advanced Computing Concepts	5	4	25	75
20		Project	25	14	25	75
Total			30	18	50	150
Grand Total			120	90	500	1500

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Course:	M.Sc.	CORE – I: INTERNET PROGRAMMING WITH JAVASCRIPT	Semester:	I
Major:	Computer Science		Hours:	5
			Credits:	4

Scope and Objectives: To expose basic knowledge towards web designing and also bringing out the programming skills by using a script language.

Unit – 1:

XHTML: XHTML Example – Headings – Linking – Images – Special Characters and Horizontal Rule – Lists – Ordered lists – Unordered lists – Definition lists – Tables – Forms: The <form> tag – <input> tag, <label> tag, <select> tag, <textarea> tag – Internal Linking – Image Maps – Frames – Frameset – Nested Frameset – Cascading Style Sheets: Introduction – Inline Styles – Embedded Style Sheets – Conflicting Styles – Linking External Styles Sheets – User Style Sheets.

Unit – 2:

Java Script: Introduction – Simple Programs – Obtaining User Input with Prompt Dialogs – Memory Concept – Arithmetic Operators – Equality and Relational Operators – Assignment Operators – Increment and Decrement Operators – Logical Operators – Control Statements: If, If...Else, Switch, While Statement, For, Do...While Break And Continue – Labelled Break and Continue.

Unit – 3:

Functions: Program Modules in Java Script – Programmer Defined Functions – Function Definition – Random Number Generation – Random Image Generator – Scope Rules – Global Functions – Recursion – Arrays: Declaring and Allocating Arrays – Examples using Array – Random Image Generator using Arrays – Reference and its Parameters – Passing Arrays to Functions – Multidimensional Arrays.

Unit – 4:

Java Script Objects: Introduction to Object Technology – Math Object – String Object – Fundamentals of Characters and Strings – Methods of the String Object – Character Processing Methods – Searching methods – Splitting Strings and Obtaining Substrings – XHTML Markup Methods – Date Object – Boolean and Number Object – Document Object – Window Object.

Unit – 5:

Events: Registering Event Handlers – Event Onload – Onmousemove, The Event Object and This – Rollovers With Onmouseover and Onmouseout – Form Processing With Onsubmit and Onreset – Event Bubbling.

Text Book

1. “Internet and World Wide Web – How to Program?”, 4th Edition, P.J.Deitel & H.M. Deitel, Prentice Hall.

Reference Book

2. “Web Enable Commercial Application Development Using HTML, DHTML, Java Script, Perl CGI”, Ivan Bayross, 2000, BPB Publications.

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

Scope and Objectives: To study the basic concepts of Biometrics, different types of Biometrics, Biometric tests, and implementation.

Unit – 1:

Authentication – Biometric Authentication – Deploying • Authentication systems – Key elements of Biometric Systems.

Unit – 2:

Fingerprint and Hand geometry: Manual Matching of Fingerprints – Uses of Hand Geometry – Facial and Voice Recognition – Voice Verification.

Unit – 3:

Eye Biometrics – Iris scanning – Applications – Retina Scanning – Signature Recognition and Keystroke Dynamics: Working of signature Recognition – Implementation Studies – Keystroke Application – Digraph Representation.

Unit – 4:

Liveness Testing: Properties of living body – Biometrics in Large scale Systems: Getting started, Documenting procurement process and Specifying systems.

Unit – 5:

Biometric Testing and Evaluation: Introduction – Tests and Benefits – Three Bears Principle – Best Practices for Biometrics Testing – Types of Testing.

Text Book

1. “Biometrics - The Ultimate Reference”, John D. Woodward, Jr., Nicholas M. Orlans, Peter T. Higgins, Dreamtech Press, 2003.

M.Sc. COMPUTER SCIENCE – MCBCS SYLLABUS – 2015-2016 ONWARDS

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

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

Unit – 1:

Introduction: Definition – Multimedia presentation and production – characteristics of multimedia presentation – Multiple media – Hardware and Software requirement – Uses of multimedia – Promotion of multimedia based content – Steps for creating a multimedia presentation.

Unit – 2:

Text: Types of text – UNICODE standard – Text compression – File formats – Texts in multimedia projects. Audio: Audio sampling – Audio sampling parameters – Digital audio file formats – Digital audio playback – Windows media player – Digital audio recording techniques – Steps in audio recording process – Digital audio editing process – Audio transformation – MP3 revolution – MIDI fundamentals.

Unit – 3:

Image: Image types – Color models – Scanner – Digital camera – Specifications of digital images – Image processing software – 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 – Video editing software.

Multimedia Application Development: Software lifecycle – Conceptualization – Content Collection and Processing – Story – Flowline – Script – Storyboard – Implementation – Authoring metaphors – Testing – Delivery – Documentation.

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Unit – 5:

User interfaces: Introduction – Windows multimedia support – Windows API, Graphics Libraries, DirectX – Distributed multimedia application – Streaming technologies – Multimedia skill sets and careers – Content experts.

Text Books

1. “Principles of Multimedia”, First Edition, Ranjan Parekh, Tata McGraw Hill Publishing Company, 2006.
2. “Multimedia Magic”, Updated Second Edition, S. Gokul, BPB Publications.

Unit – 1: Principles of Multimedia:	1.1 – 1.4, 1.6 – 1.9
Unit – 2: Principles of Multimedia:	4.2 – 4.3, 4.6 – 4.7
Multimedia Magic:	11.2 – 11.8, 11.14 – 11.30 5.4 – 5.5, 5.7 – 5.9, 7.3 – 7.4, 7.7 – 7.11, 7.13, 7.14 – 7.24, 8.1 – 8.7, 9.2 – 9.3, 9.8.
Unit – 3: Principles of Multimedia:	5.1 – 5.2, 5.4, 5.6 – 5.7, 5.9, and 5.13 – 5.14 9.1 – 9.3, 9.4 – 9.5, 9.7 – 9.8, 9.9, 9.13, 9.16, 9.17
Unit – 4: Principles of Multimedia:	8.1, 8.4 – 8.5, 8.10 – 8.12 15.2, 15.4 – 15.14
Unit – 5: Principles of Multimedia:	13.2 – 13.3, 13.5, And 13.8
Multimedia Magic:	23.3 – 23.18

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

Scope and Objectives: To introduce some fundamental concepts and techniques of Cryptography and network Security. To understand some algorithms of cryptography and network security.

Unit – 1:

Introduction: Security goals – attacks, services and mechanisms – Techniques – Traditional Symmetric key Cipher: Introduction, crypt analysis, Ceaser cipher – mono alphabetic cipher – Play fair cipher – Transposition cipher – stream and block cipher – Modern symmetric cipher: DES – AES.

Unit – 2:

Mathematics of cryptography: primes – cardinality – checking for primeness – Euler phi function – Fermat theorem – Euler theorem – Chinese remainder theorem – Asymmetric key cryptography: Introduction, RSA.

Unit – 3:

Message Integrity and Authentication: Message Integrity – Message Authentication – Hash function – SHA 512 – Digital Signature: process – services – attacks on DS Entity Authentication: Password – Biometrics.

Unit – 4:

Network Security: Security at Application layer: Email architecture – Email security – S/MIME – Security at Transport layer: SSL – Security at Network layer: IPSec modes – protocol AH, ESP – Ipv4 vs. IPV6.

Unit – 5:

System Security: Intruders – Intrusion Detection – Password management – Malicious software: viruses and related threats – Firewall: design principles.

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Text Books

Units: 1, 2, 3 and 4

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

Unit – 5

2. “Cryptography and Network Security” – William Stalling – Pearson Education Publishers, Fourth edition, 2007.

Reference Book

1. “Cryptography and Network Security” – Atul Kahate, MGH, Third edition, 2003

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Course:	M.Sc.	CORE – V: PRACTICAL – I: HTML AND JAVASCRIPTING LAB	Semester:	I
Major:	Computer Science		Hours:	5
			Credits:	4

Scope and Objectives: To develop programming skills in web designing using HTML and Internet programming using JavaScript.

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

02. Create a web page using Cascading style sheets –
Embedded style sheets – Inline style sheets

03. 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

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

Scope and 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.

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

Scope and Objectives: To understand the basic concepts and organization of a database and to give the basic knowledge on relational database concepts and design.

Unit – 1:

Introduction – Data Abstraction – Instances and Schema – Data Model – Entity Relationship Model – Entity sets – Relationship Sets – Constraints – Mapping Cardinalities – Keys – Entity Relationship Diagram – Weak Entity Sets – ER Diagram – Reduction of ER Schema to Tables – Relational Model – Database Languages .

Unit – 2:

Relational Model: Structure of Relational Databases – The Relational Algebra – The Tuple Relational Calculus – The domain Relational Calculus – Extended Relational – Algebra Operations – Modification of the Database – Views.

Unit – 3:

SQL: Basic Structure – Set Operations – Aggregate Functions – Null Values – Nested Subqueries – Derived Relations – Views – Complex Queries – Modification of the Database – Joined Relations – DDL – Embedded SQL.

Integrity Constraints: Domain Constraints – Referential Integrity – Assertions – Triggers – Functions and Procedures – SQL functions and Procedures – Procedural Constructs.

Unit – 4:

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 – 5:

Transactions: Transaction Concept – Transaction State – Implementation of Atomicity and Durability – Concurrent Executions.

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Text Books

Units – 1, 2, 3, and 5:

1. “Database System Concepts”, Abraham Silberschatz, Henry F.Korth & S. Sudharshan, 3rd Edition, McGraw Hill International Editions, 1997.

Unit – 4:

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

Reference Book

1. “SQL, PL/SQL – The Programming Language of ORACLE”, Ivan Bayross, 3rd Edition, BPB Publications.

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

Scope and Objectives: To introduce the concept of Embedded system, it's Hardware. To impart the knowledge of embedded software design techniques and to know the principle of RTOS

Unit – 1:

Introduction to Embedded Systems: Embedded Systems, Processor Embedded into a System – Embedded Hardware Units and Devices in a System – Embedded Software in a System – Examples of Embedded Systems – Embedded System – on – chip (Soc) – Complex Systems Design and Processors – Design Process in Embedded System – Formalization of System Design – Design Process and Design Examples – Classification of Embedded Systems – Skills Required for an Embedded System and Designer.

Unit – 2:

8051 Architecture and Interfacing: 8051 Architecture – Real World Interfacing – Processor and Memory Organization – Instruction Level Parallelism – Memory: – Types, Memory – Maps and Addresses – IO: Types and Examples – Serial Communication Devices – Parallel Device Ports – Sophisticated Interfacing Features in Device Ports – Wireless Devices – Timer and Counting Devices – Watchdog Timer – Real Time Clock – Device drivers and Interrupt service mechanism: Programmed I/O – ISR – Interrupt service mechanism – multiple interrupts – context switching – Interrupt latency – DMA.

Unit – 3:

Interprocess Communication and Synchronization: Multiple Processes in an Application – Multiple Threads in an Application – Tasks – Task States – Task and Data – Clear – cut Distinction between Functions, – Tasks by their Characteristics – Semaphores – Shared Data – Interprocess Communication – Signal Function – Semaphore Functions – Message Queue Functions – Mailbox Functions – Pipe Functions – Socket Functions – RPC Functions.

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Unit – 4:

RTOS: OS services – Timer function – Event function – IR in RTOS – handling IRs – RTOS – Basic design using RTOS – RTOS scheduling – interrupt latency – case study: Automatic chocolate vending machine, mobile phone software for key input.

Unit – 5:

Embedded Software Development Process: Introduction to Embedded Software Development Process and Tools – Host and Target Machines – Linking and Locating Software – Getting Embedded Software into the Target System – Issues in Hardware – Software Design and Co – design – Testing and Debugging Techniques and Tools: Testing on Host Machine – Simulators – Laboratory Tools.

Text Book

1. “Embedded Systems Architecture, Programming and Design”, Raj Kamal, 2nd Edition, Tata McGraw Hill, 2008.

Reference Books

1. “Embedded System Design: An Introduction to Processes, Tools and Techniques”, Arnold S. Berger, CMP Books, 2002.
2. “Programming Embedded Systems: With C and GNU Development Tools”, Michael Barr, Anthony J. Massa, O’Reilly Media, Inc., 2006.

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

Scope and Objectives: To study the basic concepts of data mining and algorithmic details of various data mining techniques to discover patterns in large amount of data.

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 – Descriptive summarization – Data Cleaning – Data Integration and Transformation – Data Reduction – data cube aggregation and attribute subset selection

Data warehousing: Data warehouse definition – Multidimensional Data Model – Data Warehouse Architecture – Data Warehouse Implementation.

Unit – 3:

Mining Frequent Patterns, Associations and Classification – Basic concepts – apriori algorithm – generating association rules from frequent itemsets – improving the efficiency of apriori – mining various kinds of association rules.

Unit – 4:

Definition of Classification and Prediction – Issues regarding classification and prediction – Classification by decision tree induction – linear regression prediction – classifier accuracy.

Unit – 5:

Cluster analysis – Types of data in cluster analysis – Major clustering methods – Partitioning methods: Classical • partitioning methods k – Means and k – Medoids – Hierarchical • methods: BIRCH – Outlier analysis.

Text Book

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

Reference Book

1. “Data Mining”, Margaret H. Dunham, Pearson Education.

Unit – 1: Chapter 1

Unit – 2: Chapter 2 up to 2.5.2 & Chapter 3 upto 3.4

Unit – 3: Chapter 5.1, 5.2.1 – 5.2.3 and 5.4

Unit – 4: Chapter 6.1 6.3, 6.4.1, 6.11, 6.12 and 6.13

Unit – 5: Chapter 7.1 to 7.4, 7.5.1 – 7.5.2 and 7.11

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

Scope and Objectives: To introduce different algorithmic design strategies and to impart an understanding and selection of an efficient algorithm for each specific problem.

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 – Branch and Bound Method – 0/1 Knapsack Problem.

Unit – 5:

NP-Hard and NP-Complete Problem – Basic Concepts – Cooke’s Theorem – NP-Hard Problems – Clique Decision Problem – Job Shop Scheduling – Code generation with Common Sub expressions.

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”, Sara Baase and Allen Van Gelde, 3rd Edition, 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.

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

Scope and Objectives: To impart programming skills in Structured Query Language for database operation in DDL and DML. Also provide hands on experience in SQL Programming.

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, Merge.
9. Cursor: Types of Cursor, Explicit Cursor, Explicit Cursor Attributes, Trigger: Trigger, Statement Trigger, Row Trigger, Using Conditional Operations, DML Operations.

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

Scope and Objectives: To introduce the basic concepts of Mobile computing and to impart an understanding of the various aspects required to implement 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.

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

Scope and Objectives: To enlighten the students on the various phases of the compilation process and to enable them to understand how high level language features are converted into their low level counterparts.

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.

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

Scope and Objectives: To provide basic knowledge on parallel 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.

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

Scope and Objectives: To impart the knowledge of 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 – Label – Text field – Button – Checkbox – Radio Button – Menu – Slider – Combo Box – Tabbed Pane – Scroll Pane – Tables.

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.

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Text Books

1. “The Complete Reference: JAVA 2”, Herbert Scheldt, Fifth Edition,
Tata McGraw Hill, 2002.
2. “Java Programming Advanced Topics, Core Technology, Joe Wigglesworth,
Paula Lumby, Thomson Learning, First reprint 2001.

Reference Book

1. “Programming with Java”, C. Muthu, Vijay Nicole Imprints Pvt. Ltd., 2004.

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

Scope and Objectives: To develop programming skills 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 IPaddress of local host using InetAddress class.
7. Program to handle multiple threads.
8. Develop an application using RMI to display factorial of a number.
9. Develop an application using RMI to implement C/S communication.
10. Program using servlet for currency conversion (using HttpServlet class).
11. Program to implement a counter with JSP for counting the number of website viewers.
12. Program to implement cookies.
13. Program to implement Session tracking.
14. Demonstrate JavaBean.

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Course:	M.Sc.	CORE BASED ELECTIVE – II: DYNAMIC WEB DEVELOPMENT TECHNOLOGY	Semester:	III
Major:	Computer Science		Hours:	5
			Credits:	4

Scope and Objectives: To expose knowledge on creating dynamic and robust web page using webform concepts.

Unit – 1:

Features of ASP.NET, Visual Studio 2005 – The Document Window – Toolbox, ASP.NET Page event, Web forms, web form controls – ASP.NET web server controls – Label, Literal, Text Box, Button, LinkButton, ImageButton, Hyperlink, Drop Downlist, ListBox, CheckBox, RadioButton, RadioButtonList, Checkboxlist, Image Server, Table server, calendar server, AdRotator, Placeholder, Tree view and Menu control.

Unit – 2:

Validation Server Control: Client side versus server Side validation, Validation Server Controls: Required Field, Comparison, Range, Regular Expression, Custom validator, Validation summary, Turning of Client side validation, Using images and Sounds for Error notifications.

Unit – 3:

Working with Master Pages: Need of Master pages, Basics, Coding a Master page, Coding a content Page, Specifying default content in the Master page, Assigning the Master Page using program, Nesting Master Page, Container Specific Master Page.

Unit – 4:

Data Binding in ASP.NET: Data Source Controls – SqlDataSource, XmlDataSource, ObjectDataSource, SiteMapDataSource, Using Bound List control with Data Source Controls – Grid View, Editing Gridview Row data, Deleting Gridview data, Insert, update and delete data using Details View, Other Databound Control – Dropdown list, ListBox, RadioButtonList and Checkboxlist.

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Unit – 5:

Data Management with ADO.NET: Basic ADO.NET features, Namespace and class, Connection Object, Command Object, DataReader object, DataAdapter, Using Parameters, Understanding Dataset and DataTable.

Text Book

1. “Professional ASP.NET 2.0”, Wiley Publishing, Inc., 2006.

(Programming using VBScript only)

Reference Book

1. ASP.NET Made Simple, BPB Publications.

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Course:	M.Sc.	CORE BASED ELECTIVE – III: PRACTICAL – IV: .NET TECHNOLOGY LAB	Semester:	III
Major:	Computer Science		Hours:	5
			Credits:	4

Scope and Objectives: To expose practical knowledge on creating dynamic and robust web page using advanced webform controls.

ASP.NET

1. Placing Textboxes dealing with its properties.
2. Making use of place – holders, literals and controls.
3. Making use of list box, check box and radio button controls.
4. Setting up and using Adrotator control.
5. Making use of required field validator and compare validator controls.
6. Using range validator, regular expression validator and validation summary.
7. Database connectivity through connected approach.
8. Data view with the help of grid view control.
9. Formatting data with a help of data list control.
10. Tree view control.
11. Calendar control.
12. Menu control.
13. Creating master page.

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

Scope and Objective: To learn the fundamentals of contemporary concepts in computing.

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 – Traveling Sales Man Problem – Other Applications.

Unit – 2:

CLOUD COMPUTING: Introduction to Cloud Computing: Roots of Cloud Computing – Layers and Types of Cloud – Features of a Cloud – Infrastructure Management – Cloud Services – Challenges and Risks. Migrating into a Cloud: Introduction – Broad Approaches – Seven Step Model. Integration as a Service – Integration Methodologies – SaaS.

Unit – 3:

GRID COMPUTING: Introduction: Early Grid Activity, Current Grid Activity, Overview of Grid Business areas, Grid Applications, Grid Infrastructures. Grid Computing organization and their Roles: Organizations Developing Grid Standards and Best practice Guidelines, Global Grid Forum (GCF), Organization Developing Grid Computing Toolkits and Framework, Organization and building and using grid based solutions to solve computing, commercial organization building and Grid Based solutions.

Unit – 4:

ARTIFICIAL INTELLIGENCE: The AI problems – AI techniques – problems, problems space & search – Defining the problem as a state Search – Production systems – problem characteristics – heuristic search techniques – Generate & test – Hill climbing – Best first search. Problem reduction – constraint satisfaction – means – ends analysis.

Unit – 5:

ARTIFICIAL NEURAL NETWORKS AND FUZZY SYSTEMS: Artificial Neural Networks Basic concepts – Single layer perception – Multilayer Perception – Supervised and Unsupervised learning – Back propagation networks – Kohonen's self – organizing networks – Hopfield network. Fuzzy Systems Fuzzy sets and Fuzzy reasoning – Fuzzy matrices – Fuzzy functions – Decomposition – Fuzzy automata and languages – Fuzzy control methods – Fuzzy decision making.

Text Books

1. “Genetic Algorithms in Search, Optimization and Machine Learning”, David E. Goldberg, Addison Wesley.
2. “Cloud Computing Principles and Paradigms”, Rajkumar Buyya, James Broberg, and Andrzej Goscinski, John Wiley and Sons, Inc., 2011.
3. “Grid Computing”, Joshy Joseph and Craig Fellenstein, Pearson Education Pvt. Ltd. Indian Branch, 482, F.I.E. Patparaganj, New Delhi – 110 092, India, 2004.
4. “Artificial Intelligence”, Elaine Rich & Kevin Knight, Tata McGraw Hill International Edition, New Delhi 2006.
5. “Fundamentals of Neural Networks”, Laurene Fausett, Prentice Hall, 1994.
6. “Neuro-Fuzzy and Soft computing”, Jang J.S.R., Sun C.T. and Mizutani E, Prentice Hall 1998.
7. “Fuzzy Logic with Engineering Applications”, Timothy J. Ross, McGraw Hill, 1997.

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