

# M.C.A. (Masters in Computer Applications)

Revised MCA Course Structure-2007 (Modified)

## SEMESTER - III

### CS 7011 Java Programming

#### Module-I

**Fundamentals of Java Programming:** Data in Java Programs, Arithmetic Operators and Expressions, Simple Program Input and Output.

#### Module-II

**Making Decisions with Java:** Comparing Numbers in Java, Comparing Strings in Java, Logical (Boolean) Operators and Order of Precedence, Selection Structures in Java.

#### Module-III

**Repeating Program Statements:** The **while** Statement, The **for** Statement, The **do...while** Statement, Nested Loops, **break**, and **continue**.

#### Module-IV

**Methods and Classes:** Predefined Java Methods, Programmer-Defined Methods.

**Arrays:** The One-Dimensional Array, Multidimensional Arrays, Other Array Topics.

#### Module-V

**Characters, Strings, and Formatting:** Working with Characters, Working with Strings, Formatting Data for Output.

**Exceptions and Assertions:** Exception Handling, Assertions.

#### Module-VI

**File Input and Output:** Inputting Data from a Text File, Outputting Data to a Text file, Performing Input and Output with Binary Files.

#### Module-VII

**Graphical User Interfaces:** Creating User Interfaces, Overview of a Java GUI, Developing a Java GUI, Adding Functionality to a GUI , Improving GUI Layout.

***Text Book:***

1. Richard A. Johnson, “ An Introduction to Java Programming and Object-Oriented Application Development”, 1<sup>st</sup> Edn., Thomson Learning, New Delhi – 2007

***Reference Books:***

1. Dietel, Dietel - Java How to Program , 5<sup>th</sup> Edn, Pearson Education , New Delhi , 2006
2. E. Balagurusamy – JAVA Programming, TMH, New Delhi , 2005
3. James M. Sleet – Programming and Problem Solving with JAVA, Thomson Learning, Indian Edition, 2007.

## **CS 7012 DATA COMMUNICATIONS**

### **MODULE - I**

**Data Communications and Networking Overview:** A Communications Model, Data Communications, Data Communication Networking.

**Protocol Architecture:** The Need for a Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture

### **MODULE - II**

**Data Transmission:** Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity.

**Guided and Wireless Transmission:** Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission.

### **MODULE - III**

**Signal Encoding Techniques:** Digital Data Digital Signals, Digital Data Analog Signals, Analog Data Digital Signals, Analog Data Analog Signals.

### **MODULE - IV**

**Digital Data Communication Techniques:** Asynchronous and Synchronous Transmission, Types of Errors, Error Detection, Error Correction, Line Configurations, Interfacing.

### **MODULE - V**

**Data Link Control:** Flow Control, Error Control, High-Level Data Link Control (HDLC).

**Multiplexing:** Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing.

### **MODULE - VI**

**Circuit Switching and Packet Switching:** Switching Networks, Circuit-Switching Networks, Circuit-Switching Concepts, Control Signaling, Soft switch Architecture, Packet-Switching Principles, X.25, Frame Relay.

### **MODULE -VII**

**Asynchronous Transfer Model:** Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Service Categories, ATM Adaptation Layer.

**Routing in Switched Networks:** Routing in Circuit-Switching Networks, Routing in Packet-Switching Networks, Least-Cost Algorithms

***Text Book:***

1. W. Stallings - Data and Computer Communications, 7<sup>th</sup> Edn., Pearson Edn./ PHI, New Delhi , 2006

***Reference Books:***

1. B. A. Forouzan - Data Communications and Networking, 4th Edn. TMH, New Delhi 2006
2. P.C. Gupta – Data Communications and Computer Networks, PHI, New Delhi 2006

## **CS 7013 AUTOMATA THEORY**

### **Module –I & II**

**Basic Mathematical Objects and Mathematical Induction:** Sets, logic, Functions, Relations, Alphabets, Strings, Languages, Principle of mathematical induction, Recursive definition.

**Regular Expressions and Finite Automata:** Regular languages and Regular Expressions, Memory required to recognize a language, Finite Automata, capability & limitations of FSM, Deterministic Finite Automata , Non-Deterministic Finite Automata, NFA with e-moves, regular sets & regular expressions, Equivalence of DFA and NFA, NFA from regular expressions, regular expressions from DFA, Moore versus Mealy m/c, two way finite automata equivalence with one way , Kleen's Theorem, applications of finite automata.

### **Module -III**

**Regular and Non-regular languages:** Criterion for Regularity, Minimal Finite Automata, Pumping Lemma for Regular Languages, Decision problems, Regular Languages and Computers.

### **Module-IV**

**Context Free Grammars :** Introduction, definition, Regular Grammar, Derivation trees, Ambiguity, Simplified forms and Normal Forms, Applications.

### **Module-V**

**Pushdown Automata :** Definition, Moves, Instantaneous Descriptions, Language recognised by PDA, Deterministic PDA, Acceptance by final state & empty stack, Equivalence of PDA , Pumping lemma for CFL, Interaction and Complements of CFL, Decision algorithms.

### **Module -VI**

**Turing Machines:** Definition and examples, Computing Partial Functions with Turing Machine<sup>TM</sup>, Combining TMs, Variations of TMs, Multi-tape TMs, Non-deterministic TM, Universal TM, Church Thesis.

### **Module -VII**

**Recursively Enumerable Languages:** Recursively Enumerable and Recursive, Enumerating Language, Context Sensitive and Chomsky Hierarchy.

**Unsolvable Problems and Computable Functions:** Nonrecursive Language and unsolvable Problems, Halting Problem, Rice Theorem, Post Correspondence Problem.

**Computational Complexity:** Discussion on P, NP, NPC and NP-Hard Problems.

***Text Books :***

John Martin -“Introduction to Languages and the Theory of Computation”, 3<sup>rd</sup> edition, TMH.

***Reference Books:***

1. K.L.P Mishra & N. Chandrasekharan -“Theory of Computer Science”, PHI
2. Hopcroft JE. And Ullman JD -“Introduction to Automata Theory, Languages & Computation”, Narosa.
3. Lewis H. R. and Papadimitrou C. H -“Elements of the theory of Computation”, PHI.

## **CS 7014 SOFTWARE ENGINEERING**

### **Module – I**

**Introduction to Software Engineering:** Evolving Role of Software, Changing Nature of Software, Legacy Software, Software Engineering – A layered Technology.

### **Module – II**

Process Frame work, Process Patterns, Process Models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Unified Process Model, Agile Process Model.

### **Module – III**

**Requirement Engineering:** A bridge to design and construction, Requirement Engineering Task, Initiating the Requirement Engineering Process, Eliciting Requirements, Developing Use case, Building the Analysis Model, Negotiating Requirements, Validating Requirements.

### **Module – IV**

**Design Engineering:** Design Process and Design Quality, Design Concepts, Design Models, Pattern Based Software Design.

### **Module – V**

**Testing Strategies and Testing Tactics:** Strategic Approach to software Testing, Test Strategies for conventional and Object Oriented Software, Validation Testing System Testing, White Box Testing, Basic Path Testing Control Structure Testing, Black Box Testing, Object Oriented Testing Methods.

### **Module – VI**

**Metric for process and Estimation Techniques:** Process metrics, Software Measurement, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Estimation for Object Oriented Projects Specialized Estimation Techniques.

## **Module – VII**

**Software Quality and Configuration Management:** Quality Concepts, Software Quality Assurance, Software Reliability, Software Configuration Management, SCM Repository, SCM Process.

### ***Text Book:***

1. Roger S. Pressiman – “Software Engineering – A Practitioner’s Approach”, 6<sup>th</sup> Edn., McGraw Hill.

### ***Reference Books:***

1. John Wiley and Sons – “Software Engineering – Principles and Practice –2<sup>nd</sup> Edn., Haus Van Vliet.
2. Ian Sommerville – “Software Engineering”, 7<sup>th</sup> Edn., Pearson Education