# Solapur University, Solapur

# M. C. A. (Science Faculty)

# Syllabus (Semester – III and IV)

# (Choice Based Credit System)

# With Effect from June 2016

**MASTER OF COMPUTER APPLICATIONS (SCIENCE FACULTY)**
**DETAIL SYLLABUS OF SEMESTERS I AND II**

**1. Introduction:** The **Master of Computer Applications (M.C.A.) Programme has been designed with a semester approach** in mind. It is a three years course and in each year there are two semesters. Courses in semester-I to semester-V are aimed at skills development in computers using various technologies. Also in each semester student has to develop a software project so that a student can become more expert in handling the programming language and the programming logic is also improved.

**2. Objective**: The M.C.A. program prepares students to take up positions as systems analysts, systems designers, programmers, and managers in any field related to information technology. The program, therefore, aims at imparting comprehensive knowledge with equal emphasis on theory and practice. However, the course curriculum will have enough flexibility to enable a student to undertake advance studies in Computer Science later on.

**3. Intake Capacity: 60**

**4. Ordinances and regulations**

**0.MCA. S1 – ELIGIBILIY**: Admission to the course is open to any graduate of this University or graduate of any other University recognized by UGC, New Delhi, satisfying the following conditions:

a) The candidate should have secured at least FIFTY PERCENT marks (45% in case of candidates of reserved categories) at the aggregate of all years of Graduation Examination.

b) The student must have taken Mathematics at XII std. or at least one of the subjects from Mathematics/ statistics / Computer Science/ Computer Applications/ Computer Programming in first year of Bachelors Degree.

*c) The candidate should not be employed at the time of admission and should not take employment during the tenure of course.*

d) The candidate should not be above TWENTY-EIGHT years of age as on 30th June of the year of his admission.

e) Subject to the above conditions, the final admission is based solely on the merit at the entrance test. Every candidate has to appear for the entrance test conducted during the year in which he/she is seeking admission.

f) Seats are allocated as per the reservation policy of the State Government. However, 10% of the seats are reserved for the candidates from the other University. The entrance test score of the student admitted from other University should not be less than that of the last candidate admitted from Solapur University, Solapur.

**0.MCA. S2 - FEES STRUCTURE:** The tuition fees or laboratory fees and other fees have to be paid at the beginning of every semester. At present a student has to pay tuition fees Rs.7000 /- per semester, laboratory fee Rs.14000/-per semester and laboratory deposit of Rs.500/- together with

other fees. These fees may be revised from time to time. The fees once paid will not be refunded.

**0.MCA. S3 – COURSE STRUCTURE:** The MCA course is a SIX semester course. The teaching for the semesters I, III and V will be during the first half of the academic year and for the semesters II and IV will be during the second half the academic year. During the sixth semester the student has to work for the project and the project will be evaluated at the end of that semester.

**0.MCA. S4**

A) A student has to clear all the heads of passing of first and second semesters to be eligible for the admission to the fifth semester.

B) A candidate will be awarded a class or distinction as per the rules of other science subjects.

C) The Regulations/ Ordinance not covered in this shall be followed from the Regulations/ Ordinance laid down for the science faculty.

**5. Credit System:**

**Six Semester M. C. A. Course**

| Semester | No. of Papers/ Practicals | Marks | Credits |
|---|---|---|---|
| **Semester I** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester II** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester III** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester IV** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester V** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester VI** | | | |
| • Project | 01 | 250 | 10 |
| **Total marks and credits for MCA Course** | **3750** | | **150** |

**6. Structure of the Syllabus:**

**M. C. A. Part – II, Semester – III**

| Paper No. | Paper Code | Title of the Paper | Contact hours/ week | Distribution of Marks for Examination | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | Internal | University | Total | |
| I | MCA-301 | Computer Communication Network | 04 | 30 | 70 | 100 | 04 |
| II | MCA-302 | Java Programming | 04 | 30 | 70 | 100 | 04 |
| III | MCA-303 | System Software | 04 | 30 | 70 | 100 | 04 |
| IV | MCA-304 | DBMS | 04 | 30 | 70 | 100 | 04 |
| V | MCA-305 | Computer Oriented Statistics | 04 | 30 | 70 | 100 | 04 |
| | MCA-306 | Practical – III | 12 | 30 | 70 | 100 | 04 |
| | MCA-307 | Project –III | 02 | 30 | 70 | 100 | 04 |
| | **Total** | | **34** | **210** | **490** | **700** | **28** |

**M. C. A. Part – II, Semester – IV**

| Paper No. | Paper Code | Title of the Paper | Contact hours/week | Distribution of Marks for Examination | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | Internal | University | Total | |
| VI | MCA-401 | Distributed Operating System | 04 | 30 | 70 | 100 | 04 |
| VII | MCA-402 | Data Mining and Warehouse | 04 | 30 | 70 | 100 | 04 |
| VIII | MCA-403 | UML | 04 | 30 | 70 | 100 | 04 |
| IX | MCA-404 | .NET | 04 | 30 | 70 | 100 | 04 |
| X | MCA-405 | Finite Automata | 04 | 30 | 70 | 100 | 04 |
| | MCA-406 | Practical – IV | 12 | 30 | 70 | 100 | 04 |
| | MCA-407 | Project –IV | 02 | 30 | 70 | 100 | 04 |
| | **Total** | | **34** | **210** | **490** | **700** | **28** |

**7. Passing Standard:** Passing standard is same as that of other M.Sc. courses in the Solapur University. The candidate has to appear for internal evaluation of 30 marks and external evaluation (university exam) for 70 marks for each paper

/ practical / project. In case of theory papers internal examinations will be conducted by the school / department. The nature of internal evaluation of practical and project will be decided by the respective schools / departments. The internal evaluation is a process of continuous assessment.

A student who failed in Term End examination (theory) and passed in internal assessment of a paper (subject) shall be given FC (Failed in Term End Exam) Grade. Such student will have to appear for Term End examination only. A student who fails in internal assessment and passed in Term End examination (Theory) shall be given FR (Failed in Internal Assessment) Grade. Such student will have to appear for Term End examination as well as internal assessment.

In case of year down candidates from the mark scheme the candidates shall appear for the same 70 marks paper of the external examination and his performance shall be scaled to 100 marks.

**9. Nature of theory question paper**

1) Duration of each theory paper is 3 hours.
2) Each paper contains 7 questions each carrying 14 marks.
3) Students have to attempt five questions.
4) Question No.1 is compulsory and contains 14 objective type sub-questions each carrying 1 mark.
5) Question No. 2 is compulsory and contains 3 short answers / short note type sub-questions each carrying 5 or 4 marks.
6) Students have to attempt any three questions from Question No. 3 to Question No. 7.
7) Question No. 3 to Question No. 7 contains 2 sub-questions

**MASTER OF COMPUTER APPLICATIONS (SCIENCE)**

SEMESTER III

## MCA 301 – Computer Communication Network

**Unit – I**

### 1. Introduction

Uses of Computer networks: Business Applications, Home Applications, Mobile Users, Social Issues; Network Hardware: Local Area Networks, Metropolitan Networks, Wide Area Networks, Wireless Networks, Home Networks, Internetworks; Network Software: Protocol Hierarchies, Design Issues for the Layers, Connection-Oriented and Connectionless Service Primitives, Relationship of Services to Protocols; Example of Networks: The Internet, The ARPANET, NSFNET, Internet usage, Architecture of the internet. (7)

### 2. Data Link Layer

Data Link Layer Design Issues: Services Provided to the Network Layer, Framing, Error Control, Flow Control; Error Detection and Correction: Error-Correcting Codes, Error-Detecting Codes; Elementary Data Link Protocols: An Unrestricted Simplex Protocol, A Simplex Stop-and-Wait Protocol, A Simplex Protocol for a Noisy Channel; Sliding Window Protocols: A One-Bit Sliding Window Protocol, A Protocol Using Go Back N, A Protocol Using Selective Repeat; Example Data Link Protocols: HDLC—High-Level Data Link Control, The Data Link Layer in the Internet. (8)

**Unit – II**

### 3. Network Layer

Network Layer Design issues: Store and Forward packet Switching, Services provided to the Transport Layer, implementation of Connectionless Service, Implementation of Connection-oriented Services, Comparison of Virtual Circuit and Datagram subnets; Routing algorithms: The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link state Routing, Hierarchical Routing, Broadcast Routing, Routing for Mobile Hosts;
Congestion Control Algorithms: General Principles of Congestion Control, Congestion Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnet, Load Shedding, Jitter Control; Quality of Service: Requirements, Techniques for Achieving Good Quality of Service, Internetworking: Differences in Networks, Network Connection, Concatenated Virtual Circuits, Connectionless Internetworking; Tunneling; Internetwork Routing, Fragmentation; The Network Layer in the Internet: The IP Protocol, IP Addresses, Internet Control Protocols, Mobile IP; IPV6. (15)

**Unit – III**

**4. The Transport Layer**

The Transport Service: Services Provided to the Upper Layers, Transport Service Primitives, Berkeley Sockets; Elements of Transport Protocols: Addressing, Connection Establishment, Connection Release Flow Control and Buffering, Multiplexing, Crash Recovery; The Internet Transport Protocol – UDP: Introduction to UDP, Remote Procedure Call, The Real-Time Transport Protocol; The Internet Transport Protocols – TCP: Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management TCP Transmission Policy, TCP Congestion Control, Wireless TCP and UDP (15)

**Unit – IV**

**5. The Application Layer**

DNS – The Domain Name System: The DNS Name Space, Resource Records, Name Servers; Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery; The World Wide Web: Architectural Overview, Static Web Documents, Dynamic Web Documents, HTTP, Performance Enhancements, The Wireless Web. (15)

**References**


1. Andrew S. Tanenbaum, Computer Networks, 4th Edition, Pearson Education, Asia, 2002.
2. Alberti Leon – Garcia and Indra Wadjaja, Communication Networks – Fundamental Concepts and Key Architectures, Tata McGraw Hill, Edition-2000.
3. Behrouz A Forouzan, Data Communications and Networking, Tata McGraw Hill, Second Edition, 2001.

## MCA 302 – Java Programming

**Unit – I**

1. **Introduction to Java:** Importance and features of java, keywords, constants, variables and data types, Operators and expressions, Decision making, branching and looping: if..else, switch, ?: operator, while, do, for statements, labeled loops, jump statements: break, continue, return. (9)
2. **Classes and Objects:** defining a class, adding variables and methods, creating objects, constructors, class inheritance. (6)

**Unit – II**

3. **Arrays and strings:** creating an array, one and two dimensional arrays, string array and methods, String and StringBuffer classes, Wrapper classes. (5)
4. **Inheritance:** Basics types, using super, Multilevel hierarchy abstract and final classes, Object class, Packages and interfaces, Access protection, Extending Interfaces, packages. (6)

5. **Exception Handling:** Fundamentals, exception types, uncaught exceptions, throw, final, built in exception, creating your own exceptions. (4)

**Unit – III**

6. **Multithreaded Programming:** Fundamentals of Java thread model, priorities, synchronization, messaging, thread class, Runnable interface, interthread Communication, suspending, resuming and stopping threads. (8)
7. **Input/Output:** Basics, Streams, Byte and Character stream, predefined streams, Reading and writing from console and files. Using Standard Java Packages (lang, util, io, net). (7)

**Unit – IV**

8. **Event Handling:** Event Model, Event Classes, Event Listener Interfaces, Adapter and Inner Classes, Working with windows, graphics and text, using AWT controls, Layout managers and menus, handling Image, animation, sound and video, Java Applet. (8)

9. **JDBC:** JDBC API, JDBC Drivers, Products, JDBC Design considerations, Basic steps to JDBC, setting up a connection to database, Creating and executing SQL statements. (7)

**References**


1. Patrick Naughton and Herbertz Schidt, Java-2 the complete Reference, Tata McGraw-Hill Education, 2002.
2. Balaguruswamy, Programming with Java, Tata McGraw-Hill Edn., 4th edition, 2006.
3. Horstmann, Computing Concepts with Java 2 E Essentials, John Wiley, 2nd edition, 1999.
4. Decker and Hirshfield, Programming Java, Vikas Publication, 2000.

## MCA 303 – System Software

**Unit I**

1. **Introduction:** System software and machine architecture, traditional (CISC) machines, RISC machines. (6)

2. **Assemblers:** Basic assembler functions, machine dependent and machine independent assembler features, one-pass assemblers, multi-pass assemblers, MASM and SPARC assembler. (9)

**Unit II**

3. **Loaders and Linkers:** Basic loader functions, machine dependent and machine independent loader features, linkage editors, dynamic linking, bootstrap loaders, MS-DOS and SunOS Linkers. (15)

**Unit III**

4. **Macro Processors:** Basic macro processor functions, machine independent macro processor features, macro processor design options, MSAM macro processor, ANSI C macro language. (15)

**Unit IV**

5. **Compilers**: Basic compiler functions, machine-dependent compiler features, machine-independent compiler features, compiler design options, the YACC compiler-compiler. (15)

**References**


1. Leland L. Beck, System Software – An Introduction to System Programming, 3/e, Pearson Education.
2. A.V. Aho, R. Semi, J.D. Ullman, Compilers – Principles, techniques and tools, Pearson Education.
3. D.M. Dhamdhere, Systems Programming and Operating Systems, Tata McGraw Hill.
4. Santanu Chattopadhyay, Compiler Design, PHI.

## MCA 304 – DBMS

**Unit – I**

1. **Introduction to Database Systems:** Database – Definition, Limitations of traditional file processing systems, Advantages of DBMS, Users of DBMS. (4)
2. **Database Architecture and Environment:** Components of DBMS, Architecture, Physical, logical and view, DDL, DML, DCL, schemas, life cycle of Database System Development, Functions of DBMS. (5)
3. **Conceptual Database Modeling:** Data Model – Concept, types of data models, ER model, concepts of entity, entity set, attributes, domains, existence dependency, Keys: candidate, primary, composite, strong and weak entities, cardinality, specialization, generalization, aggregation, Relational Algebra, Relational Calculus (6)

**Unit – II**

4. **Relational Database Systems:** Characteristics, relation, attribute, tuple, domain, null, Normalization, Functional Dependencies, Multivalued Dependencies, 1NF, 2NF, 3NF, 4NF, 5NF, Boyce Codd's normal form. (7)
5. **SQL and PL/SQL:** DDL, DML, DCL, Select: From, Where, Order by, Group by, Having, Intersect, Union, Distinct, Between, In, Between, Different types of functions, Delete, Update, Insert, Nested queries, joins, create, alter and drop, constrains, index, views, Triggers, Grant, Revoke, Commit, RollBack, Savepoint, PL/SQL: %Type, %Rowtype, Exception, Cursor etc. (8)

**Unit – III**

6. **Transaction Management and Concurrency Control:** Transaction – properties (ACID), states, Concurrency control, locks, two phase locking serialization. (7)
7. **Distributed Databases:** Standalone v/s Distributed databases, Replication, Fragmentation, Client/Server architecture, types of distributed databases. (8)

**Unit – IV**

8. **Database Recovery:** Need for recovery, techniques – log based recovery, check point, differed and immediate updates, shadowing, Catastrophic and non-catastrophic failures, Recovery in multi-database environments, Two phase commit protocol. (7)
9. **Query Processing:** Steps in query processing, advantages of optimization. (3)
10. **Object – Relational Databases:** Abstract Datatypes, Nested Tables, Varying Arrays, Large Objects, Naming Conventions for Objects. (5)

**References**


1. Korth, Silberschatz, Sudarshan, Database System Concepts, McGraw Hill, 6th edition,2006.
2. Navathe, Elmasari, Fundamentals of Database Systems, Addison Wesley,Pearson Education,5 th Edition,2010.
3. C. J. Date, Introduction to Database Systems, Addison Wesley,8thy edition,2003.
4. Loney, Koch, Oracle 8i – The Complete Reference, Tata McGraw Hill,2002.

## Paper 305 – Computer Oriented Statistics

**Unit – I**

1. **Elementary Concepts:** Various types of data, Frequency distribution, Tabulation, Graphical Representation of data. Descriptive measures: Measures of central tendency, dispersion, skewness and kurtosis. (6)
2. **Probability and Probability Distributions:** Sample Space, equally likely outcomes, exclusive, exhaustive events, Definition of probability, examples of probability of various events, Addition and multiplication theorems of probability, Conditional probability, Bayes theorem and its applications. (9)

**Unit – II**

3. **Discrete probability distributions:** Definition of random variable, Probability mass function (pmf) and probability distribution function (pdf), Bernoulli, Binomial, Poisson, Geometric, Hyper Geometric, Negative Binomial Distributions, Computation of mean and variance of these distributions and examples (15)

**Unit – III**

4. **Continuous Distributions:** Probability density function (pdf),normal and exponential distributions, computations of mean and variance and their important properties, computation of probabilities of various events, applications of these distributions. (15)

**Unit - IV**

5. **Simulation Techniques:** Random Number (Uniform [0, 1]) generation techniques, Random variate generation, inverse of c.d.f., relation with uniform variate, rejection method. (9)
6. **Curve fitting:** Regression, Correlation, fitting of exponential and power curves, Interpretation of correlation and Regression. (6)

Emphasis must be given for sampling from these distributions, sketching the graphs of the p.m.f., Use of packages for the graphical representation, developing algorithms for computation and their implementation.

**References**


1. Bhat B. R., Srivenkatramana T. and Madhava, Rao K.S., Statistics, vol.1 and 2, Newage international publications, 1996.
2. Chou Cy, A Lin, Statistical analysis for Business and Economic, Elsevier 1989.
3. Dixit G., Statistics.
4. Devroye, Non uniform random variate Generation, 1986.
5. J. Medhi, Introduction to statistical methods, 2nd edition, 2005.
6. Levin R.I., Statistics for management, Prentice Hall, 1980.
7. Paul New Bold, Statistics for Business and Economics, Prentice Hall, 1991.
8. S. Ross, A First course in probability, 9th edition, Prentice Hall, 2005.
9. Kishore Trivedi, Introduction to probability and queuing theory for Engineers, Second Edition, Wiley, 2002.

## MCA 306 – Practical – III

The practical course will contain 30 practical assignments covering syllabi of all theory papers

## MCA 307 – Project and Viva III

Project work.

SEMESTER IV

## MCA 401 – Distributed Operating System

**Unit – I**

1. **Overview of Operating System:** Operating System - concept, need and requirements of operating system, Processor, Memory, Device and File management, Virtual memory, Pipes, Deadlocks and Protection issues, Comparative study of Various types of operating systems. (15)

**Unit – II**

2. **Introduction to Distributed system:** Goal, Hardware Concepts, Software concepts, Design issues. (8)
3. **Communication in distributed system:** Layered protocols, Client server model, remote procedure call, and Group communication. (7)

**Unit – III**

4. **Synchronization in distributed system:** Clock synchronization, Mutual Exclusion, election algorithms, atomic transaction, deadlocks in distributed systems. (8)
5. **Processes and processors in distributed systems:** Threads, System models, Processor allocation, Scheduling in distributed systems. (7)

**Unit – IV**

6. **Distributed file system:** Distributed file system, Design and Implementation trends in distributed file system. (7)
7. **Case study:** Detail and comparative study of MS-windows NT and Novel Netware, Windows programming concepts. (8)

**References**


1. A.S. Tanenbaum, Distributed Operating Systems, PEARSON edition.
2. P. K. Sinha, Distributed Operating System – Concepts and Design, Pearson Education Asia.
3. A.S. Tanenbaum, Modern Operating Systems, PHI, 3rd edition, 2008.
4. Donovan Madnick, Operating System, Galgotia Publication, 2nd edition.
5. Peterson, Operating System, 5th edition, 1998.
6. Hansen Per Brinch, Operating systems principles.
7. Cowart, Windows NT 4 - Server and Workstation unleashed, Techmedia. BPB Publications
8. Helen Custer, Inside Windows NT, Second Edition Microsoft Press, 1998.
9. Jeffery Richter, Advanced Windows NT: The Developer's Guide to the WIN32 application Interface, IBM, 1996.
10. Peter Norton's maximizing Windows NT server 4, Techmedia, 1999.
11. Peter Norton's complete guide to Windows NT workstation, Techmedia, 2nd Edition.
12. Charles et al, Programming windows 3.1, Microsoft Press.
13. Novel Netware Manuals.

## MCA 402 – Data Mining and Warehouse

**Unit – I**

1. **Introduction:** What is Data Warehouse? A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data cube Technology, From Data Warehousing to Data Mining, Data Mining, Functionalities, Data Cleaning, Data Integration and Transformation, Data Reduction. (8)
2. **Data Mining Primitives, Languages, And System Architectures:** Data Mining Primitives, Presentation and Visualization of discovered patterns, A Data Mining Query Language. (7)

**Unit – II**

3. **Mining Association Rules In Large Data Bases Translation:** Association Rule Mining Single-Dimensional Boolean, Association Rules from Transactional Databases, Mining Multilevel Association Rules From Transactional Databases. (15)

**Unit – III**

4. **Classification And Predication:** Issues regarding Classification and Predication, Classification by Decision tree induction, Bayesian Classification, Classification by Back propagation, Classification Based on the concepts from association rule mining, Other classification methods, Prediction. (15)

**Unit – IV**

5. **Clustering:** What is Cluster Analysis? Types of data in Cluster Analysis: A Categorization of Major Clustering Methods. Partitioning Methods, Hierarchical Methods, Density-Based Methods, Model-Based Clustering Methods: Statistical Approach, Neural Network Approach. Outlier Analysis (10)
6. **Applications and Trends in Data Mining:** Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining, Data Mining and Intelligent Query Answering, Trends in Data Mining. (5)

**References**


1. Jiawei Micheline Kamber, Data Mining Concepts and Techniques, Morgan Kauf Mann Publishers, 3rd edition, 2011.
2. George M. Marakas, Modern Data Warehousing, Mining and Visualization, Pearson Education, 2003.
3. W.H.Inmon, Building the Data Warehouse, Wiley Dreamtech, Third Edition, 2002.

## MCA 403 – UML

**Unit – I**

1. **Object Oriented Design and Modeling:** Object Oriented Fundamentals, Objects and object classes, object oriented design process, importance of modeling, principles of modeling, object oriented modeling. (8)
2. **Introduction to UML:** Conceptual model of UML, building blocks of UML, Mechanisms in UML, architecture, software development life cycle. (7)

**Unit – II**

3. **Basic Structural Modeling:** Classes, relationships, common mechanisms, class and object diagrams. (7)
4. **Advanced structural Modeling:** Advanced classes, advanced relationships, Interfaces types and roles, packages, instances and object diagrams. (8)

**Unit – III**

5. **Collaboration Diagrams and Sequence Diagrams:** Terms, concepts and depicting a message in collaboration diagrams, Terms and concepts in sequence diagrams, Difference between collaboration and sequence diagram, Depicting synchronous messages with/without priority call back mechanism. (8)
6. **Basic behavioral modeling:** Interactions, use cases, Use Case Diagrams, Interaction Diagrams and activity diagrams. (7)

**Unit – IV**

7. **Advanced behavioral modeling:** Events and signals, state machines, process and threads, time and space, state chart diagrams. (7)
8. **Architectural Modeling:** Terms, Concepts, examples, Modeling techniques for component diagrams and deployment diagrams. (8)

**References**


1. Grandy Booch, James Rumbough, Ivar Jacobson, the Unified Modeling Language User Guide, Pearson Education 2002.
2. Ian Sommerville, Software Engineering Sixth Edition, 2003.
3. Meilir Page Jones, Fundamentals of Object Oriented Design in UML Addison Wesley, 2000.

## MCA 404 – .NET

**Unit – I**

1. **Microsoft .NET framework:** Structure, the common language runtime, JIT, CTS, Metadata. (5)
2. **C#:** Introduction to C#, Programming structure of C#, editing, compiling & executing C# programs, namespace, comments, using aliases for namespace classes, using command line argument, math functions, scope of variables, boxing & unboxing, file **operations**, indexes, delegates, events, preprocessor, attributes, creating winform applications, COM interoperability, using COM / COM+, reflection, components in C#, Handling databases using ADO.net. (10)

**Unit – II**

**3. Introduction to ASP.Net** (7)

- Introduction, difference between ASP & ASP.Net Application, Web Architecture Model, Introduction to Visual Studio for Web Application.

**Application and Page Frameworks** (8)

- Application Location Options, The ASP.NET Page Life Cycle, The ASP.NET Page Structure Options, ASP.NET Page Directives, ASP.NET Page Events, Dealing with PostBacks, ASP.NET Application Folders, Global.asax

**Unit – III**

**ASP.NET Server Controls and Validation Controls** (7)

- ASP.Net Server Controls, Understanding Validation, Client-Side versus Server-Side Validation, Turning Off Client-Side Validation.

**Working with Master Pages** (8)

- Need and basics of Master Pages, Master Page and Content Page, Programmatically Assigning the Master Page, Nesting Master Pages, Master Page Events.

**Unit – IV**

**ASP.Net State Management** (15)

Application State, Session State, Client & server storing, View state, Cache, Hidden Variable, Session object, Profiles, Overview of HTTP Handler & Modules.

**References**


1. Sharp, Jagger, Microsoft Visual C# .NET Step-By-Step, Version 2003, Publisher: Microsoft Press (Published: 3/2003)
2. E. Balagurusamy, Programming in C#, TMH, 2nd edition, 2008.
3. Herbert Schildt, C# a beginners guide, TMH, 4th edition, 2001.
4. Bill Evjen, Scott Hanselman, Farhan Muhammed, Sirnivasa Sivakumar, Devin Rader, Professional ASP.NET 2.0 – Wrox Publication, 2005.
5. George Shepherd, Microsoft ASP.NET 2.0 Step by Step - Microsoft Press, 2010.

## MCA 405 – Finite Automata

**Unit – I**

1. **Introduction to Finite Automata:** Introduction to Finite Automata, the central concepts of Automata theory, deterministic finite automata, non-deterministic finite automata, and application, Finite automata with Epsilon-transition. (7)
2. **Regular Expressions and Languages, Properties of Regular Languages.:** Regular Expression, Finite Automate and Regular Expressions, Applications of Regular Expressions, Proving languages not to be regular, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and minimization of automata. (8)

**Unit – II**

3. **Context-Free Grammars and Languages :** Context-free grammars, Parse trees, Applications, Ambiguity in grammars and languages. (7)
4. **Pushdown Automata:** Definition of the Pushdown automata, the languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata. (8)

**Unit – III**

5. **Properties of Context Free Languages:** Normal forms for CFGs, The pumping lemma for CFGs, Closure properties of CFLs. (6)
6. **Introduction to Turing Machines:** Problems that computers cannot solve, The Turing Machine, Programming techniques for Turing machines, extension to the basic Turing machine, Restricted Turing Machine, Turing Machine and Computers. (9)

**Unit – IV**

7. **Undecidability:** A Language that is not recursively enumerable, AN undecidable problem that is RE, Post's Correspondence problem, other undecidable problems. (15)

**References**


1. J.P. Hopcroft, Rajeev Motwani, J.D. Ullman, Introduction to Automata Theory, Languages and Computation, II Edition, Pearson Education, 2001.
2. John Martin, Introduction to Languages and Theory of Computation, Tata McGraw Hill, 2003.
3. Daniel I. A., Cohen, Introduction to Computer Theory, 2nd Edition, John Wiley and Sons, Inc, 2000.
4. Peter Linz, An Introduction to Formal Languages and Automata, II Edition, Narosa Publishing House, 1997.

## MCA 406 – Practical – IV

The practical course will contain 30 practical assignments covering syllabi of all theory papers

## MCA 407 – Project and Viva IV

Project work.

Chairman
Ad hoc BOS in Computer Science