

## SOFTWARE TESTING

Lecture : 4 Hrs/week

Practical : 3 Hrs/week

One paper: 100 marks / 3 Hrs duration

Practical exam: 50 marks

Term work: 25 marks

### 1. Fundamentals of Testing

Human and errors, Testing and Debugging, Software Quality, Requirement Behavior and Correctness, Fundamentals of Test Process, Psychology of Testing, General Principles of Testing, Test Metrics

### 2. Role of Testing in SDLC

Review of software development models (Waterfall Models, Spiral Model, W Model, V Model) Agile Methodology and Its Impact on testing, Test Levels (Unit, Component, Module, Integration, System, Acceptance, Generic)

### 3. Approaches to Testing - I

Static Testing

Structured Group Examinations

Static Analysis

Control flow & Data flow, Determining Metrics

### 4. Approaches to Testing - I

Dynamic Testing

Black Box Testing

Equivalence Class Partitioning, Boundary Value Analysis, State Transition Test, Cause Effect Graphing and Decision Table Technique and Used Case Testing and Advanced black box techniques

White Box Testing

Statement Coverage, Branch Coverage, Test of Conditions, Path Coverage, Advanced White Box Techniques, Instrumentation and Tool Support

Gray Box Testing, Intuitive and Experience Based Testing

### 5. Test Management

Test Organization

Test teams, tasks and Qualifications

Test Planning

Quality Assurance Plan, Test Plan, Prioritization Plan, Test Exit Criteria

Cost and economy Aspects

Test Strategies

Preventive versus Reactive Approach, Analytical versus heuristic Approach

Test Activity Management, Incident Management, Configuration Management

Test Progress Monitoring and Control

Specialized Testing: Performance, Load, Stress & Security Testing

### 6. Testing Tools

Automation of Test Execution, Requirement tracker, High Level Review

Types of test Tools

Tools for test management and Control, Test Specification, Static Testing, Dynamic Testing, Non functional testing

Selection and Introduction of Test Tools

Tool Selection and Introduction, Cost Effectiveness of Tool Introduction

### 7. Testing Object Oriented Software

Introduction to OO testing concepts, Differences in OO testing

Term work/Practical : Each candidate will submit a journal in which at least 12 practical assignments based on the above syllabus along with the flow chart and program listing will be submitted with the internal test paper. Test will be graded for 10 marks and practical will be graded for 15 marks.

**References:**

1. Software Testing Foundations, Andreas Spillner, Tilo Linz, Hans Schaefer, Shoff Publishers and Distributors
  2. Software Testing: Principles and Practices by Srinivasan D and Gopalswamy R, PearsonEd, 2006
  3. Foundations of Software Testing by Aditya P. Mathur – Pearson Education custom edition 2000
  4. Testing Object Oriented Systems: models, patterns and tools, Robert V Binder, Addison Wesley, 1996
  5. Software Engineering – A practitioner’s approach by Roger S. Pressman, 5<sup>th</sup> Edition, McGraw Hill
  6. The art of software testing by GJ Myers, Wiley.
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**WIRELESS TECHNOLOGY AND MOBILE COMPUTING**

**Lecture : 4 Hrs/week**

**Practical : 3 Hrs/week**

**One paper: 100 marks / 3 Hrs duration**

**Practical exam: 50 marks**

**Term work: 25 marks**

**1. Introduction and Overview**

History of Wireless Communications,  
Communication Fundamental Review and Wireless Communication Technology  
Transmission fundamentals, Communication Networks, TCP/IP Suite

**2. Wireless Communication Technology**

Frequency for Radio Transmission, Signal Antennas, Signal Propagation, Multiplexing,  
Modulation, Spread Spectrum, Coding and Error Control

**3. Mobile Internet**

WAE, WML, WAP 2.0 protocol, XHTML, CHTML

**4. Cellular Networks**

Frequency reuse, First Generation, Second Generation, Third Generation systems. GSM  
and CDMA Fundamentals

**5. Fixed Wireless Networks and Wireless Local Loop**

Cordless Systems, WLL, IEEE 802.16

**6. WiMAX, Rural wireless network, VSAT**

Cellular Wireless Network – GPRS, 2.5G, 3G - WCDMA

**7. Wireless LANs**

IEEE 802.11 Protocol Architecture, 802.11 Architecture and Services, MAC and Physical  
Layer  
WiFi security – WPA2

**8. Bluetooth**

Overview, Radio Specification, Baseband Specification, Link Manager Specification,  
Logical Link Control and Adaptation

**9. Mobile Computing Platform – TAPL, OS**

## 10. Application Design for Mobile devices - J2ME and MIDP

**Term work/Practical :** Each candidate will submit a journal in which at least 12 practical assignments based on the above syllabus along with the flow chart and program listing will be submitted with the internal test paper. Test will be graded for 10 marks and practical will be graded for 15 marks.

### References:

1. Jochen Schiller “Mobile Communications”, Addison Wisley, Pearson Education
2. S Stallings, W. “Wireless Communications and Networks”
3. Roy Blake, “Wireless Communication Technology”, Cengage Learning, India Edition
4. Mark Ciaampa, Jorge Olenewa, “Wireless Communications”, Cwenge learning
5. Principles of Mobile Computing Uwe Hansmann, et. Al, Springer International Ed
6. Dharma Prakash Agarwal, Qing-AnZeng, “Introduction to Wireless and Mobile System”, Cenage Learning
7. J2ME Complete Reference Book, TMH
8. HTML/XHTML – Complete Reference Book, TMH
9. WML and WML Script Programming : How to Design and Implement Effective Web Sites for Portable Devices – Christopher Hoever

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## DISTRIBUTED COMPUTING

**Lecture : 4 Hrs/week**

**Tutorial : 1Hr/week**

**One paper: 100 marks / 3 Hrs duration**

**Term work: 25 marks**

### 1. Fundamentals

Evolution of Distributed Computing Systems, System models, issues in design of Distributed-computing environment, web based distributed model, computer networks related to distributed systems and web based protocols

### 2. Message Passing

Inter process Communication, Desirable Features of Good Message-Passing Systems, Issues in IPC by Message, Synchronization, Buffering, Multidatagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication

### 3. Remote Procedure Calls

The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshaling Arguments and Results, Server Management, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs, Lightweight RPC, Optimization for Better Performance

### 4. Distributed Shared Memory

Design and Implementation Issues of DSM, Granularity, Structure of shared memory space, Consistency Models, replacement Strategy, Thrashing, Other Approaches to DSM, Advantages of DSM

### 5. Synchronization

Clock Synchronization, Event Ordering, Mutual Exclusion, Election Algorithms

**6. Resource and Process Management**

Desirable Features of a good global scheduling algorithm, Task assignment approach, Load Balancing approach, Load sharing approach, Process Migration, Threads, Processor allocation, Real Time distributed Systems

**7. Distributed File Systems**

Desirable Features of a good Distributed File Systems, File Models, File-Accessing Models, File-sharing Semantics, File-caching schemes, File Replication, Fault Tolerance, Design Principles, Sun's network file system, Andrews file system, comparison of NFS and AFS

**8. Naming**

Desirable features of a Good Naming System, Fundamental Terminologies and Concepts, systems-Oriented Names, Name caches, Naming & security, CDE directory services.

**9. Case Studies**

Mach & Chorus (Keep case studies as tutorial)

Tutorials:

1. Numerical problems on DES, IDEA, MD2, MD5, Diffie-Helman and El=Gamal Signatures
2. Comparative study of network security tools
3. Vulnerability tools: Nessus, Retina, Wireshark, Nmap
4. Packet Sniffers: Tcpdump, Ettercap, DSNIFF

Term work/Assignment : Each candidate will submit assignments based on the above syllabus with the flow chart and program listing will be submitted with the internal test paper.

**Reference Books:**

1. Distributed OS by Pradeep K. Sinha (PHI)
2. Tanenbaum S. : Distributed Operating Systems, Pearson Education
3. Tanenbaum S. Maarten V.S.: Distributed Systems Principles and Paradigms. (Pearson Education)
4. George Coulouris, Jean Dollimore, Tim Kindberg: Distributed Systems concepts and design

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**ADVANCED WEB TECHNOLOGIES**

**Lecture : 4 Hrs/week**

**One paper: 100 marks / 3 Hrs duration**

**Term work: 25 marks**

**Practical : 3 Hrs/week**

**Practical exam: 50 marks**

**1. Introduction**

- The World Wide Web
- Web Search Engines
- Search engines optimization and limitations
- Introduction to the semantic web

**2. Servlets**

- Introduction to Servlets
- Servlet Life cycle
- Servlet Classes
  - Servlet

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- ServletRequest
- ServletResponse
- ServletContext
- Threading Models

### 3. JSP

- JSP Development Model
- Components of JSP page
- Request Dispatching
- Session and Thread Management

### 4. Introduction to web services

- What is a Web Service?
- Software as a service
- Web Service Architecture
- SOA

### 5. Introduction to .NET framework

- Evolution of .NET
- Comparison of JAVA and .NET
- Architecture of .NET framework
  - Common Language Runtime
  - Common Type System
  - Metadata
  - Assemblies
  - Application Domains
  - CFL
- Features of .NET
- Advantages and Application

### 6. C#

- Basic principles of object oriented programming
- Basic Data Types
- Building Blocks – Control Structures, operators, expressions, variables
- Reference Data Types – Strings, Data time objects
- Arrays
- Classes and object
- Exception Handling
- Generics
- File Handling
- Inheritance and Polymorphism
- Database programming

### 7. Web Applications in ASP.NET

- ASP.NET coding modules
- ASP.NET page directives
- Page events and Page Life Cycle
- PostBack and CrossPage Posting
- ASP.NET Application Compilation models
- ASP.NET server Controls
- HTML Controls
- Validation Controls

## Syllabus for MCA Third Year Semester – V (with effect from the academic year 2007-2008)

- Building Databases

### 8. XML

- Syntax
- DTDs and XML Schema
- XPath
- XSLT
- Sax and DOM

**Term work/Practical :** Each candidate will submit a journal in which at least 12 practical assignments based on the above syllabus along with the flow chart and program listing will be submitted with the internal test paper. Test will be graded for 10 marks and practical will be graded for 15 marks.

#### References :

1. .NET programming – Black Book
2. Beginning C# - Wrox Publication
3. C# with Visual Studio – Vijay Nukhi, BPB
4. .NET 2008 Programming – SAMs Techmedia
5. XML Complete Reference
6. JSP Complete Reference

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## SERVICE ORIENTED ARCHITECTURE (ELECTIVE)

**Lecture : 4 Hrs/week**

**Tutorial : 3 Hrs/week**

**One paper: 100 marks / 3 Hrs duration**

**Term work: 25 marks**

### 1. Introduction to SOA

Service Oriented Analogy, Service Encapsulating Logic, Relationship and Communication in Services, Design and Building of Services, Primitive SOA

2. Common Characteristics of Contemporary SOA, Misperceptions of SOA, Benefits of SOA, Evolution of SOA, Overview & basic Components of SOA

### 3. Web Services and Primitive SOA

Web Service Framework, Roles and Models of Services, Web Services at different network layers HTTP, XML, SOAP, WSDL and SAML Standards, Use of XML in SOA, Service Descriptions with WSDL, Messaging with SOAP

### 4. Web Services and Contemporary SOA – I

Message Exchange Patterns, Service Activity, Coordination, Atomic Transaction, Business Activities, Orchestration and Choreography

### 5. Web Services and Contemporary SOA – II

Addressing, Reliable Messaging Correlation, Policies, Metadata Exchange, Security

### 6. Principles of Service Orientation

Service Orientation and Enterprise, Anatomy of Service Oriented Architecture, Common Principles of Service Orientation and their Interrelation

**7. Service Layers**

Service Layer Abstraction, Different Service Layers (Application, Business, Orchestration)

**8. Development of a SOA Application**

SOA Life Cycle, SOA Governance and its Challenges

**Term work/Practical :** Each candidate will submit assignments based on the above syllabus will be submitted with the internal test paper.

**References :**

1. Service Oriented Architecture: Concepts Technology and Design, Thomas Erl, Prentice Hall
2. Service Oriented Architecture, Eric A. Marks, Prentice Hall
3. Enterprise SOA: Service Oriented Architecture Best Practices, Dirk Kraefzig.

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**CYBER LAWS AND IPR (ELECTIVE)**

**Lecture : 4 Hrs/week**

**Practical : Nil**

**One paper: 100 marks / 3 Hrs duration**

**Term work: 25 marks**

**1. Introduction**

Legal environment in Information Age, Technology and law, Legal issue recognition, Internet code of Practice for an educational institute of higher learning. US initiatives in internet legislation. Creating, Using and protecting software, cyber companies and internet agreement, E-commerce, E-document & contracts, Digital signatures, Digital Identity.

**2. Basic foundation of Law : Types of laws,**

**Digital Contracts:** Basic Contract law: Nomenclature, Contract information, Genuineness of Assent, writing requirements and statues of frauds, performance and discharge of contractual obligations

**Current and future contract law :** Contracting and licensing software, torts: wrongs and their remedies, cyber torts, piracy and government regulation, product liability in tort

**3. Overview of Intellectual property : Copy Rights, Trade marks, patents, basic copyright and trademark law**

**Intellectual Property Rights and Issues :** Typical Items that may be protected, How a Patent protects your invention, Duration of Patents, Provisional Patents, International patents, Trademark, Maintenance, Renewable, copyright, Contracts for IP protection

**4. Cyber Acts and related issues**

Childrens' Online Privacy Protection Act (COPPA)  
Electronic signatures in Global & National Commerce Act (E-Sign), Internet Filtering Encryption, Internet Gambling Spam – Unsolicited Junk E-mail, Digital Signatures Internet Taxation, State Legislation, Computer Crime Act of 2000, HB 2428, Anti-Spam Laws, Anti-Spam Suits, Copyright Laws and the Internet, What is cyber squatting? Anti cyber squatting Consumer Protection Act, Childrens' Internet Protection Act, Software Piracy, Domain Name Disputes, file Sharing, The Communications Decency Act (CDA),

The Child Online Protection Act (COPA), The Childrens' Internet Protection Act (CIPA Sexual Predator Laws)

### 5. Fundamentals of Cyber Law

Overview of General Laws and Procedures in India, Introduction to Indian Cyber Law: Information Technology Act 2000 and main features of the act, Information Technology Amendment Act 2008 and its major strengths.

### 6. Different Cyber Crimes and related Case Studies

#### References :

1. Cyberlaw and Ecommerce by David Baumer and J Poindexter of North Carolina State University: Tata McGraw Hill
2. "GUIDE TO CYBER LAWS" by Rodney D. Ryder
3. Cyber Laws in India. ITA 2000 and Beyond By Na Vijayashankar, Naavi.org
4. "Cyber Law: The Law of the Internet", J. Rosenoer, Springer Verlag 1996

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## KNOWLEDGE MANAGEMENT (ELECTIVE)

Lecture : 4 Hrs/week

Practical : 3 Hrs/week

One paper: 100 marks / 3 Hrs duration

Term work: 25 marks

1. **Understanding Knowledge** : Data, Information, Knowledge, Wisdom, Types of Knowledge, Human Thinking and Learning

**Essentials of Knowledge** : Knowledge creation and capture, Knowledge creation and Models of Creation, Nonaka's Model of Knowledge creation and Knowledge Architecture, Knowledge Capture and techniques of Knowledge Capturing

2. **An Insight to Knowledge Management** :

KM evolution, KM – why now, KM – imperatives, Organizational KM – the need, Organizational KM – drivers, KM – the future, Global knowledge economy, what is KM organizational KM approach, learning organization, KM life Cycle, KM System Life Cycle, Implications of KM

3. **KM Techniques, System & System Tools** :

Organizational knowledge creation, organizational knowledge acquisition / capture, Knowledge analysis

#### **KM System Tools** :

Role of DM in KM, DM and Business Intelligence, Business and Technical Drivers, Developing a DM Application, Components of Data Management and its use in practice, Knowledge Portals and Technologies, Content Management

4. **Organizational KM Architecture & Implementation strategies** :

Introduction, developing a KM framework, KM system components, Implementation strategies, organizational organic capabilities architecture, organizational knowledge repositories, KM application, organizational knowledge measurement framework, organizational knowledge measurement techniques, organizational implementation barriers

5. **K-Careers** :

Introduction, KM roles, New organizational roles, organizational k-role classification KM job opportunities

**6. Value differentiation organizing ‘know-what’ for product concept innovation :**

Product concept innovations, three dimension of innovation & knowledge, functional differentiation, value different ion, bounded cohabitation, emergence and evolution of product concepts.

**7. Ethical and Legal issues in KM**

Knowledge owners and Legal issues, ethical Factors

Managerial issues in KM : Knowledge workers and their role in the learning organization, work adjustment and knowledge worker, technology and knowledge worker, managerial considerations, managing knowledge projects

**Term work/Practical :** Each candidate will submit assignments based on the above syllabus will be submitted with the internal test paper.

**References :**

1. Knowledge Management, Elias M.Awad, Hassan M. Ghaziri, Pearson Education
2. Knowledge Management Systems, Barnes, Cengage India Ltd
3. Knowledge Management – Sudhir Warier [vikas publishing house pvt ltd (1<sup>st</sup> Edition)]
4. Knowledge Management – Hirotaka Takeuchi, Ikujiro Nonaka [John Wiley & sons (Asia) p ltd 1<sup>st</sup> edition]

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**MULTIMEDIA (ELECTIVE)**

**Lecture : 4 Hrs/week**

**Practical : 3 Hrs/week**

**One paper: 100 marks / 3 Hrs duration**

**Term work: 25 marks**

**1. Introduction to Multimedia :**

Definition and scope of Multimedia, its components and applications, Use of Multimedia in CBT, Presentation & Conferencing, Hypermedia Multimedia in Public place, Multimedia on Web, Multimedia in business

**2. Multimedia Elements :**

Image file format, Bitmap image, Vector drawing Images, Principles of animations, Animation types & technique, Animation file and formats, Using text in multimedia, Designing with text, Text fonts, Menus and Navigation, Font editing drawing tools, file formats, Hypermedia and Hypertext

**3. Sound, Audio and video :**

Multimedia system sounds, MIDI audio, Audio file formats, MIDI v/s Digital Audio, Adding sound to your Multimedia Project, Analog display standards Digital display standards, Digital audio, Video recording and tap formats, Optimizing video files for CD-ROM

**4. Multimedia Authoring Tools :**

Making instance multimedia, Types of authoring tools, Time based authoring tools, card and page based authoring tools, Icon and object based authoring tools.

Story boarding, Media Design, Developing Multimedia Packages, Content analysis for different applications

**5. Designing and Producing :**

Designing, designing the structure of multimedia, Different types of multimedia structure, Hot spots hyperlink Buttons, Hot spots Web pages, Designing the user interfaces: GUIs, Audio Interface, A multimedia design case history.

## Syllabus for MCA Third Year Semester – V (with effect from the academic year 2007-2008)

Delivering : Testing, Preparing of delivery, Delivering on CD-ROM, Compact Disk technology

### 6. Planning and costing :

The process of making multimedia, Idea analysis, Idea management software, Pre testing, task planning, building a team, prototype development: Alpha Development, Beta Development

### 7. Coding and Compression :

Introduction to coding and compression techniques, Entropy encoding run length, Huffman, JPEG compression process, MPEG audio and video compression, Various CD Formats, MPEG Standards

**Term work/Practical :** Each candidate will submit assignments based on the above syllabus will be submitted with the internal test paper.

### References :

1. Multimedia Madness, Ron Wodaski, SAMS pub.
2. Multimedia : Making it works, Tay Vaughan, TMH pub
3. Multimedia , Shuman, Multimedia in Action with CD, Cengage India
4. Multimedia System : S.K. Trapathi, S.V. Raghvan
5. Multimedia System Design, P.K. Andleigh Kthakar, Prentice Hall of India
6. Multimedia System, J.E.K. Budford, Addison Wesley

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## SUPPLY CHAIN MANAGEMENT AND LOGISTICS (ELECTIVE)

**Lecture : 4 Hrs/week**

**Practical : 3 Hrs/week**

**One paper: 100 marks / 3 Hrs duration**

**Term work: 25 marks**

### 1. Understanding of Supply Chain

Objectives of Supply Chain, Importance, Decision Phase, Process View, Examples, Supply Chain Performance Drivers

Evolution and Overview of Supply Chain Management, Traditional and Modern Approach of SCM, Elements in SCM

### 2. Demand Management in Supply Chain

Demand planning & Forecasting, Types of Demand, Characteristics of forecasts, Components of a Forecast & Forecasting Methods, Basic Approach to Demand Forecasting, The Role of IT in Forecasting, Risk Management in Forecasting, Forecasting in practice, case studies

### 3. Procurement Management in Supply Chain

Introduction, Traditional Inventory Management, Inventory models, New Paradigms in Inventory, JIT, vendor managed inventory, case studies

### 4. Logistics Management

Introduction, History & evolution of Logistics, elements of logistics, Distribution management *warehousing* (types, operations, site selection, layout and design), Packing for logistics (concepts, importance, requirement, important aspects of logistics, packing Repacking & forwarding, Trends in packaging)

### 5. Transportation Problem

Role and Functionality in Supply Chain, Participants in transportation, Transportation formats, Modes, Decision and Other Formats and Transport Documentation

**Syllabus for MCA Third Year Semester – V (with effect from the academic year 2007-2008)**

Private Fleet Management : Process Factors and Drivers

**6. Benchmarking the Supply Chain**

Introduction and Concepts, Benchmarking the logistics process, Mapping SC process, Supplier and Distributor benchmarking, Case Study

**7. IT for SCM**

Concept of IT (need for IT, IT tools for business) IT Application in SCM, Evolution, benefits, role of internet, Issues with SCM system typical Data warehouse concepts, Data Mining, use of Data mining tools in SCM

**8. Distribution Networks of Supply Chain :**

Role of Distribution, influencing factors, design, application to e-business, Distribution networks in Practice

**9. Network Design in Supply Chain :**

Role of Network Design, influencing factors and Framework, models of facility location and capacity allocation, role of IT in network Design decisions in practice

**Term work/Practical :** Each candidate will submit assignments based on the above syllabus will be submitted with the internal test paper.

**References :**

1. Supply Chain Management (Concepts & cases) – Rahul V. Altekar – [Prentice Hall of India, 4<sup>th</sup> edition]
2. Supply Chain Management (Strategy, planning and operation) – Sunil Chopra, Peter Meindl, D.V. Kalra – [Pearson, 3<sup>rd</sup> edition]
3. Principles of Supply Chain Management : A Balanced Approach, Eisner, Cengage India
4. Logistics & Supply Chain Management (Strategies for Reducing cost & improving service) – Martin Christopher [FT financial Times/Pitman publishing, 2<sup>nd</sup> edition]
5. Logistics & Supply Chain Management (Cases & Concepts) – Raghuram & N. Rangaraj [McMillan India Ltd, 1<sup>st</sup> edition]