# **Government College of Engineering, Aurangabad**

An autonomous Institute of Government of Maharashtra

**Department of Master of Computer Application** Curriculum Structure and Scheme of Evaluation for S.Y.M.C.A.

Friculum Structure and Scheme of Evaluation for S.Y.M.C. Effective from Academic Year 2014-15

SEMESTER -I

	Name of Subject	Teaching Scheme Hours/Week				Examination Scheme - Marks					
Course Code		L	Т	Р	Total Credits	Tes t	ТА	ESE	Pract ical	Term Work	Total
THEORY	COURSES			1	1			1	ı		
MCA251	Core Java	3	0		3	20	20	60			100
MCA252	Design & Analysis of Algorithm	3	1		4	20	20	60			100
MCA253	Computer Network	4	0		4	20	20	60			100
MCA254	Operating System	3	0		3	20	20	60			100
MCA255	Microprocessor Fundamentals and Interfacing	3	1		4	20	20	60			100
LABORA	TORY COURSES			-				-	-		
MCA256	Lab- Core Java			4	2				25	50	75
MCA257	Lab- Design & Analysis of Algorithm			2	1				25	25	50
MCA258	Lab- Operating System			2	1				25	25	50
MCA259	Lab-Advanced Development Tools-I			4	2				25	50	75
A) Total o	of Semester-I	16	2	12	24	100	100	300	100	150	750
	SEI		STE.	<u>K -II</u>	l Coltante o	I					
	Name of Subject	Hours/Week				Examination Scheme - Marks					
Course Code		L	Т	Р	Total Credits	Tes t	ТА	ESE	Pract	Term	Total
THEORY COURSES									ical	Work	
MCA260									ical	Work	
	Advanced Java	3	1		4	20	20	60	ical	Work	100
MCA261	Advanced Java Software Testing Techniques	3	1 0		4 3	20 20	20 20	60 60	ical 	Work	100
MCA261 MCA262	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws	3 3 4	1 0 0		4 3 4	20 20 20	20 20 20	60 60 60	ical  	Work  	100 100 100
MCA261 MCA262 MCA263	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws Data Mining Techniques	3 3 4 3	1 0 0	 	4 3 4 4	20 20 20 20 20	20 20 20 20	60 60 60	ical   	Work	100 100 100 100
MCA261 MCA262 MCA263 MCA264	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws Data Mining Techniques Software Project Management	3 3 4 3 3	1 0 0 1 0	  	4 3 4 4 3	20 20 20 20 20 20	20 20 20 20 20 20	60 60 60 60	ical   	Work	100 100 100 100 100
MCA261 MCA262 MCA263 MCA264 LABORA	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws Data Mining Techniques Software Project Management <b>TORY COURSES</b>	3 3 4 3 3	1 0 0 1 0	  	4 3 4 4 3	20 20 20 20 20 20	20 20 20 20 20 20	60 60 60 60	ical    	Work	100 100 100 100 100
MCA261 MCA262 MCA263 MCA264 <b>LABORA</b> MCA265	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws Data Mining Techniques Software Project Management TORY COURSES Lab- Advanced Java	3 3 4 3 3	1 0 1 0	   4	4 3 4 4 3 2	20 20 20 20 20	20 20 20 20 20	60 60 60 60	ical 225	Work                       50	100 100 100 100 100 75
MCA261 MCA262 MCA263 MCA264 <b>LABORA</b> MCA265 MCA266	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws Data Mining Techniques Software Project Management TORY COURSES Lab- Advanced Java Lab- Software Testing Techniques	3 3 4 3 3	1 0 1 0	   4 2	4 3 4 4 3 2 1	20 20 20 20 20	20 20 20 20 20	60 60 60 60	ical 225 25	Work                       50           25	100 100 100 100 100 75 50
MCA261 MCA262 MCA263 MCA264 <b>LABORA</b> MCA265 MCA266 MCA267	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws Data Mining Techniques Software Project Management TORY COURSES Lab- Advanced Java Lab- Software Testing Techniques Seminar	3 3 4 3 3	1 0 1 0	   4 2 2	$ \begin{array}{c c}     4 \\     3 \\     4 \\     4 \\     3 \\   \end{array} $ $ \begin{array}{c}     2 \\     1 \\     1 \end{array} $	20 20 20 20 20	20 20 20 20 20	60 60 60 60	ical 25 25	Work                       50           25           50	100 100 100 100 100 75 50 50
MCA261 MCA262 MCA263 MCA264 <b>LABORA</b> MCA265 MCA266 MCA267 MCA268	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws Data Mining Techniques Software Project Management <b>TORY COURSES</b> Lab- Advanced Java Lab- Software Testing Techniques Seminar Lab-Advanced Development Tools-II	3 3 4 3 3	1 0 1 0	   4 2 2 4	4 3 4 4 3 2 1 1 2	20 20 20 20 20 20	20 20 20 20 20	60 60 60 60 	ical 25 25 - 25	Work                       50           25           50           50           50	100 100 100 100 100 75 50 50 75
MCA261 MCA262 MCA263 MCA264 <b>LABORA</b> MCA265 MCA266 MCA267 MCA268 <b>B) Total (</b>	Advanced Java Software Testing Techniques Cyber Security & Cyber Laws Data Mining Techniques Software Project Management <b>TORY COURSES</b> Lab- Advanced Java Lab- Software Testing Techniques Seminar Lab-Advanced Development Tools-II <b>of Semester-II</b>	3 3 4 3 3  16	1 0 1 0	   4 2 2 4 <b>12</b>	4 3 4 4 3 2 1 1 2 24	20 20 20 20 20 20  <b>100</b>	20 20 20 20 20  <b>100</b>	60 60 60 60  <b>300</b>	ical 25 25 - 25 100	Work                          50           25           50           50           50           150	100 100 100 100 100 100 75 50 75 750 <b>750</b>

(L-Lectures, T-Tutorials, P-Practical, TA-Teacher Assessment, ESE-End-Semester Examination)

#### **Examination Scheme :**

Test : 20 Marks Assignment : 20 Marks End Sem. Exam. : 60 Marks

# • Course Educational Objectives:

- 1. Understand fundamentals of Object Oriented programming in java, including defining classes, invoking methods, using class libraries etc,
- 2. Be able to use the java SDK environment to create, debug and run simple java programs.

# • Course Outcomes Expected:

- 1. Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring
- 2. Use testing and debugging tools to automatically discover errors of Java programs
- 3. Develop programs using the Java Collection API as well as the Java standard class library.

# 1. Java Fundamentals -

History, Bytecodes And The Java Virtual Machine, Application And Applets, Classes And Objects, The Java Class Libraries, The Java Development Kit (Jdk), Your First Java Application Identifiers, Keywords & Types –

Variables And Assignments, Strings And Characters, Arithmetic Operators And Expressions, Type Conversion In Assignments, Comments Arrays – One-Dimensional Arrays, Multidimensional Arrays

# 2. Using Classes And Methods -

The Structure Of A Method, Introducing Static Methods, Variables, Instance Methods And Variables, The Integer Class, The New Operator, Garbage Collection, Other Wrapper Classes, The String Buffer Class, Arrays Of Objects, Command Line Arguments, The System Class Introducing Java's Control Statements -The Statement, The If-Else Statement, Blocks Of Code, The For Statement Operators - Increment And Decrement Operators, Backslash Codes, Relational And Boolean Logical Operators, Ternary Operator, Nested If Statements, The Switch Statement, Variations Of The For Loop, The While Loop, The Do Loop, Nested LOOPS, The Break Statement, The Bitwise Operators

# 3. Java Memory Model -

Call by Ref / Call By Value Creating Classes – The General Form Of A Class, Creating Simple Classes, Method Overloading, Adding Constructors, The This Keyword, Instance Variables And Methods, Static Variables And Methods, Local Variables And Variable Scope, Argument Passing, Introduction to Inner Classes Inheritance – Subclasses, Inheritance And Variables, Method Overriding, Inheritance And Methods, inheritance And Constructors, Class Modifiers, Variable Modifiers, Constructor Modifiers, Method Modifiers, Interface And Packages, Interfaces, Interface References, Interface Inheritance, The Instance Of Operator, Packages, Classpath, The Import Statement, Access Control And Packages

# 4. Exceptions –

Exception Handling, Catch Block Searches, The Throw Statement, Exception And Error Classses, The Throws Clause, Multithreaded Programming, An Overview Of Threads, Creating Threads, Synchronization, Deadlock, Thread Communication Introducing The Java Class Libraries – The Random Class, The Date Class, The Calendar And Gregorian Calendar Classes, The Vector Class And Enumeration Interface, The Stack Class, Collection classes, The Hashtable Class, The String Tokenizer Class, Collection API, Study of methods of Object class I/O Package -

Files and Directories, Overview Of Codes and Streams, Buffered Character Streams, The Print Writer Class, Byte Streams

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# **Teaching Scheme :**

Lectures : 3 hrs/week

## 5. Applets –

An Overview Of Applets, Your First Java Applet, The Life Cycle Of An Applet, The Graphics Class, Using Colors, Displaying Text, Using Applets In A Web Page Event Handling The Delegation Event Model, Event Classes, Event Listeners, Adapter Classes, Advance Language Features, Inner Classes, Anonymous Inner Classes, The Abstract Window Toolkit, Labels, Buttons, Canvases, Check Boxes, Choices, Text Fields And Text Areas, Lists, Scroll Bars, Grid Layout, Panels, Windows And Frames, Menus And Menu Bars, Overview Of JFC (Java Foundation Classes), Swings & AWT Component Hierarchy

# Tools Used -

JDK 1.4 / 1.5, TextPad / EditPlus, java, javac, jar, javaw, javap

# **Text/Reference Books –**

- 1. Java 2 Complete Reference Herbert Schildt and Patrick Naughton McGraw Hill
- 2. Programming with JAVA E. Balgurusamy,  $2^{nd}$  Ed, TMH
- 3. Thinking in Java Bruce Eckel 3<sup>rd</sup> Edition Prentice-Hall
- 4. Java Swing, 2<sup>nd</sup> Edition by Dave Wood, Marc Loy, James Elliott, Brian Cole, Robert Eckstein O'Reilly
- 5. Core Java Part 1 Sun Microsystems press
- 6. A Programmer's Guide to Java Certification Khalid Mughal, Rolf Rasmussen

# **Teaching Scheme :**

Lectures : 3 hrs/week Tutorials : 1 hrs/week **Examination Scheme :** 

Test : 20 Marks Assignment : 20 Marks End Sem. Exam. : 60 Marks

# • Course Educational Objectives:

- 1. This course introduces the analysis and design of algorithms.
- 2. After completion of this course, students will be able to do the following:
  - Analyze the asymptotic performance of algorithms
  - Apply different design and analysis methods
- Course Outcomes Expected:
  - 1. Describe and use different algorithmic techniques such as divide and conquer, greedy method, dynamic programming, backtracking and branch and bound.
  - 2. Evaluate different algorithms using worst, average and best case analysis.
  - 3. Perform competitive analysis of algorithms.

#### Unit1: Introduction, Divide and conquer

Algorithm performance analysis, complexity issues, recurrences, binary search, merge sort, quick sort, heap sort. [8]

#### Unit2: The greedy method

Knapsack problem, job sequencing, Huffman code, minimal spanning tree, topological sorting. [8]

# **Unit3: Dynamic programming**

All pairs shortest path, optimal binary search tree, travelling salesman problem, flowshop scheduling. [8]

# **Unit4: Back tracking**

N-queens problem, sum of subsets, graph coloring, knapsack problem, Hamiltonian cycles. [8]

# Unit5: Branch and bound

LC branch and bound, FIFO branch and bound, Job sequencing problem with FIFO and LC branch and bound, 0/1 knapsack problem. [8]

# Text/Reference Books -

- 1. Fundamentals of computer algorithms (second edition) -Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Universities press
- 2. Data structures and algorithm analysis in C++ -Mark Allen Weiss, Pearson Education

#### **Teaching Scheme:** Lectures : 4 Hrs/Week Tutorials : 0 Hrs/Week

# Examination Scheme:

Test : 20 Marks Assignment : 20 Marks End Sem. Exam: 60 Marks

#### • Course Educational Objectives:

- 1. To demonstrate knowledge of basic principles of computer networking,
- 2. To make students familiar with the detailed functionality of the layered network architecture.
- 3. To enable students develop Internet applications and their protocols, and to develop student's own applications such as Client Server applications, Web Services etc.

#### • Course Outcomes Expected:

- 1. Students will come to know about various protocols, models in Networks
- 2. Students will be aware of Network hardware, Media Types (cables , Wireless),
- 3. Students will be able to design, implement and analyze simple computer networks.
- 4. Students will know the different strategies of operations of TCP/UDP, FTP, HTTP, SMTP, SNMP

# **Contents:**

#### **UNIT 1. Introduction**

Overview of Computer Network, Network hardware and software, Reference model- OSI and TCP/IP and their comparison Network layer-network layer design issues, various routing Algorithms and congestion control algorithms, Networking layer in the internet.

# UNIT 2. Transport layer

The transport services, elements of transport protocols, internet transport protocols, ATM – AAL layer protocols, Performance issues.

# UNIT 3. TCP/IP

TCP/IP architecture, the internet protocols, IPv6, DHCP and Mobile IP, internet routing protocols, multicast routing ,The network layer in ATM networks

# UNIT 4. The Application layer

Network security – principle of cryptography, secret key and public key algorithm, digital scanners, Domain name system-The DNS name space, resource records, name server, simple network management Protocol –SNMP model, Electronic mail- architecture and services, Message formats and message transfer, email privacy Usenet news- user view of Usenet and Usenet implementation

# UNIT 5. Multimedia Information and Networking

Lossless data compression, ,Video on Demand, Transmission in ATM network, Communication satellites.

# **Text/Reference Books:**

- 1) Computer Networks, Andrew. S. Tanenbaum, PHI
- 2) Communication Networks- Fundamental concepts and key architectures, Alberto,Leon –Garcia and Indra widjaja, Tata Mc-Graw Hill

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**Teaching Scheme:** Lectures : 3 Hrs/Week

# **Examination Scheme:**

Test : 20 Marks Assignment : 20 Marks End Sem. Exam: 60 Marks

## • Course Educational Objectives:

- 1. Define and list the functions of an operating system.
- 2. List resources involved in process creation and management.
- 3. Explain the use of paging and segmentation
- 4. Explain the function and structure of the I/O system
- 5. Describe path names and directory structure visible to end users

# • Course Outcomes Expected:

- 1. Differentiate between multiprocessing, multiprogramming, and multitasking.
- 2. Differentiate between programs, processes and threads.
- 3. Apply segmentation and paging techniques.
- 4. Compare file naming in Linux and Windows.

# Unit I: Fundamentals of Operating System:-

OS services and Components, Multitasking , Multiprogramming, Multiprocessing Time Sharing, Buffering, Spooling, Distributed OS

#### **Unit II: Process and Thread Management**

Concept of process and threads ,Process states ,Process management ,Context switching Interaction between processes and OS ,Multithreading,Example OS : Linux

# **Unit III: Memory Management**

Memory partitioning,Swapping,Paging ,Segmentation ,Virtual memory Overlays ,Demand paging ,Performance of Demand paging ,Virtual memory concepts ,Page replacement algorithms ,Allocation algorithms ,Example OS : Linux

# Unit IV: I/O Systems

Secondary-Storage Structure, Disk structure , Disk scheduling , Disk management , Swap-space management , Disk reliability , Stable storage implementation , Introduction to clock , Clock hardware , Clock software

# Unit V: File systems

File concept ,File support ,Access methods ,Allocation methods ,Directory systems ,File protection ,Free space management Example OS : Linux Case study:Android OS

# **Text/Reference Books:**

- 1) Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts. Seventh edition. Addison-Wesley
- 2) Andrew Tanenbaum, Modern Operating Systems, Prentice Hall.
- 3) Operating Systems (5th Ed) Internals and Design Principles By WilliamStallings, Prentice Hall
- 4) Operating Systems Achyut S. Godbole Tata Mc Graw Hill

# MCA255 - Microprocessor Fundamentals and Interfacing

Teaching Scheme :	Examination	Scheme :
Lectures : 3 hrs/week	Test	: 20 Marks
Tutorials: 1 hrs/week	Assignment	: 20 Marks
	End Sem. Exa	am. : 60 Marks
Course Educational Objectives:		
1. To familiarize with the Intel 8086 Microprocessor & instruction	on set.	
2. To develop & execute programs in assembly language.		
3. To demonstrate 8255 interfacing with 8086 microprocessor.		
Course Outcomes Expected:		
<ol> <li>Conversant with 8086 microprocessor and 8051 microcontrolle</li> <li>Understand, write, test and debug assembly language programs</li> <li>Understand architectural advances in general purpose processe</li> <li>Use the concepts for designing microcontroller based circuits a Apply high end microcontrollers for different applications</li> </ol>	er s ors ising peripherals	
UNIT 1. 8086 Architecture, Segmented memory, Pipelining a	and addressing mo	odes [8]
<b>UNIT 2.</b> Instruction set of 8086, Programming with 8086 Use of Assembler		[8]
Debug, Development cycle, debugging software		
Modular Programming, Procedures		
Develop		
UNIT 3. Designing 8086 CPU		[8]
Basic 8086 CPU hardware design, Generating CPU clock and techniques, 8086 minimum mode CPU module, 8086 maximum	reset signals, Bus t n mode CPU mode	ypes and buffering ale
UNIT 4. Main memory design - SRAM, ROM interfacing		[8]
Basic input output – Parallel, serial Programmed and interrupt	driver I/O DMA	

#### **UNIT 5.** Peripheral Controllers

8255, 8259, 8279

#### Text/Reference Book -

- 1. 8086 Family, Programming and interfacing By John P. Uffenbeck, PHI 2001
- 2. Yu Chen Liu & Glenn A Gibson : Microcomputer Systems; The 8086/8088 Family, PHI

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**Examination Scheme :** Practical Exam. : 25 Marks Term Work : 50 Marks

- Course Educational Objectives:
- Course Outcomes Expected:

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs -

- 1. Write a program to input an array of 10 elements and sort it with any sorting method
- 2. Write a program to add two matrices by using different methods, classes
- 3. Write a program to convert a digits into its word format using different method.
- 4. Write a program to collect the basic information of flowers. Define base class, derived class with different properties; inherit the basic properties from base class. Display the properties of flowers.
- 5. Write a program to collect the information about student, write method for validation in base class. Input faculty & marks of student with validation in derived class and in an interface, find the result of the student. Display the result of the student.
- 6. Create a package contains addition, geometric mean, and harmonic motion of array elements and use it in your program.
- 7. Write a program to throws exception and for throwing our own exception using try, catch and finally statement.
- 8. Write a program to implement single thread and multiple threads in single program. Do the operations on thread. Also create runable interface on it.
- 1. Create a simple applet for drawing an ellipse, rectangle, menu etc. & Run in HTML
- 10. Write a program to create I/O file operations

Practical Examination will consist of Performance and Viva-voice Examination The assessment will be based on the following –

- 1. Performance in the practical examination
- 2. Record of programs submitted by the candidate.

**Examination Scheme :** Practical Exam : 25 Marks Term Work : 25 Marks

- Course Educational Objectives:
- Course Outcomes Expected:

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs -

- 1. Write a program for binary search with recursive and non-recursive methods.
- 2. Write a program for implementing sorting techniques quick sort and merge sort
- 3. Write a program for implementing Prim's and Kruskal's algorithm.
- 4. Write a program for finding shortest path for multistage graph problem.
- 5. Write a program to implement knapsack problem.
- 6. Write a program to implement n-queens problem.
- 7. Write a program to implement sum of subsets.
- 8. Write a program for travelling salesman problem.

Practical Examination will consist of Performance and Viva-voice Examination The assessment will be based on the following –

1. Performance in the practical examination Record of programs submitted by the candidate.

#### MCA258 - Lab : Operating System

# **Teaching Scheme :**

Practical : 2 hrs/week

**Examination Scheme :** Practical Exam. : 25 Marks Term Work : 25 Marks

- Course Educational Objectives:
- Course Outcomes Expected:

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs -

- 1. Write a program on fork and vfork.
- 2. Write a program on File system calls.
- 3. Write a program on handling signals.
- 4. Write a program on CPU scheduling algorithms.
- 5. Write a program on File commands.
- 6. Write a program on exit and exit(0).
- 7. Write a assignment on memory management.
- 8. Write a assignment on structure of a process.

Practical Examination will consist of Performance and Viva-voice Examination The assessment will be based on the following –

- 1. Performance in the practical examination
- 2. Record of programs submitted by the candidate.

## MCA258 - Lab : Advanced Development Tools-I

**Teaching Scheme :** 

Practical : 4 hrs/week

# • Course Educational Objectives:

At the completion of this course, the student will be able to:

- 1) Create and populate Windows Forms.
- 2) Create and use user controls in a Windows Forms application
- 3) To Create Multiple Document Interface (MDI) applications
- 4) Validate user input in a Windows Forms application
- 5) Bind Windows Forms applications to various data sources by using Microsoft ADO.NET
- 6) Print documents in a Windows Forms application
- 7) Deploy and Secure a Windows Form application
- Course Outcomes Expected:

# **Experiment 1**

NET and Visual Studio, Framework, Common Language Runtime, Basic C# Syntax, Creating your first console application, Comments, Data Types, Variables, Operators, Conditional Statements, Looping Structures, Functions

List of Experiments:

- A. With diagram Explain .NET Framework in detail.
- B. Write a program for executing Conditional and Looping structures using C#

# **Experiment 2**

Partial Classes, Methods, Properties and Events, Constructors, Property Procedures, Enumerations, Reference vs. Value Types, Structures, Namespaces **Arrays & Collections** Arrays, Array Lists & Hash Tables, Generic Collections

List of Experiments:

- A. Write a program for creating & implementing classes using C#
- B. Write a program for implementing Generic Collection

# **Experiment 3**

Windows Forms and Controls Control Class, Buttons, Text Boxes Labels, Literals, Image Controls, Picture Box Control, Panel Control, Combo Box Control, List Boxes, Dropdown Lists, Date Time Picker Control, Link Labels, Check Boxes, Check Box Lists, Radio Buttons Radio Button Lists, Rich Text Box Control, Tab Control, Tool Strip Control, Menu Strip Control, other standard controls List of Experiments:

- A. Write a program which uses standard windows components like Image controls, List boxes, Textboxes etc
- B. Write a program which uses remaining standard components like Tab Control, Menu Strip etc

# **Experiment 4**

**Creating MDI Applications** MDI Applications, MDI Parent and MDI Child Forms, Manage Menus, **Printers and Printing, Exception Handling** 

List of Experiments

- A. Write a program which demonstrate implementation of MDI Forms
- B. Write a program for Exception Handling

# **Experiment 5**

ADO.NET (Working with Database) Creating SQL Server Database, Overview of ADO.NET

, Connection Object, Command Object, Data Readers, Data Sets & Data Adapters, Execute non-query, Execute scalar, Execute reader, Data Grid View Control

List of Experiments:

List of Experiments:

- A. Write a program which connects Windows forms with Database. Also execute Insert, Update, Delete and select queries using the same.
- B. Write a program demonstrating use of Data Grid Control

# **Experiment 6**

**Building Setup Applications:** Installation Package, Customize a Setup Project, Control Installation of an Application, Specify Conditions of an Install, Custom Actions for after an Installation List of Experiments:

A. Write & demonstrate steps involved in Creating Deployment Package

# **Teaching Scheme:**

Lectures : 3 Hrs/Week Tutorials : 1 Hrs/Week Total Credits : 4

# **Examination Scheme:**

Test : 20 Marks Assignment : 20 Marks End Sem. Exam: 60 Marks

# • Course Educational Objectives:

- 1. Describe Collection Framework and introduce Eclipse IDE
- 2. Describe JDBC and Database Operations
- 3. Enable Students on how to use Servlets & JSP
- 4. Demonstrate MVC Architecture and Struts
- 5. Demonstrate ORM Mapping and Hibernate
- **Course Outcomes Expected:** At the end of the course the student will be able to
- 1. Develop and use Eclipse to create new project
- 2. Develop Database & its related Operations
- 3. Create their first application using Servlets
- 4. Convert their project to layered MVC Architecture
- 5. Implement Hibernate in their Application

# Unit 1. Introduction to Networking

Basics Of Networking, Overview Of The OSI Model, Socket Programming, Client Sockets And Server Socket, Multicast Sockets

Javabeans –

Javabean Architecture, Bean Properties, Methods And Events, Bean Introspection

# Unit 2. Java Database Connectivity [JDBC]

DBMS Concepts, RDBMS & Understanding basic database design, SQL, Introduction To SQL, DDL, DML, Joins, JDBC, Basics Of Database Connectivity, Introduction To JDBC, JDBC Architecture, JDBC Interfaces, JDBC Exceptions, Prepared Statement, Callable Statement, Stored Procedure And Functions, Triggers

# Unit 3.Servlets

Introduction To Web Application Development, Introduction of a 2 & 3 Tier Architecture, Server Side Programming, Introduction To Servlets,

Comparing Servlets With CGI, Servlet Lifecycle, Servlet With Html, Server Side Includes, Servlet Chaining, HTTP Tunneling, Session Management, Servlets With JDBC, Inter Servlet Communication, Deployment Descriptor ( web.XML ), Servlet Context & Config Objects, Event Handling in Servlet, Jasper Report generation & Calling Using Servlet.

# Unit 4. Remote Method Invocation [RMI]

Introduction To Distributed Computing, RPC, Client Side And Server Side Proxies, Introduction To RMI, Stubs And Skeletons, The Process Of Creating A Simple RMI Application, Callbacks, Bootstrap Server, RMI With JDBC, RMI Packages

# Unit 5. Enterprise Java Beans

Architecture, Introduction To Session Beans, Characteristics, How To Write & Call Session Beans, Understanding EJB Security, Introduction To Entity Beans & its features, Example Server, Example Client, Transactions - Need, benefits, model, isolation

# Unit 6. Introduction to Core Java design patterns

Creational, Structural and Behavioral Design patterns Introduction to J2EE design patterns – Model View Controller, Data Access Object, Business Delegate, Front Controller Security Introduction to Internet Security Issues, Eavesdropping, Tampering, Impersonation, Spoofing, Misrepresentation

# **Unit 7.Java Server Page**

Introduction,Difference between Servlet & JSP,Basic Tags(Scriptlet,expression,directives,declaration), Basic Objects (out, session, request, application), Action tags(forward,include etc.),Java Server Tag Library

# Unit 8. Hibernate

Introduction,difference between hibernate & JDBC,Architecture of hibernate & ORM understanding, Steps to configure hibernate & create sample program,Session with save,load,upload,delete method,Introduction to HQL & work with database,inheritance with hibernate,Association,cache concept(first level & second level cache),hibernate with jsp & swing integration

# Unit 9. Structs

Introduction & History,Difference beytwee MVC1 & MVC2,Steps to Create Struts2 Application,Interceptors,Valuestack,Actioncontext,ActionInvocation,OGNL,Struts2 (Flow,Action,Validation,Tiles,MultiName),Struts with Hibernate, Struts with Spring, Struts withJDBC.

# Unit 10. Spring

Spring Core Module, Spring J2EE module, Spring ORM, Spring JDBC, Spring AOP(Aspect Oriented Module), Spring Web MVC module.

# **Text/Reference Books:**

- 1. Core Java Part 2 Advanced Features Sun Microsystems press
- 2. J2EE<sup>TM</sup> Tutorial, The, 2nd Edition By Eric Armstrong, Jennifer Ball, Stephanie Bodoff, Stephanie Bodoff, Debbie Carson, Ian Evans, Dale Green, Kim Haase,

Eric Jendrock. Published by Addison Wesley

- 3. Java Design Patterns: A Tutorial by James W. Cooper Addison Wesley Pearson Press
- 4. Struts in Action Ted Husted

## MCA261 - Software Testing Techniques

#### **Teaching Scheme :**

Lectures : 3 hrs/week

#### **Examination Scheme :**

Test : 20 Marks Assignment : 20 Marks End Sem. Exam. : 60 Marks

#### • Course Educational Objectives:

- 1) Understand the basics of software testing
- 2) Study different strategies for software testing
- 3) To stress the need of testing and conduct testing at different levels
- 4) To identify the issues in testing management

# • Course Outcomes Expected:

- 1) To make students understand the principles of software testing
- 2) Conduct testing at diggerent levels
- 3) Bring out the efficient ways to conduct testing activity

# **Unit 1. Introduction**

What Is a Bug? Terms for Software Failures, Software Bug: A Formal Definition, why do bugs occur? The Cost of Bugs. What Exactly Does a Software Tester Do? What Makes a Good Software Tester? What Effort Goes Into a Software Product? What Parts Make Up a Software Product? Software Project Staff. Overview of Software Development Lifecycle Models. Big-Bang Model, Code-and-Fix Model. Waterfall Model. Spiral Model. Software Testing Terms and Definitions, Precision and Accuracy, Verification and Validation, Quality and Reliability, Testing and Quality Assurance (QA)

# Unit 2. Fundamentals of Testing

Black-Box and White-Box Testing, Static and Dynamic Testing, Static Black-Box Testing: Testing the Specification, Performing a High-Level Review of the Specification, Low-Level Specification Test Techniques, Test-to-Pass and Test-to-Fail, Equivalence Partitioning, State Testing, Other Black-Box Test Techniques, Static White-Box Testing: Examining the Design and Code Formal Reviews, Coding Standards and Guidelines, Generic Code Review Checklist, Dynamic White-Box Testing, Dynamic White-Box Testing Versus Debugging, Testing the Pieces- Unit and Integration Testing, Data Coverage, Code Coverage

# Unit 3. Types of Testing

Configuration Testing, Compatibility Testing, Foreign Language Testing, Usability testing, Testing the Documentation, Testing software security, Website testing, Automated Testing and Test Tools. Bug Bashes and Beta Testing.

# Unit 4. Test Planning and Management

Approaches to Managing Software Testing. Planning Your Test Effort. Writing and Tracking Test Cases. The Most Important Tests (mits) Method. Reporting What You Find. Using the Information in the Bug Tracking Database. Fundamental Metrics for Software Testing.

# Unit 5. Risk Analysis and Data Aalysis Methods

Risk Analysis, Applied Risk Analysis, Path Analysis, Applied Path Analysis, Data Analysis Techniques, Software Quality Assurance

# [8]

[8]

#### [8]

# **[8]** 5.

[8]

# **Text/Reference Books:**

- 1. Software Testing Ron Patton
- 2. Software Testing Fundamentals: Methods and Metrics by Marnie L.Hutcheson

Self Study Assignments on Software Testing could be done in Bugzilla (Open source bug tracking tool that could be deployed in the college LAN). A practical lab should include learning of a scripting language like Perl or Python.

#### MCA262 - Cyber Security & Cyber Laws

#### **Teaching Scheme :**

Lectures : 4 hrs/week

#### **Examination Scheme :**

Test: 20 MarksAssignment: 20 MarksEnd Sem. Exam. : 60 Marks

[8]

[8]

#### **Course Educational Objectives:**

- 1. Describe Professional & Philosophical Ethics
- 2. Describe the process of Securing Intellectual Property
- 3. Enable Students on how to Recover the Evidence and Investigation
- 4. Demonstrate on how to secure own presence online
- 5. Describe Cyber Law provision related to all type cyber crimes

# **Course Outcomes Expected:**

At the end of the course the student will be able to

- 1. Make defensible decision making based on Professional & Philosophical Ethics
- 2. Develop process to File an IPR Application
- 3. Investigate and Recover Cyber Evidence
- 4. Implement Cyber Security
- 5. Suggest legal action to be taken against the cyber crimes

# UNIT 1.Introduction To Cyber Security, Public Key Cryptography And RSA[8]

Need for security, security attacks, security services, model for network security. Principles of public-key cryptosystems, the RSA algorithm, key management, Diffle-Hallman key exchange.

<b>UNIT 2.</b>	E-mail Security, IP Security And Web Search	[8]
Pretty Good Pri	vacy, S/MIME, IP security architecture, web security considerations, SSL and TTL	
LINIT 3	CyberLaw	[8]
	•	

UNIT 4. Cyber Crime And Investigation

Cyber crimes: crimes against the computer, crimes using a computer, Investigation Issues: cyber Forensics.

#### UNIT 5. Professional Ethics

Property rights in Computer Software, Computers and Privacy, Crime, Abuse, And Hacker Ethics, Responsibility and Liability Solving Ethical Dilemmas, Discovering an Ethical Dilemma, Copyright Ethics overseas. Ethics Codes and Policies- The need for Codes and Policies, An Email Privacy, An Internet Use Policy

# **Text/Reference Books:**

- 1 Cryptography and network security- principles and applications William Stallings – Third edition –Pearson education
- 2 Network Security Complete reference
  - Roberta bragg, Mark Rhodes, Keith Strassberg Tata Mcgraw Hill
- 3. Cryptography and network security Atul Kahate Tata Mcgraw Hill
- 4. Network security Chaile Kaufman, Radia Perlman Mike speciner Pearson education
- 5. Dr.R.K.tiwari P.k.Sastri,K.v. Ravikumar "Computer crime and Compute Forensics" First Edition 2002, Select publishers.
- 6. Computer Ethics and professional responsibility Terrell Ward Bynum, Simon Rogerson

# **Teaching Scheme :**

Lectures : 3hrs/week Tutorials: 1 hrs/week

#### **Examination Scheme :**

Test: 20 MarksAssignment: 20 MarksEnd Sem. Exam. : 60 Marks

# **Course objective:**

- Introduce students to the basic concepts and techniques of Data Mining.
- Understand mining and knowledge discovery process.
- Introduce techniques for association rule mining
- Understand classification and clustering algorithms
- Discuss concepts for text and web mining.

# **Course Outcome:**

- Identify and apply OLAP operations
- Illustrate various visualization techniques
- Apply Apriori and FP-growth algorithm in frequent pattern analysis
- Compare and apply problem domains suitable for cluster analysis and classification
- Identify research areas for application of text and web mining techniques

# **Unit I: Introduction to Data Mining**

What is data mining?, Related technologies - Machine Learning, DBMS, OLAP, Statistics Data Mining Goals, Stages of the Data Mining Process, Data Mining Techniques

#### Unit II:Data mining knowledge representation Task relevant data ,Background

knowledge ,Interestingness measures ,Representing input data and output knowledge,Visualization techniques ,Experiments with Weka– visualization

**Unit III:Data mining algorithms: Association rules** Motivation and terminology,Basic idea: item sets,Generating item sets and rules efficiently,Apriorialgorithm,FP-growth tree,Experiments with Weka - mining association rules

# Unit IV:Data mining algorithms: Classification and Clustering

Basic issues in clustering ,Partitioning methods: k-means, Hierarchical methods: distance-based agglomerative and divisible clustering ,Experiments with Weka - k-means,Basic learning/mining tasks, Decision trees,Covering rules ,Experiments with Weka - decision trees, rules

# Unit V:Advanced techniques, Data Mining software and applications

Text mining: extracting attributes (keywords), structural approaches (parsing, soft parsing). ,Bayesian approach to classifying text ,Web mining: classifying web pages, extracting knowledge from the web.

# **Text/Reference Books:**

- 1) Jiawei Han and MichelineKamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.
- 2) Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw Hill Edition, Tenth Reprint 2007
- 3) Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction To Data Mining", Person Education, 2007.
- 4) K.P. Soman, ShyamDiwakar and V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.

## **Teaching Scheme :**

Lectures : 3 hrs/week

#### **Examination Scheme :**

Test : 20 Marks Assignment : 20 Marks End Sem. Exam. : 60 Marks

#### • Course objective:

- 1. Define and highlight importance of software project management.
- 2. Describe the software project management activities
- 3. To study processes, methods & systems used to plan, schedule and monitor projects
- 4. Create project plans that address real-world management challenges
- 5. Develop the skills for tracking and controlling software deliverables

#### • Course Outcome:

After the completion of the course, the student will be able to:

- 1. Develop a project management plan (PMP).
- 2. Develop a project plan, schedule various activities, track the progress, prepare status reports and manage changes.
- 3. Plan and manage a small project as project manager

UNIT-1	Introduction & Software Project Planning – Fundamentals, project management cycle, management spectrum, SPM framework, software project planning, types of project plan, software project estimation	08 Hrs	
UNIT-2	Project organization, scheduling and management issues- project life cycle and product life cycle, controlling activities, project planning,- choice of process model, project scheduling, resource allocation, Role changing technology	08 Hrs	
UNIT-3	Project management and control- Dimensions of project monitoring and control, Earned value analysis (EVA), EVA indications	08 Hrs	
UNIT-4	Technical communications – fundamentals of technical communications – oral and written, software project documentation, preparing oral presentations and supporting materials, out-sourcing	08 Hrs	
UNIT-5	Software quality assurance and testing- types of testing, levels of testing, test strategies, program correctness, program verification and validation, software quality, SQA activity		08 rs

# **TEXT / REFERENCE BOOKS:**

- 1. Bob Hughes, Mikecotterell, "Software Project Management", Tata McGraw Hill, Third Edition, 2004
- 2. Rajiv Chopra, "Software Project management- A practical approach", S.K.Kataria and sons, Second, 2009
- 3. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001
- 4. Royce, "Software Project Management", Pearson Education, 1999
- 5. Jalote, "Software Project Management in Practice", Pearson Education, 2002

#### **Teaching Scheme :** Practical : 4 hrs/week

**Examination Scheme :** Practical Exam. : 25 Marks Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs -

- 1. Write programs to implement different applications using java beans
- 2. Create a JDBC Connection with access database and print the records.
- 3. Write a Simple menu driven program using applet to insert, delete & modify the records from the database using JDBC connection and print the Reports.
- 4. Write a program using socket programming
- 5. Create a simple RMI Application
- 6. Write a program to create a simple servlet
- 7. Write a program to create servlet with JDBC
- 8. Write a programs using EJB Application

Practical Examination will consist of Performance and Viva-voice Examination The assessment will be based on the following –

- 1. Performance in the practical examination
- 2. Record of programs submitted by the candidate.

# **Teaching Scheme :**

Practical : 2 hrs/week

**Examination Scheme :** Practical Exam. : 25 Marks Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs -

- 1. Study of testing tools
- 2. Test case design for functional testing
- 3. Test case design for loop testing
- 4. Test case design for synchronization
- 5. Test case design in batch mode
- 6. Testing of GUI application
- 7. Testing of object oriented application
- 8. Testing with Data Driver Wizard

Practical Examination will consist of Performance and Viva-voice Examination The assessment will be based on the following –

- 1. Performance in the practical examination
- 2. Record of programs submitted by the candidate.

# MCA267 – Seminars

**Teaching Scheme :** Practical : 4 hrs/week **Examination Scheme :** Term Work : 50 Marks

The seminar will consist of a typewritten report covering the topic selected for the seminar. The candidate shall deliver seminar on the topic, which will be judged internally in the department by two examiners and the marks will be given accordingly.

Practical Examination will consist of Performance and Viva-voice Examination The assessment will be based on the following –

- 1. Performance in the practical examination.
- 2. Record of programs submitted by the candidate.

# MCA258 - Lab : Advanced Development Tools-II

**Teaching Scheme :** 

Practical : 4 hrs/week

**Examination Scheme :** Practical Exam. : 25 Marks Term Work : 50 Marks

# **Course Educational Objective:**

- 1. Describe .NET Framework and introduce its IDE to create Presentation Layer
- 2. Describe basic concepts in C# and introduce important file and folders in C#
- 3. Enable Students on how to use Standard and Validation Controls
- 4. Demonstrate on various ways of interacting with Database
- 5. Demonstrate use of AJAX and Web Services

# **Course Outcomes Expected:**

After completion of course students will be able to

- 1. Develop presentation layer for their web application
- 2. Differentiate and Use proper files and folders to address situation
- 3. Implement the Standard and Validation Controls
- 4. Connect with Database and Manage it
- 5. Implement AJAX and Web Services

# **Experiment 1:**

**Getting Started with .NET:** Introduction to .NET Framework and Visual Studio.NET, Kind of Applications that can be developed using Visual Studio.NET, Website v/s Web Application, Creating a new sample Web Project with Visual Studio

Creating Presentation Layer: Creating Front-End with the HTML & CSS, Grid Layout v/s Liquid Layout, using Cascaded Style Sheets

List of Experiments:

- 1. To Study the ASP.Net Framework
- 2. To Study & Create Presentation Layer using HTML & CSS

# **Experiment 2:**

**Introduction to C#:** Working with Variables, Data Types, Data Type Conversion, Operators and Expressions, Creating Classes and Objects in C#, Using Namespaces, Arrays, Exception Handling in C#, Navigating amongst Web Pages, Event Handling

Important Files and Folders in Web Application: All System Folders, Web.Config, Global.asax, Building sites with Master Pages, Using User Controls

List of Experiments

1. To Study & Create Master Page, User Control etc

# **Experiment 3:**

Building ASP.NET Pages: Standard Controls, Validation Controls,

**State Management:** ASP.NET Page Life Cycle, Session Management, Managing Query String, View State in C#

List of Experiments

- 1. To Study & Use Standard Controls in ASP.NET
- 2. To Study & Use Validation Controls in ASP.NET

# **Experiment 4:**

**Working with Data:** ADO.NET Architecture, Connected & Disconnected Architectures, SQL Connection, SQL Command & important Classes for operating database related operations (CRUD), Using Datasets & Data Adapters

Working with Data Controls: Grid View, Repeater Control

List of Suggested Experiments

1. To Study, Create and Connect with Database using ASP.NET & SQL Server

# **Experiment 5:**

AJAX: Ajax Architecture, Script Manager, Update Panel, Ajax Control Toolkit Web Services: Creating and Consuming Web Services

**Deploying ASP.NET Websites:** Installing and configuring website using IIS

List of Suggested Experiments

- 1. To Study & Implement Web Services
- 2. To Study & Implement AJAX in ASP.NET
- 3. To Study & Deploy Project on IIS

# **Experiment 6**

Create a Mini Project covering all above constructs