Faculty of Engineering & Technology  
Board of Studies in Computer Science & Engineering  
Proposed Curriculum structure of Second Year M.C.A.  
w.e.f. July 2009

Part – I

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject Code</th>
<th>Subjects</th>
<th>Teaching Scheme [Hours/Week]</th>
<th>Examination Scheme [Marks]</th>
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</thead>
<tbody>
<tr>
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<td>Lecture</td>
<td>Pract.</td>
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<tr>
<td>01</td>
<td>MCA 201</td>
<td>Programming in Java</td>
<td>4</td>
<td>2</td>
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<tr>
<td>02</td>
<td>MCA 202</td>
<td>Database Management System</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>03</td>
<td>MCA 203</td>
<td>Operating System</td>
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<tr>
<td>04</td>
<td>MCA 204</td>
<td>Software Engineering</td>
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<tr>
<td>05</td>
<td>MCA 205</td>
<td>Microsoft Technologies Lab –I</td>
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Part – II

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<thead>
<tr>
<th>Sr. No.</th>
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<tr>
<td>01</td>
<td>MCA 206</td>
<td>Design and Analysis of Algorithm</td>
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<tr>
<td>02</td>
<td>MCA 207</td>
<td>Computer Network</td>
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<tr>
<td>03</td>
<td>MCA 208</td>
<td>Linux Operating system</td>
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<tr>
<td>04</td>
<td>MCA 209</td>
<td>Data Warehousing and Data Mining</td>
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<td>2</td>
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<td>MCA 210</td>
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|         |              |                                 | **Total of I and II**     |                           |
|         |              |                                 |                           |                           |
|         |              |                                 |                           | 800  | 250  | 250  | 1300 |
Title of the Subject: Programming in Java  
Course Code: MCA 201

Teaching Scheme:
Lectures: 4 Hrs/Week  
Practical: 2 Hrs/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)  
Practical Exam: 25 Marks  
Term Work: 25 Marks

Objectives:
- To learn programming skills using JAVA language  
- To enhance ability of students for developing advance programs using Java which is required in IT industry

Contents -

Unit 1:  (8 hrs)
Basics of Java: Java’s importance to the internet, Java’s Magic: The Byte Code, Java Buzzwords, Basic syntax of Java - Identifiers, Keywords & Data Types, Strings And Characters, Arithmetic Operators And Expressions, Type Conversion in Assignments, Comments

Classes in Java: Introduction to Methods, Constructors, This Keyword, Overloading Methods, Overloading Constructors, Using objects as Parameters, A closer look at argument passing, Returning objects, Understanding Static, Command Line Arguments.

Unit 2:  (8 hrs)

Exception handling: Fundamentals, Exception Types, Uncaught Exceptions, Using Try and Catch, Multiple Catch Clauses, Throw, throws, finally, Built-in Exceptions and creating your own Exception Sub Classes.

Unit 3:  (8 hrs)
Multithreading: Java Thread Model, The Main thread, Creating a Thread, Creating Multiple Threads, Using Alive ( ) and Join ( ), Thread Priorities, Synchronization, Interthread Communication, Suspending, Resuming and Stopping Threads.

Applets: An Overview of Applets, the Life Cycle of an Applet, creating applets, the Graphics Class, Using Colors, Displaying Text, Using Applets in a Web Page

Unit 5:  (8 hrs)
JDBC: Basics of Database Connectivity, Introduction to JDBC, JDBC Architecture, Steps to create JDBC Application, insert, update, delete and select operations

I/O Package:
Files and Directories, Overview of Codes and Streams, Buffered Character Streams, Byte Streams

Text Books/ Reference Books:
2. Deitel & Deitel: “How To Program JAVA”, Pearson Education
3. E Balguruswamy: “Programming with Java- A Primer”, TMH
Reference websites:
1. www.java.sun.com/docs/books/tutorial

Term Work:
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.
* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

(Tools to be used –
JDK 1.2 onwards, TextPad / EditPlus, Eclipse 3.x, Tomcat 5.x, JBoss 4.x, Ant 1.6.x, Struts 1.2 )

Practical Examination:
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Suggestive List of Experiments –

1. Design a simple class to represent Time using overloaded constructors
2. Design a program to display string array in sorted order
3. Design a class to create a package and use package in another class
4. Design a program to display digital clock in applet
5. Design a program to create logon form for user
6. Program to create a frame to enter details of student
7. Program to create free hand drawing tool using keyboard.
8. Program to create menu based application
9. Program to save student details in a database
10. Program to display student details in a frame

Title of the Subject: Database Management System
Course Code: MCA-202

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical : 2 Hrs/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Practical Exam: 25 Marks
Term Work: 25 Marks

Objectives:
- To make students familiar with the fundamental concepts of database management.
- To develop the expertise in database management skills
- To give emphasis on how to organize, maintain and retrieve--efficiently, and effectively--information from a DBMS
To use the concepts in Information System implementation.

**CONTENTS**

**Unit 1- Introduction:** (08 Hrs)

**Unit 2- ER Models, Relational Models:** (08 Hrs)
Database Modeling using the ER Model, Using High-Level conceptual Data Models for Database design, An example Database Application, Entity types, Entity Sets, Attributes and keys, Relationships, Relationship types, roles and Structural Constraints, Week Entity types, Refining the ER Design for the Company Database, ER Diagrams, naming conventions and design Issues, the Relational Data Model, Relational constraints, the Relational Algebra: Relational Model Concepts, Relational concepts and Relational Database Schemes, Update Operation and Dealing with Constraints Violations, Relational Database Design, Using ER-to-Relational Mapping.

**Unit 3- Database Designing:** (08 Hrs)

**Unit 4- SQL-The Relational Database Standard:** (08 Hrs)
Data definition, Constraints and Schema changes in SQL 2, Basic Queries in SQL, More Complex SQL Queries, Insert, Delete and Update Statements in SQL, views(Virtual Tables) in SQL, Specifying general constraints as Assertion features of SQL. Integrity constrains, Triggers, Functional dependencies.

**Unit 5- Transaction Processing:** (08 Hrs)

**Text Books:**

**Term Work:**
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester
Practical Examination:
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Suggestive list of Experiments:

1. Introduction to DBMS
2. To create table, alter table & delete table (DDL)
3. To study SELECT command
4. To insert, delete & update operations on table (DML)
5. To study different types of sub queries
6. To study referential integrity constraints
7. To study other constraints
8. To study joins
9. To study views
10. To study trigger

Title of the Subject: Operating System
Course Code: MCA 203

Teaching Scheme:                          Examination Scheme:
Lectures: 4 Hrs/Week                    Theory Paper: 100 Marks (3 Hrs)
Practical: 2 Hrs/Week                   Practical Exam: 25 Marks
                        Term Work: 25 Marks

Objectives:
• To provide the students complete knowledge of Operating Systems principles.
• To have a clear understanding of OS design methodologies adapted by designers

Contents:

Unit 1:                               (8 hrs)
Introduction: Introduction to OS, OS as extended machine, OS as resource manager, History of OS: - first to fourth generation (simple batch system, time - sharing systems, Real-time systems, parallel systems, distributed system), OS concepts (Process, Files, Shell), System calls.

Process Management:
The process model, process states, PCB (process control block), Threads

Process Synchronization:
Intercrosses communication (IPC), race condition, critical sections, mutual exclusion with busy waiting, sleep & wake-up, semaphores, event counters, monitors, message passing, classical IPC problems: Dining philosophers problem, Readers & Writers problems.

Unit 2:                               (8 hrs)
Process scheduling:
Round Robin scheduling, priority scheduling, multiple queues, shortest job first, policy driven scheduling, two level scheduling

Memory management:
Memory management without swapping or paging, use of multiprogramming.
Swapping: Multiprogramming with fixed and variable partitions, memory management with bitmaps, linked lists and buddy system.
Allocation of swap space, Virtual Memory: Paging, segmentation.

**Unit 3:**  
**Principles of I/O Hardware:** I/O devices, Device controlling.  
**Principle of I/O software:** Goals of I/O software, Interrupt handlers, Device drivers, device-independent I/O software, user space I/O software.  
**Deadlocks:** Resources, deadlock modeling, the Ostrich algorithm, detection & recovery, deadlock prevention, deadlock avoidance (Banker’s Algorithm)

**Unit 4:**  
**RAM disks:** RAM disks H/W & S/W, overview of RAM disk driver. Disks: Disk H/W disk S/W (disk scheduling algorithms)

**Terminals:** Terminal H/W & S/W, Clocks H/W & clocks S/W  
**File System:** The user view of the file system: Files, directories, File system implementation: Implementing files with Contiguous, Linked list, index and index-nodes (UNIX), disk space management, Implementing directories, file storage, Directory structures, shared files, file system reliability, consistency & performance.

**Unit 5:**  
**Security:** security environment, flaws generic security attacks, user authentication, design principles of security.  
**Protection Mechanism:** Protection domains, access control lists, capabilities, protection models

**Text Books:**  

**Reference Books:**  

**Term Work:**  
The term work shall consist of at least 10 experiments/assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.  
* Continuous lab assessment  
* Actually performing practicals in the laboratory during the semester

**Practical Examination:**  
The Practical Examination shall consist of writing and performing an experiment/assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

**Suggestive list of experiments:**  
1. Simulate copy and more command  
2. Simulating First-fit and Best-fit method of partitioned memory allocation
3. Simulate and performance measurement in Shortest Job First, First Come First Served and priority scheduling algorithms for processor scheduling.
4. Program illustrating deadlock detection.
5. Simulate and performance measurement in FIFO and LRU page replacement algorithm.
6. Write TSR (Terminate and Stay Resident Program) illustrating concept of DOS interrupts.
7. Implementation and illustrating process/semaphore concept using Dining philosopher or Reader- writer problem.
8. Case study: Windows NT

Title of the Subject: Software Engineering (SE)
Course Code: MCA 204

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)

Objectives:
- To train the students on basic principles of Software Engineering used in Industry.
- To learn the software engineering concepts and methodologies.

Unit 1: (8 hrs)
The Product & the Process:

Software Engineering Concepts:

Unit 2: (8 hrs)
Requirement Analysis: Concepts & Principles:

Project Management Concepts:

Unit 3: (8 hrs)
Design Concepts & Methods:

Unit 4: (8 hrs)
Coding:
TOP-DOWN and BOTTOM-UP structure programming, information hiding, programming style, and internal documentation, verification, metrics, monitoring and control.

**Software Testing Methods:**

**Unit 5: Software Quality Assurance:** (8 hrs)
Quality Concept, Quality Movement, Formal Technical Review.
Re-engineering: Business Process Engineering, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering

**Text Books / Reference Books:**
3. Rajesh Prasad, Yogesh Sharma, Nihar Ranjan, Bhavna Tiple, “Software Engineering”

**Reference Books:**

**Title of the Subject: Microsoft Technologies Laboratory –I (VB.NET)**
Course Code: MCA 205

**Teaching Scheme:**
Practical: 4 Hrs/ week

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

**Objectives:**
- To provide the students, complete knowledge of VB.NET programming principles.
- To provide a proper expertise on Software development using these techniques

**Contents:**
**Unit 1:**

**Unit 2:**
Object Oriented Features- Classes & objects, Inheritance, Interface

**Unit 3:**
Windows Forms – Form Controls, Mouse and Keyboard events, File stream and Text IO operations

**Unit 4:**
Database Handling – ADO.NET, Table, Adapter, Data Set, Sql operations, Data Binding

**Unit 5:**
Error Handling, Security in.Net Framework, Assemblies & Deployment
Reference Books:
1. “Professional VB.NET”, WROX Publication
2. VB.NET, Black Book

Term Work:
The term work shall consist of The term work shall consist of at least 5 experiments based on the syllabus above and a mini project.

Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.
- Continuous lab assessment
- Actually performing practicals in the laboratory during the semester
- Mini project developed by the student

Practical Examination:
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record and the mini project. Duration of examination is three hours.

Mini Project (Compulsory):

Guidelines for Mini Project:
- Allow minimum 2 to maximum 4 students per mini project group
- Take the topic from students in first 15 days from the start of the semester.
- Follow Software Development Life Cycle Phase for mini project development.

Mini Project shall follow the steps below:
1. Define the problem with specifications
2. Define the functionality of the project
3. Design a solution for the project
4. Implement the solution.
   (Also Keep a record of total number of man hours spent for the mini project.)
5. Present and evaluate the project.

The report of this Mini project is to be submitted in typed form with Spiral Binding. The report should have all the necessary diagrams, charts, printouts and source code. The work has to be done in groups.

The suggestive format of the report is as follows:
(Only one report should be submitted per group as a part of term work submission.)

Title of the Mini Project:
Names & Roll Nos of the students:
Name of the guide:
Chapter 1: Introduction
Chapter 2: Requirement specifications
Chapter 3: Design and implementation
   (This chapter will include the entire design process with necessary DFDs, other diagrams, design methodologies and other design and implementation details.)
Chapter 4: Performance Analysis
   (This chapter will include Testing and evaluation process. It should also mention about the method of testing used. It will include test case analysis with results. It should also indicate how better the designed system performs with tabular results.)
Chapter 5: Conclusions
   (This should include conclusion & future scope)
Title of the Subject: **Design and Analysis of Algorithms (DAA)**  
Course Code: MCA 206

**Teaching Scheme:**  
Lectures: 4 Hrs/Week  
Practical: 2 Hrs/Week

**Examination Scheme:**  
Theory Paper: 100 Marks (3 Hrs)  
Practical Exam: 25 Marks  
Term Work: 25 Marks

**Objectives:**  
- To study different methods to devise an algorithm  
- To use computational complexity to analyze algorithms

**Contents:**

**Unit 1:** (8 Hrs)  
Introduction and a brief review of Elementary Data Structures  
Definition of an Algorithm, Algorithm specification, Performance analysis: -Space and time complexity, Asymptotic Notation, Practical Complexities, Performance Measurement, heap and heap sort, sets and disjoint set, Union, graphs, hashing.

**Unit 2:** (8 Hrs)  
Divide and Conquer -  
General method of Divide and Conquer, Binary search, finding the maximum and minimum, merge sort, quick sort, Selection, Strassen’s Matrix Multiplication.

**Unit 3:** (8 Hrs)  
The Greedy Method: -  
General method, Knapsack Problem, Tree vertex splitting, Job sequencing with deadlines, Minimum cost spanning trees, optimal storage on tape, optimal merge Patterns, Single sources shortest paths.

**Unit 4:** (8 Hrs)  
Basic Search and Traversal Techniques -  
The techniques for binary trees, Techniques for graphs, connected components and spanning trees, Biconnected Components and DFS

**Unit 5:** (8 Hrs)  
Backtracking and Branch and Bound Technique -  
The general method of backtracking, The 8- queens problem, sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack problem using backtracking.

**Text Books/Reference Books:**

**Term Work:**  
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.
* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

**Practical Examination:**
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

**Title of the Subject: Computer Networks**
**Course Code: MCA 207**

**Teaching Scheme:**
Lectures: 4 Hrs/Week

**Examination Scheme:**
Theory Paper: 100 Marks (3 Hrs)

**Objectives:**
- To train the students on basic principles of Computer Networks.
- To learn the Networking concepts and methodologies.

**Contents**

**Unit 1- Introduction:**
Overview of computer networks, Network hardware and software, Switches, routers, Reference model-OSI and TCP/IP and their comparison, Network layer – Network layer design issues, Various Routing algorithms and congestion control algorithms, Internetworking, The networking layer in the internet and in ATM network.

**Unit 2- Transport Layer:**

**Unit 3- TCP/IP :**
The TCP/IP architecture, The Internet Protocols, Ipv6, User gram Protocol, DHCP and mobile IP, Internet protocols, Multi cast routing.

**Unit 4- The Application Layer:**

**Unit 5- Multimedia Information and Networking:**

**Text Books/Reference Books :**
Title of the Subject: Linux Operating System
Course Code: MCA 208

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Practical Exam: 25 Marks
Term Work: 25 Marks

Objectives –
- To train the students on basic principles of Linux Operating System.

Contents -

Unit 1: Introduction (8 hrs)
History of Linux, Flavors of Linux, Architecture of Linux Operating System, Linux Vs Classic Unix operating system, obtaining the kernel source, installing kernel source, kernel source tree

Unit 2: Process Management (8 hrs)
The process Descriptor and task structure, Process state, Process creation, Process termination, Policy, Process scheduling algorithms

Unit 3: File and Memory Management (8 hrs)
Buffer Cache – Buffer Header, Structure of Buffer pool, Scenarios for retrieval of buffer, reading and writing disk blocks, advantages and disadvantages of buffer cache
Memory Management – pages, zones, kmalloc(), kfree()
Internal Representation of Files – inodes, structure of regular files, directories, conversion of pathname to an inode, superblock, inode assignment to new file

Unit 4: Commands and Utilities (8 hrs)
User login and session management commands, file system navigation and file management commands, communication commands, commands for working with text files, grep, awk, vi editor, File management system calls like read(), write(), open(), close(), create()

Unit 5: Shell Scripts and Configuration (8 hrs)
Writing simple shell scripts, command line arguments, logical operators, using if then else, case, for loop, while and until loop, Role of system administrator, configuring - Apache, DNS, Samba servers

Text Books/Reference Books:
3. Sumitabha Das: “Unix concepts & applications”, TMH

Term Work:
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

Practical Examination:
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.
Title of the Subject: Data Warehousing and Data Mining  
Course Code: MCA 209

Teaching Scheme:  
Lectures: 4 Hrs/Week  
Practical: 2 Hrs/Week

Examination Scheme:  
Theory Paper: 100 Marks (3 Hrs)  
Practical Exam: 25 Marks  
Term Work: 25 Marks

Objectives:  
- To familiarize with the fundamental concepts of Data warehousing and OLAP  
- To develop the concepts of data mining methods in database management skills  
- To be able to efficiently design and manage data storages using data warehousing, OLAP, and data mining techniques,  
- To use the concepts in Text mining, web mining and Knowledge Discovery

Unit 1- Introduction to Data Warehousing: (8 hrs)  
Introduction to Decision Support System: DSS Defined, History of DSS, Ingredients of DSS, Data and Model Management, DSS Knowledge base, User Interfaces, The DSS Users, Categories and Classes of DSSs Need for data warehousing, Operational & informational data, Data Warehouse definition and characteristics, Operational Data Stores.

Unit 2- Data warehouse Components (8 hrs)  
Architectural components, Data Preprocessing: Why Preprocess Data? Data Cleaning Techniques, Data Integration and Transformation, Data Reduction Techniques, Discretization and Concept Hierarchy Generation for numeric and categorical data, Significant role of metadata, Building a Data warehouse, Benefits of Data Warehousing.

Unit 3- OLAP in the Data Warehouse (8 hrs)  

Unit 4- Data Mining Algorithms (8 hrs)  
Concept Description: What is Concept Description? Data Generalization and Summarization-Based Characterization, Mining Descriptive Statistical Measures in Large Databases. Mining Association Rules: Association Rule Mining, Market Basket Analysis, Association Rule classification, The Apriori Algorithm, Mining Multilevel Association Rules, Constraint-Based Association Mining, Sequential mining.  
Classification and Prediction: What is Classification and Prediction? Data Classification Process, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification,

Unit 5- Classification, Knowledge Discovery (8 hrs)  
Classification Based on Association Rule Mining, Other Classification Methods Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Clustering Methods. Introduction to Knowledge Discovery, innovative techniques for knowledge discovery, application of those techniques to practical tasks in areas such as fraud detection, scientific data analysis, and web mining, Introduction to huge data sets such as Web, telecommunications networks, relational databases, object-oriented databases, and other sources of structured and semi-structured data, Problem of Large Data sets

Text/Reference Books –
2. Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann .
3. Alex Berson, S.J. Smith, “Data Warehousing, Data Mining and OLAP”, Tata McGraw Hill

Term Work:
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.
   * Continuous lab assessment
   * Actually performing practicals in the laboratory during the semester

Practical Examination:
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Suggestive List of experiments:
1. Evolution of data management technologies, introduction to data warehousing concepts
2. Develop an application to implement defining subject areas, design of fact and dimension tables, data marts.
3. Develop an application to implement OLAP, roll-up, drill-down, slice, and dice operations.
4. Develop an application to construct a multidimensional data
5. Develop an application to implement data generalization and summarization techniques
6. Develop an application to extract association mining rules.
7. Develop an application for classification of data.
8. Develop an application for implementing one of the clustering technique
9. Develop an application for implementing Naïve Bayes classifier
10. Develop an application for Decision tree classifier

Title of the Subject: Microsoft Technologies Laboratory –II (ASP.NET)
Course Code: MCA 210

Teaching Scheme:
Practical: 4 Hrs/ week

Examination Scheme:
Practical Exam: 50 Marks
Term Work: 50 Marks

Objectives:
- To Study website development using GUI environment.
- To develop programming skills with ASP.NET

Contents:
Unit 1: Introduction
Internet terminology, Web Server, Browser, Client Vs Server Side Scripting
Introduction to Java Script (Client Side Script) – Variables, Document Object Model, Functions, Event Handling.
Introduction to .NET framework, ASP.NET namespace hierarchy, Page life cycle, view state, postback, IsPostBack property, HTML and Web Controls

**Unit 2: Web Controls**
- TextBox, Label, Button, Link Button, Hyperlink Button, Image Button, ListBox, DropDownList, CheckBox, Radio Button, CheckBoxList, RadioButtonList, Panel

**Unit 3: Validation Controls & Rich Controls**
- RequiredFieldValidator, RangeValidator, CompareValidator, RegularExpressionValidator, CustomValidator and ValidationSummary
- Rich Controls – Calendar Control, AdRotator Control

**Unit 4: ADO.NET**
- Overview of ADO.NET, Advantages of ADO.NET, Connected and disconnected data access, Connection, Command, DataReader, DataAdapter, DataSet, DataTables, DataGrid Control, DataList Control and Repeater Control

**Unit 5: Passing Data between Pages & Web Services**
- Cache, Session, Context, QueryString, Post, Global.asax, Introduction to web services

**Reference Books:**
1. ASP.NET: Stephen Walther - Unleashed.

**Term Work:**
The term work shall consist of **The term work shall consist of at least 5 experiments based on the syllabus above and a mini project.**

Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

- Continuous lab assessment
- Actually performing practicals in the laboratory during the semester
- Mini project developed by the student

**Practical Examination:**
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record and the **mini project**. Duration of examination is three hours.

**Mini Project (Compulsory):**

**Guidelines for Mini Project:**
- Allow **minimum 2 to maximum 4** students per mini project group
- Take the topic from students in **first 15 days** from the start of the semester.
- Follow Software Development Life Cycle Phase for mini project development.

**Mini Project shall follow the steps below:**
1. Define the problem with specifications
2. Define the functionality of the project
3. Design a solution for the project
4. Implement the solution.
   (Also Keep a record of total number of man hours spent for the mini project.)
5. Present and evaluate the project.
The report of this Mini project is to be submitted in typed form with Spiral Binding. The report should have all the necessary diagrams, charts, printouts and source code. The work has to be done in groups.

The **suggestive format** of the report is as follows:
( Only one report should be submitted per group as a part of term work submission. )

**Title** of the Mini Project:
Names & Roll Nos of the students:
Name of the guide:
Chapter 1: Introduction
Chapter 2: Requirement specifications
Chapter 3: Design and implementation
   (This chapter will include the entire design process with necessary DFDs, other diagrams, design methodologies and other design and implementation details.)
Chapter 4: Performance Analysis
   (This chapter will include Testing and evaluation process. It should also mention about the method of testing used. It will include test case analysis with results. It should also indicate how better the designed system performs with tabular results.)
Chapter 5: Conclusions
   (This should include conclusion & future scope)

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\SYMCASYLLA
Faculty of Engineering & Technology  
Board of Studies in Computer Science & Engineering  
Proposed Curriculum structure of Third Year M.C.A.  
w.e.f. July 2009

Part – I

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject Code</th>
<th>Subjects</th>
<th>Teaching Scheme [Hours/Week]</th>
<th>Examination Scheme [Marks]</th>
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<td>Software Testing</td>
<td>4</td>
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<tr>
<td>02</td>
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<td>Professional Ethics and Cyber Security</td>
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Part – II

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Title of the Subject: Software Testing
Course Code: MCA 301

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical : 2 Hrs/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Practical Exam: 25 Marks
Term Work: 25 Marks

Objectives:

-To identify correctness, completeness and quality of developed Software.
-To train student to create good test case is one that has a high probability of finding an as yet undiscovered error.

CONTENTS

Unit 1- Introduction to Basic of software testing & Terminology: (8 hrs)
Quality Concepts, Quality Assurance, Quality Control, What is testing?, Why is testing necessary?, Objective of testing?, Software Development & Software Testing Life Cycle, Testing Standards:-IEEE,CMM,ANSI, Object – oriented testing, Web testing, GUI testing

Unit 2- Levels Of Testing: (8 hrs)
Verification and Validation Model, Techniques of Verification:-Peer Review, Walkthrough, Inspection.Unit testing, Integration testing, Function Testing System testing:-Installation Testing, Usability Testing, Regression testing, Performance testing:-Load Testing, Stress Testing, Security testing, Volume testing Acceptance testing:-Alpha testing, Beta testing, Gamma testing.

Unit 3- Testing methods and Testing tools: (8 hrs)
Black Box methods:-Equivalence partitioning, Boundary-value analysis, Error guessing. White Box methods:-Statement coverage, Decision coverage, Condition coverage. Testing Tools:-Win Runner, Load Runner.

Unit 4- Test Planning & Documentation: (8 hrs)
Testing Strategy:-type of project, type of software. Test Plans, Test Case, Test Data, Risk Analysis.

Unit 5- Defect Management and Test Reporting: (8 hrs)
Defect analysis, Defect Reporting, Tracking Workflow, Test reporting, Defect rates and schedules.

Reference Books:
1. Dr.K.V.K.K. Prasad, “Software testing tools”, Dreamtech Publications
2. Rex Black, “Software testing”, Wrox Publications
5. Ron Patterson, “Software testing “, Tech Publications

Reference Website:
1. www.onestoptesting.com
2. www.wikipedia.org
Term Work:
The term work shall consist of at least 10 experiments/assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

Practical Examination:
The Practical Examination shall consist of writing and performing an experiment/assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Suggestive List of Experiments:

1. Study of Testing tools
2. Introduction to Win runner
3. Recording test in analog and context sensitive mode
4. Synchronizing test
5. Checking GUI Objects
6. Checking Bitmap Objects
7. Programming test with TSL
8. Creating data driven test
9. Maintaining test script
10. Project (Creating test report)

Title of the Subject: Professional Ethics and Cyber Security
Course Code: MCA 302

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Practical Exam: 25 Marks
Term Work: 25 Marks

Objectives:
- To make students familiar with the fundamental concepts of computer ethics
- To know the linkage between computer, professional, philosophical ethics and decision making
- To develop the concepts in computer forensics
- To give emphasis on how cyber security operations are carried out
- To introduce the linkage between technology, law and ethics

CONTENTS
Unit 1- Computer ethics and philosophical ethics: (08 Hrs)
Vacuum of policies, conceptual muddles, social context, moral and legal issues, uniqueness of ethical issues, role of analogy, descriptive and normative claims, ethical relativism, utilitarianism, other theories

Professional Ethics:
Characteristics, the system of professions, computing as a profession, professional relationships, responsibilities, code of ethics and professional conduct

**Privacy:** Computers and privacy issue, reframing this issue, legislative background, better privacy protection

**Unit- 2**  
**(08 Hrs)**  
**Intellectual property issues in cyberspace:**  
Introduction to intellectual property Protections via Copyright, Trade Secrets, Trademarks, Patents, Contracting to protect intellectual property, Protection options – Encryption, copyright on web-content, copyright on software

**Ethical Decision Making:**  
**(08 Hrs)**  
Types of ethical choices, Making defensible decisions, Ethical dilemmas, law and ethics, Guidelines for dilemma (Informal and Formal), Four-step analysis process of solving dilemma  
Case studies: i) A stolen password ii) Recovery of data leads to Discovery of confidential files iii) Do copyright ethics change overseas?

**Unit 3- Crime incident Handling Basics:**  
**(08 Hrs)**  
Hacking, cyber activism, Tracking hackers, clues to cyber crime, privacy act, search warrants, common terms, organizational roles, procedure for responding to incidents, reporting procedures, legal considerations

**Information Technology Act 2000**  
Scope, jurisdiction, offense and contraventions, powers of police, adjudication

**Unit 4- Cyber Forensics:**  
**(08 Hrs)**  
Cyber forensics, cyber crime examples, forensics casework, investigative incident-response actions, computer forensics tools, Threats in cyberspaces, Blended attacks  

**Unit 5-**  
**(08 Hrs)**  
Information Security Certifications, CISSP and SSCP, CISA and CISM, SCP, GIAC, certification weaknesses, Role of these certified professionals, Windows Server 2003 Security Fundamentals

**Text/ Reference Books:**


**Term Work:**

The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment  
* Actually performing practicals in the laboratory during the semester

**Practical Examination:**
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

**Title of the Subject: Business Processes**  
**Course Code: MCA 303**

**Teaching Scheme:**  
Lectures: 4hrs/week

**Examination Scheme:**  
Theory Paper: 100 Marks (03 hrs)

**Objectives:**  
- To study concepts of Business Process  
- To enable students to understand various types of processes involved in Business  
- To know the linkage between the technology and the actual processes used in Business

**CONTENTS**

**Unit-1**  
(8 hrs)  
**Business Process:** Overview, History – Adam Smith and Other definitions. Supporting Theories and Concepts - Division of Labor, Span of Control, Departmentalization by Process and Purpose, Information Management Concepts  

**Unit- 2:**  
(8 hrs)  
**Business Process Management:** Overview, BPM Life-cycle - Design, Modeling, Execution, Monitoring, Optimization. Practice - BPM Technology. Use of Software  
**Business Process Automation:** Delivery – Extension of Existing IT Systems, Purchase of a Specialist BPA tool, Purchase of a Business Process Management Solution with BPA Extensions, Purchase of a Middleware Solution. BPA vs BPM, The Role of Service-Oriented Architecture (SOA) with respect to BPA

**Unit -3:**  
(8 hrs)  
**Business Process Reengineering:** Basic Concepts, Need for BPR, Principles of BPR, Role of IT, BPR and restructuring the organization  
**Business Process Mapping:** Early History, Recent Developments

**Unit -4:**  
(8 hrs)  
**Business Process Execution:** Overview, History, Business Process Execution Language Topics – BPEL Design Goals, The BPEL Languages, Relationship of BPEL to BPMN, Adding 'Programming in the Small' Support to BPEL, WS- BPEL  
**Business Process Outsourcing (BPO):** Benefits and limitations of outsourcing the processes, offshore and nearshore outsourcing, industry size, risks involved

**Unit -5:**  
(8 hrs)  
**Business Management Strategy- Six Sigma:** Historical Overview, Origin and Meaning of the Term "Six Sigma Process", Role of the 1.5 Sigma Shift, Sigma Levels. Methods- DMAIC, DMADV. Implementation Roles, Quality Management Tools and Methodologies used in Six
Title of the Subject: (i) Mobile Computing (Elective I)
Course Code: MCA 304

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical : 2 Hrs/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Practical Exam: 25 Marks
Term Work: 25 Marks

Objectives:
1. To make students familiarize with Wireless Networking.
2. To know the basics of WAP and WML
3. To familiarize students with open source tools for Mobile Applications

Unit 1 (8 hrs)
Introduction
Principle of Cellular Communication, Overview of 1G, 2G, 2.5G and 3G and 4G technologies. Applications - Vehicles, Emergencies, Business, Replacement of wired networks, Infotainment and more, Location dependent services, Mobile and wireless devices, Mobile OS

Wireless transmission
Frequencies for radio transmission, Regulations Signals, Antennas, Signal propagation - Path loss of radio signals, Additional signal propagation effects, Multipath propagation, Multiplexing - Space division multiplexing, Frequency division multiplexing, Time division multiplexing, Code division multiplexing. Modulation - Amplitude shift keying, Frequency shift keying, Phase shift keying, Advanced frequency shift keying, Advanced phase shift keying, Multicarrier modulation, Spread spectrum - Direct sequence spread spectrum, Frequency hopping spread spectrum, Cellular systems

Unit 2 (8 hrs)
Medium access control
Motivation for a specialized MAC - Hidden and exposed terminals, Near and far terminals, SDMA, FDMA, TDMA - Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA
Multiple access with collision avoidance, Polling, Inhibit sense multiple access, CDMA - Spread Aloha multiple access, Comparison of S/T/F/CDMA

Telecommunication systems
GSM - Mobile services, System architecture, Radio interface Protocols, Localization and calling, Handover, Security, New data services, Cellular Digital Packet Data, VOIP, GPRS Services, Wireless Local Loop-WLL system, Bluetooth Technology

Unit 3 (8 hrs)
Wireless LAN
Infrared vs. radio transmission, Infrastructure and ad hoc networks
IEEE 802.11 – System architecture, Protocol architecture, Physical layer, Medium access control layer, MAC management, Future development

Mobile network layer
Mobile IP - Goals, assumptions, and requirements, Entities and terminology, IP packet delivery, Agent advertisement and discovery, Registration, Tunnelling and encapsulation, Optimizations, Reverse tunnelling, IPv6, Dynamic host configuration protocol, Ad hoc networks - Routing, Destination sequence distance vector, Dynamic source routing, Hierarchical algorithms, Alternative metrics

Unit 4 (8 hrs)
Mobile transport layer
Traditional TCP - Congestion control, Slow start, Fast retransmit/fast recovery, Implications on mobility, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP

Wireless ATM
Motivation for WATM, Wireless ATM working group, WATM services, Reference model - Example configurations, Generic reference model, Functions

Wireless application protocol

Unit 5 (8 hrs)
Wireless Markup Language
An Introduction to Wireless Technologies, Markup Languages, An Introduction to XML, Fundamentals of WML, Writing and Formatting Text, Navigating Between Cards and Decks, Displaying Images, Tables, Using Variables, Acquiring User Input

Wireless Markup Language Script
An Introduction to WMLScript, WMLScript Control Structures, Events, Phone.com Extensions, Usability

Application of Mobile computing:
ASP and Dynamic WAP Sites, XML and XSLT, Dynamic WML Generation with ASP and XSLT, Developing WAP Applications using Emulators.

Text/Reference Books:
1. Jochen Schiller, Mobile Communication, Pearson Education Asia
3. Wrox “The Beginning WML and WML Script”, Wrox Publication
4. Asha Mehrotra, GSM System Engg., Artech House

Term Work:
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

Practical Examination:
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Suggestive List of Experiments –
1. WAP and WML
2. Programs Wireless Markup Language  
3. Writing and formatting of text in WML  
4. Navigation between cards and deck  
5. Displaying of Image using WML  
6. Table properties of WML  
7. Methods of acquiring user inputs in WML  
8. WML scripts basics  
9. If – else structure of WML script  
10. Assignment on latest Open Source Operating Systems for Mobile

**Title of the Subject:** (ii) Multimedia Systems (Elective I)  
**Course Code:** MCA 304

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<tr>
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<th>Examination Scheme:</th>
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<tr>
<td>Lectures: 4 Hrs/Week</td>
<td>Theory Paper: 100 Marks (3 Hrs)</td>
</tr>
<tr>
<td>Practical : 2 Hrs/Week</td>
<td>Practical Exam: 25 Marks</td>
</tr>
<tr>
<td></td>
<td>Term Work: 25 Marks</td>
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**Objectives:**
- To introduce to the students the characteristics and design methodologies of Multimedia  
- To focus on content creation for the web and multimedia  
- To expose students to theoretical and fundamental concepts of multimedia, its applications and the techniques involved.  
- To help students learn the issues involved in capturing, processing, manipulating, storing, and retrieving various kinds of continuous media.

**Unit 1** (8 hrs)
Evolution of Multimedia and its objects, Multimedia System Architecture, Scope of multimedia in business & work, Production and planning of Multimedia applications. Multimedia hardware, Memory & Storage Devices, Communication Devices, Multimedia Software

**Unit 2** (8 hrs)

**Unit 3** (8 hrs)
Macromedia products, Basic drawing techniques, Advance animation techniques, Creating multi layer combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.

**Unit 4** (8 hrs)

**Unit 5** (8 hrs)

**Text/Reference Books:**

**Term Work:**
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

**Practical Examination:**
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

**Suggestive List of Experiments:**
1. Image Editing using Image Processing Software- Photobie, Photoshop, CorelDraw
2. Creating a Multimedia Slide Show (Presentation) using Flash Slide Show Maker or alike
3. Audio Editing using Audio Processing Software- CoolEdit, SoundForge XP
5. Animation Creation using- Photobie-GIF Animator, Alice, Macromedia Flash, 3D Studio, MAX, Maya
6. Creating a Theme Movie: Audio-Video Mixing, Music, Narration, Video Effects, Video Transitions, Credits, Titles, etc.
7. For Example: Preparing Documentary, Advertisement, Awareness Program, Presentation CDs, etc.

**Title of the Subject: Open Source Software Development Lab**
**Course Code: MCA 305**

**Teaching Scheme:**
Practical: 2 Hrs/ week

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

**Term Work:**
The term work shall consist of at least 10 experiments/ assignments based on the syllabus given below.

Implementation, installation and configuration tasks for Linux OS, installation of Apache, PHP and MySql, Programs in C / C++ /Java / Perl /Python.

Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

**Practical Examination:**
The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.
Suggestive List of Experiments:
1. Installation of Linux
2. Use of various commands
3. Use of Text Processing Tools: grep, cut,
4. User and Group Creation
5. Back up using tar
6. Installation using RPM
7. C/C++ program using cc / gcc
8. Configuring Apache
9. PHP script for sorting the marks
10. PHP scripts for other tasks
11. MySQL Installation, Configuration and Testing
12. Design of admission form using PHP – MYSQL

Title of the Subject: Seminar
Course Code: MCA 306

Teaching Scheme:                  Examination Scheme:
Practical: 2 hrs /week            Term Work: 50 Marks

- Seminar is to be independently delivered by each candidate.
- The topic selected should be associated with current trends in Computer field.
- A report is to be submitted before the presentation. There should be unified format for the report which is to be given by the department. Presentation must be done using PPTs.
- The seminar presentation and the report is to be evaluated by two examiners of the Department.

Title of the Subject: Dissertation
Course Code: MCA 307

Teaching Scheme:                  Examination Scheme:
Practical: 8 hrs/week             Practical Exam: 150 Marks
Term Work: 50 Marks

The candidate should complete the project work individually. The project can be done within the institute or it can be sponsored and performed in an industry. The performance Analysis chapter should consist of various testing methods used along with sample test cases. It should also include how better the system is performing as compared to other similar systems.

1. The guide should be internal examiner for oral examination.
2. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
3. The evaluations at final oral examination should be done jointly by the internal and external examiner.

The final examination will consist of the demonstration of work which will be judged by two examiners (one internal and one external) and the marks will be given accordingly.

The suggestive format of the report is as follows:
( Only one report should be submitted per group as a part of term work submission. )
Title of the Project:
Names & Roll No. of the student:
Name of the guide:

Chapter 1: Introduction
Chapter 2: Literature Survey
Chapter 3: System Development
   (This chapter will include the entire design process with necessary DFDs, other diagrams, design methodologies and other design and implementation details.)
Chapter 4: Performance Analysis
Chapter 5: Conclusions
   (Detailed format of the project report is to be made available by the Dept.)

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