

S-25 March, 2013 AC after Circulars from Circular No.153 &amp; onwards

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**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**  
**CIRCULAR NO. ACAD / NP /MCA-II Yr./Syllabus/186/2013**

It is hereby informed to all concerned that, the syllabus prepared by the Board of Studies in Computer Science & Engineering and recommended by the Faculty of Engineering and Technology, the Hon'ble Vice-Chancellor has accepted the **"Revised Syllabus of M.C.A. Second Year"** under the Faculty of Engineering & Technology on behalf of the **Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994 as appended herewith.**

This is effective from the academic year 2013-2014 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,  
 Aurangabad-431 004.  
 REF.NO. ACAD/ NP/ MCA/IIIND YR.  
 SYLLABUS/2013/14170-76

Date:- 15-06-2013

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**Director,**  
**Board of College and**  
**University Development.**

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**Copy forwarded with compliments to :-**

- 1] The Principals, affiliated concerned Colleges,  
 Dr. Babasaheb Ambedkar Marathwada University.
- 2] The Director, University Network & Information Centre, UNIC, with **a request to upload the above syllabus on University Website [www.bamu.net].**

**Copy to :-**

- 1] The Controller of Examinations,
- 2] The Superintendent, [ Engineering Unit ],
- 3] The Superintendent, [ Eligibility Unit ],
- 4] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,  
 Dr. Babasaheb Ambedkar Marathwada University,
- 5] The Record Keeper,  
 Dr. Babasaheb Ambedkar Marathwada University.

**DR. BABASAHEB AMBEDKAR  
MARATHWADA UNIVERSITY,  
AURANGABAD.**



**Revised Syllabus of**

**SECOND YEAR**

**MCA**

**UNDER THE FACULTY OF ENGINEERING & TECHNOLOGY**

*[ Effective from the Academic Year 2013-14 & onwards ]*

**Faculty of Engineering & Technology**  
**Proposed Curriculum structure of Second Year M.C.A.**  
w.e.f. July 2013

**Part – I**

| Sr.No             | Subject Code | Subjects   | Teaching Scheme |           | Examination Scheme |            |            |           |            | Duration of Theory Examination |    |
|-------------------|--------------|--|-----------------|-----------|--------------------|------------|------------|-----------|------------|--------------------------------|----|
|                   |              |  | [Hours/Week]    |           | [Marks]            |            |            |           |            |                                |    |
|                   |              |  | Lecture         | Practical | Theory             | CT         | TW         | PR        | Total      |                                |    |
| 1                 | MCA 201      | Advance Java Programming (J2EE)                        | 4               | --        | 80                 | 20         | --         | --        | 100        | 3 Hrs                          |    |
| 2                 | MCA 202      | System Programming and Advance Operating System        | 4               | --        | 80                 | 20         | --         | --        | 100        | 3 Hrs                          |    |
| 3                 | MCA 203      | Computer Networks                                      | 4               | --        | 80                 | 20         | --         | --        | 100        | 3 Hrs                          |    |
| 4                 | MCA 204      | Relational Database Management System                  | 4               | --        | 80                 | 20         | --         | --        | 100        | 3 Hrs                          |    |
| 5                 | MCA 205      | Software Engineering I                                 | 4               | --        | 80                 | 20         | --         | --        | 100        | 3 Hrs                          |    |
| 6                 | MCA 221      | Lab I Advance Java programming (J2EE)                  | --              | 2         | --                 | --         | --         | 25        | 25         | 50                             | -- |
| 7                 | MCA 222      | Lab II System Programming and Advance Operating System | --              | 2         | --                 | --         | --         | 25        | 25         | 50                             | -- |
| 8                 | MCA 223      | Lab III Relational Database Management System          | --              | 2         | --                 | --         | --         | 25        | 25         | 50                             | -- |
| 9                 | MCA 224      | Lab IV Web Development Using Open Source Technology    | --              | 4         | --                 | --         | --         | 50        | --         | 50                             | -- |
| <b>Total of I</b> |              |  | <b>20</b>       | <b>10</b> | <b>400</b>         | <b>100</b> | <b>125</b> | <b>75</b> | <b>700</b> |                                |    |

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## Part – II

| Sr.No                    | Subject Code | Subjects                                 | Teaching Scheme |           | Examination Scheme |            |            |            |             |       | Duration of Theory Examination |
|--------------------------|--------------|--|-----------------|-----------|--------------------|------------|------------|------------|-------------|-------|--------------------------------|
|                          |              |  | [Hours/Week]    |           | [Marks]            |            |            |            |             |       |                                |
|                          |              |  | Lecture         | Practical | Theory             | CT         | TW         | PR         | Total       |       |                                |
| 1                        | MCA 251      | Design and Analysis of Algorithm         | 4               | --        | 80                 | 20         | --         | --         | 100         | 3 Hrs |                                |
| 2                        | MCA 252      | Cryptography                             | 4               | --        | 80                 | 20         | --         | --         | 100         | 3 Hrs |                                |
| 3                        | MCA 253      | Operation Research                       | 4               | --        | 80                 | 20         | --         | --         | 100         | 3 Hrs |                                |
| 4                        | MCA 254      | Data Warehousing and Data Mining         | 4               | --        | 80                 | 20         | --         | --         | 100         | 3 Hrs |                                |
| 5                        | MCA 255      | Software Engineering II                  | 4               | --        | 80                 | 20         | --         | --         | 100         | 3 Hrs |                                |
| 6                        | MCA 271      | Lab V Design and Analysis of Algorithm   | --              | 2         | --                 | --         | 25         | 25         | 50          | --    |                                |
| 7                        | MCA 272      | Lab VI Cryptography                      | --              | 2         | --                 | --         | 25         | 25         | 50          | --    |                                |
| 8                        | MCA 273      | Lab VII Data Warehousing and Data Mining | --              | 2         | --                 | --         | 25         | 25         | 50          | --    |                                |
| 9                        | MCA 274      | Lab VIII ASP.Net                         | --              | 4         | --                 | --         | 50         | --         | 50          | --    |                                |
| <b>Total of II</b>       |              |  | <b>20</b>       | <b>10</b> | <b>400</b>         | <b>100</b> | <b>125</b> | <b>75</b>  | <b>700</b>  |       |                                |
| <b>Total of I and II</b> |              |  |                 |           | <b>800</b>         | <b>200</b> | <b>250</b> | <b>150</b> | <b>1400</b> |       |                                |

CT : Class Test

TW : Term Work

PR: Practical




**Title of the subject: Advance Java Programming (J2EE)****Course Code: MCA 201****Teaching Scheme:**  
**Lectures: 4 hrs/week****Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks****Objectives:**

- To enable the students to understand the core principles of the Java language as well as J2EE Specifications to produce well designed, effective web applications using JSP and supportive technologies.

|               |   |        |
|---------------|---|--------|
| <b>Unit 1</b> | <b>JAVA Basics:</b><br>Java Buzzwords, Java programming structure, Type Conversion, Object Oriented Terminologies Constructors, Using objects as Parameters, Argument passing and returning objects, Understanding Static, Command Line arguments, Packages and Interfaces.<br><b>Java Database Connectivity:</b><br>JDBC Introduction, Types of drivers, Basic Steps of JDBC, Creating and Executing SQL statement, The Result Set Object, Working with Databases. | 10 Hrs |
| <b>Unit 2</b> | <b>Servlets:</b><br>Introduction, Life cycle of Servlet, Handling GET and POST requests, Servlet handling from data, Cookies and Session Tracking.<br><b>Java Server Pages:</b><br>Basics and Overview, JSP architecture, JSP tags and JSP expressions, Lifecycle of a JSP Model View Controller (MVC), JSP Objects, JSP Beans Tags, Working with Databases.  | 10 Hrs |
| <b>Unit 3</b> | <b>Struts:</b><br>Introduction to the Apache Struts, MVC Architecture, Struts Architecture, How Struts works? Introduction to the Struts Controller, Introduction to the Struts Action Class, Using Struts ActionForm Class, Using Struts HTML Tags, Introduction to Struts Validator Framework Client Side Address Validation in Struts, Custom Validators Example, Developing Application with Struts.  | 10 Hrs |
| <b>Unit 4</b> | <b>EJB:</b><br>Types of Enterprise Java beans, Session Bean & Entity Bean, Features of Session Bean Life-cycle of Stateful Session Bean, Features of Entity Bean, Life-cycle of Entity Bean.<br><b>Hibernate:</b><br>Introduction to Hibernate 3.0, Hibernate Architecture, Hibernate Applications  | 10 Hrs |

**Text Books/ Reference Books:**

- Core Java Vol I and Vol II : Sun Microsystems Press
- The Java Programming Language 3rd Edn., Arnold Ken, D.Holmers, J. Gosling, P. Goteti
- The Complete Reference Java 7th Edn. Herbert Schildt
- Advanced Java Programming (OB74)( IBM Learning Services Worldwide Certified Material)
- J2EE the Complete Reference, First Edition by Jim Keogh, 2002 Tata McGraw Hill
- Java Servlet Programming, Second Edition by Jason Hunter, William Crawford, O'Reilly

**Digital References:**

- [www.java.sun.com/docs/books/tutorial](http://www.java.sun.com/docs/books/tutorial)
- <http://www.tutorialspoint.com/jsp/>
- <http://struts.apache.org/>

**Title of the subject: System Programming and Advance Operating System**  
**Course Code: MCA 202**

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

**Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks**

**Objectives:**

- The course presents advanced concepts related to special classes of operating systems, with particular regards to distributed, real-time, Parallel and Multimedia operating systems.
- The main objective consists of highlighting differences between traditional and advanced operating systems in the context of processes, memory and file system management.

**Prerequisite Knowledge:-**

- The course assumes the students have to understand topics in operating systems such as synchronization, virtual memory management, scheduling, and file systems.
- Students are expected to be familiar with Operating Systems Subject (MCA-102).

|               |   |        |
|---------------|---|--------|
| <b>Unit 1</b> | <b>Introduction to System programming and Operating System</b><br>System software: - Compiler, Assembler, linker, Loader, Interpreter<br>Introduction to operating System: - Need of OS, Types of OS, Services of OS, System Calls,<br>Process Management:-Process Management and Process Synchronization   | 10 Hrs |
| <b>Unit 2</b> | <b>Distributed Operating System</b><br>Distributed operating System:-Need and Characteristics, Inter Process Communication in Distributed OS, Distributed Process Synchronization, and Deadlock Handling.<br>Distributed File System: Structure and Implementation  | 10 Hrs |
| <b>Unit 3</b> | <b>Network operating System</b><br>Introduction, Services of NOS: - Peripheral Shearing Service, File Service, DNS, RPC Service, group Communication, Kernel architecture.<br>Mechanism for NOS: - Message passing, RPC, distributed Memory Sharing<br><b>Parallel Operating System</b><br>What is Parallel Processing? Differences between Distributed and Parallel Processing, Operating System for Parallel Processors<br>Issues in Parallel Processing OS:-Mutual Exclusion and Deadlocks Handling. | 10 Hrs |
| <b>Unit 4</b> | <b>Real Time Operating System:-</b> Introduction, need of RTOS, RTOS Vs General Purpose Operating System, process Scheduling and Synchronization, Memory Mgmt<br><b>Multimedia Operating System: -</b> Introduction, Multimedia data, characteristics, components, process scheduling, file system  | 10 Hrs |

**Text Books and Reference Books**

1. System Programming and Operating System By D. M. Dhamdhere, Tata McGraw-Hill Education
2. Operating Systems, A Concept Based Approach By Dhananjay M. Dhamdhere Tata McGraw-Hill Education
3. Operating System By. Achyut S. Godbole and Atul Kahate McGraw Hill

4. Advanced Concepts In Operating Systems, By Mukesh Singhal (Author), Niranjan Shivaratri  
Tata McGraw-Hill Education,
5. Distributed systems: principles and paradigms, By Andrew S. Tanenbaum, Maarten van  
Steen ,Pearson Prentice Hall
6. Modern operating systems By Andrew S. Tanenbaum, Pearson Prentice Hall,

**Digital References**

1. <http://cactus.eas.asu.edu/partha/Teaching/531-common-files/NetworkOS.pdf>
2. <http://www.Wikipedia.com>
3. [http://en.wikipedia.org/wiki/Real-time\\_operating\\_system](http://en.wikipedia.org/wiki/Real-time_operating_system)

**Title of the subject: Computer Networks****Course Code: MCA 203****Teaching Scheme:**  
**Lectures: 4 hrs/week****Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks****Objectives:**

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

|        |  |        |
|--------|--|--------|
| Unit 1 | <p>Physical communication:</p> <p>Network Architecture: LAN, MAN &amp; WAN. Topologies: Bus, Ring, Star, Mesh, Hybrid, Tree. Network Devices: Hub, Switch, Router, Bridge, Gateway, Firewall, Load Balancers, VPN Concentrators. How to select devices based on the requirement. When to use which devices. Transmission Media: Coaxial, Twisted Pair, Fiber Optics, Wireless. Transmission Switching: Circuit Switching, Packet Switching, Message Switching, PDH/SDH Standards (this creates base for today's transmission networks deployed globally). Ethernet. Lease-Line. ISDN.</p> <p>Data Communication Networks and Reference Models</p> <p>Components, Data Representation, Data Flow, Network Criteria, Network Models, Categories of Networks, Interconnection of Networks: Internetwork. Protocol Layering, OSI model, TCP/IP Model, OSI vs. TCP/IP Connection oriented N/Ws, Connectionless N/Ws, Wireless LAN, Gigabit, Trunk Ports, and Access Ports. What is Line of site and what are the advantages /disadvantages of WI-FI technology.</p> <p>Link Layer Communication</p> <p>Error detection and Correction Techniques, framing, flow and error control, HDLC, P2P protocol, Frame Relay.</p> | 10 Hrs |
| Unit 2 | <p>IP Addressing &amp; Routing</p> <p>Internet Protocol (IPv4), IP packet format, Addressing: Unicast, Multicast and Broadcast, Physical Addresses, Logical Addresses, Port Addresses, and Specific Addresses. IP addresses – Host Part, Network Part and Network Masks, Network addresses and Broadcast addresses, Address Classes, Loop back address, Difference between Public and Private IP address.</p> <p>Routing: Difference between Static Routing &amp; Dynamic Routing Protocol. Advantages and Disadvantages of both. Types of routing protocol, Border Gateway Protocol (BGP), Routing Information Protocol (RIP), Open Shortest Path First (OSPF). IP routing concepts, Routing Tables, Stream &amp; Packets TCP does? TCP – a reliable pipe, TCP connection – Multiple conversations, Port Numbers</p> <p>IPv6</p> <p>Introduction, What is the problem with current IPv4 Space and why we are going for IPv6. Packet format, addressing scheme, security,</p>  | 10 Hrs |

- applications and limitations of IPv6. Types of IPv6 Address. IPv4 Vs. IPv6.
- Unit 3 Domain Network Services (DNS) 10 Hrs  
 Domain Names, Authoritative Hosts, Delegating Authority, Resource Records, SOA records, DNS protocol, DHCP & Scope Resolution; what is A, CNAME and PTR records. Forward and Reverse lookup Zone.
- Network Applications ARP/RARP, What is TCP Three way hand shake. (HTTP, Email, etc) Hyper Text Transfer Protocol (HTTP) HTTP communications - HTTP request, Request Headers, Responses, Status Code, Error Status Code, Email- Sending & Receiving, Email Addressing, Message Structure MIME–Multipurpose Internet Mail Extensions , SMTP–Simple Mail Transfer Protocol with examples, Mail Exchangers – Delivering a message, Mail Boxes, POP – Post Office Protocol IMAP – Internet Message Access Protocol FTP – File Transfer Protocol Telnet – Remote Communication Protocol Proxy Server, Proxy Web Server.
- Unit 4 Network Security 10 Hrs  
 Threat: Active attack, Passive Attack, Cryptography: Symmetric and Asymmetric key cryptography; Security services, Digital signature, IPsec, SSL, VPN, Firewall: Packet filter, application gateway, Unicode. How to restrict attacks by using security devices; what is Statefull Inspection; Difference between Firewall; IDS and IPS.

**Text Books and Reference Books:**

1. Computer Networks Andrew S. Tanenbaum, Pearson, 5th Ed
2. Data Communications and Networking Behrouz A. Forouzan , TMH, 4th Ed.
3. Cryptography and Network Security Atul Kahate , TMH, 2nd Ed.
4. Network Essential Notes GSW MCSE Study Notes
5. Internetworking Technology Handbook CISCO System
6. Computer Networks and Internets with Internet Applications Douglas E. Comer
7. Cryptography and Network Security William Stallings

**Title of the subject: Relational Database Management System**  
**Course Code: MCA 204**

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

**Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks**

**Objectives:**

- In this subject the concept related to fundamentals of database, to conceptualize and depict a database system using ER diagram, Database techniques, SQL and concepts of transaction processing- concurrency control techniques and recovery procedure are introduced. This creates strong foundation for understanding of Database technology.

|               |  |        |
|---------------|--|--------|
| <b>Unit 1</b> | <b>Introduction and Conceptual Modeling:</b><br>Database and Need for DBMS, Characteristics of DBMS, Database Users, 3-tier architecture,(its advantages over 2-tier) Data Models, Views of data-schemes and instances, Independence, Data modeling using the Entity-Relationship approach, Specialization and Generalization. Relational Algebra and Relational Calculus.   | 10 Hrs |
| <b>Unit 2</b> | <b>Relational Models and Normalization:</b><br>Relational Model concepts, Relational Model concepts and Relational Database Schemas, Update Operation and Dealing with Constraint Violations, Anomalies in databases, Functional dependencies – determinant, partial, full, transitive, Various normal forms and normalization process, 1NF, 2NF, 3NF, BCNF, Lossy and lossless joins, Multi-valued dependency, 4NF, 5NF.  | 10 Hrs |
| <b>Unit 3</b> | <b>Data Storage and Query Processing:</b><br>Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree – Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join operation. Query Optimization.  | 10 Hrs |
| <b>Unit 4</b> | <b>Transaction Processing:</b><br>Transaction and states, acid properties, Schedules, types of schedules, view and conflict serializability issues , conflict serializability testing mechanism, Dead locks and resolving deadlocks.<br>Concurrency control: Needs, Use of locks, lock protocols – s, x, binary, 2pl, graph based, Granularity, Concurrency control by timestamps. Concurrency control by validation. Concurrency control by optimistic scheduling, multi version schemes.<br>Recovery management: Types of failures, Log based recovery – deferred and immediate mode<br>Check points, shadow page tables, Backup | 10 Hrs |

**Text Books:**

1. Elmasri and Navathe : Fundamentals of Data base Systems ( 5th Ed.).

2. Abraham Silberschatz and Henry Korth, Sudarshan : Database System Concepts, 4th Edition, ISBN : 0-07-120413-X, Tata McGraw-Hill.
3. Database management System, Bipin desai
4. Raghu Ramakrishnan/Johannes Gehrke, "Database Management Systems", Tata Mc Graw Hill.
5. Introduction to database systems C.J.Date
6. Oracle by Ivan N. Bayross
7. Oracle PL/SQL Programming by Scott Urmann

**Title of the subject: Software Engineering I****Course Code: MCA 205****Teaching Scheme:**  
**Lectures: 4 hrs/week****Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks****Objectives:**

- To incur engineering approach for software development.
- Absorb underlying principles from software planning to project deployment.
- Understand and apply the process of requirement analysis and design.

|        |   |        |
|--------|---|--------|
| Unit 1 | Define Software, Software Characteristics, Software Applications, Software Myths, Software Crisis.<br>Define Software Engineering, Software engineering a layer process, Software engineering practice.<br>Software process model: A Generic process model, prescriptive process model, specialized process model, unified process, personal and team process model.  | 10 Hrs |
| Unit 2 | Software project Planning: The management spectrum, project planning process, Software Scope and feasibility, Resources, Software project estimation, Decomposition techniques, empirical estimation models, project scheduling, risk management<br>Software Configuration Management: SCM Repository, SCM process, Configuration management for web Apps   | 10 Hrs |
| Unit 3 | Core Principles: Principles that guide the process, Principles that guide the practice, Principles that guide each framework Activity, planning principles, Modeling principles, requirement modeling principles, design modeling principles, construction principles, testing principles, Deployment principles<br>Software Requirement: Requirement engineering, establishing the groundwork, Eliciting requirements, Developing use case, Building the requirement model, Negotiating requirements, validating requirements. | 10 Hrs |
| Unit 4 | Requirement modeling: Data modeling, Functional modeling, Behavioral modeling, Software Requirement Specification (SRS) and SRS review.<br>Design Concept: Design Process , Design Concept, Design Model, Architectural styles, Designing class based components, Golden rules for user interface design<br>WebApp Design : WebApp Design pyramid, Interface design, Aesthetic design, content design, navigation design, architecture design, component design   | 10 Hrs |

**Text Books:**

1. Software Engineering A Practitioner's Approach, Roger S. Pressman, McGraw-Hill International Edition, 7th edition.
2. Software Engineering, K. K. Aggarwal, Yogesh Singh, New Age International Publishers Second edition.
3. An Integrated Approach to Software Engineering, Pankaj JaloteNarosa Publishing House, Third Edition
4. Software engineering , Ian Sommerville, Addison Wesley 9th Edition

**Title of the subject: Lab I Advance Java Programming (J2EE)**  
**Course Code: MCA 221**

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

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

**Objectives:**

To enable the students to perform practical's based on core principles of the Java language and J2EE specifications.

**Suggestive List of Experiments:**

| Practical No | Assignments   |
|--------------|---|
| 1            | <p><b>Class &amp; Objects:</b><br/>           Define a class named Circle as described below:<br/>           Data members : radius,angle<br/>           Methods: constructor,circleCircumference(),arcLength().<br/>           Create an object of Circle class and compute the circumference when radius is 20 and the arc length when angle is 90.</p>  |
| 2            | <p><b>Packages &amp; Interfaces:</b><br/> <pre>           Interface TVSTATION{               String satellite_name="SatSun"; String cableTvName="SunTv";               double signalfrequency =12.3; void show();           }           </pre>           Define a class named BROADCAST that implements the above interface.<br/>           Data members : broadcasttime,date Methods: constructor(),display(),show()<br/>           Data members for PROGRAMME class: programmename,sponser.<br/>           Methods: constructor(),display()<br/>           Define a package named TV that contains above interface TVSTATION and two classes named PROGRAMME and BROADCAST. Import the package TV in <i>PackTest.java</i> program that contains the main() method .Within this method , create an object for the BROADCAST class and test its method.</p> |
| 3            | <p><b>JDBC:</b></p> <ul style="list-style-type: none"> <li>• Create a database 'SYMCA' and three tables with specific constraints.</li> <li>• Insert the information in all the three tables using JDBC application.</li> <li>• Update and delete the specific information of any one table by specifying the condition by using 'where' clause.</li> <li>• List the entire content of any one table.</li> </ul>  |
| 4            | <p><b>Servlet :</b></p> <ol style="list-style-type: none"> <li>a) Create an HTML file named <i>insertEmployee.html</i> and then create a servlet <i>EmployeeServlet.java</i> to insert employee information into 'Employee' table.</li> <li>b) Create an HTML file named <i>employee.html</i> and a servlet named <i>GetServlet1.java</i> .With the help of <i>employee.html</i> , we send the 'ID' of an employee to the <i>GetServlet1</i> program. Then, we use it to retrieve his/her information from 'Employee' table and display it on to the browser.</li> </ol>  |

- 5     **State management:**
- a) Create an HTML file *AddCookies.html* which contains four text boxes .When user enters the values in these text boxes and press the submit button, the values will be sent to *AddCookies.java* servlet and get saved in cookies.
  - b) Create an HTML form *login.html* that accepts the username and password and submits to *login.java* servlet. Verify credentials and on success, set the username in the HTTP Session and show a "Welcome <username>" message. (Use the `request.getSession().setAttribute()` method).
- 6     **JSP:**
- a) Design a *registrationform.jsp* page with all user registration information and after filling all the details, transfer all the filled information to *registrationsuccess.jsp* page.(use Implicit objects)
  - b) Create *connection.jsp* which contains database connection settings and include this file in *registrationsuccess.jsp* page to save 'registration' details into registration table.
- 7     **Java Beans:**  
Design a StudentBean class with getter/setters for the Student details like firstname,lastname and age;  
Access the above bean class in JSP. You can use `<jsp:getProperty/>` action to access get methods and `<jsp:setProperty/>` action to access set methods
- 8     Write a program to accept citizen name,address & age in struts.If age is greater than 18 then allow the person for voting.
- 9     Demonstrate a program in struts that uses Action Class
- 10    Demonstrate a database application in struts

**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 practical's 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.

**Tools to be used –**

Eclipse 3.x, Tomcat 5.x, JBoss 4.x, Ant 1.6.x, Struts 1.2 or latest version

**Title of the subject: Lab II System Programming and Advance Operating System  
Course Code: MCA 222**

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

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

**TERM WORK:**

Term work shall consist of minimum of 05 programs/Assignments and 01 Case Study to be developed based on the above syllabus .The assessment on the term work shall be done on the following criteria:

1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Five marks of weightage of term work marks will go to case study.
4. Oral examination on the syllabus and the term work, mentioned above.

**PRACTICAL EXAMINATION:**

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

**Suggested List of Experiments:**

1. Program to get Regular expression and convert it into Prefix, Postfix Notation.
2. Program to recognize and count the number of identifiers in a given input file.
3. Program to count the number of vowels and consonants in a given string.
4. Program to count the number of characters, words, spaces, end of lines in a given input file.
5. Program to recognize a valid arithmetic expression and identify the identifiers and operators present. Print them separately.
6. Case Study to determine Difference and Similarities between the various Operating System Mention in Unit 2, 3 and 4.

**Suggested Programming Language: C++**

**Title of the subject: Lab III Relational Database Management System**  
**Course Code: MCA 223**

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

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

**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 practical 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. Database creation, connectivity, user creation and schema authorization
2. Create minimum set of six tables using following constraints:
  - a) Primary key b) Foreign key c) Not Null d) Check e) Unique f) On delete/update cascade g) Default
3. Insert minimum ten records in each of the above created tables and comment on the constraints specified.
4. Execute SQL queries using Aggregate functions on above tables (faculties are expected to design minimum ten SQL Queries):
  - a) count b) sum c) min d) max e) avg
5. SQL Queries based on joins (on above created tables):
  - a) Natural Join b) Left Outer Join c) Right Outer Join d) Full Outer Join
6. SQL Queries based on Nested Queries and Views
7. Update, Delete, Alter, Drop and conditional updates using 'where' clauses and 'case' statement.
8. Indexing :
  - a. Insert large number of records in the above created schema. Then record the time taken by the Query to insert the data.
  - b. Find the Query plan for any two queries which have where clause.
  - c. Now create index on un-indexed attribute.
  - d. Now execute the Queries in step number [b] and record the time as well as query plan after Indexing.
9. Assignment based on concurrency control.
10. Assignment based on Triggers.

Suggested Database: PostgreSQL

**Title of the subject: Lab IV Web Development Using Open Source Technology**  
**Course Code: MCA 224**

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

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

|        |  |        |
|--------|--|--------|
| Unit 1 | <b>Introduction to web development</b><br><br>Web page designing (using any open source web designing tool), Introduction to client side & server side scripting   | 10 Hrs |
| Unit 2 | <b>Postgres SQL</b><br>Installation, Basic SQL Commands, executing queries using pgAdminIII.   | 10 Hrs |
| Unit 3 | <b>JSP and Java Servlets</b><br>Setting up Eclipse and Tomcat. Basic JSP tags, Request and Response Objects, State management Techniques, creating a servlet in dynamic web environment, including JDBC-postgres SQL driver in project to write a simple jdbc code, running servlet through html file. | 10 Hrs |
| Unit 4 | <b>Application Development</b><br>Mini project where the students will use PostgreSQL 9.2 database, Java Servlets for the back end, and any standard Web browser for front end.  | 10 Hrs |

**TERM WORK:**

Term work shall consist of minimum of 10 programs/Assignments to be developed based on the above syllabus. The assessment on the term work shall be done on the following criteria:

1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Oral examination on the syllabus and the term work, mentioned above.

**PRACTICAL EXAMINATION:**

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

**Mini Project :**

Guidelines for Mini Project:

- Allow minimum 1 to maximum 2 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.

**Suggested Open Source tools:**

1. Web Designing – WordPress
2. Dynamic Web Page - Eclipse
3. Database - Postgres
4. Webserver – Apache Tomcat

**Text/Reference Books:**

Reference:

1. [www.postgresql.org/](http://www.postgresql.org/)
2. <http://www.eclipse.org/downloads/>
3. <http://jakarta.apache.org/tomcat>

**Title of the subject: Design and Analysis of Algorithm**  
**Course Code: MCA 251**

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

**Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks**

**Objectives:**

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

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|--------|---|--------|
| Unit 1 | <b>Introduction</b> : Introduction and a brief review of Elementary Data Structures<br>Definition of an Algorithm, Algorithm specification, Performance analysis: -Space and time complexity, Asymptotic Notation, Practical Complexities, Performance Measurement, hashing.  | 8 Hrs  |
| Unit 2 | <b>Divide and Conquer</b> : General method of Divide and Conquer, Binary search, finding the maximum and minimum, merge sort, quick sort, Strassen's Matrix Multiplication  | 10 Hrs |
| Unit 3 | <b>The Greedy Method</b> : 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. Basic Search and Traversal Techniques -The techniques for binary trees, Techniques for graphs, connected components and spanning trees, Biconnected Components and DFS.   | 10 Hrs |
| Unit 4 | <b>Dynamic Programming, Backtracking and Branch and Bound Technique:</b> The general method of Dynamic Programming-Matrix chain multiplication, Longest common subsequence, String editing<br>The general method of backtracking, The 8- queens problem, sum of subsets, Graph coloring, Hamiltonian cycle, Knapsack problem using backtracking. The method of branch and bound, 0/1 knapsack problem. Traveling sales person problem using branch and bound. | 12 Hrs |

**Text Books/Reference Books:**

1. E. Horowitz and S. Sahni, "Fundamentals of Computer Algorithms", Galgotia Pub
2. Aho, Hopcroft, Ulman, "The Design and Analysis of Computer Algorithms", Addison Wesley
3. Sachin Dev Goya "Design and Analysis of Algorithm"

**Title of the subject: Cryptography****Course Code: MCA 252****Teaching Scheme:**  
**Lectures: 4 hrs/week****Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks****Objectives:**

- To introduce elementary simple classical cryptosystems and principles of Modern Cryptography.
- Emphasis on Mathematical background to help design cryptographic algorithms.
- Detail study of cryptographic algorithms based on Integer factorization, Discrete logarithm and elliptical curve cryptosystem.

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| Unit 1 | <p><b>Introduction:</b> Cryptography, Symmetric and asymmetric key, Historical ciphers and their cryptanalysis,</p> <p><b>Classical Cryptosystems:</b> Shift Cipher, Substitution Cipher, Affine Cipher, Hill Cipher</p> <p><b>Basic principles of Modern Cryptography:</b> Principle 1: Formulation of exact definition, Principle 2: Reliance on precise assumptions, Principle 3: Rigorous proofs of security.</p> <p><b>Introduction to:</b> Integer factorization, Discrete logarithm and elliptical curve discrete logarithm.</p>                              | 10 Hrs |
| Unit 2 | <p><b>Number Theory:</b> Division algorithm for integers, Euler Phi function, Euclidean algorithm, extended Euclidean algorithm, Integers modulo n, Multiplicative inverse, Chinese remainder theorem, modular exponentiation, repeated square and multiply algorithm for exponentiation, Legendre and Jacobi symbols</p> <p><b>Abstract algebra:</b> Groups, Rings, Fields</p> <p>Cryptographic Hash Function” Hash function and data integrity, Security of Hash function, The Random Oracle Model, Secure Hash Algorithm SHA-1, Message Authentication Codes.</p> | 10 Hrs |
| Unit 3 | <p><b>Prime Numbers:</b></p> <p>Prime number generation Algorithm, Primality Testing: Fermat’s Theorem, Rabin-Miller’s Probabilistic Primality Algorithm.</p> <p><b>Algorithms for Factoring:</b></p> <p>Pollard’s <math>p - 1</math> Method, Pollard’s Rho Method, The Quadratic Sieve Algorithm</p> <p><b>Algorithms for Computing Discrete Logarithms :</b>The Baby-Step/Giant-Step Algorithm The Pohlig-Hellman Algorithm, The Index Calculus Method</p>   | 10 Hrs |
| Unit 4 | <p><b>Cryptography algorithms:</b></p> <p>Diffie Hellman Algorithm, RSA algorithm on integer factorization, Taher Elgamal algorithm based on Discrete logarithm, Elliptical curve over the Reals, Elliptical curves modulo a prime</p>   | 10 Hrs |

**Text Books:**

1. Introduction to modern cryptography, Jonathan Katz and Yehuda Lindell, CRC Press
2. Handbook of Applied Cryptography by A. Menezes, P. Van Oorschot, S. Vanstone.(Available free: <http://cacr.uwaterloo.ca/hac/>)
3. Cryptography Theory and Practice, Douglas R. Stinson, Chapman and Hall /CRC Second Edition.

**Title of the subject: Operation Research****Course Code: MCA 253****Teaching Scheme:**  
**Lectures: 4 hrs/week****Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks****Objectives:**

- Operations research applies scientific method to problems concerning the management of systems of people, machines, materials and money in industry, business government and defence.
- He or she conducts logical analysis of management problems in collaboration with management with a view to understanding the system behind that problem, so that the system may be made to work in a manner which eliminates the problem.

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| Unit 1 | <b>Linear Programming</b> : Introduction, Basic terms, Standard and canonical form of set of equations, Simplex method steps for computation, Maximization and minimization problems, Graphical method to solve linear problem-maximization and minimization case, Big M-method, Degeneracy, Duality in LPP  | 10 Hrs |
| Unit 2 | <b>Transportation model</b> : General linear programming formulation of transportation problem, solution procedure and applications of transportation problem, North west corner method(NWCM),Least Cost Method (LCM), Vogel's Approximation method(VAM), Optimality test -- Stepping stone method, Modified distribution (MODI) method.   | 10 Hrs |
| Unit 3 | <b>Assignment and Sequencing model:</b> Introduction, Comparison with transportation model, Steps for solution, example problems, check for optimality-minimization and maximization assignment problem, Sequencing problem- Introduction, basic terminology, processing n jobs through two machines and three machines.   | 10 Hrs |
| Unit 4 | <b>PERT and CPM</b> : Historical background, work breakdown structure. Network (Arrow Diagram) logic -- Activity, event, path, network construction, dummy, partial dependency, looping, numbering the event(fulkerson's Rule), measuring activity, frequency distribution curve for PERT, example, Forward pass computation, backward pass computation, representation in tabular form, slack, critical path.<br>CPM- Difference with PERT, CPM terms, Float, examples. | 10 Hrs |

**Text Books:**

1. Operations Research by Gupta P K, D S. Hira-S.Chand.
2. Operations Research by V.K. Kapoor – Sultan Chand & son
3. Operations Research by S.D.Sharma-Kedarnath Ramnath & co

**Title of the Subject: Data Warehousing and Data Mining**  
**Course Code: MCA 254**

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

**Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks**

**Pre-requisites:** Knowledge of RDBMS and OLTP

**Objectives:**

- To understand the need of Data Warehouses over Databases, and the difference between usage of operational and historical data repositories.
- To be able to differentiate between RDBMS schemas & Data Warehouse Schemas.
- To understand the concept of Analytical Processing (OLAP) and its similarities & differences with respect to Transaction Processing (OLTP).
- To conceptualize the architecture of a Data Warehouse and the need for pre-processing.
- To understand the need for Data Mining and advantages to the business world.
- To get a clear idea of various classes of Data Mining techniques, their need, scenarios (situations) and scope of their applicability.
- To learn the algorithms used for various type of Data Mining problems.

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| Unit 1 | <b>Introduction to Data Warehousing and Components:</b><br>Introduction to Decision Support System: DSS Defined, DSS Characteristics, Need for data warehousing, Operational & informational data, Data Warehouse definition and characteristics, Operational Data Stores. Architectural components, Data Preprocessing: Need of Preprocessing Data, Data Cleaning Techniques, Data Integration and Transformation, Data Reduction Techniques, Discretization and  | 10 Hrs |
| Unit 2 | <b>OLAP in the Data Warehouse</b><br>A Multidimensional Data Model. Schemas for Multidimensional Databases: Stars, Snowflakes, Star join and Fact Constellations Measures. Concept Hierarchies, OLAP Operations in the Multidimensional Data Model, Need for OLAP, OLAP tools , Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.   | 10 Hrs |
| Unit 3 | <b>Data Mining Algorithms</b><br>Concept Description: 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.<br><b>Classification and Prediction:</b> Classification and Prediction Data Classification Process, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification. | 10 Hrs |
| Unit 4 | <b>Classification, Knowledge Discovery</b><br>Classification Based on Association Rule Mining, Other Classification Methods Cluster Analysis: Cluster Analysis, Types of Data in Cluster   | 10 Hrs |

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 Books and Reference Books:**

1. Paul Punnian, "Data Warehousing Fundamentals", John Wiley Pub
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
4. Margaret Dunham, "Data Mining: Concepts and Techniques", Morgan Kaufmann Pub.
5. Ralph Kimball, "The Data Warehouse Lifecycle toolkit", John Wiley.
6. Jiawei Han, Micheline Kamber, "Data Mining : Concepts and Techniques". 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
7. A B M Shaukat Ali, Saleh A Wasimi, "Data Mining: Methods and Techniques", Cengage Learning Pub.
8. Ian Witten and Eibe Frank, Data Mining, "Practical Machine Learning Tools and Techniques with Java Implementations", Morgan Kaufman, ISBN 1558605525, 1999,
9. Ralph Kimball, "The Data Warehouse Lifecycle toolkit", John Wiley.
10. Jiawei Han, Micheline Kamber, "Data Mining : Concepts and Techniques", 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
11. A B M Shaukat Ali, Saleh A Wasimi, "Data Mining: Methods and Techniques", Cengage Learning Pub.
12. Ian Witten and Eibe Frank, Data Mining, "Practical Machine Learning Tools and Techniques with Java Implementations", Morgan Kaufman, ISBN 1558605525, 1999.

**Title of the subject: Software Engineering II**  
**Course Code: MCA 255**

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

**Examination Scheme:**  
**Theory Paper: 80 marks [3 hrs]**  
**Class Test: 20 Marks**

**Objectives:**

- Understand the process of software testing and awareness to important issues in software maintenance.
- Introduce advance software engineering concepts.

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|--------|---|--------|
| Unit 1 | Software Quality : Garvin's Quality dimensions, McCall's Quality factors, ISO 9126 Quality factors, Cost of Quality, Elements of software quality assurance, SQA task, goals and metrics, Statistical software quality assurance. Software Testing: White box and black box testing, Testing strategies. Types of testing.  | 10 Hrs |
| Unit 2 | Defect: Types of Defect, Defect life cycle, Defect report.<br>Dependability and security: Availability, reliability, Safety and security. Dependability and security specification, Dependability and security assurance.<br>Software Reuse: The reuse landscape, Application framework, Software product lines and COTS product reuse.   | 10 Hrs |
| Unit 3 | Agile development: Agility, Agile process, Extreme programming, Adaptive software development, Scrum, Dynamic System Development Method, Crystal, Feature Driven Development, Lean software development, Agile modeling, Agile unified process.<br>Aspect Oriented Software Engineering: The Separation of Concerns. Aspects, Join Points and pointcuts, Software engineering with aspects. | 10 Hrs |
| Unit 4 | Software Maintenance: categories of maintenance, maintenance process, Maintenance models: Quick-fix Model, Iterative Enhancement Model, Reuse Oriented Model, Boehm's Model, Toute Maintenance Model, Estimation of maintenance cost: Belady and Lehman model, Boehm model, Business process reengineering, Software reengineering, reverse engineering.                                    | 10 Hrs |

**Text Books:**

1. Software engineering , Ian Sommerville, Addison Wesley 9th Edition
2. Software Engineering, K. K. Aggarwal, Yogesh Singh, New Age International Publishers Second edition.
3. Software Engineering A Practitioner's Approach, Roger S. Pressman, McGraw-Hill International Edition, 7th edition.
4. An Integrated Approach to Software Engineering, Pankaj Jalote Narosa Publishing House, Third Edition
5. Software Testing, Ron Patton, Pearson Education, Second Edition

**Title of the subject: Lab V Design and Analysis of Algorithm**  
**Course Code: MCA 271**

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

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

**Term Work:**

The term work shall consist of at least 10 experiments/ assignments and mini project based on the syllabus.

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 practical and mini project 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 Hashing Techniques:
  - a. Implement Linear probing
  - b. Implement Quadratic probing
- 2
  - a. Implement an algorithm for addition of two matrices.
  - b. Implement the algorithm for finding program step using count variable for program in 3.(a).
  - c. Create a step table for program in 3.(a).
- 3 Implement Simple Binary search & Recursive Binary search using Divide and Conquer
- 4
  - a. Write traditional algorithm for finding minimum and maximum and implement it in C++.
  - b. Write a recursive algorithm for finding minimum an maximum using Divide and conquer.
- 5 Quick Sort Using Divide and Conquer
- 6 Implement Job Sequencing using greedy approach
- 7 Dynamic Programming : String editing.
- 8 Implement Prim's and Kruskal's algorithm for an undirected weighted graph.
- 9 Implement Sum of Sub Set Problem using back tracking.
- 10 0/1 Knapsack using Branch and Bound
- 11
  - a. Implement Travelling Salesman Problem using branch and bound.
  - b. Draw the state space tree for TSP using Branch and bound.

**Mini Project:**

Animated program demonstrating any one algorithm of DAA of your choice in C++ or Java.

**Title of the subject: Lab VI Cryptography**  
**Course Code: MCA 272**

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

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

**Term Work:**

The term work shall consist of at least 10 experiments/ assignments and mini project based on the syllabus.

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 and mini project 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 Shift cipher
- 2 substitution cipher
- 3 Prime number generation
- 4 Fermat theorem
- 5 Primality testing algorithm
- 6 Euclidean and extended Euclidean algorithm
- 7 Integer modulo n
- 8 Pollard's  $p - 1$  Method,
- 9 Pollard's Rho Method
- 10 Baby step giant step

**Mini Project:**

Any one of the following:

1. RSA Algorithm
2. Diffie-Hellman Algorithm
3. Taher Elgamal Algorithm

**Title of the Subject: Lab VII Data Warehousing and Data Mining**  
**Course Code: MCA 273**

**Teaching Scheme:**

Practical : 2 Hrs/Week

**Examination Scheme:**

Practical Exam: 25 Marks

Term Work: 25 Marks

**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 practical's in the laboratory during the semester
- \* 10 marks of term work are allocated to case study.

**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

## o Case Study:

- Map Reduce
  - The Map reduce paradigm
  - Distributed File Systems
  - Hadoop
- Big. Data Storage Systems

**Title of the Subject: Lab VIII - ASP.NET**  
**Course Code: MCA 274**

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

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

**Objectives:**

To enable the students to design and develop effective web applications using ASP.NET and supportive technologies

**Contents:**

- Unit 1 Introduction to C#.NET:**  
 Introduction to .NET framework, Features of .NET, Object Oriented Features, Working with Components / Assemblies, Namespaces, Console applications
- Unit 2 Introduction to ASP.NET and Web Controls:**  
 Internet terminology, Web Server, Browser, Client Vs Server Side Scripting, Webforms in ASP.NET, Page life cycle, IsPostBack property, Text Box, Label, Button, Link Button, Hyperlink Button, Image Button, List Box, Drop DownList, 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, Tree View Control, Rich text control.
- Unit 4 SQL Server and ADO.NET:**  
 Creating Database, Tables, Stored Procedures in SQL Server, Overview of ADO.NET, Advantages of ADO.NET, Connected and disconnected data access, Connection, Command, DataReader, DataAdapter, DataSet, Data Tables, GridView Control, DataList Control and Repeater Control
- Unit 5 State Management Techniques, Web Services & Reporting:**  
 Server Side and Client Side State Management techniques-Cookies, QueryString, View State, Hidden, Session and Application Introduction to web services, Webservice Standards - SOAP, WSDL, DISCO, UDDI, Crystal Reports, Ajax, LINQ.

**Reference Books:**

1. ASP.NET: Stephen Walther - Unleashed.
2. ASP. NET: The Complete Reference: TATA Mc GRAW HILL.
3. ASP. Net 2.0 Black Book, Dream Tech, Kogent
4. Microsoft SQL Server 2005: The Complete Reference By -- Jeffrey Shapiro, Tata McGraw Hills Publication
5. Microsoft SQL Server: Black Book Microsoft SQL Server Black Book  
*(Publisher: The Coriolis Group) Author(s): Patrick Dalton ISBN: 1576101495*

**Website References:**

1. <http://msdn.microsoft.com/en-us/library/>
2. <http://www.tutorialspoint.com/asp.net/>

**Term Work:**

The term work shall consist of at least 10 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 practical's 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:**

1. Allow minimum 1 to maximum 2 students per mini project group
2. Take the topic from students in first 15 days from the start of the semester.
3. 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 Numbers 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 UML diagrams)

Chapter 4: Performance Analysis

(This chapter will include Testing and evaluation process.)

Chapter 5: Conclusions

(This should include conclusion & future scope)