

MADURAI KAMARAJ UNIVERSITY
(University with Potential for Excellence)
Directorate of Distance Education

Syllabus for M.C.A Computer Application

I. About the Department

The Department of Computer Science in the Directorate of Distance Education of Madurai Kamaraj University is one of the oldest departments in the Directorate started in late 1970s. The department currently offers both P.G. and U.G programs in Computer Science.

II. Program Overview

The M.C.A. program (Master of Computer Application) at the Directorate is a conventional program focusing on Information Technology. It stresses the development of applied analytic tool skills, advanced cognitive abilities, and topical specialties allowing students to tailor the program to their interest.

III. Objectives of the Program

1. To prepare the students to manage the software components in a computer independently and to be a Programmer.
2. To motivate the students to take up higher studies in Computer Application and other streams.

IV. Program Target Groups

The Program may be structured in a way to attract aspirants of system programmer, Software industries, Program Analyst, Data –Operator Software development, IT, Banking, Consultancies etc.

V. Program Requirements

Educational Qualification

M.C.A (Master of Computer Application)

Course code: 6040

Duration: 2 Year

Eligibility:

Degree in Engineering / Technology/Commerce/Banking/Business Administration / Computer Application/Science with Mathematics as one of the subjects. Any degree with Mathematics at plus 2 level (Allied subjects like Basic Mathematics, Applied Mathematics and Business Mathematics are not treated as equivalent to +2 Mathematics)

VI. Degree Overview

M.C.A. Computer Application is a **2 year Postgraduate** program which deals with subjects and topics related to computer application and services. Technological implementation of computer systems is the main agenda of the program. The program ranges widely from creating quality professionals and research fellows who are working in every sector of the world today.

VII. Degree Title: M.C.A Computer Application

VIII. Program Structure

See Appendix – CA1

Appendix – PCA1 Subject/Structure of Course Study

| | Subjects | | | | Total Hours | Total Credits |
|-------|------------|------------|--------------|------------|-------------|---------------|
| I | FS1(4)[4] | CS1(4)[4] | CS2(5)[5] | CS3(5)[3] | 18 | 16 |
| II | CS4(4)[4] | ES1(4)[4] | CS5(5)[5] | CS6(5)[3] | 18 | 16 |
| III | CS7(4)[4] | CS8(4)[4] | CS9(5)[5] | CS10(5)[3] | 18 | 16 |
| IV | CS11(4)[4] | CS12(4)[4] | EES1(16)[12] | | 24 | 20 |
| Total | | | | | 78 | 68 |

- **Abbreviations:**– Number of Hours
- [] – Number of Credits
- FS – Foundation Subject
- CS - Core Subject
- EES - Enhanced Employability Subject
- ES - Elective Subject

Total No. of Hours: 78

Total No. of Credits: 68

I SEMESTER

| S No | Code | Subject | Hours | Credits | Internal Marks | External Marks |
|-------|------|---|-------|---------|----------------|----------------|
| 1 | FS1 | Mathematical Foundations of Computer Applications | 4 | 4 | 25 | 75 |
| 2 | CS1 | Operating Systems | 4 | 4 | 25 | 75 |
| 3 | CS2 | Object Oriented Programming and Design | 5 | 5 | 25 | 75 |
| 4 | CS3 | LAB: Object Oriented Programming using C++ | 5 | 3 | 25 | 75 |
| Total | | | 18 | 16 | | |

II SEMESTER

| S No | Code | Subject | Hours | Credits | Internal Marks | External Marks |
|-------|------|---|-------|---------|----------------|----------------|
| 1 | CS4 | Data Communication and Computer Networks | 4 | 4 | 25 | 75 |
| 2 | ES1 | Internet of Things | 4 | 4 | 25 | 75 |
| 3 | CS5 | Relational Database Management Systems | 5 | 5 | 25 | 75 |
| 4 | CS6 | LAB: Relational Database Management Systems | 5 | 3 | 25 | 75 |
| Total | | | 18 | 16 | | |

III SEMESTER

| S No | Code | Subject | Hours | Credits | Internal Marks | External Marks |
|-------|------|-----------------------------|-------|---------|----------------|----------------|
| 1 | CS7 | Software Engineering | 4 | 4 | 25 | 75 |
| 2 | CS8 | Data Warehousing and Mining | 4 | 4 | 25 | 75 |
| 3 | CS9 | Dot Net | 5 | 5 | 25 | 75 |
| 4 | CS10 | LAB: Dot Net | 5 | 3 | 25 | 75 |
| Total | | | 18 | 16 | | |

IV SEMESTER

| S No | Code | Subject | Hours | Credits | Internal Marks | External Marks |
|-------|------|--|-------|---------|----------------|----------------|
| 1 | CS11 | Information Security | 4 | 4 | 25 | 75 |
| 2 | CS12 | Mobile Computing | 4 | 4 | 25 | 75 |
| 3 | EES1 | Project Work and Viva Voce (Industry / Institutional based) | 16 | 12 | 40 | 60 |
| Total | | | 24 | 20 | | |

See Appendix – CA2

MCA

Scheme of Examination / Question Paper Pattern I - Theory Subjects:

(Total Marks: 100 (Internal: 25 Marks, External: 75 Marks))

| Parameters | | | |
|--------------------------------|----------|----------------------|----------|
| Internal Marks | | External Marks | |
| i. Average of two tests | 10 Marks | i. Part – A (10*1) | 10 Marks |
| ii. Assignment | 05 Marks | ii. Part – B (5*7) | 35 Marks |
| iii. Seminar/ Group Discussion | 05 Marks | iii. Part – C (3*10) | 30 Marks |
| iv. Peer-team-Teaching | 05 Marks | | |
| Total : | 25 Marks | Total : | 75 Marks |

Note: Peer-Team- Teaching shall conducted by forming a groups according the strength of the class with representation of both slow learners and fast learners. At least 10 % of the syllabus may be allocated with proportional allocation of teaching hours and be evaluated.

External examination question pattern:

| | |
|--|-----------------------|
| Time: 3 Hours | Max. Marks: 75 |
| Part – A (10*1=10) | |
| Answer all the questions | |
| Ten Questions, two questions from every unit: Multiple Choice questions. | |
| Part – B (5*7=35) | |
| Answer all the questions | |
| Five Questions, one question set from every unit: Either ...Or... type | |
| Part – C (3*10=30) | |
| Answer any three questions | |
| Five Questions, one question from every unit | |

II - Practical Subjects:

(Total Marks: 100 (Internal: 40 marks, External: 60 Marks))

- A candidate has to prepare Algorithm / Procedure for both the questions covering both the parts.
- The following list of parameters taken into account for the evaluation of practical examination.

| Parameters | | | |
|-----------------------|----------------------|-----------------------|---|
| Internal Marks | | External Marks | |
| i. | Average of two tests | 25 Marks | i. Aim, Procedure / Algorithm and Program |
| ii. | Record Work | 10 Marks | 15 Marks |
| iii. | Seminar/ Quiz / Viva | 05 Marks | ii. Coding and Compilation |
| | | | 10 Marks |
| | | | iii. Debugging |
| | | | 15 Marks |
| | | | iv. Results |
| | | | 10 Marks |
| | | | v. Viva |
| | | | 10 Marks |
| Total : | | 40 Marks | Total : |
| | | | 60 Marks |

Note: The External Examiner can fix exercises also other than those found in the list (Syllabus) in consultation with the Internal Examiner without violating the scope of the prescribed syllabus.

III –Project Work:

(Total Marks: 100 (Internal: 40 marks, External: 60 Marks))

The following list of parameters taken into account for the evaluation of the Project work.

| Parameters | | | |
|-----------------------|------------|-----------------------------------|----------|
| Internal Marks | | External Marks | |
| Start-up Review: | 5.0 Marks | i. Project Report: | 20 Marks |
| Design Review: | 7.5 Marks | ii. Project demo & Presentation : | 30 Marks |
| Implementation and | | iii. Viva-Voce : | 10 Marks |
| Validation Review: | 7.5 Marks | | |
| Final Review : | 10.0 Marks | | |
| Overall Performance: | 10.0 Marks | | |
| Total : | | 40 Marks | Total : |
| | | | 60 Marks |

The combined project shall be undertaken by the students as a team of two.

See Appendix – CA3

I SEMESTER

FS1: MATHEMATICAL FOUNDATIONS OF COMPUTER APPLICATIONS (4 Hours – 4 Credits)

Unit I:

Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, Tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus; Rules of inference.

Unit II:

Consistency of promises and indirect method of proof, Automatic Theorem Proving; Predicate calculus; Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus

Unit III:

Set theory & Relation: introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial Ordering;

Unit IV:

Elementary Combinatorics: Basis of counting, Enumeration of Combinations & Permutations, Enumeration of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion – Exclusion.

Unit V:

Graph Theory: Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

Reference Books:

1. Discrete Mathematical Structures with Applications to CS; Trembley, R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians, Molt, Kandel, Baker, PHI
3. T.Veerarajan- Probability, Statistics and Random process (Third edition), TMH
4. Sundarapandian- Probability, Statistics and Queueing theory, PHI
5. PurnaChandriaBiswal – Probability and Statistics, PHI
6. Elements of Discrete Mathematics, C.I.Liu, D P Mohanpatra, TMH
7. Discrete Mathematical Structures, Kolman, Busby, Ross, 6th ed. PHI, 2009

CS 1: Operating Systems (4 Hours – 4 Credits)

UNIT I:

Introduction – Early Operating Systems – Buffering and Spooling – Multiprogramming – Time Sharing – Protection – Operating System Structures., – Operating Systems Services – Process Concept – Hierarchy of processes – Critical section problems – Semaphores – Process Coordination problems – Inter processes communication.

UNIT II:

Process Synchronization – Scheduling Concepts – Scheduling Algorithms – Algorithm Evaluation – Multiprocessor scheduling. Deadlock problem – Characterization – Prevention – Avoidance – Detection – Recovery, Combined approach to Deadlock handling – Threads – Multithreading Models.

UNIT III:

Memory Management – Swapping – Multiple partitions – Paging –Segmentation – Paged segmentation – Virtual Memory Concepts – Overlays – Demand Paging and Performance – Page Replacement Algorithms – Allocation Algorithms –Thrashing.

UNIT IV:

Disk Scheduling and Distributed Systems – Physical characteristics – Disk Scheduling - Disk Scheduling Algorithms – Sector Queuing, File Systems – Access Methods - Allocation Methods – Directory Systems – File Protection – Implementation Issues – Distributed File Systems – Naming and Transparency – Remote File Accesses.

UNIT V:

Operating System Case Studies –UNIX and WINDOWS Operating Systems – History – Design Principles – System Components.

Text Book:

James L.Peterson, Abraham SilberSchetz - Operating System Concepts

REFERENCES:

1. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Pearson Education,2004.
2. Gary Nutt, “Operating Systems”, Third Edition, Pearson Education, 2004.

3. Harvey M. Deital ,”Operating Systems” , Third Edition, Pearson

Education,2004.

4. William Stallings, “Operating Systems: Internals and Design Principles”, Seventh Edition,Prentice Hall,

2011

CS 2: Object Oriented Programming and Design (5 Hours – 5 Credits)

Unit I:

Introduction to OOP – Overview of C++ - Classes – Structures – Union – Friend Functions – Friend Classes – Inline functions – Constructors – Destructors – Passing objects to functions – Function returning objects-Arrays of Objects, Object as Function Arguments

Unit II:

Arrays – Pointers – this pointer – References – Dynamic memory Allocation – functions Overloading – Default arguments – Overloading Constructors – Pointers to Functions

Unit III:

Inheritance – Types - Derived Class Constructors- Issues in Inheritance – Virtual base Class – Polymorphism

Unit IV:

Class templates and generic classes – Function templates and generic functions – Overloading function templates – power of templates – Exception Handling – Derived class Exception – over handling generic functions – Exception handling Functions

Unit V:

Streams – Formatted I/O with IOS class functions and manipulators –File I/O – Name spaces – Array based I/O – Error handling during file operations - Formatted I/O

Reference Books:

1. Stephen Prata,”C++ Primer Plus”, 6th Edition ,Addison-Wesley Professional, 2011
2. BjarneStroustrup, “Programming: Principles and Practice Using C++,1st Edition, Addison-Wesley Professional, 2008
3. Andrew Koenig and Barbara E. Moo, “Accelerated C++: Practical Programming by Example”, 1st Edition, Addison-Wesley Professional, 2000

4. Bruce Eckel ,”Thinking in C++: Introduction to Standard C++: Volume One” 2nd Edition,PrenticeHall, 2000
5. Andrei Alexandrescu , “Modern C++ Design: Generic Programming and Design PatternsApplied” , 1st Edition, Addison-Wesley Professional, 2001

CS 3: LAB: Object Oriented Programming using C++ (5 Hours – 3 Credits)

Section A

1. Write a C++ Program to illustrate Enumeration and Function Overloading\
2. Write a C++ Program to illustrate Scope and Storage class
3. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading
4. Write a C++ program to illustrate the Call-by-Value and Call-by-Reference
5. Write a C++ Program to illustrate Static member and methods
6. Write a C++ Program to illustrate Bit fields
7. Write a C++ Program to overload as binary operator, friend and member function
8. Write a C++ Program to overload unary operator in Postfix and Prefix form as member and friend function
9. Write a C++ Program to illustrate Iterators and Containers
10. Write a C++ Program to illustrate function templates
11. Write a C++ Program to illustrate template class
12. Write a C++ Program to illustrate Virtual functions
13. Write a C++ Program to illustrate Exception Handling
14. Write a C++ Program to illustrate File Handling – Read, Write, Update

Section B

1. Write a C++ program with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc.
2. Write a C++ program to create stack and queue classes with necessary exception handling
3. Write a C++ Manage bank account using inheritance concept using C++
4. Write a C++ program to Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.

II SEMESTER

CS 4: Data Communication and Computer Networks (4 Hours – 4 Credits)

Unit I:

Introduction to Data Communications: Components of data communication ,Data representation, Transmission Impairments, Switching, Modulation, Multiplexing ,Review of Network Hardware: LAN, MAN, WAN, Wireless networks, Internetworks, Review of Network Software: Layer, Protocols, Interfaces and services. Reference Models: OSI, TCP/IP and their comparison.

Unit II:

Physical Layer: Transmission Media: Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (Radio, Microwave, Infrared). Introduction to ATM, ISDN, Cellular Radio and Communication Satellites. Data Link Layer – Services provided by DLL; FRAMING ERROR CONTROL, FLOW CONTROL, MEDIUM ACCESS, Medium Access Sub layer; Channel Allocation, MAC protocols – ALOHA, CSMA protocols, Wireless LAN protocols, IEEE 802.3, 802.4, 802.5 standards and their comparison.

Unit III:

Network Layer Design Issues, Routing Algorithms (Shortest Path, Flooding, Distance Vector Hierarchical, Broadcast, Multicast).congestion Control Algorithms(Leaky bucket, Token bucket ,Load shedding),Internetworking, IP Protocol ,ARP, RARP, Network Trouble Shooting Using Ping, Traceroute, Ipconfig, Netstat, nslookup

Unit IV:

Transport Layer Addressing, Establishing And Releasing Connection, Flow Control, Buffering, Internet Transport Control(TCP and UDP), Application Layer – DNS – TELNET-FTP-SMTP –POP-SNMP-HTTP-IP Over ATM-Mobile IP-Multimedia :audio and video compression- Name Service, Email-Architecture and services, TELNET, File Transfer Protocol(FTP), Simple Network Management Protocol(SNMP)Simple Mail Transfer Protocol(SMTP),Hyper Text Transfer Protocol(HTTP),World Wide Web(WWW).

Unit V:

Cryptography: Symmetric key cryptography- asymmetric key cryptography – security services: Message confidentiality-message integrity-message authentication-entity authentication-digital signature key management-security in internet: IP Sec-SSL/TLS-PGP-Firewalls. Introduction to MPLS-Tunneling- QoS.

References Books:

1. Behroz A. forouzan,"Data Communication and Networking", The McGraw Hill Education Private Limited,New Delhi.
2. Behroz A. forouzan,"TCP/IP Protocol suite", The McGraw Hill edition,New Delhi.
3. "Data communication and computer networks",ISRD group, TMH publications.
4. LarryL.Peterson Bruce S,Davie, "Computer Networks - a system approach",Morgan Kaufmann publishers.
5. Andrews S Tanenbaum,"Computer Networks",Prentice Hall.

ES1: Internet of Things **(4 Hours – 4 Credits)**

Unit I:

Introduction to IoT: Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels & Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology.

Unit II:

IoT Architecture: M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model Domain model - information model - functional model - communication model - IoT reference architecture

Unit III:

IoT Protocols : Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP - Security

Unit IV:

Building Iot with Raspberry PI& Arduino: Building IOT with RASPERRY PI- IoT Systems - Logical Design using Python – IoT Physical Devices Endpoints - IoT Device - Building blocks - Raspberry Pi -Board - Linux on Raspberry Pi - Raspberry Pi Interfaces - Programming Raspberry Pi with Python - Other IoT Platforms - Arduino.

Unit V:

Case Studies and Real-World Applications: Real world design constraints - Applications - Asset management, Industrial automation, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT - Amazon Web Services for IoT

Reference Books:

1. ArshdeepBahga, Vijay Madiseti, “Internet of Things – A hands-on approach”, Universities Press, 2015
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), “Architecting the Internet of Things”, Springer, 2011.
3. Jan Ho`ller, VlasiosTsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.
4. Honbo Zhou, “The Internet of Things in the Cloud: A Middleware Perspective”, CRCPress, 2012.
5. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012

CS5: Relational Database Management Systems **(5 Hours – 5 Credits)**

UNIT-I

Introduction-Database System Applications, Purpose of Database Systems, View of Data - Data Abstraction, Instances and Schemas, Data Models, Database Languages - DDL, DML, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design , ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model - Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views

Destroying/ altering Tables and Views.

UNIT-II

Relational Algebra and Calculus: Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus - Tuple relational Calculus - Domain relational calculus - Expressive Power of Algebra and calculus.

Form of Basic SQL Query - Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set - Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values - Logical connectives - AND, OR and NOT - Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT-III

Introduction to Schema Refinement - Problems Caused by redundancy, Decompositions - Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms - BCNF - Properties of Decompositions - Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design - Multi valued Dependencies - FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

UNIT-IV

Transaction Management - Transaction Concept - Transaction State - Implementation of Atomicity and Durability - Concurrent - Executions - Serializability - Recoverability - Implementation of Isolation - Testing for serializability. Concurrency Control - Lock - Based Protocols - Timestamp Based Protocols - Validation - Based Protocols - Multiple Granularity.

Recovery System-Failure Classification-Storage Structure-Recovery and Atomicity - Log - Based Recovery - Recovery with Concurrent Transactions - Buffer Management - Failure with loss of nonvolatile storage - Advance Recovery systems - Remote Backup systems.

UNIT-V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations. Tree Structured Indexing: Intuitions for tree indexes, Indexed Sequential Access Methods(ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw Hill, VI edition, 2006.

REFERENCES BOOKS:

1. Database Systems, 6th edition, Ramez Elmasri, ShamkatB.Mavathe, Pearson Education, 2013.
2. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2nd ed.,ELSEVIER.
3. Database Systems, A Practical approach to Design implementation and Management Fourth edition, Thomas Connolly, carolyn Begg, Pearson education.
4. Database Systems Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
5. Fundamentals of relational Database Management Systems, S. Sumathi, S.Esakkirajan, Springer.
6. Database Management System Oracle SQL and PL/SQL, P.K. Das Gupta, PHI.
7. Introduction to Database Management, M.L. Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Introduction to Database Systems, C.J. Date, Pearson Education.
10. Database Management Systems, G.K. Gupta, TMH.

CS 6: LAB: Relational Database Management Systems (5 Hours – 3 Credits)

Section A:

Perform the following queries on the database :

1. Display all the details of all employees working in the company.
2. Display ssn, lname, fname, address of employees who work in particular department
3. Retrieve the name and salary of every employee

4. Retrieve all distinct salary values
5. Retrieve all employee names whose address is in „Bellaire“
6. Retrieve all employees who were born during the 1950s
7. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
8. Retrieve the names of all employees who do not have supervisors
9. Retrieve SSN and department name for all employees

Section B

1. Write a PL/SQL code to calculate total and percentage of marks of the students in four subjects.
2. Write a PL/SQL code to calculate the total salary of first n records of employee table. The value of n is passed to cursor as parameter.
3. Write a PL/SQL code to update the salary of employees who earn less than the average salary.
4. Write a row trigger to insert the existing values of the salary table in to a new table when the salary table is updated.
5. For the insert, retrieve, update and delete operations on a student table.
6. To Perform Banking Operations Using Procedures

III SEMESTER

CS 7: Software Engineering (4 Hours – 4 Credits)

Unit I:

INTRODUCTION: Software Engineering Paradigms – Waterfall Life Cycle Model – Spiral Model – Prototype Model – Agile Process Model – Unified Process Model - Planning – Software Project Scheduling – SRS - Case Study: Project Plan and SRS

Unit II:

SOFTWARE DESIGN: Designing Concepts - Abstraction – Modularity – Software Architecture – Cohesion – Coupling – Dataflow Oriented Design - Jackson System Development - Real time and Distributed System Design

Unit III:

SOFTWARE TESTING AND MAINTENANCE: Software Testing Fundamentals – Software Testing Strategies – Black Box Testing – White Box Testing – System Testing – Object Orientation Testing – State Based Testing – Testing Tools – Test Case Management – Types of Maintenance – Case Study: Testing Techniques

Unit IV:

SOFTWARE METRICS: Scope – Classification of metrics – Measuring Process and Product attributes – Direct and Indirect measures – Cost Estimation - Reliability – Software Quality Assurance – Standards – Case Study for COCOMO model.

Unit V:

SCM & WEB ENGINEERING: Need for SCM – Version Control – SCM process – Software Configuration Items – Taxonomy – Re Engineering – Reverse Engineering - Web Engineering - CASE Repository – Features

Reference Books:

1. Ali Behforrooz, Frederick J.Hudson, “Software Engineering Fundamentals”, Oxford Indian Reprint,2012.

CS 8: Data Warehousing and Mining (4 Hours – 4 Credits)

Unit I:

Introduction - Why Data Mining? - What is Data Mining? - What Kinds of Data Can Be Mined? - What Kinds of Patterns Can Be Mined? - Which Technologies Are Used? Which Kinds of Applications Are Targeted? Major Issues in Data Mining. Getting to Know Your Data: Data Objects and Attribute Types - Basic Statistical Descriptions of Data - Data Visualization –Measuring Data Similarity and Dissimilarity.

Unit II:

Data Preprocessing: Data Preprocessing an Overview - Data Cleaning - Data Integration - Data Reduction - Data Transformation and Data Discretization. Data Warehousing and Online Analytical Processing: Data Warehouse: Basic Concepts - Data Warehouse Modeling: Data Cube and OLAP - Data Warehouse Design and Usage - Data Warehouse Implementation.

Unit III:

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods - Frequent Item set Mining Methods - Which Pattern Are Interesting? - Pattern Evaluation Methods. Advanced Pattern Mining: Pattern Mining: A Road Map - Pattern Mining in Multilevel, Multidimensional Space - Constraint - Based Frequent Pattern Mining Mining High -Dimensional Data and Colossal Patterns - Mining Compressed or Approximate Patterns - Pattern Exploration and Application.

Unit IV:

Classification: Basic Concepts - Basic Concepts - Decision Tree Induction - Bayes Classification Methods - Rule-Based Classification- Model Evaluation and Selection - Techniques to Improve Classification Accuracy.

Unit V:

Cluster Analysis Basic Concepts and Methods: Cluster Analysis - Partitioning Methods - Hierarchical Methods - Density Based Methods - Grid Based Methods - Evaluation of Clustering.

Reference Books:

1. Data Mining Concepts and Techniques - Third Edition, Jiawei Han, MichelineKamber, Jian Pei
2. Insight into Data mining Theory and Practice K.P. Soman, ShyamDiwakar and V. Ajay, Easter Economy Edition, Prentice Hall of India, 2006.
3. Introduction to Data Mining with Case Studies,G. K. Gupta, Easter Economy Edition, Prentice Hall of India, 2006.

4. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Pearson Education, 2007.
5. Modern Data Warehousing, Mining, and Visualization, MARAKAS, GEORGE M, Pearson Education, 2011.

CS 9: Dot Net **(5 Hours – 5 Credits)**

Unit I:

Building-blocks of C#: C# the Trailblazer – Productivity of C# - Features, and Advantages – C# Vs. Java –Overview of C# - Gaining momentum with C# programs in VS.NET – Keywords – Data Types, Literals, and Variables – Value Types, Integers, Floating-Point Types, The Decimal Type, Characters, The Bool Type - Literals – Character Escape Sequences -Working with Variables – Scope, Type Conversion and Casting-Operators – Program Control Structures – Classes and Objects – Arrays and Strings

Unit II:

Advanced Programming concepts in C#: Inheritance – Constructors and Inheritance, Name Hiding, Virtual Methods Overriding, Boxing and Unboxing – Indexers and Properties, Interfaces Vs. Abstract Classes –Structures – Enumerations – Exception Handling – Try and Catch, Multiple Catch Clauses, Nesting Try Blocks, Using Finally, Using Checked and Unchecked – Delegates– Multicasting, Covariance and Contra variance – Anonymous Functions Vs. Methods –Lambda Expressions – Events – Reflection, and Attribute – Unsafe Code, Pointers -Introduction to Generics, and LINQ – Multithreaded Programming using TPL and PLINQ

Unit III:

Features-rich Web Application Development using ASP.NET: Introduction to ASP.NET - Advantages of ASP.NET - ASP.NET Architecture – ASP Vs.ASP.NET - ASP.NET Page's Structure - Sample Program in ASP.NET - Page Events -HTML Server Controls - Basic Web Server Controls - Data List Web Server Controls -Validation Controls - Web User Controls in ASP.NET

Unit IV:

Intrinsic Objects, and Security Mechanism in ASP.NET: Objects and Advanced Concepts in ASP.NET: Request Object - Response Object - Code-Behind Feature of ASP.NET - Caching in ASP.NET - Output Caching – Fragment Caching - Data Caching - Session / State Management – Events and Abandon Method –Authentication in ASP.NET - Error Handling and Debugging - Tracing an Application –Accessing Data with ADO.NET – Implementing Crystal Reports in ASP.NET

Unit V:

Introduction to Windows Phone Apps Development: Mobile Application Development – Featured Phone Vs. Smart Phone – Smart Phone Oss– Introducing Windows Phone 7 and the Windows Phone Platform - Building Windows Phone 7 Applications - Using Cloud Services as Data Stores - Catching and Debugging Errors - Packaging, Publishing, and Managing Applications

ReferenceBooks:

1. Herbert Schildt, "C# 4.0", Edition 2010, Tata McGraw-Hill.

2. Kogent Learning Solutions, “ASP.NET 4.0 Black Book”, Reprint 2012, Dreamtech Press.
3. Matt J.Crouch, “ASP.NET and VB.NET Web Programming”, Edition 2012, Pearson Education.
4. Henry Lee, Eugene Chuvyrov, “Beginning Windows Phone App Development”, , Apress, 2012 Edition.
5. John Sharp, “Microsoft Visual C# 2010”, Reprint 2011, Dreamtech Press.
6. Ben Watson, “C# 4.0 How-To”, Edition 2010, Pearson Education.
7. Stephen Walther, Kevin Hoffman, Nate Dudek, “ASP.NET 4 Unleashed”, Second Impression 2013, Pearson Education.

CS 10: LAB: Dot Net (5 Hours – 3 Credits)

1. Develop a control application to demonstrate the control structures in C#
2. Demonstrate Indexers and Properties
3. Demonstrate Interfaces, Structures, and Enumerations
4. Demonstrate Delegates, and Events
5. Demonstrate the working mechanism of PLINQ
6. Develop a web application to demonstrate various web server controls
7. Demonstrate the validation controls in ASP.NET
8. Demonstrate caching in ASP.NET
9. Demonstrate the intrinsic objects in ASP.NET
10. Develop a web application for students’ information management with crystalreports
11. Demonstrate LINQ to an SQL application
12. Develop a basic Windows Phone Application

IV SEMESTER CS 11: Information Security (4 Hours – 4 Credits)

Unit I:

Introduction: what is security? What is management? Principles of information security management. **Planning for security:** role of planning, precursors to planning, strategic planning. **Planning for contingencies:** Fundamentals and components of contingency planning.

UnitII:

Information security policy: why policy? Enterprise information security policy, issue specific security policy, system specific security policy. **Developing the security program:** organizing for security, placing information security within an organization, components of the security program, information security roles and titles.

UnitIII:

Security management models: blue print, framework and security models, access control model, security architecture models, security management models. Security management practices: benchmarking, performance management.

Unit IV:

Risk management: identifying and assessing risk-risk management, identification, assessment.
Controlling risk: risk control strategies, managing risk.

Unit V:

Production mechanism: access control, firewalls, intrusion detection and prevention systems, remote access protection, wireless networking protection, scanning and analysis tools, cryptography.

Reference Books:

1. Management of Information Security, 4th Edition, 2014, Michael E. Whitman and Herbert J. Mattord
2. “Principles of Information Security”, Michael E Whitman and Herbert J Mattord, Vikas Publishing House, New Delhi, 2003
3. Information Security Management Principles, Andy Taylor, 2nd edition, 2013
4. Fundamentals of Information Systems Security, by David Kim, Jones & Bartlett Learning, 3rd Edition, 2018

**CS 12: Mobile Computing
(4 Hours – 4 Credits)**

Unit 1:

Introduction to Mobile Application Development

Define mobile computing - Types of mobile computing devices - Compare and contrast web-based mobile applications and native applications – History of mobile platforms - Internet protocols for mobile applications - Evolution of browsers - Internet languages such as HTML and JavaScript.

Unit 2: Infrastructure

Mobile and cell phone technologies - Compare and contrast 3-G and 4-G - IP address - Gateways and subnet masks - Transport-HTTP and routing - Proxies and reverse proxies work.

Unit 3: HTML/CSS/DOM and Scripting

Basic HTML - Cascading Style Sheets - Document object model- utilization in web design - Basic JavaScript code - JavaScript language.

Unit 4: JQuery and Structured Data

Basic jQuery syntax - jQuery code using event listeners - Integrate JavaScript with XML - XML usage - JSON and its uses.

Unit 5: Scripting with Server Access

AJAX for web applications - Mechanics of AJAX - JavaScript frameworks

REFERENCES:

1. <http://developer.android.com/develop/index.html>
2. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
3. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012
4. James Dovey and Ash Furrow, "Beginning Objective C", Apress, 2012
5. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS 6 Development: Exploring the iOS SDK", Apress, 2013.

EES 1: Project Work and Viva Voce (16 Hours – 12 Credits)

(Industry / Institutional based)

Internal/external project work with submission of project work and viva-voce examination

Students will be able to Implement the solution for the chosen problem using the concepts and techniques in the curriculum

1. Record the research to the development process of a particular problem