

DEPARTMENT OF COMPUTER SCIENCE  
**Master of Computer Applications (MCA)**  
**P.G. PROGRAMME**  
**SYLLABUS**

Effective from the Academic Year 2012-2013



**Loyola College (Autonomous)**

**Chennai- 600 034**

**MCA SYLLABUS (Revised in 2012)**

Semester	Category	Code	Title	Hrs.	Credit
I	MC	CA1804	DISCRETE STRUCTURES	4	3
I	MC	CA1805	PROGRAMMING AND DATA STRUCTURES THROUGH C++	4	4
I	MC	CA1806	FREE AND OPEN SOURCE SOFTWARE DEVELOPMENT	4	4
I	MC	CA1807	COMPUTER ORGANIZATION AND ARCHITECTURE DATABASE	4	4
I	MC	CA1808	MANAGEMENT SYSTEMS	4	4
I	MC	CA1809	C++ AND DATA STRUCTURES LAB DATABASE	4	2
I	MC	CA1810	MANAGEMENT SYSTEMS LAB	4	2
II	MC	CA2803	STATISTICAL METHODS FOR COMPUTER APPLICATIONS	4	3
II	MC	CA2804	PROGRAMMING WITH JAVA	4	4
II	MC	CA2805	OBJECT-ORIENTED SOFTWARE ENGINEERING	4	4
II	MC	CA2806	MICROPROCESSOR AND ITS APPLICATIONS	4	4
II	MC	CA2807	OPERATING SYSTEMS	4	4
II	MC	CA2808	JAVA PROGRAMMING LAB	4	2
II	MC	CA2809	UNIX PROGRAMMING LAB	4	2
III	MC	CA3805	.NET TECHNOLOGIES	4	4
III	MC	CA3806	.NET TECHNOLOGIES LAB	4	2
III	MC	CA3807	DATA COMMUNICATION AND NETWORKS COMPUTER	4	4
III	MC	CA3808	GRAPHICS AND MULTIMEDIA LAB COMPUTER GRAPHICS	4	2
III	ID	CA3875	AND MULTIMEDIA APPLICATIONS ELECTIVE I	3 + 3 #	5
III	ES			6	4

IV	MC	CA4806	XML AND WEB SERVICES	4	4
IV	MC	CA4807	XML AND WEB SERVICES LAB RESOURCE	4	2
IV	MC	CA4808	MANAGEMENT TECHNIQUES MOBILE	4	3
IV	MC	CA4809	COMPUTING	4	4
IV	ES		ELECTIVE II	4	4
IV	ES		ELECTIVE III	4	2
IV	ES		ELECTIVE IV	4	4
V	MC	CA5805	SOFTWARE TESTING	4	4
V	MC	CA5806	KNOWLEDGE MANAGEMENT SYSTEM AND APPLICATIONS	4	4
V	MC	CA5807	DATA MINING	4	4
V	MC	CA5808	CLOUD COMPUTING	4	4
V	MC	CA5809	SOFTWARE DEVELOPMENT LAB	4	2
V	ES		ELECTIVE V	4	4
V	ES		ELECTIVE VI	4	2
VI	MC	CA6801	PROJECT WORK	30	12

**TITLE OF ELECTIVE COURSES**

SEMESTER	ELECTIVE		TITLE	HOURS	CREDITS
III	ELECTIVE I	CA3951	SOFTWARE PROJECT MANAGEMENT(OR)	4	4
		CA3952	IT INFRASTRUCTURE MANAGEMENT	4	4
IV	ELECTIVE II	CA4954	ADVANCED JAVA (OR)	4	4
		CA4956	ADVANCED .NET	4	4
IV	ELECTIVE III	CA4955	ADVANCED JAVA LAB (OR)	4	2
		CA4957	ADVANCED .NET LAB	4	2
IV	ELECTIVE IV	CA4958	NETWORK ADMINISTRATION(OR)	4	4
		CA4959	DATABASE ADMINISTRATION	4	4
V	ELECTIVE V	CA5955	NEURAL NETWORKS USING MATLAB(OR)	4	4
		CA5957	NETWORK SECURITY	4	4
V	ELECTIVE VI	CA5956	NEURAL NETWORKS USING MATLAB LAB (OR)	4	2
		CA5958	NETWORK SECURITY LAB	4	2



**Opting for Electives:**

ADVANCED JAVA THEORY AND ADVANCED JAVA LAB should be chosen together.

ADVANCED .NET THEORY AND ADVANCED .NET LAB should be chosen together.

NEURAL NETWORKS USING MATLAB THEORY AND NEURAL NETWORKS LAB should be chosen together.

NETWORK SECURITY THEORY AND NETWORK SECURITY LAB should be chosen together.

# 3 HOURS will be taken by MCA department and 3 HOURS will be taken by Visual Communication department per week

SEMESTER	CATEGORY	OFFERING DEPARTMENT	TITLE	HRS.	CREDITS
I	SOFT SKILL	ENGLISH	TECHNICAL WRITING	2 + 2*	2
II	SOFT SKILL	FOUNDATION	LIFE SKILLS	2 + 2*	2
III	EXTRA DISCIPLINARY	COMMERCE	PRINCIPLES OF MANAGEMENT ACCOUNTING	4	3
IV	SOFT SKILL	MCA	PERSONALITY DEVELOPMENT	2 + 2*	2
V	SOFT SKILL	MCA	QUANTITATIVE APTITUDE	2 + 2*	2

\*Two hours will be taken in regular class hours and 2 hours will be taken outside the class hours.

**Summer Training Program:** During summer vacation of second year each student should undergo training in a software or software related industry for 30 working days and they have to present their learning soon after the college is reopened. 2 credits will be awarded for the successful completion.

**Term Paper:** Each student has to present paper in any subject related topic during fifth semester. Paper presented in other institutions also will be considered equivalent. Marks will be given after evaluation and it will be added to third component of software development.



**SEMESTER I**

**CA 1804 DISCRETE STRUCTURES**

**Semester : I**

**Credits: 3**

**Category: MC**

**No of Hours/week: 4**

**Objectives:**

To provide mathematical foundation for computer science courses that include data structures, database theory, compiler theory, computer architecture and operating systems.

**Unit I Mathematical logic**

Mathematical Logic: Propositional Logic - Propositional Equivalence - Predicates and Quantifiers - Disjunctive and Conjunctive Normal Forms - Minimal Sum of Products – Inference using Predicate Logic.

**Unit II Set theory and Mathematical induction**

Set Theory: Sets, Set Operations – Functions – Relations - Equivalence Relations - Partial Orderings - Lattices. Mathematical Induction: Strong Induction and well-ordering - Recursive Definitions and Structural Induction.

**Unit III Combinatorics**

Counting: The Basics of Counting - Pigeonhole Principle - Permutations and Combinations - Binomial Coefficients - Recurrence Relations - Inclusion – Exclusion and its Applications.

**Unit IV Graph theory**

Graphs: Graphs and Graph Models - Graph Terminology - Representing Graphs and Graph Isomorphism – Connectivity - Euler and Hamilton Paths - Shortest-Path Problems - Planar Graphs. Trees: Application of Trees - Tree Traversal - Spanning Trees - Minimum Spanning Trees.

**Unit V Group theory and Finite automata**

Group Theory: Algebraic Structures - Semigroups and Monoids – Homomorphism - Isomorphism and cyclic groups - Cosets and Lagrange's Theorem - Elements of Coding Theory. Modeling Computation: Languages and Grammars - Finite-State Machines with output, with No output, Language Recognition.



**Book for Study:**

1. Kenneth H Rosen, Discrete Mathematics and Its Applications, Tata McGraw-Hill, 6<sup>th</sup> Edition 2007.
2. Ralph P. Grimaldi and B.V. Ramana, Discrete and Combinatorial Mathematics, Pearson Education, 5<sup>th</sup> Edition 2007.

**Book for Reference:**

1. J.P.Tremblay and R.Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill, Edition 1997.
2. Kolman, Busby and Ross, Discrete Mathematical Structures, Prentice-Hall, 5<sup>th</sup> Edition.2000
3. Seymour Lipschutz, Marc Lars Lipson, Discrete Mathematics, Tata McGraw-Hill, 3<sup>rd</sup> Edition 2010
4. T.Veerarajan, Discrete Mathematics, Tata McGraw-Hill, Edition 2007.

NPTEL Video Lectures from Loyola College Intranet under “NPTEL – Video Portal”

Discrete Structures by Prof.Kamala Kirthivasan, IIT Madras



**CA 1805 PROGRAMMING AND DATA STRUCTURES THROUGH C++**

**Semester : I**

**Credits: 4**

**Category: MC**

**No of Hours/week: 4**

## **Objectives**

This course introduces the basic programming knowledge in C++ using OOPs concepts and data structures for computing related applications.

### **UNIT I Introduction**

s/w evolution—features of procedure oriented programming—basic concepts of OOPs—benefits of OOPs—applications of OOPs—tokens—expressions—data types—variables—storage class specifiers—constants—operators—control structures—arrays—pointers.

### **UNIT I OOPS**

Class and objects—functions—friend function—inline function—**constructors:** types—overloading constructor—destructors--**Inheritance**—types—**Polymorphism:** function overloading—operator overloading(unary and binary)—virtual functions—console I/O—files—exception handling.

### **UNIT III Linear data structure**

Definition—**stack:** operation—**applications:**-infix to postfix and prefix conversion—evaluation of postfix expression—tower of Hanoi—**Queue:** operations—types—applications –**List:** single linked list—double linked list—circular linked list. **Sorting:** bubble sort—insertion sort—selection sort—quick sort—radix sort—merge sort. **Searching:** linear search –binary search.

### **UNIT IV Trees**



Basic terminologies—**binary trees**: representation—traversal—reconstruction—binary search trees—forest—conversion of binary trees into forest—threaded binary trees—B Trees—AVL trees—Red Black trees—Heap tree—Hashing—Hash functions.

### **UNIT-V Graphs**

Basic terminologies—representation—types—traversal—**minimum spanning tree**: Kruskal's algorithm—Prim's algorithm—**shortest path**: Dijkstra's algorithm

#### **Book for Study: C++**

1. Herbert Schildt, "The complete reference", Tata Mcgraw Hill Publications, 3<sup>rd</sup> edition.
2. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications, 3<sup>rd</sup> edition.
3. E. Balagurusamy, "Object Oriented Programming with C++", McGraw Hill Publications 4<sup>th</sup> edition.

#### **Book for Reference: C++**

1. Bjarne Stroustrup, "C++ programming languages" Pearson education, 3<sup>rd</sup> edition.

#### **Books for Study: Data Structures**

1. E. Horowitz S. Sahani and Mehta, "Fundamentals of Data Structures in C++" Galgotia publications, New Delhi.
2. Data Structures using C, ISRD groups, Tata Mc-Graw Hill Publications.
3. Samanta, "Classic Data Structures" Prentice Hall of India, 2009
4. Seymour Lipschitz, "Data Structures", Tata McGraw Hill Publications

NPTEL Video Lectures from Loyola College Intranet under "NPTEL – Video Portal"

**Data Structures and Algorithms by Prof. Naveen Garg, IIT Delhi.**

**Introduction to Problem Solving and Programming by D. Gupta, IIT Kanpur.**





**CA 1806 FREE AND OPEN SOURCE SOFTWARE DEVELOPMENT**

**Semester : I**

**Credits: 4**

**Category: MC**

**No of Hours/week:(2Th+2Lab)**

**Objectives:**

1. To create awareness about Free and Open Source Software
2. To acquire proficiency in Web Programming

**Unit I History of FOSS**

The FOSS Revolution - History of Free/Open Source and BSD Software - FOSS Licences (GPL, CC, ..) Living with Free Software - Discussion FOSS Projects

**Unit II PHP basics**

Origin and Uses of PHP – Overview of PHP – General Syntactic Characteristics – Primitives, Operators and Expressions – Output Statement – Control Statements – Arrays

**Unit III Functions & security**

Built-in Functions – User-defined Functions- Regular Expression – Validating Data Entry – Form Handling – Cookies – Session Tracking

**Unit IV MySQL**

MySQL: Getting Started with MySQL – Basic Data Types – Database and Table Creation – Performing Operations on Table Data – Running Calculations on Table Data – Grouping the Data – Functions in MySQL - Database Access with PHP and MySQL. Eclipse, an Integrated Development Environment.

**Unit V CSS**

Cascading Style Sheets: Introduction – Levels of Style Sheets – Style Specification Formats – Selector Forms – Property Value Forms – Font Properties – List Properties – Text Properties – Padding, Margins and Borders – Colours and Background Images – Conflict Resolution.

Ajax: Introduction - Overview of Ajax – The Basics of Ajax.

**Book for Study**

1. Robert W. Sebesta, Programming with World Wide Web, Pearson Education 4<sup>th</sup> Edition.
2. T.V.Gopal, Open Source Software, Scitech Publications, Edition 2003
3. Ivan Bayross, Sharanam Shah, MySQL 5 for Professionals, Shroff Publishers, Edition 2007.

**Book for Reference**

1. Dave W & others, Beginning PHP 5, Wiley-dreamtech, Edition 2004
- Steven M Schafer, HTML, CSS, JavaScript, Perl, Python, & PHP, Wiley-Dreamtech, Edition 2005



**CA 1807 COMPUTER ORGANIZATION AND ARCHITECTURE**

**Semester : I**

**Credits: 4**

**Category: MC**

**No of Hours/week: 4**

**Objectives**

To understand better the structure and logic behind the working of various functional modules of a computer and the interaction between them.

**Unit I Basics of Logic Design**

Introduction: Simple Computer Organization - Number System – Data Representation – Boolean Algebra – Logic Gates - Map Simplification – K Map - Introduction to Sequential Circuits and Combinational Circuits.

**Unit II Digital Components**

Adders – Subtractors – Decoders – Multiplexer – Flip Flops: RS, JK, D, T Flip Flops – Excitation Table – Master / Slave Flip Flop- Registers – Counters – Memory Unit - Micro Operations –

**Unit III Basic Computer Organisation and Design**

General Register Organization – Instruction Format – Instruction Type - Timing and Control – Addressing Modes – Memory Reference Instructions – Data Transfer and Manipulation – Computer Arithmetic - Design of ALU – Design of Control Unit.

**Unit IV Architecture**

Introduction to Loosely Coupled and Tightly Coupled Computer Architecture - RISC - CISC- Pipelining – Vector Processing – Array Processors – Peripheral Devices – Input Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt – DMA – I / O Processor.

**Unit V Memory**

Memory Hierarchy – Main Memory - Paging and Segmentation – Auxiliary Memory – Cache – Virtual Memory – Memory Management Hardware – Multiprocessor Interconnection Structures.

**Books for Study**

1. M.Morris Mano “Computer System Architecture”, Pearson Education, Third Edition 2007.
2. M.Morris Mano “Digital Logic and Computer Design”, Pearson Education, 1979, Tenth impression: 2008.



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### **Books for Reference**

1. William Stallings, “ Computer Organization and Architecture – Designing for Performance”, Eighth Edition, 2010.
2. Thomas C.Bartee, “Computer Organization and Digital Logic” Pearson Education, Seventh Edition, 2006.

John P.Hayes”Computer Architecture and Organization”, McGraw-Hill

NPTEL Video Lectures from Loyola College Intranet under “NPTEL– Video Portal”

Computer Organization by Prof. S. Raman, IIT Madras  
Computer Architecture by Prof. Anshul Kumar, IIT Delhi.



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## **CA 1808 DATABASE MANAGEMENT SYSTEMS**

**Semester : I**  
**Category: MC**

**Credits: 4**

**No of Hours/week: 4**

### **Objectives:**

To learn the concept of Database Management Systems

### **Unit-I Structured Query Language**

Definition - purpose of database system-View of Data- -Database Languages- Database Systems Structure-Relational algebra: Select – Project – Union – Additional operations- Set intersection – Natural join - SQL-Background-data definition - Set Operations-aggregate functions - Nested sub query - null values - Complex Queries- views -Modification of databases - Join relations-SQL data types and schemas -integrity constrains - authorization - Embedded SQL-Dynamic SQL-function and procedural constructs -advanced SQL Features.

### **Unit-II Database Design**

Database design: Entity Relationship Model: Overview - ER Relationship model - constraints- keys - ER diagram - design issues - Weak entity set - extended features - generalization - Unified modeling language. Relational database design: features of good design - Atomic domain first normal form - decomposition using functional dependency - functional dependency theory - decomposition using functional, multivalued dependencies - More Normal forms - modeling temporal data.

### **Unit-III Application design and development**

User interface and tools - web fundamentals - building large web applications - Triggers - authorization in SQL - Application security. Over view Physical storage - Magnetic disks - RAID- Tertiary storage - Storage Access - File Organization- Record organization - Data dictionary storage.

### **Unit-IV Indexing & Hashing**

Indexing & Hashing: Basic concepts - ordered indices - B+ TREE-B Tree-Static Hashing-Dynamic Hashing- bitmap indices .Query processing - overview - Measure of query cost - Selection operation - sorting - join - other operations - evaluation of expressions. Query Optimization - overview -transformation of relational expressions - Evaluation plan - materialized view.

### **Unit-V Managing concurrency backup and recovery**

Transaction :Transaction Concept- State - Implementation of atomicity and durability - Concurrent execution - recoverability - Concurrency Control -Lock-based - Timestamp-based - validation based Protocols - Multiple granularity - Multiversion schemes - Deadlock Handling -



Recovery Systems-Failure classification - log based recovery - Recovery with Concurrent Transactions-Shadow Paging-Buffer Management-Case Studies-Oracle-Microsoft SQL Server.

### **Book for Study**

Abraham Silberschatz, Henry F. Korth and S. Sudharssan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2010.

### **Books for Reference**

1. C.J Date, A. Kannan, S. Swaminathan, " An introduction to Database Systems", 8<sup>th</sup> edition, Pearson 2006.
2. Ramez Elamasri, Shamkant B. Navathe " Fundamentals of Database Systems". 5<sup>th</sup> edition, Pearson 2009.
3. Raghu Ramakrishnan, Johannes Gehrke, " Database Management System", 4<sup>nd</sup> edition, McGraw Hill Higher Education, 2010.
4. Alexis Leon, Mathew Leon, " Database Management System", Vikas publications.

NPTEL Video Lectures from Loyola College Intranet under "NPTEL – Video Portal"

Database Design by Prof. S. Srinath and Prof. D. Janaki Ram, IIT Madras.



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**CA 1809 C++ AND DATA STRUCTURES LAB**

**Semester : I**  
**Category: MC**

**Credits: 2**

**No of Hours/week: 4**

**LAB EXERCISES**

**C++:**

1. Control statements
  - a. Branching statements
  - b. Looping statements
2. Arrays
  - a. Matrix manipulation
  - b. Polynomial addition
3. Functions
  - a. Categories of function
4. Pointers
  - a. Pointers to arrays
  - b. Pointers to functions
  - c. Pointers to objects
5. Class and Objects
6. Array of objects
7. Friend functions
8. Inline functions
9. Constructor and Destructor
10. Types of constructor
11. Constructor Overloading
12. Inheritance types
13. Polymorphism
  - a. Function Overloading
  - b. Operator overloading(unary and binary)
  - c. Virtual functions
14. I/O formatting
15. Files



**Data Structures:**

1. Stack Operations (checking the boundary conditions)
2. Stack applications
  - a. Infix to Postfix expression
  - b. Evaluation of Expression
3. Queue Operations (checking the boundary conditions)
4. Circular Queue
5. Single Linked List ( creation, insertion, deletion, searching)
6. Doubly Linked List (creation, insertion, deletion, searching)
7. Linked Stack
8. Linked Queue
9. Sorting
  - a. Bubble sort
  - b. Selection sort
  - c. Insertion sort
  - d. Radix sort
  - e. Merge sort
10. Searching
  - a. Linear search
  - b. Binary search
11. Tree Traversals
12. Graph Traversals

Shortest Path –Dijkstra’s Algorithm



**CA 1810 DATABASE MANAGEMENT SYSTEMS LAB**

**Semester : I**

**Credits: 2**

**Category: MC**

**No of Hours/week: 4**

**Lab Exercises**

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB.
5. Write PL/SQL procedure for an application using exception handling.
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).

Typical Applications - Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory, etc. using PHP as front end





**SEMESTER II**

**CA 2803 STATISTICAL METHODS FOR COMPUTER APPLICATIONS**

**Semester : II**

**Credits: 3**

**Category: MC**

**No of Hours/week: 4**

**Objectives:**

1. To give foundation in statistical aspect of computer science
2. To train students in SPSS statistical software package.

**Unit I Basic Statistics**

**Review of Measures of Central Tendency – Measures of Dispersion:** Introduction - Range - Coefficient of Range - Quartiles - Quartile Deviation - Coefficient of Quartile Deviation - Mean Deviation and Coefficient of Mean Deviation. Standard Deviation and Coefficient of Standard Deviation - Coefficient of variation. Correlation: Definition, Types of Correlation - Scatter Diagram method - Karl Pearson's Correlation Coefficients - Correlation coefficients for Bivariate Frequency Distribution. **Regression:** Definition - Regression lines - Regression coefficients - Properties of Regression Coefficients - Fitting of regression lines

**Unit II Probability**

Sample space - events - Axiomatic approach to probability - Conditional Probability - Independent events - Baye's formula - Random variables - Continuous and Discrete random variables - Distribution Function of a Random variable - Characteristics of distribution – Expectation - Variance

**Unit III Distribution Functions**

Binomial Distribution – Poisson Distribution – Normal Distribution – Uniform Distribution

**Unit IV Concept of Sampling :**

Methods of sampling - Concepts of sampling distributions and standard error - Interval estimation of Mean and proportion. Test of Hypothesis - Critical region - Two



types of errors - Level of significance - Large sample tests for mean and proportion - Exact tests based on normal, t, F and Chi-square distributions.

### **Unit VANOVA, Time series& SPSS**

Analysis of Variance ANOVA: One- Way Classification--Time series analysis - Measurement of Trend and Seasonal variations. SPSS: Graphs and Charts—Frequencies—Descriptive statistics - Bivariate correlation - Simple regression - Chi-square Analysis—T TEST Procedure - One-Way ANOVA Procedure .

#### **Books for Study**

1. R.K.Gupta, "Statistical Methods", PHI
2. Darren George & Paul Mallery, "SPSS for Windows STEP BY STEP, Pearson, 10<sup>th</sup> Edition

#### **Books for Reference**

- 1 S.C. Gupta and V.K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand Publication.
2. S.C. Gupta and V.K. Kapoor, "Fundamentals of Applied Statistics", Sultan Chand Publication.



<b>CA 2804 PROGRAMMING WITH JAVA Semester : II</b>	<b>Credits: 4</b>
<b>Category: MC</b>	<b>No of Hours/week: 4</b>

**Objectives:**

- 1.To introduce the basics of Java Programming
2. To prepare them to learn advanced Java Programming

**Unit I Introduction to Java**

Java Language origin and Features - java buzz words - OOPS Concepts – Lexical Issues- Data types – Variables – Arrays - Operators – Control Statements. Classes – Objects – Constructors – Overloading Methods – Access Control- static and Fixed Methods – Inner classes. Inheritance – Overriding methods – Abstract classes.

**Unit II String classes**

String Objects – String methods – String buffers - I/O streams.Packages in java - Access Protection – Importing Package – interaction among packages - Interfaces – Exception handling – Throw and Throws - User defined exception.

**Unit III Java Threading**

Thread -Synchronization – Messaging - Runnable Interface - Inter-thread Communication – Deadlock – Suspension, Resuming and Stopping threads – Multithreading - Util Packages.

**Unit IV Applet**

Applet basics – Architecture – Applet Skeleton – Using status window – HTML applet tags – Passing parameters to applets – Methods available in applets AudioClip, AppletStub Interfaces- Event handling: Event classes – source – Listener interfaces - Mouse, Keyboard events.

**Unit V Working with Awt classes and networking basics**

AWT controls- layout managers and menus- Networking: basics – Socket Programming– Proxy Servers – TCP/UDP Sockets – Net Address – URL Datagrams - JDBC: Types of drivers - Steps to establish connectivity - example of connectivity.

**Books for Study**

1. Herbert Schildt, ” The Complete Reference JAVA 2”,7<sup>th</sup> Edition, Tata McGraw Hill.2010.
2. Dr. K. Somasundaram " Programming in Java2", Jaico Publishing house, 2005. ( JDBC)



**Book for Reference**

1. Y. Daniel Liang, " Introduction to Java Programming", 7<sup>th</sup> Edition, Pearson education, 2010.
2. Dr. C. Muthu, "Programming with Java", 2<sup>nd</sup> edition, Tata McGraw Hill.2010.
3. C. Thomas Wu " An introduction to Object-Oriented Programming with Java" , McGraw Hill international edition 2010,
4. Joseph L. Weber "Using Java 2 platform", Prentice Hall of India(PHI),



**CA 2805 OBJECT-ORIENTED SOFTWARE ENGINEERING**

**Semester : II**

**Credits: 4**

**Category: MC**

**No of Hours/week: 4**

**Objectives**

- To train the students to develop software in the object oriented methodology
- To introduce the software project management concepts.

**Unit I Software Engineering Concepts.**

The System life cycle: introduction – system development as a process of change – system development and reuse – methodology. Object-oriented system development: introduction – function/data methods – object-oriented analysis – object-oriented construction – object-oriented testing.

**Unit II Modeling with UML**

Introduction – An Overview – Modeling Concepts – A Deeper View into UML: Use Case Diagram – Class Diagram – Interaction Diagram – Statechart Diagram – Activity Diagram – Diagram Organization.- System development is model building - the requirements model – the analysis model

**Unit III Construction**

Introduction – the design model – block design – working with construction – User Interface Design - Object DBMS. Components: What is component – use of component.

**Unit IV Testing**

Introduction – Testing Concepts – Testing Activities: Component Inspection – Usability Testing – Integration Testing – System Testing – Planning Testing - Documentation Testing – Regression Testing – Automation Testing. Case study: Warehouse Management System.

**Unit V Managing object-oriented software engineering**

Introduction – Project selection – Product development organization – Project organization and management – Project staffing – Software quality assurance – software metrics – software configuration management.

**Book for Study**

Ivar Jacobson & others, Object-oriented software engineering, Pearson Education, 1992.

Bernd Bruegge, Allen H. Dutoit, Object-oriented Software Engineering, Pearson Education, Second Edition, 2004.

**Book for Reference**

Grady Booch & others, Object-oriented Analysis and Design with Applications, Pearson Education, Third Edition, 2010

Stephen R.Schach, Object-oriented and Classical Software Engineering, Tata McGraw-Hill, Fifth Edition, 2002

Yogesh Singh, Ruchika Malhotra, Object-Oriented Software Engineering, PHI, Edition 2012.

Ali Bahrami, Object Oriented System Development, McGraw-Hill International, 1999.

NPTEL Video Lectures from Loyola College Intranet under “NPTEL – Video Portal”

Software Engineering by Prof.Rushikesh K. Joshi & Others, IIT Mumbai.

System Analysis and Design by Prof. V. Rajaram, IISc Bangalore.



**CA 2806 MICROPROCESSOR AND ITS APPLICATIONS**

**Semester : II**

**Credits: 4**

**Category: MC**

**No of Hours/week: 4**

### **Objectives**

This course introduces the basic concepts of Microprocessor , interfacing and its applications

### **UNIT I: Introduction**

**Microcomputer:** Overview of structure and operation . **Microprocessor:** evolution and types—8086 internal architecture.—**Introduction to programming:** language types -- addressing modes—program development steps—constructing m/c ode-- program development tools—standard program structure.

### **UNIT II:Instructions**

String – procedures – Macros—Instruction descriptive— assembler directives.

### **UNIT III: Bus signals and Interrupts**

8086 bus activities—observing bus signals—trouble shooting—**Interrupts:** interrupts and responses—types—interrupt vector table—8254 programmable timer—8259A priority interrupt controller.

### **UNIT IV: Interfacing and Memory**

Parallel ports—Handshaking—**Interfacing:** digital and analog devices—Microcomputer based processor control system.—**Memory:** DMA—DRAM.

### **UNIT V:Advanced Microprocessors**

EDA tools—Coprocessors: Math Coprocessor(8087)- **Microcontrollers:** introduction--- architecture—addressing modes. **Case study:** X86 compatible VIA C7, Via Nano, AMD's Geode, Athlon Neo, Intel Atom.

### **Books for Study:**



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1. Douglas V.Hall, "Microprocessors and Interfacing". Tata McGraw-Hill edition, 2<sup>nd</sup> edition, 1999.
2. V.Vijayendran, "Fundamentals of Microprocessor", V.Subramanian for S.Viswanathan Publishers pvt Ltd.

**e-Book for Reference**

<http://download.intel.com/design/intarch/manuals/24319101.pdf>

**NPTEL Video Lectures from Loyola College Intranet under "NPTELVideoPortal"**  
**Microprocessors and Microcontrollers by Prof. Krishna Kumar, IISc., Bangalore**





**CA 2807 OPERATING SYSTEMS**

**Semester : II**  
**Category: MC**

**Credits: 4**

**No of Hours/week: 4**

**Objectives:**

1. To impart hands-on training on the fundamental OS Concepts by being centric on UNIX
2. To enable students to acquire theoretical knowledge along with the know-how to implement the concepts programmatically
3. To expose students to the various gamut of UNIX Programming such as Shell Scripts, Stand-alone and Network Programming

**Unit I**

Operating System – Definition – Functions – Components – Goals – Types of OSs , UNIX Architecture – UNIX Vs. Unix - Kernel – Monolithic - Micro – Hybrid – UNIX / Linux-based OS Flavors - Shell – Shell Scripts – Shell Programming – UNIX Basic Commands – UNIX Basic Commands – UNIX Networking Commands.

**Unit II**

File I/O – File Descriptors – File sharing - Files and directories -File types - File access permissions – File systems – Symbolic links - Standard I/O -library – Streams and file objects – Buffering - System data files and information - Password file – Group file – Login accounting – System identification.

**Unit III**

Process – Definition – Life Cycle – States – State Transition – Process Control Block – Parent / Child Process – Special Processes – Process Identifiers – Threads – POSIX and Pthreads – Inter-Process Communication using Message Queue - Pipes – FIFOs – Deadlock – Mutex – Process Synchronization using Semaphores and Shared Memory



## **Unit – IV**

CPU Scheduling- Scheduling Strategies – Preemptive Strategy – Policies under Preemptive Strategy, Non-Preemptive Strategy – Policies under Non-preemptive Strategy – Memory Hierarchy – Memory Management Functions – Memory Management Techniques – Single Contiguous – Partitions – Paging- Segmentation

## **Unit V**

Introduction to OSI Model – Transport Layer – Ping and Traceroute - Sockets - Sockets API for Connection oriented Data Transmission – Sockets API for Connectionless Data Transmission - TCP Sockets – UDP Sockets – Raw Sockets – Socket Programming

### **Books for Study**

1. H.M Dietel, P.J Dietel, D.R. Choffnes – “**Operating Systems**” – Third Edition – Pearson Education
2. James L. Peterson, Abraham Silbershatz – “**Operating System Concepts**” – Second Edition- Addison Wesley Publication
3. W.Richard Stevens, Stephen A. Rago – “**Advanced programming in the UNIX environment**”, Second Edition- Addison Wesley Publication

### **Books for Reference**

1. Stuart E. Madnick, John J. Donovan –“**Operating Systems**” - Tata McGraw-Hill- 2009 Edition

P.M. Dhamdhere – “**Operating Systems - A Concept-based Approach**”- Tata McGraw-Hill- 2006 Edition

**NPTEL Video Lectures from Loyola College Intranet under “NPTEL – Video Portal”**  
**Operating Systems by Prof. P.C.P. Bhatt, IISc., Bangalore**



**CA 2808 JAVA PROGRAMMING LAB**

**Semester : II**  
**Category: MC**

**Credits: 2**

**No of Hours/week: 4**

**LAB EXERCISES**

1 Programs implementing Inheritance, method overriding

2. Programs implementing Access specification among the package.

3. Programs implementing Inter Thread communication.

4. Programs implementing Calendar, random, vector classes.

5. Programs implementing the event handling both mouse and Keyboard.

6. Programs implementing AWT menus, font, images, images.

7. Programs implementing JDBC to a applet window to get and displaying Student details.

Programs using socket programming



<b>Semester : II</b>	<b>CA 2809 UNIX PROGRAMMING LAB</b>
<b>Category: MC</b>	<b>Credits: 2</b>
	<b>No of Hours/week: 4</b>

### **LAB EXERCISES**

1. Program to demonstrate the UNIX basic Commands.
2. Program using basic Network commands.
3. Program to demonstrate the Programming Constructs for Shell Scripts.
4. Construction of a Shell Script that validates whether the entered name corresponds to a file name or directory name.
5. Program to demonstrate the Access Permissions.
6. Program to demonstrate System Calls for File I / O : Create, Open, Read, Write, Close, Stat, fstat, lseek.
7. Program to deploy Inter Process Communication using Pipes .
8. Program to deploy Inter Process Communication using FIFOs.
9. Program to deploy Inter Process Communication using Message Queues.
10. Program to perform Inter Process Communication using shared Memory.
11. Program to perform synchronization using Semaphores.
12. Program to demonstrate Shortest Job First CPU Scheduling.
13. Program to demonstrate Round-Robin Scheduling.
14. Program using TCP sockets (Client and Server).
15. Program using UDP sockets (Client and Server). And Program for FTP



**SEMESTER III**

<b>CA3805 .NET TECHNOLOGIES</b>		
<b>Semester :III</b>		<b>Credits:4</b>
<b>Category: MC</b>	<b>No of Hours/week:4</b>	

**Objectives**

1. To introduce the students to .NET Framework and Visual Studio IDE for Application Development and Deployment
2. To impart skills for developing desktop and windows applications using VB.NET
3. To train the students on deploying ADO.NET connectivity for windows and web applications

**Unit I Introduction to .NET Technologies**

Introduction to Internet and Web Technologies-HTML Basics - Scripts- Client-side Vs Server-side Scripts - Sample Programs – Advantages and Disadvantages of Client-side and Server-side Scripts - Client-side Technologies Overview - Server-side Technologies Overview History of the Platform of .NET - .NET Framework Components Overview with Focus on CLR, CTS.

**Unit II VB.NET Building Blocks**

Introduction VB.NET – VB Vs VB.NET – VB.NET -Integrated Development Environment – Creating a short-cut to Start VB.NET - Maneuvering the Toolbar – Auto-hide, Docking and Undocking, Placing and Resizing the Windows – Working with Forms – Properties Window and Solution Explorer - Setting the Startup Object - Writing and Event Procedure – Execution - Basic Keywords – Data Types – VB.NET statements – Conditionals - If Else – Select Case – Switch and Choose – Operators - Loops – Do – For Next – For Each Next – While – Arrays.

**Unit III Application Development in VB.NET**

Windows Forms – Working with Controls – Timer, Picture-box, Group-box, Combo-box, Horizontal and Vertical Scrollbar, Numeric-up-down, Track-bar, and Progress-bar – Menus Dialog-boxes – Pop-Menus - Developing MDI – Multithreaded Programming – Code Modularization – Subroutines and Functions VB.NET Built-in Functions – Mathematical Functions, Strings, Date and Time, Data Type Inspection, Data Type Conversion, Financial and Miscellaneous Functions

**Unit IV OOPs deployment in VB.NET**

Classes, Objects, Methods – Methods Overloading – Events - Delegates – Inheritance – Interfaces – Encapsulation – Polymorphism – Classes Vs Components – Advanced Techniques – Drawing, and Printing – Debugging – Exception Handling – Introduction to Web Application Development using VB.NET

**Unit V ADO.NET Connectivity**

Introduction to ADO.NET – ADO Vs ADO.NET – Connected ADO.NET Architecture – Disconnected ADO.NET Architecture – Data Reader - Data Adapter – ADO.NET Classes –



ADO.NET - Namespaces – Interfacing VB.NET Applications with ADO.NET – Interfacing - ASP.NET Applications with ADO.NET

**Books for Study**

1. Shirish Chavan, “Visual Basic.NET”, Edition 2009, Pearson Education.
2. Matt J. Crouch , “ASP.NET and VB.NET Web Programming”, Edition 2012, Pearson Education.
3. Michael Otey and Denielle Otey, “ADO.NET Complete Reference”, Tata Macraw Hill Publication.

**Reference Books**

1. Kogent Learning Solutions, “.NET Framework 4.0 in Simple Steps”, Edition 2011, Dreamtech Press.
2. Steven Holzner, “Visual Basic.NET Programming – Black Book”, Edition 2005, Paraglyph Press.
3. Fred Barwell , “Professional VB.NET” 2<sup>nd</sup> Edition, Wrox Publication.



**CA3806 .NET TECHNOLOGIES LAB**

**Semester : III**  
**Category: MC**

**Credits: 2**  
**No of Hours/week: 4**

**Lab Exercises**

1. Demonstrate the conditional statements in VB.NET using a console application
2. Demonstrate the looping statements in VB.NET using a console application
3. Develop an application that demonstrates the windows controls
4. Develop a windows application with Menus and Dialog Boxes
5. Demonstrate Multithreaded Programming
6. Demonstrate subroutines and functions
7. Develop an application for deploying various built-in functions in VB.NET
8. Develop an MDI application for Employee Pay-roll transactions
9. Construct a console application to demonstrate the OOP Concepts
10. Demonstrate Events, Delegates, and Interfaces
11. Develop a Windows applications with database connectivity for core-banking transactions
12. Develop a web application for dynamic Login Processing



**CA3807 DATA COMMUNICATION AND NETWORKS**

**Semester :III**  
**Category: MC**

**Credits:4**  
**No of Hours/week:4**

**Objectives**

1. To enable the students to learn the basics of data communication .
2. To enable the students to understand the layers functionality.

**UNIT I Introduction and physical layer**

Introduction to network—networking—network devices--Data representation—data flow—networks: physical structures—categories of networks—protocols and standards—network models: OSI model—TCP/IP protocol suite—addressing. Physical layer and media: analog signals--digital signals—digital transmission— analog transmission--multiplexing—spread spectrum—transmission media: guided media—unguided media. switching: circuit switched networks—datagram networks—virtual circuit networks.

**UNIT II Data link layer**

Error detection and correction: types of errors—block coding—cyclic codes—checksum—data link control: framing—noiseless channel—noisy channels—point to point protocol-- Multiple access: random access—controlled access—channelization. wireless LANs Ethernet: IEEE standards—standard Ethernet----changes in standard—fast Ethernet—gigabit Ethernet—Wireless Lans: IEEE 802.11—bluetooth—connecting devices—backbone networks—virtual LANs—frame relay—ATM—L2 devices—X.25.

**UNIT III Network and transport layer**

Logical addressing: IPv4 addresses—IPv6 addresses—IP: IPv4—IPv6—transition from IPv4 to IPv6--IP addresses: classful addressing—classless addressing—forwarding—ARP—RARP—IP—ICMP—IGMP--UDP: process to process communication—UDP operation-- UDP package--TCP:-services—features—segment—TCP connection—state transition diagram—flow control—error control—congestion control—unicast routing protocols—multicast routing protocols—DHCP.

**UNIT IV Application layer**

DNS—TELNET—FTP—SMTP—POP—SNMP—HTTP—IP over ATM—Mobile IP—Multimedia: audio and video compression—streaming stored audio/video—streaming live audio/video---real-time inter active audio/video—voice over IP—SIP—H.323—skype--virtual private network.

**UNIT V Network security**

Cryptography: symmetric key cryptography—asymmetric key cryptography—security services: message confidentiality—message integrity—message authentication—entity authentication—digital signature key management—security in internet: IPsec—SSL/TLS—PGP—Firewalls. Introduction to MPLS—VPN—Traffic Engineering—RSVP(reservation protocol)—Tunneling—QoS.





**Text Books**

1. Behrouz A. Forouzan, "Data Communications and Networking", 4<sup>th</sup> edition, 2006, The McGraw Hill Education Private Limited, New Delhi.
2. Behrouz A. Forouzan, "TCP/IP protocol suite", 3<sup>rd</sup> edition, 2006, The McGraw Hill edition, New Delhi.

**Reference Books**

1. "Data communication and computer networks", ISRD group, Tata McGraw hill publications.
2. Larry L. Peterson and Bruce S. Davie, "Computer networks-a system approach", 3<sup>rd</sup> edition, Morgan Kaufmann publishers.
3. William Stallings, "Data and Computer communications", 6<sup>th</sup> edition, Pearson Education.
4. Andrew S Tanenbaum, "Computer Networks", 4<sup>th</sup> Edition, Prentice Hall.
5. Natalia Olifer, Victor Olifer, "Computer Networks-Principles, Technologies and Protocols for Network design", 2011, Wiley India..
6. Bhushan Trivedi, "Computer Networks", 2011, Oxford University press.

**NPTEL Video Lectures from Loyola College Intranet under "NPTEL – Video Portal"  
Computer Networks by Prof. Sujoy Ghosh, IIT Karagpur**

**Computer Networks by Prof. Ajit Pal, IIT Karagpur**

**Computer Networks by Prof. Hema A Murthy, IIT Karagpur**

**Data Communications by Prof. Ajit Pal, IIT Karagpur**

**Data Communications by Prof. H. S. Jamadagni, IISc, Bangalore**



**CA3875COMPUTER GRAPHICS AND MULTIMEDIA**

**Semester : III**

**Credits:5**

**Category: ID**

**No of Hours/week:3+3**

**Objectives:**

1. To enlighten the students on the actual foundations of 2D and 3D graphics and to appreciate the process in projecting 3D scene on a 2D plane.
2. To introduce the theories and practice of components of multimedia

**UNIT I Introduction and Output Primitives**

Introduction – Applications - Overview of Graphics System – Introduction to OpenGL – Output Primitives – Line, Circle and Ellipse Generating Algorithms – Interactive Input Methods.

**UNIT II 2D Graphics**

Two Dimensional Transformations -Basic Transformations , Reflection – Shear- 2D Viewing Pipeline – Window to Viewport Mapping - Clipping – Polygons - Splines - Bezier Curves.

**UNIT III 3D Graphics**

3D Transformations - Viewing a 3D scene - Visible Surface Detection Methods - Visualization and polygon rendering – Color Models – Computer Animation – General Animation Functions - Key Frame systems - Morphing.

**UNIT IV Overview of Multimedia**

Definition - Multimedia Elements Overview - Multimedia Hardware and software – Compression and Decompression - Components of multimedia – Text, Image – Graphics – Audio – Video – Animation – Authoring.

**UNIT V Multimedia Systems and Applications**

Multimedia Communication systems – Synchronization Issues – Presentation requirements – Applications – Video conferencing – Virtual reality – Interactive video – Video on Demand – Introduction to VRML.

**TEXT BOOKS**

1. Donald Hearn and M. Pauline Baker , “Computer Graphics with OpenGL”, Third Edition, 2004, Prentice Hall.
2. Ranjan Parekh , “ Principles of Multimedia”, 1st Edition, 2006, Tata McGraw-Hill Education.

**REFERENCE BOOKS**

1. Hearn D and Baker M.P, “Computer graphics – C Version”, 2004, 2nd Edition, Pearson Education.



**LOYOLA COLLEGE (AUTONOMOUS)**  
**CHENNAI - 600 034.**

2. Angel Edward, “Interactive Computer Graphics - A Top-down Approach With Opendgl”, 2000, 2nd Edition.
3. Andries van Dam, F. Hughes John, James D. Foley, Steven K. Feiner, “Computer Graphics : Principles and Practice in C”, 2nd Edition, 2002, Pearson Education.
4. Ralf Steinmetz, Klara steinmetz, “Multimedia Computing, Communications and Applications”, 2004, Pearson education.

**NPTEL Video Lectures from Loyola College Intranet under “NPTEL – Video Portal”**

**Introduction to Computer Graphics by Prof. Prem K. Kalra, IIT DELHI**  
**Computer Graphics by Prof. Prem K. Kalra, IIT DELHI**  
**Computer Graphics by Prof. Sukhendu Das, IIT MADRAS**



**CA3808 COMPUTER GRAPHICS AND MULTIMEDIA LAB**

**Semester :III**  
**Category: MC**

**Credits: 2**  
**No of Hours/week:4**

**LAB EXERCISES**

1. Program using OpenGL library functions, to implement the basic primitives such as POINT, LINES, QUAD, TRIANGLES and POLYGON etc.
2. Program using OpenGL library functions, to implement the line chart as per user input. Input monthly data for period of one year.
3. Program to draw hard wired house by using basic primitives of OpenGL library functions.
4. Program by using OpenGL library functions, to implement the Digital Differential Analyser line drawing algorithm.
5. Program by using OpenGL library functions, to implement the Bresenham's Line drawing, Circle drawing, Mid-point Circle drawing and Mid-point Ellipse drawing algorithms.
6. Program by using OpenGL library functions, to implement the Cohen-Sutherland Line clipping algorithm.
7. Program by using OpenGL library functions, to implement the Liang-Barsky Line clipping algorithm..
8. Program to demonstrate 2D and 3D transformations.
9. Window to Viewport Transformation
10. Sp Splines Using OpenGL, 2D Animation



**CA3951 SOFTWARE PROJECT MANAGEMENT**

**Semester :III**

**Credits:4**

**Category: ES**

**No of Hours/week:4**

**Objectives:**

1. To teach methods of s/w project planning.
2. To teach various controlling mechanisms used in s/w projects.

**UNIT I INTRODUCTION**

Project definition – Contract management – Activities covered by Software Project Management – Plans Methods and Methodologies – Stakeholders – Objectives – Project Success and Failure – Project Evaluation – Cost benefit evaluation and Risk Evaluation.

**UNIT II PROJECT PLANNING AND SELECTION**

Step wise Project Planning – Choosing Methodologies and Technologies – Software Processes and Models – Managing Iterative processes - Basis of Software Estimating – Techniques – Function Point Analysis

**UNIT III ACITIVITY PLANNING**

Objectives – Project Schedules – Sequencing and Scheduling Activities – Network planning model – Forward pass – The Backward Pass – Activity Float - Risk Management – Risk Identification – Risk assessment and planning- Resource Allocation.

**UNIT IV MONITORING AND CONTROL**

Creating framework – Collecting data – visualizing progress – cost monitoring – earned value – prioritizing monitoring – getting the project back to target – change control - types of contract – stages in contract placement – typical terms of a contract – contract management.

**UNIT V MANAGING PEOPLE AND ORGANIZING TEAM**

Introduction – understanding behavior – organizing behavior – motivation – stress – health and safety – working in team: becoming team – decision making – organizing and team structures – communication - leadership – software quality – Case Studies

**Text Books**

1. Bob Hughes , Mike cotterell and Rajib Mall “Software Project Management” 5<sup>th</sup> edition, 2012, Tata Mc Graw Hill.

**Reference Books**

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, “Quality Software Project Management”, 2002, Pearson Education,.
2. Pankai Jalote “Software Project Management in Practice”, 2002, Addison Wesley.



**CA3952 IT INFRASTRUCTURE MANAGEMENT**

**Semester :III**

**Credits:4**

**Category: ES**

**No of Hours/week:4**

**Objectives:**

1. To introduce different hardware and software infrastructure.
2. To teach how to manage storage of information efficiently.
3. To teach the concept of security management

**UNIT I Introduction**

Introduction – Information Technology, computer Hardware, computer software, network and Internet, computing resources IT infrastructure- Design issues, requirements IT system management process service management process, information system design, IT infrastructure library.

**UNIT II Services**

Service delivery process – Service delivery process, service level management, financial management, service management, capacity management, availability management.

**UNIT III Service and storage management**

Service support process – service support process, configuration management, incident management, problem management, change management, release management. Storage management – Backup and storage, archive and retrieve, disaster recovery space management, database and application protection, bare machine recovery, data retention.

**UNIT IV Security management**

Security management – Security, Computer and Internet security, Physical security, identity management, access management, intrusion detection, security information management.

**UNIT V IT Ethics and Trends**

IT Ethics – Introduction to cyber ethics, intellectual property, privacy laws-cyber forensics, internet - cyber crimes. Emerging trends in IT- e-Commerce, electronic data interchange, mobile communication development, smart card, expert system

**Text Books**

1. Manoj Kumar Choubey, Saurabh Singhal , “IT Infrastructure and Management ”,2012,Pearson Education.

**ReferenceBooks**

1. Phalguni Gupta, Umarani Jayaraman, Surya Prakash “IT Infrastructure And Its Management” 2010,Tata McGrawHill,



**SEMESTER IV**

<b>CA4806 XML AND WEB SERVICES</b>		
<b>Semester : IV</b>		<b>Credits: 4</b>
<b>Category: MC</b>	<b>No of Hours/week:4</b>	

**Objectives:**

1. To educate the students on the basics and technologies of XML thereby helping them to build XML based applications.
2. To analyse the aspects of Web Services and to integrate web based applications.

**UNIT I Essentials of XML**

The Beginnings and Promise of XML — Application Areas –XML Fundamentals –XML Technology Family- Validating XML – DTD and XSD –Transforming and Formatting XML - X-Files: XPath, Xlink and XPointer - XQuery – Voice XML

**Unit – II Building XML Based Applications**

Processing XML - DOM – SAX — XML and content Management- Semantic Web Architecture (24) – Role of XML and metadata in web content management – RDF– XML Standards – Standards organizations.

**Unit-III Architecting Web Services**

Business motivations for web services – B2B – B2C- Technical motivations – limitations of CORBA and DCOM – Service – oriented Architecture (SOA) – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services – deployment view – Application server to peer to peer – process view – life in the runtime

**Unit – IV Web Services Building Blocks**

Transport protocols for web services – messaging with web services – protocols – SOAP – describing web services – WSDL – Anatomy of WSDL – manipulating WSDL – web service policy – Discovering web services – UDDI – Anatomy of UDDI- Web service inspection- Web Services and E-business (E-com & ebXML)

**Unit - V XML Security**

Security Overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents – XML In Practice. Brief history of REST - Understanding REST Services.

**Text Books**

1. Ron schmelzer et al, “XML and Web Services”,2002, Pearson Education.
2. Frank P. Coyle, “XML, Web Services and the Data Revolution”, 2002, Pearson Education.



**Reference Books**

1. Sandeep Chatterjee and James Webber, “Developing Enterprise Web Services: An Architect’s Guide”, 2008, Prentice Hall.
2. Keith Ballinger, “.NET Web Services Architecture and Implementation”, 2003, Pearson Education.
3. Henry Bequet and Meeraj Kunnumpurath, “Beginning Java Web Services”, 2003, Apress.
4. Russ Basiura and Mike Batongbacal, “Professional ASP.NET Web Services”, Apress.
5. Leonard Richardson, Sam Ruby, “RESTful Web Services” , 2007, O'Reilly Media.
6. Elliotte Rusty Harold, “Processing XML with Java”, 2002, Addison-Wesley.





**CA4807 XML AND WEBSERVICES LAB**

**Semester : IV**

**Credits: 2**

**Category: MC**

**No of Hours/week:4**

**LAB EXERCISES**

- 1) Simple XML file
  - 2) Validating XML document using Internal DTD
  - 3) Validating XML document using External DTD
  - 4) Implementing Predefined Entity
  - 5) External Entity
  - 6) Demonstration of Parameterized Entity
  - 7) Demonstration of Parameterized Entity – Importing definition from DTD
  - 8) Merging and Validating two or more XML documents
- XSD
- 9) Validating an XML document using XSD
  - 10) Validating an XML document with attributes using XSD
  - 11) XML with mixed contents
  - 12) Validating an XML document using XSD that implements user defined data type
  - 13) XSD Global attributes and elements.
- 
- 14) Program to demonstrate the function of XSD Elements
- XSLT
- 15) Demonstration of INCLUDE element.
  - 16) Demonstration of IMPORT element.
  - 17) Presenting an XML document using CSS
  - 18) Presenting an XML file using XSLT elements
- XPATH
- 19) Transforming XML using XSLT and implementing XPath – Nodeset functions
  - 20) Transforming XML using XSLT and implementing XPath – number functions
  - 21) Traversing XML file using DOM
- 
- 22) Displaying contents of an XML document in a data grid.
  - 23) Dynamically creating XML document during runtime
  - 24) Dynamically accepting user input and creating an XML file.
  - 25) Using XML for Creating Advertisements.
- Web Services
- 26) Creating a Web Service.
  - 27) Creating and invoking a Web Service



**CA4808 RESOURCE MANAGEMENT TECHNIQUES**

**Semester : IV Credits: 3**

**Category: MC No of Hours/week:4**

**Objectives**

1. To impart the knowledge of managing the resources in a software project.
2. To teach algorithms pertaining to Networks.
3. To impart the skills of effective decision making

**UNIT-I Linear Programming model**

Introduction and Applications of Resource Management Techniques – Mathematical Formulation – Graphical solution – Simplex method – Artificial variable techniques – Variants of simplex method – Revised simplex method.

**UNIT- II Transportation and Assignment model**

Mathematical formulation of transportation problem – Methods for finding initial basic feasible solution – optimum solution – degeneracy – Mathematical formulation of assignment problem – Hungarian algorithm – Variants of assignment problem.

**UNIT- III Decision Analysis and Game Theory**

Decision Making under Certainty – Decision under Risk – Decision under Uncertainty – Game Theory – Two Person Zero-Sum Games – Mixed Strategy Games.

**UNIT- IV Network Models**

Shortest-Route Problems – Maximal Flow Problems – Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling.

**UNIT-V Queuing Models**

Characteristics of Queuing Models – Poisson Queues (M/M/1): (FIFO/ $\infty/\infty$ ), (M/M/1): (FIFO/N/ $\infty$ ), (M/M/C): (FIFO/ $\infty/\infty$ ) models.

**Text Books**

1. Taha H.A., Operations Research: An Introduction, 7<sup>th</sup> Edition, 2004, Pearson Education.
2. Kanti Swarup, Gupta, Man Mohan, Operations Research, 2010, Sultan Chand Publication.

**Reference Books**

1. Ravindran, Philips, Solberg, Operations Research- Principles and Practice, 2<sup>nd</sup> Edition, 2007, Wiley India.
2. J.K.Sharma, Operations Research- Theory and Applications, 2<sup>nd</sup> Edition, 2003, Macmillan India.
3. Prem Kumar Gupta, D.S.Hira, Operations Research, S.Chand



**CA4809 MOBILE COMPUTING**

**Semester : IV**

**Credits:4**

**Category: MC**

**No of Hours/week:4**

**Objective:**

1. To introduce the basic concepts of mobile computing.
2. To enable the students to develop mobile applications.

**Unit I Introduction to mobile computing**

Introduction—evolution -- mobile computing functions—mobile computing devices—middleware and gateways—application and services-- mobile computing architecture: 3 tier –design considerations for mobile computing—cellular concepts—multiple access techniques: FDMA—TDMA—CDMA-- SDMA—TDD—FDD-- mobility management—Call control—power management.

**Unit II Cellular Technologies**

GSM: architecture—entities—call routing—PLMN interfaces—address and identifiers—mobility management—frequency allocation—authentication and security—GPRS: introduction—network architecture--network enhancements—channel coding—protocol architecture—network operations—data services in GPRS—applications—limitations. Medium access--CDMA—EDGE—UMTS—UTRAN—OFDM--HSPA—LTE--WiMax—mobile satellite communication.

**Unit III Short range wireless communication**

Different standards—WLAN: advantages—applications—IEEE 802.11 standards—types of WLAN—ad hoc versus infrastructure mode—802.11 architecture--mobility—HiperLAN--Bluetooth—RFID—NFC(near field communication)—Infra red—UWB(ultra wide band)-- WAP: networks for WAP—architecture—Wireless Application Environment(WAE)—Wireless Markup Language(WML)—Wireless Telephony Application(WTA)—Wireless Session Protocol(WSP)—WAP gateway.

**Unit IV Mobile devices and protocols**

Mobile IP:-architecture—discovery—registration—tunnelling—cellularIP--IPV6:address space—security—IPV4 to IPV6—Mobile agent: application frame work—application server—Gateways—service discovery—device management—mobile file systems--smart mobile devices—OS: Android—Symbian – Java—J2ME—Java card.

**Unit V Databases and Applications**

Databases:Data organization—database transactional models—query processing—data recovery process—data catching—client server computing—adaptation software—power aware mobile computing—context aware mobile computing—delivery mechanisms-- Applications: mCommerce—mPayment—Location based services(LBS)—Wireless sensor network:- -- Mobile ad hoc networks. Introduction to simulator: A simple application .



**Text Books**

1. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, “ Mobile Computing-Technology, Applications and Service Creation”, 2<sup>nd</sup> edition ,2010, Tata McGraw Hill Education Private Limited.
2. Raj Kamal, ”Mobile Computing”, 2nd edition ,2012, Oxford university press.
3. Martin Sauter , “From GSM To LTE”, Wiley. .

**Reference Books**

1. Jochen H.Schiller, “ Mobile Communications”, 2<sup>nd</sup> edition ,2003, Pearson Education India.
2. Kumkum Garg, “ Mobile Computing-Theory and Practice”, 2010, Pearson Education.
3. William Stallings, “Wireless Communication and Networks”, 2003, Pearson Education.
4. William C.Y.Lee, “Mobile Communication Design Fundamentals”, 1993, John Wiley.



**CA4954 ADVANCED JAVA PROGRAMMING**

**Semester : IV**

**Credits:4**

**Category: ES**

**No of Hours/week:4**

**Objectives**

1. To enhance the knowledge in advanced features of Java
2. To empower programming skill as per the industry need
3. To occur the real time project development skills in Java platform.

**Unit I J2EE Introduction**

Enterprise Architecture- objectives- Introduction to java EE Platform- Features- Exploring Java EE platform – Architecture – Containers - Java EE applications – Servers for Java EE applications. Web applications – HTTP protocol – Introduction to web applications – Web container – web architecture – Model–view controller (MVC) architecture. Exploring JDBC process.

**Unit II Servlets**

Servlets Features – 3-Tier applications – Servlet API – Explaining servlet life cycle - Creating sample servlet – working with ServletConfig , ServletContext, HttpServletRequest and HttpServletResponse – Request Delegation and Request scope – Implementing servlet collaboration – Session tracking Mechanisms — configure and running. Exploring session tracking mechanism - Java servlet API for session tracking. Implementing event handling in servlet – working with wrappers.

**Unit III JavaServer Faces (JSF)**

JSF features – Architecture – JSF elements – Request processing life cycle - understand faces configuration file – structure of Facelet pages – understanding core tag libraries – UI components - working Beans - Designing navigation – validating and converting data – creating resource bundles – configuring JSF applications - developing JSF Employee backing bean– working with JSF lifecycle events – configuring and deploying JS apps.

**Unit IV Enterprise java applications (EJB)**

Fundamentals – classifications – Session bean: introduction - implementation Message Driven Bean (MDB): Character – Structure – Life cycle - Implementation of MDB – Managing transactions in java EE applications - EJB timer services – Implementation of timer – EJB interceptors – working with interceptor classes - lifecycle callback methods in an interceptor class – method in MDB – method in session bean.



### **Unit V Java Persistence API (JPA)**

[Introduction to the Java Persistence API](#) - Entity Manager – Introduction to Entities – Lifecycle of entity – understanding Entity Relationship types – mapping collection based relationship – Understanding Entity Inheritance - [The Java Persistence Query Language](#)(JPQL) – JPQL functions, statements - Clauses - query API - Creating a simple application in JPA – Configuring the application.

#### **Text Books**

1. Kognet learning solutions Inc. “Java Server Programming Java EE6 BLACK BOOK”, Reprinted 2013, Dreamtech press.

#### **Reference Books**

1. Jim Keogh, “The Complete reference to J2EE”, reprint 2012, Tata McGraw-Hill edition.
2. Mike Keith and Merick Schincariol “ Pro EJB 3.0 Java Persistence API” 2006, Apress.
3. David Geary, Cay S. Horstmann “Core JavaServer Faces” Third edition, 2010, Prentice Hall.
4. Hall Brown “ Core Servlet and JavaServer pages”, Second edition, reprint 2011, Pearson Education.
5. Andrew Lee Rubinger, Bill Burke “ Enterprise JavaBeans 3.1” Sixth Edition 2010, O’REILLY.



**CA4955 ADVANCED JAVA PROGRAMMING LAB**

**Semester : IV**

**Credits:2**

**Category: ES**

**No of Hours/week:4**

**Lab exercises**

1. Creating simple JDBC application.
2. Creating servlet with simple objects.
3. Creation of login form servlet (Creating and managing session).
4. Creating online shopping application Session tracking.
5. Build a simple JSF based UserInterface.
6. Validations using JSF validators.
7. Working with stateless session Bean.
8. Working with Stateful Session Bean.
9. Simple application packing, deploying and running in MDB.
10. Package and deploy a simple JSF web application using Netbeans (or any other IDE).
11. Creating a Simple JPA application.



**CA4956 ADVANCED .NET TECHNOLOGIES**

**Semester : IV**

**Credits:4**

**Category: ES**

**No of Hours/week:4**

**Objectives**

1. To instill the productivity of C#
2. To inculcate skills to develop enterprise mobile solutions using ASP.NET
3. To orient students on Windows Phone Application Development

**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 Contravariance – 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

**Text Books**

- 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”, Edition 2012, Apress.

**Reference Books**

1. John Sharp, “Microsoft Visual C# 2010”, Reprint 2011, Dreamtech Press.
2. Ben Watson, “C# 4.0 How-To”, Edition 2010, Pearson Education.
3. Stephen Walther, Kevin Hoffman, Nate Dudek, “ASP.NET 4 Unleashed”, Second Impression 2013, Pearson Education.



**CA4957 ADVANCED .NET TECHNOLOGIES LAB**

**Semester : IV**

**Credits: 2**

**Category: ES**

**No of Hours/week:4**

**Lab Exercises**

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 crystal reports
11. Demonstrate LINQ to an SQL application
12. Develop a basic Windows Phone Application



**CA4958 NETWORK ADMINISTRATION**

**Semester : IV**

**Credits:4**

**Category: ES**

**No of Hours/week:Th:2+Lab:2**

**Objectives:**

1. To impart the basics of computer networking.
2. To train in installation and configuration of web servers
3. To train in network monitoring mechanisms.

**UNIT I Introduction to Computer Networks Devices**

Hubs, Repeaters, Switches, Bridges, Routers - Internetworking Models - OSI Model Vs TCP/IP Model - Protocols. **OSI MODEL: Application Layer:** Application Layer protocols – HTTP – FTP – FTP Control Connections – FTP Data connection – SMTP. **Transport Layer:** Introduction to Transport Layer – Transport Layer Protocols – Transmission Control Protocol – User Datagram Protocol – TCP flags – TCP Three way handshake – Synchronisation – Acknowledgement – Sequence numbers – Port numbers – Sliding windows – Packet capture and analysis.

**UNIT II Base Layers**

IP Addressing Scheme – Class A – Class B – Class C Networks – Local Area Networks (LAN) – LAN Communication – Default Gateway – Communication between Different Networks - Static Routing – Dynamic Routing - Routing Protocols – Routed Protocols – RIP – EIGRP – OSPF – Introduction to IPv6 - Network Address Translation - Private IP Addresses – Public IP Addresses – Reserved IP Addresses – Port Address Translation (PAT) – Packet capture and analysis. **Data Link Layer:** MAC Address – OUI – Address Resolution Protocol (ARP) – RARP – Encapsulation – Error Detection – Cyclic Redundancy Check (CRC) – Layer 2 broadcast – Ethernet Frames – Point to Point Protocol (PPP) – High Level Data Link control (HDLC)- Collision domain - Broadcast domain - CSMA/CD – Back off Algorithm. – LAN Switching – packet capture and analysis **Physical Layer:** Connectivity – Cabling structure - Straight through cable - Cross cable - Roll over cable – RJ 45 socket.

**UNIT III Subnetting – CIDR – VLSM**

Subnetting IP addresses – Subnet Mask – Subnetting Class A, Class B and Class C Addresses – Classless Inter-domain Routing (CIDR) – Variable Length Subnet Mask (VLSM).

**UNIT IV Networking Services**

Domain Name Service (DNS) -Introduction to DNS, Installation of DNS Server, DNS Zones, Forward look up zone, Reverse look up zone, DNS Resource records, Name resolution by DNS clients, Primary DNS, Secondary DNS, Zone Transfers, DNS Root, DNS Messages, Positive, Negative and Authoritative responses – DNS Resolver Cache memory.

Dynamic Host Configuration Protocol (DHCP) -DHCP service, DHCP Scope and Ranges, Leasing IP addresses, Lease period, T1 and T2 value, DORA process, Alternate configuration of TCP/IP under DHCP, Reservation, Binding MAC address to specific clients.



### **UNIT V Wide Area Network**

Introduction to WAN Technology – Frame Relay Technology – Frame Relay Cloud – Data Link Connection Identifier (DLCI) – Sub-interfaces – Frame Relay encapsulation – Introduction to Multiprotocol Label Switching (MPLS).

#### **Text Books**

1. James F. Kurose and Keith W. Ross, "Computer Networking – A top down approach featuring the Internet", 3<sup>rd</sup> edition 2011, Pearson Publications.

#### **Reference Books**

1. Mahabub Hassan and Raj Jain, "High performance TCP/IP networking-concepts, issues and solutions", 2003, Prentice Hall.
2. Andrew S. Tanenbaum, David J. Wetherall, "Computer Networks", Fifth Edition, Pearson Education.
3. William Stallings, "High Speed Networks and Internets-performance and quality of service" 2<sup>nd</sup> edition 2002, Pearson Education.
4. Douglas E. Comer, "Internet working with TCP/IP:Principles, Protocols, and Architecture" 2006, Prentice Hall.
5. Natalia Olifer, Victor Olifer, "Computer Networks-Principles, Technologies and Protocols for Network design", 2011, Wiley India.
6. Mani Subramanian, "Network Management-Principles and Practices", Second edition 2011, Pearson Education.



**CA4959 DATABASE ADMINISTRATION**

**Semester : IV**

**Credits:4**

**Category: ES**

**No of Hours/week:Th: 2+Lab:2**

**Objectives:**

1. To impart skills of managing databases in a software industry.
2. To impart skills of giving security to database.

**Unit I Working with Database**

Understanding Database Architecture – Installation – Creating Database – Configuring Database – Deleting and dropping Database – Starting and Stopping Database.

**Unit II Administering Tablespace and Managing Users**

Creating, editing and deleting Tablespaces – Retrieving the tablespace information – Managing Database with users, roles and privileges – Creating password for users.

**Unit III Database Management Essentials**

Using SQL statements – Joins and Views – Indexing – Stored Procedures, Functions, Packages, Transactions, Triggers and Cursors.

**Unit IV Managing Consistency and Concurrency and Database Tuning** Types of table maintenance operations – Tuning the Database – Configuring and monitoring Undo management – Working with Undo tablespaces – Managing Undo Data  
- Locks and transactions – Resolving lock conflicts – Deadlock management.

**Unit V Backup and Recovery**

Types of Database Failure – Types of Database Backups – Data that need to be backed up – Recovery of the data - Restoring database.

**Text Book**

1. Kogent Solutions, “Oracle 10g Administration in Simple Steps”, First Edition, 2008, Dreamtech.
2. Ivan Bayross, Sharanam Shah, “MySQL 5 for Professionals”, First Edition, 2007, Shroff Publications.

**Reference Books**

1. Jeremy D. Zawodny et al., “High Performance MySQL”, O’Reilly Media Publications.
2. Russell Dyer, “MySQL in a Nutshell”, O’Reilly Media Publications.
3. Rick Greenwald, Robert Stackowiak, Jonathan Stern, “Oracle Essentials: Oracle Database 10g”.
4. Kevin Loney, “Oracle Database 10g: The Complete Reference”.
5. Ian Abramson, Michael S. Abbey, “Oracle Database 10g: A Beginner’s guide”.
6. Bob Byla and Biju Thomas, “OCP: Oracle 10g new features for Administrators”.  
Chip Dawes, “OCA: Oracle 10g Administrator’s guide”.



**CA5805 SOFTWARE TESTING**

**Semester : V**

**Credits:4**

**Category: MC**

**No of Hours/week:4**

**Objectives**

1. To teach the concept of how to test a software to uncover bugs.
2. To teach how to manage a testing project.
3. To meet the demands of IT industry by producing more testers.

**UNIT I Testing Methods**

Testing Fundamentals – Introduction – Definitions – Software Testing Principles – Testing strategies and methods – Black box approach – Random Testing – Equivalence Class partitioning – Boundary Value Analysis – Other Black Box Approaches – Testing Commercial Components – White Box Approach – Test Adequacy Criteria – Coverage and Control flow graphs – Covering code logic – Paths – Data flow – Loop testing – Mutation testing.

**UNIT II Levels of Testing**

Unit Testing – Integration Testing – System Test: Functional Testing, Performance Testing, Stress Testing, Configuration Testing, Security Testing, Recovery Testing – Regression Testing – Acceptance Testing.

**UNIT III Test Planning and Execution**

Tackling the testing maze – Test Outlines: Sample Application, Outline Approach, Evaluating the Outline, schedule estimation – From Test Outline to Test cases – Using Tables and Spreadsheets – Sample Application – Documenting Test Cases – Other type of Tables – State machine – Test case table with multiple inputs – Decision tables – Application with complex data – Managing tests – Testing Object-oriented software.

**UNIT IV Web Application**

Sample Application – Functional and usability issues – Configuration and compatibility testing – Reliability – Performance – Security testing – end-to-end transaction testing – database testing – Post-implementation testing.

**UNIT V Achieving Quality through Testing**

Reducing the number of test cases – Prioritization guidelines Priority category – Risk analysis – Identifying problem areas – combination schemes Tracking selected test cases – Creating quality software – Development environment infrastructure – Software testing tasks – Common elements – Industry standards – Complying with the standards.

**Discussion of case studies using IBM Rational Functional Tester. and Free /Open source Testing tool.**



**Text Books**

1. Ilene Burnstein, “Practical Software Testing”, First Edition, 2003, Springer International Edition.
2. Louise Tamres, “Introducing Software Testing”, First Edition 2002, Pearson Education.

**Reference Books**

1. Boris Beizer, “Software Testing Techniques”, Second Edition, 2011, Dreamtech Press.
2. Cem Kaner, Jack Falk, and Hung Quoc Nguyen, “Testing Computer Software”, Second Edition, 1999, Wiley India.
3. William E. Perry, “Effective Methods for Software Testing”, Third Edition, 2006, Wiley India.
4. Edward Kit, “Software Testing in the Real World”, Third Edition, 1995.

**CA5806 KNOWLEDGE MANAGEMENT SYSTEMS**

**Semester : V**

**Credits:4**

**Category: MC**

**No of Hours/week:4**

**Objectives**

1. To infuse the importance of Knowledge for organizational survival and success
2. To train the students on Knowledge Creation, Codification, and Capturing
3. To empower the students to implement Knowledge Management Systems for organizations

**Unit I Introduction to KMS**

Data, Information, Knowledge, and Wisdom – KM and KMS - Definitions and Perspectives – KM Evolution – Limitations of existing initiatives – KM’s Value proposition – What KM is not about? – Knowledge, Market Value and Prosperity – Drivers of KM - Knowledge-centric drivers, Technology drivers, Structural drivers, Process-focused drivers, Economic drivers - Creating Knowledge Edge

**Unit II Transmuting Information into Knowledge**

From Data to Knowledge – The 5c Process - Classifying Knowledge – Fundamental Steps – Taming the Tiger’s tail – Business and Knowledge – KMS Life Cycle – Challenges in building KMS – Phases in KM Life Cycle

**Unit III Knowledge Creation and Capture**

Knowledge creation – Nonaka’s model of knowledge creation and transformation – Knowledge Architecture – The people core, Identifying Knowledge Centers – The Technical core, Build In-home, buy or outsource model – Capturing Tacit knowledge – Evaluating the Experts – Developing relationship with Experts – The Interview as a tool – Guide to a successful Interview with the Expert

**Unit IV Knowledge Codification and System Implementation**

Knowledge Codification – Codifying Tacit Knowledge – Codification Tools and Procedures – Knowledge Maps, Decision Tables, Decision Trees, Frames – Knowledge Transfer and Knowledge Sharing – Transfer Methods – Role of the Internet - Knowledge Transfer in the E-World

**Unit V KMS Tools and Portals**

Organizational Memory – Knowledge Portals, the basics- The Business Challenge- Knowledge Portal Technologies – Key functionality – Collaboration – Content Management – Intelligent Agents – Knowledge Workers – Managing the Knowledge Projects





**Text Books**

1. Amrit Tiwana, “The knowledge Management Toolkit – Orchestrating IT, Strategy, and Knowledge Platforms”, Fifth Impression 2009, Pearson Education.
2. Elias M.Awad & Hassan Ghaziri, “Knowledge Management”, Fifth Impression 2006, Pearson Education.

**Reference Books**

1. Sudhir Warier, “Knowledge Management”, Third Reprint 2009, Vikas Publishing House Pvt. Ltd.
2. Thomas A. Steward, “The Wealth of Knowledge – Intellectual Capital and the Twenty First Century Organization”, Edition 2001, Currency Books.  
“Harvard Business Review on Knowledge Management”, Harvard Review Paperback Series.



**CA5807 DATA MINING**

**Semester: V**

**Credits:4**

**Category: MC**

**No of Hours/week: 4**

**Objectives:**

1. To introduce the concept of Data Warehousing
2. To expose to various Data Mining techniques
3. To impart the knowledge of how Data Mining could be used to solve scientific and social problems.

**UNIT I Introduction and Data preprocessing**

Data Mining:Basics – Functionalities – Classification of Data Mining systems – Task Primitives-Data preprocessing: Data cleaning – Data Integration and Transformation – Data Reduction – Data Discretization Concept hierarchy generation – Data Warehousing: Difference between Database and Data Warehouse – Different types of schemas – OLAP Operations; Data Warehouse Architecture: Three-Tier Architecture – Metadata Repository; Association rule mining: Efficient and scalable frequent item set mining methods – Mining various kinds of Association Rules.

**UNIT II Classification and Prediction Techniques**

Classification and Prediction: Issues Regarding Classification and Prediction- Classification by Decision Tree Induction-Bayesian Classification- Rule based classification – classification by Back propagation – Support vector machines – lazy learners - Other Classification Methods-Prediction- Accuracy and Error Measures.

**UNIT III Cluster Analysis**

Clusters Analysis: Types of Data in Cluster Analysis- Categorization of Major Clustering Methods: Partitioning Methods –Hierarchical methods – Density based methods – Grid based Methods – Model based Clustering methods – Clustering high dimensional Data – Constraint Based cluster analysis – Outlier Analysis

**UNIT IV Data Mining Technologies**

Mining object, spatial, multimedia, text and web data: Multidimensional analysis – Spatial Data mining – Multimedia data mining – Text Mining – Mining the World Wide Web - Graph Mining – Social Network Analysis – Multi relational Data Mining.

**UNIT V Applications and Tools**

Applications of Data Mining - Social Impacts of Data Mining –Tools: An Introduction to spread sheet based data mining tools - Case Studies.

**Text Books**

1. Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2002.

**Reference Books**

1. Richard J.Roiger and Michael W.Geatz “ Data Mining – A Tutorial-based Primer”, 2003, Pearson education .
2. Alex Berson,Stephen J. Smith, “Data Warehousing, Data Mining,& OLAP”, 2004, Tata McGraw- Hill.
3. Usama M.Fayyad, Gregory Piatetsky - Shapiro, Padhrai Smyth And Ramasamy



- Uthurusamy, "Advances In Knowledge Discovery And Data Mining", 1996, The M.I.T Press.
4. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", 1998, John Wiley & Sons Inc.,.
  5. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.
  6. G.K.Gupta, "Introduction to Data Mining with Case Studies", 2006, Eastern Economy Edition, Prentice Hall of India.



**CA5808 CLOUD COMPUTING**

**Semester : V**

**Credits:4**

**Category: MC**

**No of Hours/week:4**

**Objectives**

1. To acquire the knowledge of tapping the existing resources and use them effectively.
2. To acquire the knowledge of minimizing the software resources and thereby reducing the cost of investment.
3. To impart the skills of making greener IT.

**UNIT I Distributed Computing-An Introduction**

Computing Trends - Distributed Computing-An Introduction – Distributed System Models: Grid Computing, Cluster Computing – Virtualization.

**UNIT II Cloud Computing**

What's Cloud Computing – Properties & Characteristics – Pros and cons of Cloud Development – Cloud Platform Architectures: Amazon AWS, Microsoft Azure, Google App Engine, Google Map Reduce/Yahoo Hadoop, Eucalyptus, Nimbus, Open Stack.

**UNIT III Cloud Service Models**

Infrastructure as aService(IaaS): Introduction to IaaS, Resouce Virtualization, Server, Storage, Network, Case studies – Platform as a Service(PaaS): Introduction to PaaS, Cloud platform & Management, Computation, Storage, Case studies – Software as a Service(SaaS): Introduction to SaaS, Web services, Web 2.0, Web OS.

**UNIT IV Cloud Deployment Models**

Deployment Models Introduction – Public Deployment Model – Private Deployment Model – Virtual Private Deployment Model – Hybrid Deployment Model – Community Deployment Model.

**UNIT V Cloud Issues And Challenges**

Organizational Readiness and Change management in cloud – Security in Cloud – Legal Issues in Cloud – Product Readiness for Cloud Services. Simple application using simulator.

**Text Books**

1. Rajkumar Buyya, James Broberg and Andrzej M.goscinski, “Cloud computing: Principles and Paradigms”, September 2010, John Wiley & Sons.
2. Michael Miller, ” Cloud Computing: Web -Based Applications That change the way You Work and Collaborate Online”, First Edition, 2008, Pearson Education.

**Reference Books**

1. Haley beard, “ Cloud Computing best practices for managing and measuring processes for on-demand computing, applications and Data centers in the cloud with SLAs”, July 2008, Emereo Pty Limit



**CA5809 SOFTWARE DEVELOPMENT LAB**

**Semester : V**

**Credits:2**

**Category: MC No of Hours/week:4**

**Objectives:**

1. To develop skills for developing an application oriented software
2. To train the students to apply software engineering methodology
3. To prepare them to take up project in final semester.

Students have to choose a project and submit the proposal to the coordinator. After the scrutiny, the coordinator will allot guide. Student has to do the project in lab. Minimum two review meetings will be conduct the progress of the student. At the end, student has to show demo of what he/she developed during lab class hours.



**CA5955 NEURAL NETWORKS USING MATLAB**

**Semester : V**

**Credits:4**

**Category: ES**

**No of Hours/week:4**

**Objectives:**

1. To give foundations of neural networks models and methods of analyzing various issues using neural networks.
2. To teach how to apply neural networks for cluster analysis.

**UNIT I**

Introduction to Neural Networks - Basic models - Concepts of Neural Networks - Inference and Learning Classification Models - Association Models - Optimisation Models - Self-organisation Models - Introduction to MATLAB.

**UNIT II**

Supervised and Unsupervised Learning - Statistical Learning - AI Learning – Neural Network Learning - Rule Based Neural Networks - Network Training - Network Revision - Issues - Theory of Revision Decision Tree Based NN - Constraint Based NN.

**UNIT III**

Incremental Learning - Mathematical Modelling - Applications of NN - Knowledge based approaches.

**UNIT IV**

Heuristics - Hierarchical Models - Hybrid Models - Parallel Models – Differentiation Models - Control Networks - Symbolic Methods - NN Methods.

**UNIT V**

Structures and Sequences - Spatio-temporal NN - Learning Procedures – Knowledge based Approaches.

**Text Books**

- 1 .Limin Fu “Neural Networks in Computer Intelligence”, 2003, McGraw Hill Companies.
2. Sathish Kumar, “Neural Networks – A Class Room Approach”, 2007, McGraw Hill Companies.
3. Sivanandam, et al, “Introduction to Neural Networks using MATLAB”, 2007, McGraw Hill Companies.

**Reference Books**

1. Robert J. Schalkoff, “ Artificial Neural Networks”, 1997, McGraw Hill.
2. Anderson, “ An Introduction to Neural Network”, 2001, PHI.



**Ca5956 NEURAL NETWORKS LAB**

**Semester : V**  
**Category: ES**

**Credits:2**  
**No of Hours/week:4**

**Lab Exercises**

1. Construct a simple neuron to demonstrate AND gate.
2. Experiment Adaptive Linear Element (ADALINE)
3. Experiment Multiple Adaptive Linear Element (MADALINE) for various bias units.
4. Build Neural network for any given decision tree.
5. Implement Back Propagation Network to demonstrate XOR gate.
6. Construct a Bidirectional Art Map to store pairs of vectors.
7. Implement Boltzman simulator.
8. Implement Counter Propagation Network to recognize alphabets of your choice.
9. Simulate Self Organising Map (SOM) and experiment with different time periods,
10. Simulate Adaptive Resonance Theory (ART) networks for pattern matching.
11. Design a Hopfield network to solve Travelling Salesman problem.
12. Implement two layer perceptrons to analyse given patterns.
13. Construct a single layer neural network for a continuous function.
14. Construct a Neural network system to demonstrate Bayesian Classification.



**CA5957 NETWORK SECURITY**

**Semester : V**

**Credits: 4**

**Category: ES**

**No of Hours/week: 4**

**Objectives:**

1. To introduce the fundamentals of network security.
2. To give awareness of various threats.
3. To teach various cryptographic algorithms to protect data.

**UNIT I Introduction to Network Security**

Introduction to Information Security, Need for computer security, Confidentiality, Integrity, Availability, Authenticity, Accountability, non-repudiation, Authorization, Security threats, Security mechanisms, Security services, Model for internetwork security, Internet standards, Key principles of Network security.

**UNIT II Security Threats and Vulnerabilities**

Overview of Security threats, Vulnerabilities, Foot printing, Scanning, Sniffers, Social Engineering, Denial-of-Service Attacks – Distributed Denial of Attacks (DDOS), Malicious code - Viruses, worms, Trojan horses, Sniffing, back door, spoofing, brute force attack, Vulnerable Configurations, Security of Hard drives.

**UNIT III Introduction to Cryptosystems**

History of Cryptosystems, Cryptography terminologies, Classical Encryption Techniques, steganography, Cryptanalysis, importance of key range and key size, Encryption / Decryption algorithms, IPSec Protocol Stack – SSL Encryption.

**UNIT IV Symmetric & Asymmetric Encryption Methods**

Introduction to Symmetric Encryption – key and algorithm, Key maintenance and Key distribution - Data Encryption Standard (DES), Advanced Encryption Standard (AES), 3DES, - Block cipher principles, DES, Key strength of DES, 3DES - Cipher block chaining (CBC), Stream cipher RC4, RC5, Advanced Encryption Standard (AES) - Asymmetric Cryptosystem - Diffie-Hellman Key Exchange - El-Gammal, Public-key Infrastructure, Digital Certificate, Certificate Authority - Hashing algorithms – MD5 – SHA1 - Digital Signature, Digital Certificate, Message Digest, Non-Repudiation- RSA algorithm, Authentication codes, Hash functions, Security of Hash functions and MAC, HMAC, Digital signature Standard, Features of Message Digest, application of Message Digest, Non-repudiation.

**UNIT V Introduction to Firewall** – Packet filtering firewalls – Application filtering firewalls – Stateful inspection Firewalls – firewall logs – Perimeter security – Authentication using Firewall – Enterprise level firewalls –rules. **Virtual Private Network** - ISAKMP/Oakley Key exchange, IKE and IPSec protocol stack, Authentication Header and Encapsulating Security Payload, Security Parameter Index (SPI), Security Association (SA), Transport mode and Tunnel mode encryption - Site to Site VPN- Pre-shared keys, VPN based on Digital Certificate, VPN communities, Encryption and hashing algorithm properties, Phase – I and phase – II VPN Communication and its IKE properties - Site to Client VPN – VPN Domain.





**Text Books**

1. William Stallings, "Cryptography and Network Security- Principles and Practices", 4<sup>th</sup> Edition.

**Reference Books**

1. Sidnie feit, "TCP/IP – Architecture, protocols and implementation with ipV6 and IP security" McGraw Hill Computer Communication Series.
2. Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security – Private communication in a Public world" ,Prentice hall PTR.



**CA5958 NETWORK SECURITY LAB**

**Semester : V**  
**Category: ES**

**Credits:2**  
**No of Hours/week:4**

**LAB EXERCISES**

1. Implementing a simple client/server application using sockets and TCP/IP
2. Using of open SSH
3. Port forwarding.
4. Sniffing .
5. Proactive filtering of weak pass words and salting passwords.
6. Using open SSH for communication confidentiality and integrity.
7. Using open SSL to set up a simple certifying authority.
8. Issuing and verifying certificates to avoid MITM attacks.
9. Setting up of a firewall.
10. Setting up of IP Sec virtual private network (VPN).
11. Packet capturing and packet replay attack.
12. ARP spoof, DNS spoof attacks - man in the middle attacks demonstration.
13. Logic for brute force attacks.
14. Program that using hashing technique.  
Encryption and decryption of files program.



**PRINCIPLES OF MANAGEMENT ACCOUNTING**

**Semester :III**

**Credits:3**

**Category: ED No of Hours/week:4**

**Objectives**

1. To impart the fundamentals on different forms of accounting
2. To understand financial and management accounting by explaining how the latter is used by internal decision makers
3. To empirically demonstrate how an organization's mission, goals, and investment strategies affect the different facets of management accounting

**Unit I Introduction to Accounting**

Accounts, Accounting, and Accounting – Conventions Types of Book-keeping – Braches of Accounting – Financial Accounting, Cost Accounting, Management Accounting - Definition for Management Accounting – Nature and Scope of Management Accounting – Characteristics - Difference between Management Accounting and Balance Sheet – Tools and Techniques in Management Accounting

**Unit II Ratio Analysis**

Meaning of Ratio – Steps in Ratio Analysis – Advantages – Limitations – Classification of Ratios – Traditional Classification – Introduction to Profit and Loss Account Ratios, Balance Sheet Ratios, Profit and Loss and Balance Sheet Ratios – Functional Classification – Profitability Ratios, Turnover Ratios, Financial Ratios - Problems

**Unit III Fund Flow Statement Preparation**

Fund Flow Statement – Meaning, Objectives, Advantages – Limitations – Value Proposition – Preparation of Fund Flow Statements. Cash Flow Statements – Meaning – Differences between Cash Flow Statement and Fund Flow Statement – Advantages – Limitation – Preparation of Cash Flow Statements as per Accounting Standard III

**Unit IV Budgetary Control and Marginal Costing**

Budget - Essentials of Successful Budgetary Control – Classification of Budget based on Functions – Sales Budget, Production Budget, Purchase Budget, Cash Budget, Zero-Base Budgeting - Intro to Marginal Costing and Break-even Analysis

**Unit V Capital Budgeting**

Definition – Significance – Factors affecting the Capital Expenditure Projects – Methods of Capital Budgeting – Traditional Methods – Pay-back Period Method, Modern Pay-back Period Method, Average Rate of Return (ARR) – Discounted Cash Flow Method - Net Present Value (NPV), Profitability Index (PI), Internal Rate of Return (IRR) Method

**Text Books**

1. T.S. Grewal, “Introduction to Accountancy”, Edition 2008, S.Chand and Company Ltd.



**LOYOLA COLLEGE (AUTONOMOUS)**  
**CHENNAI - 600 034.**

2. A. Murthy and S. Gurusamy, “Management Accounting”, Edition 2006, Vijay Nicole Imprints Pvt. Ltd.

**Reference Books**

1. Rachchh - Gadade – Patil – Rachchh, “Introduction to Management Accounting”, Edition 2011, Pearson Education.
2. L. Solomon Raj, A. Arockiyasamy, “Management Accounting”, Edition 2011, Vijay Nicole Imprints Pvt. Ltd.



**PERSONALITY DEVELOPMENT**

**Semester : IV**

**Credits: 2**

**Category: Soft Skill**

**No of Hours/week:2+2(outside class)**

**Objectives**

1. To inculcate the significance of Soft-skills both for personal and professional success
2. To orient the students to imbibe positive attitude
3. To enable the students to muster effective verbal and non-verbal communication

**Unit I Soft-Skills Introduction**

What are Soft Skills? Significance of Soft-Skills – Soft-Skills Vs. Hard Skills - Selling Soft- Skills – Components of Soft Skills – Identifying and Exhibiting Soft-Skills – Soft-Skills Orientation – Top 60 Soft-Skills – Practicing Soft-Skills

**Unit II Developing Positive Attitude**

Introduction – Meaning – Features of Attitudes – Attitudes and Behavior – Formation of Attitudes – Change of Attitudes – Ways of changing Attitudes – Attitudes in Workplace – The power of positive Attitude- Developing Positive Attitude – Obstacles in developing Positive Attitude

**Unit III Active Listening and Effective Public Speaking**

Differences between Listening and Hearing – Critical Listening – Barriers to Active Listening – Improving Listening – Ethical Listening – Effective Public Speaking – Selecting the topic for public speaking – Understanding the audience – Evidence and Research – Organizing the main ideas – Language and Style choice in the speech – Delivering the speech

**Unit IV Persuasive Writing**

Introduction – Importance of writing – Creative Writing – Writing Tips – Writing powerful email communication – Using appropriate salutations – Making subject matter significant – Anticipating, Empathizing, and understanding others while sending emails – Do and Don'ts in email communication

**Unit V Effective Body Language**

Introduction – Voluntary and Involuntary Body Language – Forms of Body Language, Parts of Body Language – Forms of Body Language – Uses of Body Language in building the Interpersonal relationship – Types of Body Language – Gender Differences – Interpreting Body Language

**Text Books**

1. Dr. K. Alex, “Soft Skills Know yourself & Know the World”, Edition 2009, S.Chand Publications.
2. Barun K. Mitra, “Personality Development and Soft Skills”, Sixth Impression 2012, Oxford University Press.



**Reference Books**

1. Gopaldaswamy Ramesh, Mahadevan Ramesh, “The Ace of Soft Skills”, Edition 2010, Pearson Education.
2. Deanna D. Sellnow, “Public Speaking – A Process Approach”, Edition 2002, Vijay Nicole Imprints Pvt. Ltd.
3. Sanjay Kumar, and Pushp Lata, “Communication Skills”, Third Impression 2012, Oxford University Press.



**QUANTITATIVE APTITUDE**

**Semester : V**

**Credits: 2**

**Category: Soft Skill**

**No of Hours/week: 4**

**Objectives**

1. To impart the skills of solving problems quickly and efficiently.
2. To give practice of facing Aptitude Test conducted by IT industry confidently.

**Unit I Manipulation with Numbers**

Numbers – H.C.F & L.C.M of Numbers – Decimal Fractions – Square Roots and Cube Roots – Surds & Indices – Average – Problems on Age – Calendar.

**Unit II Different Forms of Ratio**

Ratio & Proportion – Time & Work – Pipes & Cistern – Time & Distance – Problem on Trains – Boats & Streams – Product Mix Problems.

**Unit III Business Arithmetics**

Percentage – Profit & Loss – Simple Interest – Compound Interest – Stocks & Shares – True Discount – Banker's Discount.

**Unit IV Area, Volume and Permutations**

Area – Volume & Surface Area – Heights & Distances – Logarithm – Permutations & Combinations.

**Unit V Data Interpretation**

Tabulation – Bar Graphs – Pie Charts – Line Graphs.

**Text Book**

1. R.S.Aggarwal, "Quantitative Aptitude", S.Chand, First Edition, 1989, Reprint 2012.

**Reference Book**

1. Preethi Gupta, "Quantitative Aptitude", 2006, Unique Publication
2. Dinesh Khattar, "A Pearson Guide To Quantitative Aptitude", 2005, Pearson Education.



**SEMESTER VI**

**CA6801 PROJECT WORK**

**Semester : VI**

**Category:**

**Credits: 12**

**No of Hours/week:30**

Students of VI semester have to do project throughout the semester in any application in a software company to gain practical knowledge of what they have studied in five semesters and they have to submit a report which will be evaluated by conducting project viva at the end of the semester. Their progress is monitored continuously to award the internal assessment marks.