

**Instruction Hours / week: L: 3 T: 1 P: 0 C : 4 Marks: Internal: 40 External: 60 Total: 100**  
**End Semester Exam: 3Hours**

**Course Objectives:**

To make students

- understand the fundamental number system with its conversions
- gain knowledge about different codes, digital logic gates and Boolean operations
- acquire basic understanding about the Instruction Set Architecture
- understand the architecture of the basic functional units of the computer such as the input output system. memory systems and secondary storage systems.
- Learn the function of each element of a memory hierarchy.
- Study various data transfer techniques in digital computer.

**Course Outcomes (Cos)**

Upon completion of this Course, student will be able to:

1. Interpret the functional architecture of computing systems.
2. Identify, compare and assess issues related to ISA, memory, control and I/O functions.
3. Design and analyze solutions in the area of computer architecture.
4. Design an instruction encoding scheme for an ISA.
5. Build large memories using small memories for better performance.
6. Examine various inter connection structures of multi processors.

**Unit I**

Number System and Operations: Decimal, Binary, Octal and Hexadecimal numbers – Conversion – Floating point representation – Binary addition, subtraction, multiplication and division – 1's and 2's complements. Codes: Binary Coded Decimal (BCD) - Excess-3 – Gray Code – Error detection codes – Hamming codes – ASCII codes. Logic gates: OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR gates. Boolean Logic Operations: Boolean functions - Basic laws – DeMorgans theorem – Sum of Products and Products of Sum – Karnaugh Map .

**Unit II**

Combinational Logic Circuit Design: Half adder – Full adder – Half Subtractor – Full Subtractor – Parallel binary adder – 4-bit binary adder/subtractor – BCD adder – Multiplexer – Demultiplexer – Decoders – Encoders .

Flip-flops: RS- D- JK Flip flops. Registers: Shift Registers. Counters: Ripple counters - Synchronous counters.

**Unit III**

Basic Structure of Computers: Functional units - basic operational concepts - bus structures. Machine instructions and Programs: Memory locations and addresses – Memory operations – Instructions and Instruction Sequencing – Addressing modes.

**Unit IV**

Input/Output Organisation: Accessing I/O Devices- Interrupts- Direct Memory Access – Interface Circuits – Standard I/O Interfaces. Computer Peripherals: Input devices – Output devices – Data transfer mechanism.

**Unit V**

The Memory System: Some Basic Concepts – Semiconductor RAM memories – Read-only memories – Cache memories – Virtual Memories – Secondary Storage.

Basic Processing Unit: Some fundamentals concepts – Execution of a complete Instruction – Multiple-Bus organization – Hardwired control – Microprogrammed control.

**Text Books**

1. Vijayendran.V, 2011, Digital fundamentals , 1<sup>st</sup> Edition, SV Printers and Publishers. (Unit 1 & 2)
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 2013, Computer Organization, 5<sup>th</sup> Edition, Tata McGraw Hill. New Delhi. (Unit 3,4 & 5)

**References**

1. Albert Paul Malvino, P. Donald Leach and Goutam Saha, 2011, Digital Principles and Applications, 7<sup>th</sup> Edition, Tata McGraw Hill, New Delhi.
2. Pankaj Agarwal, 2009, Computer Organization, 1<sup>st</sup> Edition, Vayu Education of India. (Unit 4 & 5).
3. Thomas .L. Floyd, 2008, Digital Fundamentals,; 10<sup>th</sup> Edition Prentice Hall. (Unit 1 & 2)
4. M.V.L.N Raja Roa, 2004, Fundamentals of Computer Organization, 1<sup>st</sup> Edition ,Scitech Publications Pvt Ltd., Chennai.(Unit 3, 4 & 5).

**Web sites**

1. <http://williamstallings.com>
2. <http://www.stat.auckland.ac.nz/~dscott/782/Computers.pdf>
3. <http://www.vocw.edu.vn/content/m10708/latest>

**Instruction Hours / week: L: 3 T: 1 P: 0 C : 4 Marks: Internal: 40 External: 60 Total: 100**  
**End Semester Exam: 3Hours**

**Course Objectives:**

To enhance students with the knowledge of

- The behavior and flow of the software
- Planning, designing, developing, validating, and evaluating of software using contemporary practices.
- Software analyzing, coding, and Testing.
- To understand the nature of software development and software life cycle models
- To understand methods of capturing, specifying, visualizing and analyzing software requirements.
- To know basics of testing and understanding concept of software quality assurance and software configuration management process.

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Describe software engineering layered technology and process framework.
2. Introduces theories, models, and techniques that provide a basis for the software development life cycle.
3. Introduces software testing approaches including verification and validation, static analysis, reviews, inspections, and audits.
4. Understanding of the role of project management including planning, scheduling, risk management, etc.
5. Work as an individual and/or in team to develop and deliver quality software.
6. Justify role of SDLC in Software Project Development.

**Unit I**

The Evolving role of software: - software - software crisis - software process model. Component based development: - The formal methods model – fourth generation techniques. Software Project Planning – Project Planning Objectives - Software Scope – Resources.

**Unit II**

Analysis concepts and Principles: Requirement analysis principles – The Information domain – modeling – partitioning – Essential and implementation views. Software prototyping methods and tools. Specification: Specification principles – representation – software requirements specification.

**Unit III**

Design concepts and principles: The Design process: design and software quality – The Evolution of Software Design. Design principles:- Design concepts – effective modular design – the design model – design documentation – Software Architecture.

**Unit IV**

The Golden rules: user interface design – task analysis and modeling – interface design activities – Implementation tools – design evaluation. Component level Design: - structured programming – comparison of design notation.

**Unit V**

Software testing techniques: software testing fundamentals – White box testing – basis path testing – control structure testing – Black box testing. Software testing strategies:- Unit testing – Validation testing.

**Text Book**

1. Roger. S. Pressman. 2010 Software Engineering: A Practioner's Approach, 7<sup>th</sup> Edition, Tata McGraw Hill Publishing Company, New Delhi.

**References**

1. Lan Sommerville. 2015. Software Engineering, 10<sup>th</sup> Edition, Pearson, New Delhi.
2. Bruce R. Maxim, Roger S. Pressman, 2014, Software Engineering: A Practioner's Approach, 8<sup>th</sup> Edition, onlybooks.org
3. Carlos Otero , 2012, Software Engineering Design: Theory and Practice, Auerbach Publications, New Delhi.
4. Stephen Schach. 2010. Object oriented and classical software engineering, 8<sup>th</sup> Edition, McGraw-Hill Higher Education, New Delhi.

**Web Sites**

1. [http://en.wikipedia.org/wiki/Software\\_engineering](http://en.wikipedia.org/wiki/Software_engineering)
1. <http://www.onesmartclick.com/engineering/software-engineering.html>
2. [http://www.cc.gatech.edu/classes/AY2000/cs3802\\_fall/](http://www.cc.gatech.edu/classes/AY2000/cs3802_fall/)

**Instruction Hours / week: L: 3 T: 1 P: 0 C:4    Marks: Internal: 40 External: 60 Total:100****End Semester Exam: 3Hours****Course Objectives:**

To provide students with

- Extensive knowledge of principles and modules of operating systems
- Fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.
- The principles of concurrency and synchronization, and apply them to write correct concurrent programs/software
- Basic resource management techniques (scheduling or time management, space management) and principles and how they can be implemented. These also include issues of performance and fairness Objectives, avoiding deadlocks, as well as security and protection.
- To introduce the architecture of Linux operating system.
- To learn basic Unix commands and to write shell scripts

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Learn various types of OS and also understand various functions of OS.
2. Learn operating system structures and processor management.
3. Understand how the operating system shares hardware resources between processes, tasks, threads, and users
4. Learn the process management and its storage in memory and disk.
5. Implement various memory management schemes, file system and I/O schemes.
6. Write and execute shell programs.

**Unit I**

OS Design and Implementation: Introduction-Operating System Definition-Function-History of Operating System-Types of Operating System- Operating System Concepts- Operating System Structure-The nature of the Design problem-Implementation-Trends in Operating System Design.

**Unit II**

Process and Threads: Process-Threads-Inter process communication-classical IPC Problems-Scheduling –Deadlocks: Introduction to Deadlocks, Detection and Recovery, Avoidance and Prevention.

**Unit III**

Memory Management: Basic Memory Management, Swapping, Virtual Memory, Page Replacement Algorithms, Segmentation. File systems-Files-Directories-File System Implementation.

**Unit IV**

Distributed Operating System: Distributed Operating Concepts and Design Fundamentals-Remote Procedure Calls-The RPC model-Transparency of RPC-Implementing RPC mechanism-Stub Generation-RPC Messages-Marshalling Arguments and Results-Server Management-Parameter-Passing Semantics-Call Semantics-Communication Protocol for RPCs

**Unit V**

Real Time Operating System and Micro Kernels: Characteristics of Real Time Systems-Micro kernel's and RTOS-Scheduling for real-time Systems.

**Text Books**

1. Andrew S Tannenbaum, Herbert Bos . 2014. Modern Operating System, 4<sup>rd</sup> Edition, Prentice Hall of India, New Delhi. [ Unit 1 to 4]
2. Pradeep K Sinha. 2009. Distributed Operating Systems Concepts and Design, Prentice Hall of India, New Delhi. [ Unit 5]

**References**

1. Pramod Chandra P.Bhatt . 2010. An Introduction to Operating Systems , 2nd Edition, Prentice Hall India (pvt) Ltd, New Delhi
2. Andrew S Tannenbaum. 2008. Modern Operating System, 3<sup>rd</sup> Edition, Prentice Hall of India, New Delhi
3. Deitel.H.M. 2005. Operating systems, 3<sup>rd</sup> Edition, Addison Wesley Publication, New Delhi.

**Web Sites**

1. [www.cs.columbia.edu/~nieh/teaching/e6118\\_s00/](http://www.cs.columbia.edu/~nieh/teaching/e6118_s00/)
2. [www.clarkson.edu/~jnm/cs644](http://www.clarkson.edu/~jnm/cs644)
3. [pages.cs.wisc.edu/~remzi/Courses/736/Fall2002/](http://pages.cs.wisc.edu/~remzi/Courses/736/Fall2002/)

**Instruction Hours / week: L: 4 T: 0 P: 0 C:4    Marks: Internal: 40 External: 60 Total: 100**  
**End Semester Exam: 3Hours**

**Course Objectives:**

- To understand the major components of computer system, the types and functions of OS.
- To know about different programming languages and their corresponding Translators and to learn about the basic concepts of Networking.
- To understand the building blocks of C language like variables, data types, managing I/O etc.
- To understand the different statements like sequential, decision making, iterative such as if-else, loops.
- To understand derived data types like arrays and structures.
- Apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Acquire knowledge about components of a computer system and fundamentals of Operating Systems and Networking.
2. Acquire knowledge about building blocks of C language like variables, data types, managing I/O etc.
3. Solve basic problems using different statements like sequential, decision making, iterative such as if-else, loops and derived data types like arrays and structures.
4. Apply Pointers, functions, file handling and dynamic memory allocation schemes for efficient programming.
5. Understand the dynamics of memory by the use of pointers.
6. Develop solutions to problems using derived data types and files.

**Unit I**

Introduction to Programming Languages- Introduction to C- Advantage of C- Identifier- Constants-Variable- Data Types- Variable declaration- Assignment operation- Expressions- Operators-Evaluation of Expression- Library functions- Mathematical- Character functions; Formatted and Unformatted Input and Output statements: Scanf(), Printf()- Character based functions.

**Unit II**

Decision Making and Branching: Simple IF statement- If Else statement- Nesting of If Else statements- Switch statement- Break- Conditional operator ( ?: ) operator- GOTO statement; Looping statements: WHILE- DO-WHILE statement- FOR statement- Jumps in loops- Continue and Nested Looping Statements.

**Unit III**

Arrays: Single, Two and Multidirectional arrays- Strings and related library functions; Functions: Need of function-Types of functions-User-defined functions-Return values and their types-Calling a function-Category of functions-Recursion-functions with arrays-Storage classes.

**Unit IV**

Pointers: Pointer Arithmetic- Declaring and initializing pointers- Pointers and arrays- Pointers and Strings- Pointers and functions- Pointers and Multidimensional Arrays; Structures: Declaration- Array of structures- Nested structures- Structures and Functions- Unions- Typedef statement- Enumeration.

**Unit V**

Files: Types of Files- Functions related for FILE- Read/Write operations- Character, Word, Line and Structure based Read/Write operations- Random Files. Random access to files- Command line arguments-the preprocessor; Advanced Topics: Interrupts-BIOS/DOS function handling- Video RAM- TSR Programme.

**Text Books**

1. Balagurusamy. E. 2012 . Programming in ANSI C, 4<sup>th</sup> Edition ,Tata McGraw-Hill, New Delhi. [Unit 1 to 5 ]
2. Y.P.Kanetkar. 2013 .Let Us C, Thirteen revised Updated Edition, BPB Publications, New Delhi.[ Unit 5]

**References**

1. Richard M. Reese, 2013, Understanding and Using C Pointers, 1<sup>st</sup> Edition, O'Reilly Media, India
2. Jeri R. Hanly, 2013, Problem Solving & Program design in C, 7<sup>th</sup> Edition, Pearson Education
3. Yashavant Kanetkar, 2013, Let Us C , 13<sup>th</sup> Edition, BPB Publications, New Delhi, India.
4. Reema Thareja, 2011, Programming in C, 1<sup>st</sup> Edition, Oxford Publications, New Delhi, India

**Web Sites**

1. <http://www.cs.cf.ac.uk/Dave/C/CE.html>
2. <http://www2.its.strath.ac.uk/courses/c/>
3. <http://www.iu.hio.no/~mark/CTutorial/CTutorial.html>



**Instruction Hours / week: L: 4 T: 0 P: 0 C:4    Marks: Internal: 40 External: 60 Total: 100**  
**End Semester Exam: 3Hours**

**Course Objectives:**

- Understand the fundamental concepts of logic.
- Analyze the four types of normal forms.
- Understand the fundamental concepts of formal languages and graph theory.
- To learn Algebraic Structures and their types and understand Cosets and Lagrange's theorem.
- To understand Graphs, their types and different algorithms based on Graph Theory.
- To provide the necessary back ground of discrete structures with particular reference to the relationships between discrete structures and their data structure counterparts including algorithm development.

**Course Outcomes (COs)**

Upon completion of this Course, student will be able to:

1. Apply set theory, functions, relations and lattices to solve computational problem.
2. Apply basic operation in propositions, validate the arguments and formalize the arguments in propositional logic.
3. Apply algebraic structure to prove theorems like Lagrange's theorem
4. Apply the core ideas of graph theory, trees and various algorithms to solve the problems based on the same.
5. Implement finite state machine, equivalent regular expression, and conversion of various machines like Moore, mealy etc.
6. Use of K-Maps and Truth Tables to construct and verify correctness of a Boolean expression .

**Unit I**

Mathematical Logic: Connectives – Statement formulas and truth tables - well formed formulas, tautologies, equivalence of formulas, tautological implications – Normal forms- Theory of inference for statement calculus - Validity using Truth Tables – Rules of Inference – Consistency of premises

**Unit II**

Predicate Calculus: Predicates - The statement functions, Variables and Quantifiers – Predicate Formulas - Free and bound variables.

Inference Theory of the Predicate Calculus: Valid formulas and equivalences – Special Valid formulas involving quantifiers – Theory of inference for Predicate calculus – Formulas involving more than one quantifiers.

**Unit III**

Relations and functions: Relations – Properties of relations – Equivalence relations - composition of relations, Closure of relations, Binary relations – Recurrence relations – Order relations – Partial order relations – Partitions – Functions - one-to-one, onto, one-to-one-onto functions – composition of functions, Inverse functions.

**Unit IV**

Formal languages and Automata: grammars- phrase – structure grammar, context-sensitive grammar, context-free grammar, regular grammar. Finite state automata- Deterministic finite automata and Non deterministic finite automata-conversion of non deterministic finite automata to deterministic finite automata.

**Unit-V**

Graph Theory: Directed and undirected graphs, connected graph, path, reachability, circuits. Matrix representation- adjacency matrix, incidence matrix, path matrix. Trees- binary tree Theorems - statement only (No Proof).

**Text Book**

1. Trembly J,P and R.Manohar. 2002. Discrete Mathematical structures with applications to Computer Science. Tata Macgraw Hill Book Company,New Delhi.

**Reference**

1. Sundaresan .V, K.S.Ganapathy Subramanian and K.Ganesan. 2002. Discrete Mathematics, A.R.Publications, Nagapatinam.

**Instruction Hours / week: L: 0 T: 0 P: 5 C:2    Marks: Internal: 40 External: 60 Total: 100**  
**End Semester Exam: 3 Hours**

**Course Objectives:**

Enable the student

- To Learn the basics of OO analysis and design skills.
- To Be exposed to the UML design diagrams.
- To Learn to map design to code.
- To Be familiar with the various testing techniques
- To apply the knowledge of mathematics, basic science and engineering solving the real world computing problems to succeed higher education and professional careers.
- To develop the skills required to comprehend, analyze, design and create innovative computing products and solutions for real life problems.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Write test suites for a given software.
2. Demonstrate testing process in Selenium IDE.
3. Test websites using eclipse.
4. Draw different UML diagrams.
5. Develop models using UML tools.
6. To Write the Simple applications with technologies like HTML,JavaScript,AJAX,PHP,Servlets and JSPs

**List of Programs:****1. CASE tools**

Use of diagramming tools for system analysis, such as Turbo analyst, for preparing Data Flow diagrams and E-R diagrams. use of tools for relational database design such as relational Designer.

**2. Application Development Tools:**

Use of toots such as Power Builder, Delphi, Magic etc. in developing application software including interactive data-entry screens, transaction processing, report generations, etc.

**3. Management Tools:**

Use of tools for managing the process of software development such as Source Code Control System (SCCS), Revision Control System (RCS), Make etc.

**4. Program Using Selenium Tool: [web: <http://docs.seleniumhq.org>]**

- i. Using seleniumhq tool perform single webpage test case
- ii. Using seleniumhq tool perform testing for multiple webpage

**Course Objectives:**

To provide students with

- Extensive knowledge of principles and modules of operating systems
- Fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.
- The principles of concurrency and synchronization, and apply them to write correct concurrent programs/software
- Basic resource management techniques (scheduling or time management, space management) and principles and how they can be implemented. These also include issues of performance and fairness Objectives, avoiding deadlocks, as well as security and protection.
- To introduce the architecture of Linux operating system.
- To learn basic Unix commands and to write shell scripts

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Learn various types of OS and also understand various functions of OS.
2. Learn operating system structures and processor management.
3. Understand how the operating system shares hardware resources between processes, tasks, threads, and users
4. Learn the process management and its storage in memory and disk.
5. Implement various memory management schemes, file system and I/O schemes.
6. Write and execute shell programs.

**List of Programs:**

1. To write a Linux program to display process deadlock state.
2. To write a program to implement signal handling.
3. Write a Shell program to handle student data base with options given below:
  - a. Create data base. b) View Data Base. c) Insert a record d) Delete a record.
  4. e) Modify a record. f) Result of a particular student. g) Exit.
5. To write a simple Linux program using thread.
6. Deadlock avoidance using Banker's Algorithm.
7. To write a program to display the date & time using TCP Sockets.
8. To write a program to display the date & time using UDP Sockets.
9. Simulation of following CPU scheduling algorithms:
  - i. FCFS

- ii. SJF (preemptive and non-preemptive)
  - iii. Priority scheduling (preemptive and non-preemptive)
  - iv. Round Robin Scheduling
10. To write a Linux program to create a lock file.
11. To write a program to display the user information

### **Text Books**

1. Andrew S Tannenbaum, Herbert Bos . 2014. Modern Operating System, 4<sup>rd</sup> Edition, Prentice Hall of India, New Delhi. [ Unit 1 to 4]
2. Pradeep K Sinha. 2009. Distributed Operating Systems Concepts and Design, Prentice Hall of India, New Delhi. [ Unit 5]

### **References**

1. Pramod Chandra P.Bhatt . 2010. An Introduction to Operating Systems , 2nd Edition, Prentice Hall India (pvt) Ltd, New Delhi
2. Andrew S Tannenbaum. 2008. Modern Operating System, 3<sup>rd</sup> Edition, Prentice Hall of India, New Delhi
3. Deitel.H.M. 2005. Operating systems, 3<sup>rd</sup> Edition, Addison Wesley Publication, New Delhi.

### **Web Sites**

1. [www.cs.columbia.edu/~nieh/teaching/e6118\\_s00/](http://www.cs.columbia.edu/~nieh/teaching/e6118_s00/)
2. [www.clarkson.edu/~jnm/cs644](http://www.clarkson.edu/~jnm/cs644)
3. [pages.cs.wisc.edu/~remzi/Classes/736/Fall2002/](http://pages.cs.wisc.edu/~remzi/Classes/736/Fall2002/)

**Course Objectives:**

Enable the student

- To understand the major components of computer system, the types and functions of OS.
- To know about different programming languages and their corresponding Translators and to learn about the basic concepts of Networking.
- To understand the building blocks of C language like variables, data types, managing I/O etc.
- To understand the different statements like sequential, decision making, iterative such as if-else, loops.
- To understand derived data types like arrays and structures.
- Apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Acquire knowledge about components of a computer system and fundamentals of Operating Systems and Networking.
2. Acquire knowledge about building blocks of C language like variables, data types, managing I/O etc.
3. Solve basic problems using different statements like sequential, decision making, iterative such as if-else, loops and derived data types like arrays and structures.
4. Apply Pointers, functions, file handling and dynamic memory allocation schemes for efficient programming.
5. Understand the dynamics of memory by the use of pointers.
6. Develop solutions to problems using derived data types and files.

**List of Programs:**

1. SIN and COS Series
2. Array Operations ( Insert, Delete and Display )
3. Bubble Sorting .
4. Stack
5. Queue.
6. Implement String functions
7. Pointers and Arrays, Pointers and function
8. Recursive function
9. Dynamic Memory Allocation
10. Matrix Operations ( Addition, Subtraction and Multiplication )
11. Linked List Operations.
12. Mark sheet preparation using array of structures

13. Electricity Bill Preparation using Files (Use structures)
14. Implement TWO Dos commands using Command line arguments
15. Design an application using VRAM
16. Display a message every 5 minutes using TSR programming

### **Text Books**

1. Balagurusamy. E. 2012 . Programming in ANSI C, 4<sup>th</sup> Edition ,Tata McGraw-Hill, New Delhi. [Unit 1 to 5 ]
2. Y.P.Kanetkar. 2013 .Let Us C, Thirteen revised Updated Edition, BPB Publications, New Delhi.[ Unit 5]

### **References**

1. Richard M. Reese, 2013, Understanding and Using C Pointers, 1<sup>st</sup> Edition, O'Reilly Media, India
2. Jeri R. Hanly, 2013, Problem Solving & Program design in C, 7<sup>th</sup> Edition, Pearson Education
3. Yashavant Kanetkar, 2013, Let Us C , 13<sup>th</sup> Edition, BPB Publications, New Delhi, India.
4. Reema Thareja, 2011, Programming in C, 1<sup>st</sup> Edition, Oxford Publications, New Delhi, India

### **Web Sites**

1. <http://www.cs.cf.ac.uk/Dave/C/CE.html>
2. <http://www2.its.strath.ac.uk/courses/c/>
3. <http://www.iu.hio.no/~mark/CTutorial/CTutorial.html>

**Course Objectives:**

- To prepare object-oriented design for small/medium scale problems
- To demonstrate the differences between traditional imperative design and object-oriented design
- To explain class structures as fundamental, modular building blocks
- To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.
- To learn the object oriented programming concepts.
- To introduce the principles of inheritance and polymorphism and demonstrate how they are related to the design of abstract classes

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Compare OOPS with other programming techniques
2. Implement C++ programs with constructors and destructors
3. Develop OOP involving polymorphism using operator overloading and method overloading
4. Implement programs with code reusability using inheritance
5. Develop Programs with file handling and templates
6. Apply OOP concepts to solve real world problems

**Unit I**

Introduction to Computers and C++ Programming: Computer Organization – History of C and C++ - C++ standard Library – Arithmetic- Decision making: Equality and Relational Operators.

Control Structures: Pseudocode- if, if/else selection structures – while, for, do while repetition structure- Assignment, Increment, Decrement operators – switch Multiple selection structure – break and continue statements – Logical, Equality, Assignment operators.

Functions: Function Definitions, Prototypes – Storage classes- Recursion- Functions with Empty Parameter Lists – Inline functions- REFERENCES and Reference Parameters – Default Arguments – Unary Scope Resolution Operator- Function overloading – Function Templates.

**Unit II**

Arrays: Declaring Arrays – Passing Arrays to Functions – Sorting Arrays – Linear Search and Binary Search.

Pointers and Strings : Pointer variable declaration and initialization- Pointer Operators- Calling functions by reference –Pointer expression and Pointer arithmetic- relationships between Pointer and Arrays – Arrays of Pointers – Function Pointers – Introduction to character and String Processing.

Classes and Data Abstraction : Structure Definitions- Class Scope and Accessing Class Members – Access Functions and Utility Functions- Constructors- Destructors.



**Unit III**

Classes : Part II : Introduction- friend functions and friend classes- this pointer- new, delete operator- static class members- Data abstraction and Information hiding- Container Classes and Iterators.

Operator Overloading : Fundamentals and restriction of operator overloading –Overloading Stream Insertion, Stream Extraction, Unary, Binary, ++ and – operators. Inheritance : Base Classes and derived Classes – Protected Members- casting base class pointers to derived class pointers- Using member Functions- public, protected, private inheritance – Direct Base classes and Indirect Base classes- Using constructors and Destructors in Derived Classes.

**Unit IV**

Virtual Functions and Polymorphism : Type Fields and switch statement – virtual functions- abstract base classes and concrete classes- polymorphism- New classes and Dynamic binding – virtual destructors. C++ Stream Input/Output : Introduction- Streams- Stream Output- Stream Input- Stream Manipulators- Stream Format states- Stream error states.

Templates : Function, Class templates – Overloading template functions- Templates and Inheritance, friends, static members.

**Unit V**

Exception Handling : Basics of C++ Exception handling: try, throw, and catch – Throwing, catching, and rethrowing an exception, Exception specifications.

File Processing: Data Hierarchy- files and streams- Creating, Reading, Updating sequential Access files and Random Access files.

The Preprocessor : #include, # define, #error, # pragma preprocessor directives.

Standard C++ Language Additions : Boolean data type- static\_cast, const\_cast, reinterpret\_cast operator, namespaces.

**Text Book**

1. Deitel. H.M and P.J.Deitel. 2013. C++ How to Program, 9<sup>th</sup> Edition, Prentice Hall India, New Delhi, India

**References**

1. Y. Daniel Liang 2014, Introduction to Programming with C++, 3<sup>rd</sup> Edition, Pearson Publications, New Delhi, India.
2. Bjarne Stroustrup., 2013. 13<sup>th</sup> Impression, The C++ Programming Language, Addison Wesley, New Delhi
3. Diane Zak, 2012, Introduction to Programming with C++ , 7<sup>th</sup> Edition, Cengage Learning India Private Limited, New Delhi, India

**Web Sites**

1. <http://www.cplusplus.com/doc/tutorial/>
2. [www.cplusplus.com/](http://www.cplusplus.com/)
3. [www.cppreference.com/](http://www.cppreference.com/)

**Course Objectives:**

Enable the student

- Understand the role and nature of relational database management systems (RDBMS) in IT environment.
- Translate written business requirements into conceptual entity-relationship data models.
- Convert conceptual data models into relational database schemas using the SQL Data Definition Language (DDL).
- Query and manipulate databases using the SQL Data Manipulation Language (DML).
- to provide students with comprehensive and in-depth knowledge of architecture and functioning of database management systems.
- To design and build a database system and use computer and database management skills to implement a solution to a business case using database management systems.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Introduces how to apply logical database design principles, including E-R/EE-R diagrams, conversion of ER diagrams to relations.
2. Familiarize students with the concepts of integrity constraints, relational algebra, relational domain & tuple calculus, data normalization.
3. Construct simple and moderately advanced database queries using Structured Query Language (SQL).
4. Familiarize students with the concept of a database transaction including concurrency control, backup and recovery, and data object locking.
5. Design and implementation of a small database project using Oracle.
6. Improve the database design by applying normalization techniques.

**Unit I**

**Overview of Database Systems:** Managing Data – A historical Perspective systems Vs DBMS-Advantages of DBMS- Describing and storing data in DBMS- Queries in DBMS- Transaction Management- Structure of DBMS; Database Design & ER Diagram: Entities-Attributes- Entity Sets-Relationship & Relationship set- Additional features of ER Model- Conceptual Design with ER Model.

**Unit II**

Relational Model: Integrity Constraints over relations- Enforcing integrity constraints- Querying relational data- Logical Database Design- ER to relation- Introduction to views- Destroying & Altering Tables & Views; Relational Algebra Calculus: relational algebra-relational calculus.

Unit III

SQL Queries Programming: The form of Basic SQL Query- UNION, INTERSECT and EXCEPT-Nested queries- Aggregate operations- Null values Complex integrity constraints in SQL- Triggers & Active databases; Transaction Management Overview: The ACID Properties- Transactions & Schedules- Concurrent Execution of Transactions- Lock Based Concurrency Control- Performance of Locking Transaction support in SQL.

**Unit IV**

An Introduction to PL/SQL: PL/SQL Overview- Declaration section- Executable Commands Section – Exception Handling Section; Triggers: Types of Triggers – Trigger Syntax – Enabling & Disabling Triggers – Replacing & Dropping Triggers; Procedures, Functions, and Packages- Required System & Table privileges – Procedures vs. Functions- Procedures vs. Packages – Create Function syntax – Create Package syntax - Compiling, Replacing, Dropping Procedures, Functions and packages.

**Unit V**

Schema Refinement and Normal Forms: Introduction to Scheme refinement- Functional Dependencies - Reasoning about functional dependencies- Normal form properties of decomposition –Normalization- Scheme refinement in database designing- other kinds of dependencies; Security: Introduction to database security- Access control- Mandatory access control- Additional issues security; Concurrent control: 2PI, serializability and Recoverability- Introduction to lock Management- Lock conversions- Specialized Locking Techniques- Concurrency control without locking.

**Text Books**

1. Raghu Rama Krishnan and Johnnas Gehrke.2009. Database Management System, 3<sup>rd</sup> Edition, Tata McGraw-Hill. (Unit I, II, III & V)
2. Kevin Lonewy. 2014. Oracle Database 11g, the Complete Reference, Tata Mc Graw-Hill, New Delhi. (Unit IV)

**References**

1. Elmaseri and Navathe. 2013. Database Systems-Models, Languages, Design and Application Programming, 1<sup>st</sup> Edition,Pearson Education. Delhi.
2. Bipin C. Desai. 2008. *An Introduction to Database Systems*, Galgotia Publications, New Delhi
3. Nilesh Shah. 2002 .Database system using Oracle,1<sup>st</sup> Edition, Prentice Hall of India. Delhi.
4. Rajesh Narang. 2002. Database Management Systems, 1<sup>st</sup> Edition,Prentice Hall of India, New Delhi.
5. Silberschartz ,Korth and Sudarsan. 2002. Database System Concepts, 4<sup>th</sup> Edition, Tata Mc Graw-Hill, New Delhi.

**Web Sites**

1. <http://en.wikipedia.org/wiki/RDBMS>
2. [http://aspalliance.com/1211\\_Relational\\_Database\\_Management\\_Systems\\_\\_Concepts\\_and\\_Terminologies](http://aspalliance.com/1211_Relational_Database_Management_Systems__Concepts_and_Terminologies)
3. [www.compinfo-center.com/apps/rdbms.html](http://www.compinfo-center.com/apps/rdbms.html)

**Course Objectives:**

Enable the student

- Use forms and controls to create a user interface.
- Create and use Sub and Function procedures, including predefined functions.
- Implement decision structures and loops by using conditional expressions.
- Enhance the user interface by adding menus, status bars, and toolbars.
- Access and manipulate data in a Microsoft Access or Microsoft SQL Server database by using Microsoft ADO
- Build, package, and deploy an application.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Design, create, build, and debug Visual Basic applications .
2. Implement syntax rules in Visual Basic programs. And explain variables and data types used in program development and apply arithmetic operations for displaying numeric output.
3. Write and apply decision structures for determining different operations, loop structures to perform repetitive tasks, procedures, sub-procedures, and functions to create manageable code.
4. Create one and two-dimensional arrays for sorting, calculating, and displaying of data and to write Visual Basic programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, and inheritance, and polymorphism.
5. Students will be able to design Windows applications using forms, controls, and events.
6. Explore Visual Basic's Integrated Development Environment (IDE).

**Unit I**

Introduction-Visual Basic Environment-Element of Visual Basic-Statements and Expressions-Functions-String Functions-Literals-Constants-Variables-Operators-Arrays-Control Arrays-Subroutines and Functions-Looping and decision control structure-If/Then/Else, Select For Next, Do/Loop, While/Wend Structures.

**Unit II**

Intrinsic Controls: Pointer, Label, Frame, Checkbox, combo Box, Hscroll Bar, Timer, DirList Box, Shape, Image, OLE, Picture Box, List Box, Text Box, Command Button, Option Button, Vscroll Bar, Drive List Box, Line control usage and properties. Microsoft common control: Tree view control-List view control-Active X Control-Adding Control to form-SDI Forms-MDI Forms-Using Forms as Objects-Building class and collections.

**Unit III**

DDE-Methods, Properties, Events-Database programming: Data Tools-DAO, ADO, OLEDB and RDO Database Connections-Active X Commands.

**Unit IV**

Visual C++: Introduction to Windows-View Architecture-Document-GDI Components-Dialog Box-Device Context-GDI Objects-Printing and Print Preview.

**Unit V**

Database: Serialization-Accessing File-ODBC-DAO-MFE Database Classes-Record sets Querying - Internet Application: Using personal web server-Web browser-ISAPI Application-Active X Controls-ATL.

**Text Books**

1. Gray Cornell, Visual Basic 6 from the Ground Up, 2011, Tata McGraw Hill Publication. New Delhi. [ Unit 1 to 3]
2. Ivor Horton's, Beginning Visual C++, 1<sup>st</sup> 2014, Wiley India Pvt. Ltd. (Wrox Beginning Guides), New Delhi, India [ Unit 4 & 5]

**Reference**

1. Programming Microsoft Visual C++,2011, 5<sup>th</sup> Edition, Wiley India Pvt. Ltd., New Delhi, India

**Course Objectives:**

- Know fundamentals of computer graphics with different drawing techniques
- Relate 2D & 3D Geometric transformations, Matrices and vectors.
- Understand Scan Conversions, Hidden Surface Elimination
- Discusses about Curves and Surfaces
- Analyze Shading, Colour, Anti-aliasing, Texture Mapping
- To know the different algorithms for performing clipping process, scan conversions and hidden surface elimination.

**Course Outcomes (Cos)**

Upon completion of this Course, student will be able to:

1. Introduces core concepts of computer graphics.
2. Familiarize the students with graphics concepts, including 2D and 3D transformation, clipping, splines, objects modeling, colour modeling, lighting, textures, visible surface detection.
3. Algorithms to design, and create computer graphics scenes.
4. Describe the 3D object representation using primitives structures, curve structures etc
5. Implement the various illumination models
6. Explore Visual Basic's Integrated Development Environment (IDE).

**Unit I**

Introduction: The origins of computer graphics, Computer Aided Design, Visualization, Image Processing, Graphical User Interface, General-purpose graphics software. Point-Plotting Techniques: Co-ordinate systems, Incremental methods, Line-drawing Algorithms, Circle generators. Line drawing Displays: Display device and Controllers, CRT, Inherent-Memory devices, the storage tube display, The Refresh Line-Drawing Display.

**Unit II**

Graphical Input Devices: Point and Positioning Devices, the mouse, Keyboard, Trackball and Special ball, Joysticks, Digitizer, Image Scanner, Tablet, Light Pen, Three-Dimension Input devices. Graphical Input Technique: Positioning Techniques, Pointing and Selection, Inking and Painting, Online character Recognition. Event Handling: Polling, Interrupts, The Event Queue, Function of Handling Events, Polling Task Design, Light pen Interrupts. Input Function: Dragging and fixing, Hit Detection.

**Unit III**

Two-dimensional Transformation: Transformation Principles, Concatenation, Matrix Representation. Three Dimensional Transformation and Perspective: Transformations, Transformation in Modeling, Transformation in Viewing, Perspective Transformation. Clipping and Windowing: Line Clipping Algorithm, Midpoint subdivision, Clipping other

Graphic Entities, Polygon Clipping, Viewing Transformations, the Windowing Transformation.

**Unit IV**

Raster Graphics Fundamentals: Introduction to Random Scan Monitor and Raster Scan Monitor, Generating a Raster Image Frame Buffer Display, Representing a Raster Image, Scan converting Line drawings, Displaying characters, Speed of Scan Conversion, Natural Image. Solid Area scan conversion: Geometric Representation of Areas, Scan Converting Polygons, Priority, The Y-X Algorithm, Properties of Scan conversion algorithms. Raster-Graphics System: Representation, Raster Manipulation functions, System Using Raster representation, System using Geometric Representation. Raster Display Hardware: Raster Access Frame Buffer, real time Scan Conversation, Other Encoding Schemes.

**Unit V**

Realism in three-dimensional Graphics: Techniques for Achieving Realism, Modeling three-dimensional scenes, Modeling and Realism.

Curves and surfaces: Shape Description Requirements, Displaying Curves and Surfaces. Hidden-Surface Elimination: Two Approaches, The Depth-Buffer Algorithm, Geometric Computations, Scan-Line Coherence Algorithm, Area-Coherence Algorithm. Priority Algorithms, Sorting and Coherence. Shading: Shading Model, Applying the Shading Model, special effects.

**Text Book**

1. Donald Hearn, M.Pauline Baker, 2000, "Computer Graphics", 2<sup>nd</sup> Edition, Prentice-Hall of India Private Ltd., New Delhi.

**References**

1. William M.NewMan, Robert F.Sproull, 2004, Principles of Interactive Computer Graphics, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishers, New Delhi.
2. Angel, Edward, 2005, "InterActive Computer Graphics", 1<sup>st</sup> Edition, Addition-Wesly, New Delhi.
3. Donald Hearn, M.Pauline Baker, 2000, Computer Graphics, 2<sup>nd</sup> Edition, Prentice-Hall of India Private Ltd., New Delhi.
4. Egerton Paricia, 1998, "A computer Graphics", 1<sup>st</sup> Edition, Prentice Hall, New Delhi:

**Web Sites**

1. [www.microsoft.com/computer graphics/](http://www.microsoft.com/computer%20graphics/)
2. [www.en.wikipedia.org/wiki/computer graphics](http://www.en.wikipedia.org/wiki/computer_graphics)
3. [www.w3schools.com/ngws/default.asp](http://www.w3schools.com/ngws/default.asp)

**Course Objectives:**

Enable the students

- Form and solve linear programming problems
- To solve transportation and assignment problems.
- Understand the meaning of queueing and inventory problems.
- Constructing network for the projects.
- applied decision theory.
- To know the Inventory control, Replacement models, Queuing models and Network Scheduling.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Understand how to translate a real-world problem, given in words, into a Mathematical formulation.
2. Demonstrate the ability to optimize with tools from Linear Programming, Probability, Statistics, Simulation, Game Theory, Queuing Theory etc. in contexts involving uncertainty and scarce or expensive resources.
3. Formulate and solve Mathematical models (Linear programming problems) by applying the concept of Simplex method and its extensions.
4. Identify the resources required for a project and generate a plan and work schedule.
5. Learn to apply project management tools like CPM/PERT that ensures successful completion of projects.
6. Learn the comprehensive introduction of Linear Programming Problem.

**Unit - I**

Linear Programming : Formulation of LPP – Graphical solutions to LPP –Simplex method – Big M method -Duality in Linear programming Problem.

**Unit - II**

Transportation model: Mathematical formulation of the problem-Initial Basic Feasible solution - Optimum solution for nondegeneracy and degeneracy model - Unbalanced Transportation problems and Maximization case in Transportation problem

The Assignment problem : Mathematical formulation of the problem – Hungarian method – Unbalanced Assignment problem-Maximization case in Assignment problem Travelling Salesman Problem.

**Unit - III**

Inventory Control: Introduction – Costs involved in inventory, Deterministic models.EOQ models without and with shortage. Buffer stocks and Reorder level – Price Breaks models



**Unit - IV**

Replacement model: Introduction – Replacement of items that deteriorates gradually. Value of money does not change with time –value of money changes with time –Replacement of item that fails suddenly – Individual Replacement – Group replacement

Queuing theory : Introduction – Characteristics of queuing system-Markovian queuing models – Problems of single server with finite / infinite population model.

**Unit - V**

PERT and CPM: Network representation – Earliest expected time, latest allowable occurrence time - slack-critical path –Time estimates in PERT- Probability of meeting scheduled date of completion of projects – Calculations on CPM networks – various floats for activities – critical path.

**Text Book**

1. Kanthi Swarup., P.K. Gupta., and Man Mohan., 2000. Operations Research,Sultan Chand & Sons, New Delhi.

**References**

1. Sharma.J.K., 2004. Operations Research and Applications, Macmillan Ltd, New Delhi.
2. Sundaresan V., Ganapathy Subramanian K.S., and Ganesan K., 2005. Operations Research (Resource Management Techniques), A. R. Publications,Nagapatinam.

**Course Objectives:**

- To prepare object-oriented design for small/medium scale problems
- To demonstrate the differences between traditional imperative design and object-oriented design
- To explain class structures as fundamental, modular building blocks
- To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.
- To learn the object oriented programming concepts.
- To introduce the principles of inheritance and polymorphism and demonstrate how they are related to the design of abstract classes

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Compare OOPS with other programming techniques
2. Implement C++ programs with constructors and destructors
3. Develop OOP involving polymorphism using operator overloading and method overloading
4. Implement programs with code reusability using inheritance
5. Develop Programs with file handling and templates
6. Apply OOP concepts to solve real world problems

**List of Programs:**

1. Create a class Date whose data members are Day, month, and Year. Write necessary member functions and perform the following operations using overload operators  
Increment a date by a day
2. Compares two dates
3. Create a class String that has a character array as a data member and perform the following operations using overloaded operators.
  - '+' To add two strings
  - '+=' To concatenate one string with the other
  - '==' To compare two strings
4. Create a class Computer and derive two classes Client and Server from it. Have the data members of the classes as follows.  
In the main () program, get the data about n clients and servers and print it back in a neat format.
5. Create four classes with the relationship and data members as in shown in the diagram.  
In the main () program, have the facility to
  - Store the details of n inpatients and outpatients
  - Display the details in a neat format
6. Create a class staff that contains the name, designation, and years of experience of a staff member of a college. Using containership, create two more classes Teaching Staff and NonTeachingStaff according to the following specifications.

In addition to the properties of the staff class, the Teaching Staff class should contain the highest qualification the staff member possesses and the departments he belongs to. The NonTeachingStaff class needs to contain the properties of Staff only. In the main (), get data about some of the teaching and NonTeachingStaff members of your college and print the details in neat format.

7. Create a class Address as whose data members are Name, Street, City, Pincode and Phone Number of a person. In the main () program, using array of pointers, get addresses of n persons, sort it in alphabetical order of names and display it back in a neat format.
8. Create a class Shape that contains two data members of type double to hold the two dimensions of the shape.  
Derive 3 more classes' circle, rectangle, And Triangle from the class Shape. Using appropriate member functions, get the values, calculate and print the area of different shapes using dynamic binding.  
Hint:- write 2 member functions in all the derived classes: one to set the data and the other to calculate and display the area.
9. Create two classes British and Metric to store the measurements of distance in the British (feet and inches) and Metric (meters and centimeters) systems respectively.  
In the main () program, perform the following:
  - Get two measurements: one in British and the other in Metric
  - Ask the user in which system (British or Metric) (s) he wants the output.
  - Add two input measurements and print the result according to the user's choice.
10. Create a class that copies the content of a text file into another file. Write the program in such a way that the program accepts command line arguments and make the program to execute in a way exactly the copy command in Dos works.
11. Create a class Student that could the name, register number and marks in the subjects of the semester. Have the program perform the following operations:
  - Store the data about n students in a data file.
  - Print the mark list of each student whenever requested.
  - Add details about some more students at any time.
12. Sort an integer and a floating –point array using function template.
13. Create a class template stack that accepts a generic data type as a parameter and performs the basic operations of a stack. Using the above class in the main () program, implement stacks for integer and floating point data types separately and perform the operations on the stack.

### Text Book

1. Deitel. H.M and P.J.Deitel. 2013. C++ How to Program, 9<sup>th</sup> Edition, Prentice Hall India, New Delhi, India

**References**

3. Y. Daniel Liang 2014, Introduction to Programming with C++, 3<sup>rd</sup> Edition, Pearson Publications, New Delhi, India.
4. Bjarne Stroustrup., 2013. 13<sup>th</sup> Impression, The C++ Programming Language, Addison Wesley, New Delhi
3. Diane Zak, 2012, Introduction to Programming with C++ , 7<sup>th</sup> Edition, Cengage Learning India Private Limited, New Delhi, India

**Web Sites**

1. <http://www.cplusplus.com/doc/tutorial/>
2. [www.cplusplus.com/](http://www.cplusplus.com/)
3. [www.cppreference.com/](http://www.cppreference.com/)

**Course Objectives:**

To help students to

- Understand the role and nature of relational database management systems (RDBMS) in IT environment.
- Translate written business requirements into conceptual entity-relationship data models.
- Convert conceptual data models into relational database schemas using the SQL Data Definition Language (DDL).
- Query and manipulate databases using the SQL Data Manipulation Language (DML).
- To provide students with comprehensive and in-depth knowledge of architecture and functioning of database management systems.
- To design and built a database system and use computer and database management skills to implement a solution to a business case using database management systems.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Introduces how to apply logical database design principles, including E-R/EE-R diagrams, conversion of ER diagrams to relations.
2. Familiarize students with the concepts of integrity constraints, relational algebra, relational domain & tuple calculus, data normalization.
3. Construct simple and moderately advanced database queries using Structured Query Language (SQL).
4. Familiarize students with the concept of a database transaction including concurrency control, backup and recovery, and data object locking.
5. Design and implementation of a small database project using Oracle.
6. Improve the database design by applying normalization techniques.

**List of Programs**

Some sample applications which may be programmed, are given below

I Create following tables with appropriate constraints.

1. Write SQL statement for following queries.

- a. Age of employees.
- b. Employees whose take home salary is in the range Rs10,000 and 15,000
- c. Employees whose has put 10 years of service.
- d. Employees working under the department head RAGURAMAN
- e. Senior and youngest employee in each department.
- f. Employees who retires after one year.

2. Write cursors

- a. To raise the basic salaries by 25 percent
- b. To retain male employee in the existing employee table and to move female employees to a new table.

3. Create following views
    - a. For male employees of age more than 45 years.
    - b. For operator with the CHECK OPTION.
    - c. For Female employees working under the department head RAJARAMAN.
    - d. For male employees with the CHECK OPTION.
  4. Create a trigger which fires when one tries
    - a. To update records in employee table on Sundays.
    - b. To insert records in salary table with basic >30000
  5. Generate a pay slip where 40 percent, 20 percent and 15 percent of basic is given as HRA, TA and DA fro the employees.
- II Create following tables with appropriate constraints.
1. Take a stock report and list of books in circulation.
  2. Write SQL statements for following queries.
    - a. Authors of C and C++ books.
    - b. List of books issued for UG student
    - c. Title of books in computer science department.
    - d. Titles of book by the author 'DIETEL'.
    - e. Publishers of C and C++ books.
    - f. Number of book issued to each student
    - g. Publisher details of Commerce Department.
- III Write a cursor
- a. To move books costing more than Rs.1500 into a separate table, Reference table.
  - b. To move damaged books into a separate table damaged table.

#### Some sample PL/SQL Programs

1. Write a recursive program for finding the factorial of a given number.
2. Write a recursive program for finding the first n Fibonacci number.
3. Write a PL/SQL program for multiplication tables 3, 4, 5 and 6.
4. Write a recursive program for finding the reverse of a given number.
5. Write SQL queries to illustrate the string functions a mathematical functions.
6. Write a program for finding the reverse of a given string.

#### Text Books

1. Raghu Rama Krishnan and Johnnas Gehrke.2009. Database Management System, 3<sup>rd</sup> Edition, Tata McGraw-Hill. (Unit I, II, III & V)
2. Kevin Lonewy. 2014. Oracle Database 11g, the Complete Reference, Tata Mc Graw-Hill, New Delhi. (Unit IV)

**References**

1. Elmaseri and Navathe. 2013. Database Systems-Models, Languages, Design and Application Programming, 1<sup>st</sup> Edition, Pearson Education. Delhi.
2. Bipin C. Desai. 2008. *An Introduction to Database Systems*, Galgotia Publications, New Delhi
3. Nilesh Shah. 2002. Database system using Oracle, 1<sup>st</sup> Edition, Prentice Hall of India. Delhi.
4. Rajesh Narang. 2002. Database Management Systems, 1<sup>st</sup> Edition, Prentice Hall of India, New Delhi.
5. Silberschartz, Korth and Sudarsan. 2002. Database System Concepts, 4<sup>th</sup> Edition, Tata Mc Graw-Hill, New Delhi.

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3. [www.compinfo-center.com/apps/rdbms.html](http://www.compinfo-center.com/apps/rdbms.html)

**Course Objectives:**

Enable the student

- Use forms and controls to create a user interface.
- Create and use Sub and Function procedures, including predefined functions.
- Implement decision structures and loops by using conditional expressions.
- Enhance the user interface by adding menus, status bars, and toolbars.
- Access and manipulate data in a Microsoft Access or Microsoft SQL Server database by using Microsoft ADO
- Build, package, and deploy an application.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Design, create, build, and debug Visual Basic applications .
2. Implement syntax rules in Visual Basic programs. And explain variables and data types used in program development and apply arithmetic operations for displaying numeric output.
3. Write and apply decision structures for determining different operations, loop structures to perform repetitive tasks, procedures, sub-procedures, and functions to create manageable code.
4. Create one and two-dimensional arrays for sorting, calculating, and displaying of data and to write Visual Basic programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, and inheritance, and polymorphism.
5. Students will be able to design Windows applications using forms, controls, and events.
6. Explore Visual Basic's Integrated Development Environment (IDE).

**List of Programs**

1. Develop a Visual program to implement calculator.
2. Write a Visual basic Application for Banking using Data control
3. Write a visual basic application to implement Employee Pay Roll using Ado Data Control. Use MS Flex grid to display the Employee Details
4. Develop a Visual Basic Application to maintain the books in the library using ADO Data control. Uses Data Report to generate a report for Books availability in the library.
5. Write a Visual basic application to create a ActiveX Control for Calendar.
6. Write a Visual Basic Program to create a Screen saver application for windows,
7. Design a VC++ program to Create a window
8. Implement a Mouse Events
9. Write a VC++ program to create window with menu
10. Write a VC++ program to Store a records in the database for students.



11. Write a VC++ program to implement a mouse event using SDK
12. Write a VC++ program to transfer the file from source to destination using MFC.

**Text Books**

1. Gray Cornell, Visual Basic 6 from the Ground Up, 2011, Tata McGraw Hill Publication. New Delhi. [ Unit 1 to 3]
2. Ivor Horton's, Beginning Visual C++, 1<sup>st</sup> 2014, Wiley India Pvt. Ltd. (Wrox Beginning Guides), New Delhi, India [ Unit 4 & 5]

**Reference Books**

1. Programming Microsoft Visual C++,2011, 5<sup>th</sup> Edition, Wiley India Pvt. Ltd., New Delhi, India

**Course Objectives:**

- To expose the students to the best object oriented programming paradigm, java and strengthen their OOP's fundamental knowledge.
- To Study the software and hardware requirement and installing the java.
- To understand Java programming constructs like variable, primitive data types, operators, type conversion, type casting etc.
- To develop program by using classes, object, nested classes, constructors etc.
- To create package, use of packages, adding a class to a package.
- To understand conversion of numbers and Strings, manipulations of strings, Unboxing and auto boxing

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Describe the features of Java
2. Design classes with object-oriented features
3. Describe advanced features of Java like exception handling, multithreading etc.
4. Write programs in JAVA featuring its core capabilities
5. Able to create objects, classes, packages and class libraries.
6. Ability to make use of members of classes found in the Java API (such as the Math class).

**Unit I**

Introduction to Java Applications and Applets: Printing a line of text – Displaying text in a Dialog Box – Adding integers – Arithmetic – Decision Making – Drawing a String – Adding Floating Point Numbers. Control Statements: Pseudocode – Control Structures - if, if/else, while – Formulating Algorithms: Case studies: 1, 2 & 3 – Compound Assignment – Increment and Decrement Operators – Primitive types – for, do/while – switch –break and continue statements (simple & labeled) – Logical Operators - selection statements. Methods: Program Modules in Java – Method Declarations – Argument Promotion - Java API Packages – Scope of Declarations – Method Overloading – Recursion. Arrays: Declaring and Creating Arrays – REFERENCES and Reference Parameters – Passing Arrays to Methods – Multidimensional Arrays.

**Unit II**

Object-Based Programming: Implementing a Time Abstract Data Type with a Class – Class Scope – Controlling Access to members –‘this’- Constructors – Overloaded Constructors – set and get methods – Composition – Static Class Members – Creating Packages – Package Access. Object-Oriented Programming: Superclasses and Subclasses – protected Members – Constructors and Finalizers in Subclasses – Invoking Superclass Method from Subclass Objects - Using Superclass REFERENCES with Subclass-Type Variables – Subclass Method Calls via Superclass-Type Variables – Inheriting Interface and Implementation – final Methods and classes Nested Classes – Type-Wrapper Classes for Primitive Types. String and Characters: Fundamentals – Class String – Class StringBuffer – class Character – class StringTokenizer – Regular Expressions, Class Pattern and Class Matcher.

**Unit III**

Graphics and Java2D: Graphics Contexts and graphics Objects – Color Control – Font Control – Drawing Lines, Rectangles, Ovals, Arcs, Polygons and Polylines – Java2D API. Graphical User Interface Components: Overview of Swing Components- JLabel – EventHandling – Textfields – How event handling works – JButton – JCheckBox and JRadioButton – JComboBox – JList – Multiple-Selection Lists – Mouse Event Handling – Adapter classes – Key Event Handling – Layout Managers – Panels – JTextArea – JPanel – JSlider – Using Menus with Frames – JPopupMenu – Pluggable Look-and-Feel. Exception Handling: Java Exception Hierarchy – Rethrowing and Exception – finally Clause – printStackTrace, getStackTrace and getMessage – Chained Exceptions.

**Unit IV**

Multithreading: Life Cycle of a Thread – Thread Priorities and Thread Scheduling – Creating and Executing Thread – Thread Synchronization – Runnable Interface. Files and Streams: Data Hierarchy – Files and Streams – Class File – Creating a Sequential-Access File – Reading Data from a Sequential-Access File – Random-Access Files – Creating/Writing/Reading Random-Access Files – New I/O APIs for the Java Platform. Networking: Manipulating URLs – Reading a File on a Web Server –Client/Server Interaction with Stream Socket Connections. Multimedia: Loading, Displaying and Scaling Images – Animating a series of Images – Image Maps – Loading and Playing Audio Clips.

**Unit V**

Java Utilities Package and Bit Manipulation: Vector Class and Enumeration Interface – Stack Class of Package java.util – Hashtable Class – Properties Class – Bit Manipulation and the Bitwise Operators – BitSet Class. Collections: Collections Overview – Class Arrays – Interface Collection and Class Collections – Lists – Sets – Maps. Java Database Connectivity with JDBC: Relational Database Overview – SQL – Manipulating Databases with JDBC – Stored Procedures.

**Text Book**

1. Deitel & Deitel. 2014. Java How to Program, 10<sup>th</sup> Edition, Pearson Education Asia, New Delhi.

**References Book**

1. Herbert Schildt, 2014 9<sup>th</sup> edition. Java Complete Reference, Tata McGraw Hill, New Delhi.
2. Balagurusamy. E . 2012, 3<sup>rd</sup> edition . Programming with Java, Tata Mc-Graw Hill, New Delhi.
3. ISRD Group. 2012. Introduction to Object Oriented Programming through Java, 1<sup>st</sup> Edition, Tata Mc- Graw Hill, New Delhi.
4. Aaron walsh, Justin couch & Daniel H. Steinberg. 2000. Java 2 Programming, IDG Books India (P) Ltd., New Delhi.

**Web Sites**

1. [java.sun.com/docs/books/tutorial/](http://java.sun.com/docs/books/tutorial/)
2. [www.en.wikipedia.org/wiki/Java](http://www.en.wikipedia.org/wiki/Java)
3. [www.java.net/](http://www.java.net/)

**Course Objectives:**

Enable the student to

- Become familiar with layered communication architectures (OSI and TCP/IP).
- Understand the client/server model and key application layer protocols.
- Learn sockets programming and how to implement client/server programs.
- Understand the concepts of reliable data transfer and how TCP implements these concepts.
- Know the principles of congestion control and trade-offs in fairness and efficiency.
- Know the fundamentals of data communications networks, working of data transmission concepts

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components. Different types of network topologies and protocols.
3. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
4. Identify the different types of network devices and their functions within a network. Understand and building the skills of subnetting and routing mechanisms.
5. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.
6. Understand the various operation of all seven layers of OSI Model and the protocols used in each layer.

**Unit I**

Introduction: Introduction to Computer Network-OSI Reference Models-TCP/IP Reference Model-Example of Network. Physical Network: Theoretical Basics for Data Communication-Guided Transmission Media-Wireless Transmission-Communication Satellites-Mobile Phone System.

**Unit II**

Data Link Layer: Data Link Layer Design Issue-Error Detection and Correction Methods-Elementary data link protocol-Sliding window protocols-Example Data Link protocol. The channel Allocation problem-Multiple Access Protocols-Ethernet-Wireless LANs-IEEE 802 standards-High Speed LANs

**Unit III**

Network Layer: Network Layer Design Issue-Routing Algorithms-Congestion control Algorithms-Quality of service-Inter networking-Network Layer in Internet

**Unit IV**

Transport Layer: Transport service-Elements of transport protocols-Internet Transport protocols: UDP and TCP-Performance Issues

**Unit V**

Application Layer: The Domain Name System-Electronic Mail-World Wide Web-Multimedia-Compression Methods. Network Security: Cryptography-Symmetric and Asymmetric key algorithms-Digital signature-Simple Network Management protocol.

**Text Book**

1. Andrew S Tanenbaum. 2014. Computer Networks, 5<sup>th</sup> Edition, Prentice Hall of India, New Delhi.

**Reference Books**

1. Douglas E Comer. 2014. Computer Networks and Internets, 6<sup>th</sup> Edition, Pearson Education Asia, New Delhi. India
2. William Stallings, 2013, Data and Communication Network, 10<sup>th</sup> Edition, Pearson Education, New Delhi. India
3. Behrouz A. Forouzan, 2013, Data and Communication Network, 5<sup>th</sup> Edition, Tata McGraw Hill, McGraw Hill Publications, New Delhi, India

**Web Sites**

1. [www.en.wikipedia.org/wiki/Computer\\_network](http://www.en.wikipedia.org/wiki/Computer_network)
2. [www.amazon.com/Computer-Networks-Andrew-S-Tanenbaum/dp/0133499456](http://www.amazon.com/Computer-Networks-Andrew-S-Tanenbaum/dp/0133499456)
3. [www.cs.rit.edu/~hpb/Lectures/98\\_445/all.html](http://www.cs.rit.edu/~hpb/Lectures/98_445/all.html)

**Course Objectives:**

To make students to

- Understand the fundamental features of web applications.
- Understand the objects and components needed for a web designing.
- To identify which technologies can be used.
- Create a webpage
- To Understand the various steps in designing a creative and dynamic website.
- To Design dynamic and interactive web pages.

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Design simple web applications and window applications.
2. Develop, implement and creating Applications with C#.
3. Develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services.
4. Understand and be able to explain Security in the .NET framework and Deployment in the .NET.
5. Learn about the ADO.NET, the feature, controls and code to connect database with front end using ODBC, OLEDB, and SQL, and how to develop web form and data connectivity in ASP.NET.
6. Demonstrate technical skills required of Web Developers through use of W3C standards.

**Unit I**

Creating an HTML Document – creating list – creating links between document – linking to resources on the internet – working with hypertext attributes – working with fonts and text styles – tables – creating frameset – working with forms – working with cascading style sheets.

**Unit II**

JavaScript: Introduction to javascript – Programming fundamentals – Functions and objects – Navigator object model

**Unit III**

JavaScript: Form and form elements – Scripting frames and multiple windows – Event object – Functions and custom objects.

**Unit IV**

ASP: Client side scripting vs. Server side scripting- Variables & Constants- Procedures – Forms – Cookies – Application - #include – Global.asa - Functions-ASP object model: Response- Request- Application- Session – Server – Error – Array

**Unit V**

ASP: Collections & Control Structure-File system object: File System – Text Stream-Drive – File – Folder – Directory – ADO - sql & Databases for data driven applications-ASP Components: Ad Rotator – Browser Cap. – Content Linking – Content Rotator .

**Text Books**

1. Patrick Carey 2011, New Perspectives on HTML and XHTML, 6th Edition, Cengage Learning. (UNIT I).
2. Jeremy McPeak, 2015, Beginning Javascript, 5th Edition, Wiley India Pvt. Ltd. (Wrox Beginning Guides), New Delhi, India (Unit II)
3. Danny Goodman, 2010, “Javascript Bible”, 7<sup>th</sup> Edition, Wiley India Publications; 7<sup>th</sup> Edition (November 9, 2010) (Unit III).
4. A.Russell Jones. 2000. Mastering ActiveServerPages 3, 1<sup>st</sup> Edition, BPB Publishing, New Delhi.( Unit IV & Unit V).

**Reference Books**

1. Thau. 2007. The Book of JavaScript: A Practical Guide to Interactive WebPages.
2. Wendy Willard. 2007. HTML: A Beginner's Guide, Tata McGraw-Hill Professional, New Delhi.
3. Chuck Musciano and Bill Kennedy. 2006. HTML & XHTML: The Definitive \*Guide, O'Reilly.
4. David Flanagan. 2006. JavaScript: The Definitive Guide, O'Reilly,
5. Nicholas C. Zakas, Inc Ebrary and Ebrary. 2005. Professional JavaScript for Web Developers, John Wiley & Sons Inc, New Delhi.
6. Jude D'Souza and Monica D'Souza. 2002. Discover ASP, 1st Edition, TATA McGraw Hill Professional, New Delhi.

**Web Sites**

1. [www.w3schools.com/](http://www.w3schools.com/)
2. [www.javascriptkit.com](http://www.javascriptkit.com)
3. [www.aspfree.com](http://www.aspfree.com)
4. [www.aspnetutorials.com](http://www.aspnetutorials.com)

**Course Objectives:**

To help students to

- Understand the basic concepts techniques and applications of software agents.
- Understand how agent communications between them.
- Know the applications of agent.
- Understand software agents design tools.
- Introduce the concepts, techniques and applications of software agents.
- Evaluate current software agent systems.

**Course Outcomes (COs)**

Upon completion of this Course, student will be able to:

1. Know the pitfalls of Agent Development
2. Implement the interaction between the agents
3. Have an idea to develop an agent application
4. Describe the various agent application
5. Understand the Multiagent planning and Synchronization
6. Know about Agent oriented programming

**Unit I**

Introduction – Intelligent Agents – Environments – Intelligent agents – Agents and Objects – Agents and Expert Systems – Agents as Intentional Systems – Abstract Architectures for Intelligent Agents – How to tell an agent what to do – Synthesizing Agents

**Unit II**

Deductive Reasoning Agents – Agents as Theorem Provers – Agent-Oriented Programming – Concurrent Mutate.

Practical Reasoning Agents – Proactical Reasoning Equals Deliberation Plus Means-Ends Reasoning – Means-Ends Reasoning – Implementing a Practical Reasoning Agent -Homer – The Procedural Reasoning System

Reactive and Hybrid Agents- Brooks and the Subsumption Architecture – The Limitations of Reactive Agents – Hybrid Agents

**Unit III**

Multiagent Interactions – Utilities and Preferences – Multiagent Encounters – Dominant Strategies and Nash Equilibria – Competitive and Zero-Sum Interactions – The Prisoner's Dilemma – Other Symmetric 2 x 2 Interactions – Dependence Relations in Multiagent Systems

Reaching Agreements – Mechanism Design – Auctions – Negotiation – Argumentation Communication – Speech Acts – Agent Communication Languages – Ontologies for Agent Communication – Coordination Languages

**Unit IV**

Cooperative Distributed Problem Solving – Task Sharing – Combining Task and Result Sharing – Handling Inconsistency – Coordination – Multiagent planning and Synchronization



**Unit V**

Methodologies – Agent-Oriented Analysis and Design Techniques – Pitfalls of Agent Development – Mobile Agents-Applications of Agents

**Text Book**

1. Michael Wooldridge.2009. An Introduction to Multiagent Systems, John Wiley & Sons Ltd.

**References**

7. Gerhard Weiss, 2013, Multi-agent Systems, MIT Press, 2<sup>nd</sup> Edition
2. Walter Brenner et al, 2011, Intelligent Software agents: Foundations and Applications, Springer Verlag

**Course Objectives:**

Enable the student

- To Understand basics client/server architecture
- To Establish and use Database connectivity
- To gain the knowledge of CORBA
- This Subject deals with the C/S Computing, GUI.
- To apply the techniques and features of a client/server development language to construct a moderately complex client/server application.
- To learn the advantages of client-server systems over monolithic systems.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

- Know client server computing models and can establish communication between them
- Design a dynamic remote application with RMI and JDBC Connectivity
- Develop programming using C#.net
- Differentiate homogeneous and heterogeneous language communications.
- Develop real time projects by combining CORBA and database interfacing
- Differentiate between two-tier and three-tier architectures.

**Unit I**

A client-server computing-What is client/server? Server classification- FAT server- FAT client - 2 Tier versus 3 Tier- client/server building blocks- the road to bandwidth heaven- Advantages of client/server computing.

**Unit II**

Clients, servers and operating systems- NOS- Creating the single system Image- RPC, messaging and peer-to-peer. Client/server systems development- Software- Client/server systems development- Hardware.

**Unit III**

SQL database servers- SQL middleware and federated databases- Data warehouse- OLAP and multidimensional data- Client/server transaction processing- The magic of transaction-TP monitors.

**Unit IV**

Database connectivity solutions: ODBC – The need for Database Connectivity- Design overview of ODBC- Architecture- Components- Applications- Driver Manager- Drivers- Data sources- ODBC 2.5 and ODBC 3.0.

**Unit V**

Client/server groupware - CORBA- Compound Documents- Web Client/Server- 3 Tier Client/Server, Web-style- HTML 2.0's Web-based forms- CGI- Web security- The Java objects. Client Server Administration – Introduction to Windows NT- Architecture- Memory Architecture- Server and workstation- Installing Windows NT.

**Text Book**

1. Robert Orfali, Dan Harkey, Jeri Edwards. 2000, The Essential Client/Server Survival Guide. 2<sup>nd</sup> Edition. Galgotia Publication, New Delhi.

**Reference**

1. Patrick Smith, Steve Quengerich. Client/Server Computing. 2nd Edition. Prentice hall of India, New Delhi

**Course Objectives:**

Enable the student

- The Software perspective architectural and how it differs from lower-level design.
- Understand the need for a Software Architecture.
- To exploit the software architecture environment.
- To understand software engineering layered technology and Process frame work.
- To Understand Design Engineering, Web applications and Software Project Management.
- To Understand the software design concepts and know to Maintain the quality of software project

**Course Outcomes (COs)**

Upon completion of this Course, student will be able to:

1. Principles and Process of software development
2. Design various software architectures with visual notations
3. Evaluate the software design methods
4. Enumerate different software estimation and project scheduling techniques
5. Identify software requirements engineering activities.
6. Able to Verify and validate the problem of software programming

**Unit I**

Introduction – Software Architecture – Software Design levels – An Engineering Discipline for Software – The status of Software Architecture – Architectural styles – Pipes and filters – Data Abstraction and Object-oriented organization – Event based, implicit invocation – Layered systems – Repositories – Interpreters – Process Control – Other Familiar Architecture – Heterogeneous Architectures.

**Unit II**

Case studies - Key word is Context – Instrumentation Software – Mobile Robotics – Cruise Control – Three Vignettes in Mixed Style

**Unit III**

Shared Information Systems – Database Integration – Integration in Software Development Environments – Integration in the Design of Buildings – Architectural structures for shared Information Systems

**Unit IV**

Guidance for User-Interface Architectures – The quantified Design Space – The value of Architectural formalism – Formalizing the Architecture of a specific system – Formalizing an Architectural Style – Formalizing an Architectural Design Space – Towards a Theory of Software Architecture – Z Notation

**Unit V**

Requirements for Architecture – Description Languages – First class connectors – Adding Implicit Invocation to Traditional Programming Languages – Tools for Architectural Design – UniCon – Exploiting Style in Architectural Design Environments – Beyond definition/Use: Architectural Interconnection.

**Text Books**

1. Mary Shaw, David Garlan, Software Architecture – Perspectives on an Emerging Discipline, Prentice Hall of India, Eastern Economy Edition.

**Reference:**

1. Malveau, Mowbray ,Software Architecture Bootcamp. 2011,Prentice Hall.
2. Dave Hendricksen, 2011, 12 Essential Skills for Software Architects, Addison - Wesley.

**Course Objectives:**

Enable the students

- Basic multimedia concepts.
- Basic knowledge of 2D animation
- The knowledge of audio and video capture and editing tools
- The skill to design different application using flash.
- interface design, content design and creation with graphics, animation, audio and video materials, and software development using Flash.
- To learn various multimedia authoring systems.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Comprehend multimedia system fundamentals.
2. Design and implement a multimedia application or identify a problem in certain multimedia area and provide a reasonable solution.
3. Know various multimedia software tools.
4. Design multimedia software that are suitable to Internet applications.
5. Design flash animations
6. Design and development of a multimedia application

**Unit I**

Introduction to Multimedia – Usage of Multimedia- Introduction to making Multimedia: Stages of a project- Need for making multimedia- Macintosh and windows production platforms- Multimedia Building block: Text

**Unit II**

Sound: Digital Audio- Audio file formats-MIDI-MIDI vs Digital Audio - Images: Making images-Color-Image File Formats-Animation: Animation Techniques & file formats- video

**Unit III**

Storage Media & Access – Data Compression Techniques: Some basic compression techniques, JPEG, MPEG, DVI

**Unit IV**

Flash: Introduction to Flash – Variables & Data types: Data types in Action Script, creating and placing variables, Buttons with Text Fields – Basic Actions: Play, Stop, Back & Forth between frames and Scenes, Timelines, External Scripts – Operators- Loops: Repeater Loops, Frame Loop, Structure Loops, Nested Loops.

**Unit V**

Handling Events: Mouse Event, Keyboard, Key Objects, Clip Events, MovieClip Objects, Colliding Objects – Properties & Functions: setting properties, property tests, passing Property Values, Functions in Flash, using Substrings, User Defined Functions – Specialized Objects: Color, Date, Math, Number, Sound, XML & XML Socket Objects – Creating a Movie

**Text Books:**

1. Tay Vaughan. 2010 Multimedia making it work. 8<sup>th</sup> Edition, Tata McGraw Hill, New Delhi. ( Unit I , II)
2. John .F..Koegel Buford. 2001. Multimedia Systems. 1<sup>st</sup> Edition, Pearson Education, New Delhi.( Unit I , II)
3. Ralf Steinmetz and Klara Nahrstedt. 2001 Multimedia: Computing, Communications, & Applications. 1<sup>st</sup> Edition, Pearson Education , New Delhi. ( Unit III )
4. Bill Sanders. 2001 Flash5 ActionScript. 1st Edition, DreamTech Press, New Delhi ( Unit IV , V)

**Reference Books:**

1. Ranjan Parekh. 2013 Principles of Multimedia, 2<sup>nd</sup> Edition, Tata McGraw Hill, New Delhi.
2. Bojkovic & Milovanovic Rao, 2009, Multimedia Communication Systems Techniques, Standards And Networks Paperback, Phi.

**WEB SITES**

- 1.[en.wikipedia.org/wiki/Multimedia](http://en.wikipedia.org/wiki/Multimedia)
- 2.[www.arena-multimedia.com/](http://www.arena-multimedia.com/) -
- 3.[www.nextwavemultimedia.com/](http://www.nextwavemultimedia.com/)

**Course Objectives:**

Enable the student

- Understand basic communication systems.
- Acquire basic knowledge MAC Layer
- Wide knowledge about linux based operating systems
- Design different application on mobile based operating systems.
- Gain knowledge on mobile communication systems and depth knowledge of mobile operating systems.
- Learning about systems for mobile application distribution .

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

- Understand and identify the GSM, GPRS and Bluetooth software model for mobile computing.
- The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.
- Understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities
- Analyze QoS over wire and wireless channels
- Able to promote the awareness of the life-long learning,business ethics, professional ethics and currentmarketing scenarios.
- Student has knowledge concerning mobile operating systems and their architecture.

**Unit I**

Introduction to Mobile communication-Wireless communication-How wireless started-Worldwide mobile communications market-Wireless transmission - Radio transmission – frequencies-Regulations-Signals-Antennas- Signal propagation-Multiplexing- Modulation-Spread spectrum-Cellular system.

**Unit II**

Medium Access control: Introduction- Introduction -Reason for specialized MAC-SDMA FDMA- TDMA-CDMA-Telecommunication systems-GSM-Satellite System-GEO-LEO-MEO.Layers of Mobile Networks: Mobile IP-Mobile node (MN)-DHCP-Mobile Ad-hoc Networks-Mobile Transport Layer-Traditional TCP- Improvements to Classical TCP-TCP over 2.5/3G wireless networks-Performance enhancing proxies

**Unit III**

Linux Based Operating Systems: Access Linux-Android-DSLlinux- iPod Linux-Limo (Linux Mobile)-MeeGo-Mobilinux-OpenMoko-SHR-QT Extended- Ubuntu

**Unit IV**

Windows Based Operating Systems: Windows Phone-Windows Mobile.Other Operating Systems: BADA- Blackberry-Blackberry Tablet-iPhone-PALM-Palm's Web-Symbian



**Unit V**

Symbian programming-Installing the Qt Software -Create a Simple Mobile Application.  
Windows Phone 7 Programming-Installing Visual Studio 2010- Installing Windows Phone 7 SDK- Create a Simple Mobile Application.Android Programming: Installing JDK -NetBeans Installation-Create a Simple Mobile Application

**Text Books**

1. Arash Habibi Lashkari, Mohammadreza Moradhaseli.2011. Mobile Operating Systems and Programming: Mobile Communications, VDM Publishing.

**Reference Books**

1. Mischa Schwartz. 2005. Mobile Wireless Communications. Cambridge University
2. Michael J Jipping . 2007.Smartphone Operating System Concepts With Symbian Os, willey India.
3. Press.R.Roger, J Lombarddo, Z Mednieks and B. Meike, 2010, Android Applications Development, O'Reilly, Shroft Publishers & Distributors Pvt Ltd, New Delhi.

**Web sites:**

- [en.wikipedia.org/wiki/Mobile\\_operating\\_system](http://en.wikipedia.org/wiki/Mobile_operating_system)
- [www.zdnet.com/.../beyond-android-and-ios-the-top-six-mobile-operatin..](http://www.zdnet.com/.../beyond-android-and-ios-the-top-six-mobile-operatin..)
- [www.shoutmeloud.com/top-mobile-os-overview.html](http://www.shoutmeloud.com/top-mobile-os-overview.html)

**Course Objectives:**

Enable the students

- To give everybody a base level of finance knowledge that an MPA from a top business school should possess,
- To give everybody the ability and confidence to tackle common financial problems in practice
- To provide adequate preparation for future managers should organize their financial transactions effectively and with integrity.
- To understand and appreciate the basic Micro and Macroeconomics and their application to the business
- basics of Accounting Concepts and Principles to Prepare to Students to have the foot hold in Accounts.
- To know about ratio analysis

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Preparing financial statements in accordance with appropriate standards.
2. ledger accounts using double entry bookkeeping and record journal entries accordingly .
3. Interpreting the business implications of financial statement information
4. To understand theories of profit , profit maximization and analysis of Breack Even Point
5. To know law of diminishing proportion , product function , Economies of scale
6. To understand Pricing policy under Perfect Competition Monopoly,

**Unit I**

Accounting: Definition- Objectives- Advantages- Accounting Concepts- Accounting Conventions; Methods of Accounting: Single Entry and Double Entry System- Basic books of Accounts- Journal and Ledger- Preparation of Trial Balance; Final accounts: Trading and Profit and Loss Account and Balance Sheet of Sole Proprietary Concern; Depreciation- Meaning- Straight-Line Method-Diminishing Balance Method.

**Unit II**

Ratio Analysis: Meaning-Advantages-Limitations; Classification of Ratio: Profitability, Turnover and Solvency Ratios.

**Unit III**

Funds Flow Statement: Concept of funds- Funds Flow Statement- Uses and Limitations- Preparation of Fund Flow Statement- Cash Flow Statement.

**Unit IV**

Budget and Budgetary Control: Meaning and Definition- Objectives of Budgetary Control- Advantages and Limitation Preparation of Different Types of Budgets.

**Unit V**

Costing: Definition- Nature and Importance- Advantages and Limitations of Cost Accounting-Classifications of Cost - Preparation of Cost Sheet.

Marginal Costing: Meaning- Advantages- Cost-Volume Profit Analysis- Break Even analysis- Uses and assumptions- Applications of Marginal Costing.

**Text Books**

1. N.Vinayakam, Mani and Nagarajan, "Principles of Accountancy".
2. S.N.Maheswari, "Principles of Management Accounting".
3. S.P.Jain and Narang, "Cost Accounting".

**Reference Books**

1. Sharma and Sasi.K.Gupta, "Management Accounting".
2. T.S.Grewal, "Introduction to Accountancy".
3. Ramachandran and Srinivasan, "Management Accounting".

**Course Objectives:**

Enable the student

- To expose the students to the best object oriented programming paradigm, java and strengthen their OOP's fundamental knowledge.
- To Study the software and hardware requirement and installing the java.
- To understand Java programming constructs like variable, primitive data types, operators, type conversion, type casting etc.
- To develop program by using classes, object, nested classes, constructors etc.
- To create package, use of packages, adding a class to a package.
- To understand conversion of numbers and Strings, manipulations of strings, Unboxing and auto boxing

**Course Outcomes(COs)**

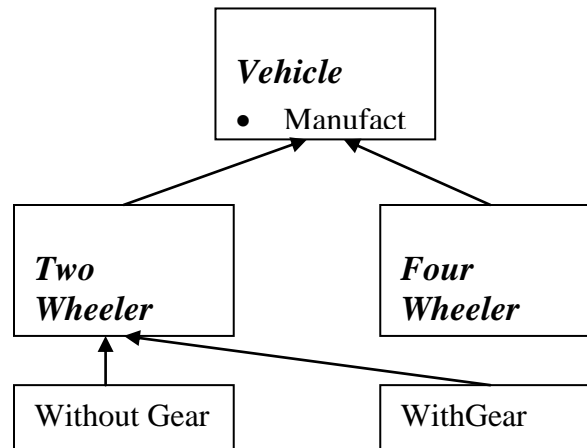
Upon completion of this Course, student will be able to:

1. Describe the features of Java
2. Design classes with object-oriented features
3. Describe advanced features of Java like exception handling, multithreading etc.
4. Write programs in JAVA featuring its core capabilities
5. Able to create objects, classes, packages and class libraries.
6. Ability to make use of members of classes found in the Java API (such as the Math class).

**List of Programs:**

1. Create an employee package to maintain the information about the employee. Use constructors to initialize the employee number and use overloading method to set the basic pay of the employee. By using this package, create a Java program.
2. Create a set of classes with the relationship as shown in the diagram and use inheritance relationship to define the sub classes.  
  
Get and display the details of some of the two and four wheelers and display them in a neat format. Create a frame with user specific size and position it at user specific position (use command line argument). Then different shapes with different colors (use menus).
3. Java program to handle different mouse events.
4. Create an applet for a calculator application.
5. Java program to maintain the student information in text file.
6. Animate images at different intervals by using multi-threading concepts.
7. Program to send a text message to another system and receive the text message from the system (use socket programming)
8. Java program by using JDBC concepts to access a database.

9. Java program by using to implement the tree viewer.
10. Implementation of Binary Search Tree



### Text Book

1. Deitel & Deitel. 2014. Java How to Program, 10<sup>th</sup> Edition, Pearson Education Asia, New Delhi.

### References Book

1. Herbert Schildt, 2014 9<sup>th</sup> edition. Java Complete Reference, Tata McGraw Hill, New Delhi.
2. Balagurusamy. E . 2012, 3<sup>rd</sup> edition . Programming with Java, Tata Mc-Graw Hill, New Delhi.
3. ISRD Group. 2012. Introduction to Object Oriented Programming through Java, 1<sup>st</sup> Edition, Tata Mc- Graw Hill, New Delhi.
4. Aaron walsh, Justin couch & Daniel H. Steinberg. 2000. Java 2 Programming, IDG Books India (P) Ltd., New Delhi.

### Web Sites

1. [java.sun.com/docs/books/tutorial/](http://java.sun.com/docs/books/tutorial/)
2. [www.en.wikipedia.org/wiki/Java](http://www.en.wikipedia.org/wiki/Java)
3. [www.java.net/](http://www.java.net/)

**Course Objectives:**

To make students to

- Become familiar with layered communication architectures (OSI and TCP/IP).
- Understand the client/server model and key application layer protocols.
- Learn sockets programming and how to implement client/server programs.
- Understand the concepts of reliable data transfer and how TCP implements these concepts.
- Know the principles of congestion control and trade-offs in fairness and efficiency.
- Know the fundamentals of data communications networks, working of data transmission concepts

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components. Different types of network topologies and protocols.
3. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
4. Identify the different types of network devices and their functions within a network. Understand and building the skills of subnetting and routing mechanisms.
5. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.
6. Understand the various operation of all seven layers of OSI Model and the protocols used in each layer.

**List of Programs:**

1. Write a networking program in Java to implement a TCP server that provides services for a TCP Client.
2. Write a networking program to implement socket programming using User datagram Protocol in Java.
3. Implement an FTP server using socket programming.
4. Implement a chat server using socket programming.
5. Implement an ECHO server using socket programming.
6. Implement Address Resolution Protocol using socket programming.
7. Implement Ping server and Ping client using socket programming.
8. Using UDP to transfer a text file from one host to another.
9. Implement Remote Command Execution using network programming.
10. Simulate simple Web Browser.

11. Write a Java program to check whether the given DNS is found in the internet or not.
12. Write a network program using HTTP to print the document for the given URL.

**Text Book**

1. Andrew S Tanenbaum. 2014. Computer Networks, 5<sup>th</sup> Edition, Prentice Hall of India, New Delhi.

**Reference Books**

1. Douglas E Comer. 2014. Computer Networks and Internets, 6<sup>th</sup> Edition, Pearson Education Asia, New Delhi. India
2. William Stallings, 2013, Data and Communication Network, 10<sup>th</sup> Edition, Pearson Education, New Delhi. India
3. Behrouz A. Forouzan, 2013, Data and Communication Network, 5<sup>th</sup> Edition, Tata McGraw Hill, McGraw Hill Publications, New Delhi, India

**Web Sites**

1. [www.en.wikipedia.org/wiki/Computer\\_network](http://www.en.wikipedia.org/wiki/Computer_network)
2. [www.amazon.com/Computer-Networks-Andrew-S-Tanenbaum/dp/0133499456](http://www.amazon.com/Computer-Networks-Andrew-S-Tanenbaum/dp/0133499456)
3. [www.cs.rit.edu/~hpb/Lectures/98\\_445/all.html](http://www.cs.rit.edu/~hpb/Lectures/98_445/all.html)

**Course Objectives:**

Enable the students to

- Understand the fundamental features of web applications.
- Understand the objects and components needed for a web designing.
- To identify which technologies can be used.
- Create a webpage
- To Understand the various steps in designing a creative and dynamic website.
- To Design dynamic and interactive web pages.

**Course Outcomes(Cos)**

Upon completion of this Course, student will be able to:

1. Design simple web applications and window applications.
2. Develop, implement and creating Applications with C#.
3. Develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services.
4. Understand and be able to explain Security in the .NET framework and Deployment in the .NET.
5. Learn about the ADO.NET, the feature, controls and code to connect database with front end using ODBC, OLEDB, and SQL, and how to develop web form and data connectivity in ASP.NET.
6. Demonstrate technical skills required of Web Developers through use of W3C standards.

**List of Programs:**

1. Develop a website for Karpagam University using HTML.
2. Write Online Quiz program (Include Style Sheets)
3. Create a simple animation using DHTML.
4. Write a program to apply Mask into an Image Using Filters in DHTML.
5. Generate web page that represents clock-every 60 see the page updated with server current time Using JavaScript.
6. Design a form and validate it using JavaScript.
7. Show the demo of AD Rotator Component
8. Write Database Access program using ASP.
9. Program to retrieve Cookies information using ASP
10. Program to count web page hits using ASP
11. Program to create Date & Time, String Manipulation using ASP
12. Write a program to find the visitor's Browser Type, IP Address and More Information.



**Text Books**

1. Patrick Carey 2011, New Perspectives on HTML and XHTML, 6th Edition, Cengage Learning. (UNIT I).
2. Jeremy McPeak, 2015, Beginning Javascript, 5th Edition, Wiley India Pvt. Ltd. (Wrox Beginning Guides), New Delhi, India (Unit II)
3. Danny Goodman, 2010, "Javascript Bible", 7<sup>th</sup> Edition, Wiley India Publications; 7<sup>th</sup> Edition (November 9, 2010) (Unit III).
4. A.Russell Jones. 2000. Mastering ActiveServerPages 3, 1<sup>st</sup> Edition, BPB Publishing, New Delhi.( Unit IV & Unit V).

**Reference Books**

1. Thau. 2007. The Book of JavaScript: A Practical Guide to Interactive WebPages.
2. Wendy Willard. 2007. HTML: A Beginner's Guide, Tata McGraw-Hill Professional, New Delhi.
3. Chuck Musciano and Bill Kennedy. 2006. HTML & XHTML: The Definitive \*Guide, O'Reilly.
4. David Flanagan. 2006. JavaScript: The Definitive Guide, O'Reilly,
5. Nicholas C. Zakas, Inc Ebrary and Ebrary. 2005. Professional JavaScript for Web Developers, John Wiley & Sons Inc, New Delhi.
6. Jude D'Souza and Monica D'Souza. 2002. Discover ASP, 1st Edition, TATA McGraw Hill Professional, New Delhi.

**Web Sites**

1. [www.w3schools.com/](http://www.w3schools.com/)
2. [www.javascriptkit.com](http://www.javascriptkit.com)
3. [www.aspfree.com](http://www.aspfree.com)
4. [www.aspnetutorials.com](http://www.aspnetutorials.com)

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Instruction Hours / week: L: 4 T: 0 P: 0 C: 4 Marks: Internal: 40 External: 60 Total: 100

End Semester Exam: 3Hours

**Course Objectives:**

Enable the student

- Be able to analyze algorithms
- Understand the fundamental skills in back tracking logic, dynamic programming.
- Understand the fundamental algorithms such as searching, and sorting
- To provide an introduction to basic techniques for designing efficient algorithms, analyzing their complexity
- Applying the algorithms to broad range of applications.
- Compute the complexity of various algorithms.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Learn to analyze worst-case running times of algorithms using asymptotic analysis. Understand operations and applications of Stack and Queue.
2. Be able to analyze and use some fundamental data structures such as Binary search trees. Understand the concept of linked list.
3. Explain the major algorithms for sorting and searching.
4. Describe and synthesize the divide and conquer paradigm, dynamic programming paradigm and greedy paradigm.
5. Understand the concept of backtracking, deterministic and nondeterministic algorithms.
6. Determine and analyze the complexity of given Algorithms.

**Unit I**

Introduction: Algorithm - pseudo code for expressing algorithms – analysis - time complexity and space complexity - efficiency of algorithms - O-notation - Omega notation and Theta notation.

DIVIDE AND CONQUER: General method – binary search - merge sort - quick sort.

**Unit II**

Greedy Method: General method- Knapsack problem - job sequencing with deadlines - minimum-cost spanning trees : Prim's and Kruskal's algorithms - Single source shortest paths : Dijkstra's algorithm.

**Unit III**

Dynamic Programming: General method - Multistage Graphs – All pairs shortest paths, Single source shortest paths - optimal binary search trees - 0/1 Knapsack problem - Traveling sales person problem.

**Unit IV**

Back Tracking: General method - n-queen problem - sum of subsets problem - graph colouring - Hamiltonian cycles - Knapsack problem.

**Unit V**

Branch and Bound: Least Cost(LC) search, Bounding - LC branch and bound - FIFO branch and bound - Travelling sales person problem.

**Text Book**

1. E. Howrowitz and Sahni.2012. Fundamentals of computer algorithms, Galgotia publications.

**Reference Books**

1. Gilles Brassard and Paul Bratley. 1997. Fundamentals of Algorithm, Prentice Hall of India Pvt.Ltd.
2. Mark Allen Weiss. 2000. Data Structures and Algorithm Analysis in C,Addition-wesley, Third Indian Reprint.

**Course Objectives:**

Enable the student

- Understand J2EE as an architecture and platform for building and deploying web-based, n-tier, transactional, component-based enterprise applications
- Understand the fundamental concepts of XML and related technologies
- Acquire knowledge on how XML is currently being used in various application areas
- Know how to parse and transform XML documents via tools and through programming APIs
- Understand the EJB architecture and have a good grasp on when to use and how to use various EJB bean types and acquire relevant Java programming experience
- Learn Java web programming with J2EE.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Develop Swing-based GUI
2. Update and retrieve the data from the databases
3. Develop distributed applications using RMI
4. Develop component-based Java software using JavaBeans
5. Develop server side programs in the form of servlets
6. To understand object-oriented programming with J2EE.

**Unit I**

J2EE Overview – Beginning of Java – Java Byte code – Advantages of Java –J2EE and J2SE. J2EE Multi Tier Architecture – Distributive Systems – The Tier – Multi Tier Architecture – Client Tier, Web Tier, Enterprise Java Beans Tier, Enterprise Information Systems Tier Implementation.

**Unit II**

J2EE Database Concepts:Data – Database – Database Schema. JDBC Objects: Driver Types – Packages – JDBC Process – Database Connection – Statement Objects – Result Set – Meta Data.

**Unit III**

Java Servlets: Benefits – Anatomy – Reading Data from Client –Reading HTTP Request Headers – Sending Data to client – Working with Cookies.

**Unit IV**

Enterprise Java Beans – Deployment Descriptors – Session Java Bean –Entity Java Bean – Message Driven Bean.

**Unit V**

Java Server Pages – Java Remote Method Invocation.

**Text Book**

1. Jim Keogh. 2008. The Complete Reference J2EE, 1<sup>st</sup> Edition, Tata McGraw Hill Edition, New Delhi .

**Reference Books**

1. Joseph J Bambaraetal. 2001. J2EE Unleashed, 1<sup>st</sup> Edition, Tech Media.
2. Paul J Perrone, Venkata S R R Chaganti, S .R.Venkata Krishna, R Chaganti and Tom Schwenk. 2003. J2EE Developer's Handbook, Sams Publications.
3. Rod Johnson. 2004. J2EE Development without EJB, 1<sup>st</sup> Edition, Wiley Dream Tech India, New Delhi.
4. Rod Johnson. 2004.Expert One-On-One J2ee Design and Development , John Wiley & Sons, Incorporated.

**Web Sites**

1. [java.sun.com/javaee/](http://java.sun.com/javaee/)
2. [java.sun.com/j2ee/1.4/docs/tutorial/doc/](http://java.sun.com/j2ee/1.4/docs/tutorial/doc/)
3. [www.j2eebrain.com/](http://www.j2eebrain.com/)

**Course Objectives:**

Enable the student

- Become a good .NET programmer.
- Know how COM components and the .NET Framework interoperate with each other.
- Identify and use the classes and namespaces in the .NET Framework class library.
- Build WEB Applications using Microsoft ASP.NET programming.
- Understanding the components of the .NET Framework and the common language runtime (CLR)
- Know how COM components. Also provides better knowledge of Architecture

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Able to analyze program requirements
2. Develop programs with GUI interfaces
3. Code programs and develop interface using Visual Basic .Net,C#.Net,ASP.Net
4. Perform tests, resolve defects and revise existing code.
5. Able to develop projects using ASP .NET
6. Able to apply all the window controls.

**Unit I**

Introduction: Getting Started With VB.NET: The Integrated Development Environment-IDE Components-Environment Options.Visual Basic: The Language Variables-Constants-Arrays – Variables as Objects-Flow Control Statements.Working with forms: The appearance of Forms-Loading and Showing Forms-Designing Menus.

**Unit II**

Basic Windows Controls: Textbox Control- ListBox, CheckedListBox-Scrollbar and TrackBar Controls-More Windows Control-The common Dialog Controls-The Rich TextBox Control - Handling Strings, characters and Dates. The TreeView and ListView Controls: Examining the Advanced Controls-The TreeView Control-The ListView Control

**Unit III**

The Multiple Document Interface-Databases: Architecture and Basic Concepts-Building Database Application with ADO.NET-Programming with ADO.NET

**Unit IV**

Goal of ASP.NET –ASP.NET Web Server Control-Validation Server Controls-Themes and Skins -Content Page Holder

**Unit V**

Data Binding in ASP.Net: Data source Controls – Configuring data source control caching – storing connection information-Using Bound list controls with Data Source Controls – Other Databound Controls-Data Management with ADO.Net

**Text Books**

1. Evangelos Petroustos, Mastering Visual Basic.Net, BPB Publications, New Delhi.
2. Bill Evjen, Scott Hanselman , Devin Rader, Farhan Muhammad and S.Srinivasa Sivakumar. 2006. Professional ASP.net 2.0, Special Edition.

**Reference Books**

1. Dave Mercer, ASP.Net Beginner's Guide . 2003. 2<sup>nd</sup> Edition McGraw Hill, New Delhi.
2. Duncan Mackenzie Kent Sharkey. 2006. Sams Teach yourself Visual Basic.JNet, 1<sup>st</sup> Edition, McGraw Hill, NewDelhi.
3. Shirish Chavan. 2007. Visual Basic.Net, 1<sup>st</sup> Edition, Pearson Education, New Delhi.

**Web Sites**

1. [www.microsoft.com/NET/](http://www.microsoft.com/NET/)
2. [www.en.wikipedia.org/wiki/.net](http://www.en.wikipedia.org/wiki/.net)
3. [www.w3schools.com/ngws/default.asp](http://www.w3schools.com/ngws/default.asp)
4. [www.vbtutot.com](http://www.vbtutot.com)

**Course Objectives:**

Enable the student

- Install and configure database
- Create users and assign roles
- Optimize schemas, tables, indexes and views
- Manage database services and clients
- Will be able to move the data from one database to another database.
- To keep database operational

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Design a data mart or data warehouse for any organization
2. Develop skills to write queries using DMQL
3. Extract knowledge using data mining techniques
4. Adapt to new data mining tools.
5. Explore recent trends in data mining such as web mining, spatial-temporal mining
6. Knowledge of monitoring performance of tasks

**Unit I**

Oracle DBA's: The Oracle DBA's Role- Oracle Database 10g Architecture: Oracle Databases and instances- Oracle Logical Storage structures – Oracle Logical Database structures – Oracle Physical Storage structures- Multiplexing Database Files - Oracle Memory Structures-Oracle Backup and Recovery – Security Capabilities – Tablespace Architecture – Oracle Tablespace installation – Traditional Disk Space Storage – Automatic Storage Management

**Unit II**

Common Space Management Problems – Oracle Segments, Extents and Blocks – Space Management Methodologies – SYSAUX monitoring and usage – Archived Redo Log File Management – Built in Space Management Tools: Segment Advisor – Undo Advisor and the Automatic Workload Repository – Index usage – Space Usage Warning Levels – Reusable space allocation – Managing alert and Trace Files with ADR – Transaction Basics – Undo Basics – Managing Undo Tablespaces – Flashback features

**Unit III**

Tuning Application Design – Tuning SQL – Tuning Memory Usage – Tuning Data Access – Tuning Data Manipulation – Tuning Physical Storage – Reducing Network Security – Database Authentication Methods



**Unit IV**

Database Authorization Methods – Auditing: Auditing Locations – Statement Auditing – Privilege Auditing Schema Object Auditing – Auditing Related Data Dictionary Views – Logical Backups – Physical Backups – Using Data Pump Export and Import – Data Pump Import Options – Integration of Backup Procedures

Overview of Oracle Net – Using the Oracle Net Configuration Assistant – Using the Oracle Net Manager – Starting the Listener Server Process – Controlling the Listener Server Process Using Data links

**Unit-V**

Creating Tablespaces in a VLDB Environment: Bigfile Tablespace Basics – Creating and Modifying Bigfile Tablespace – Bigfile Tablespace ROWID format – DBMS\_ROWID and Bigfile Tablespaces.- Advanced Oracle Table Types – Using Bitmap Indexes – Oracle Data Pump

Remote queries – Remote Data Manipulation: Two Phase Commit – Managing Distributed Data – Managing Distributed Transactions – Monitoring and Tuning Distributed Database

**Text Book**

- Bob Bryla, Kevin Loney 2008 Oracle Database 11g DBA Handbook McGraw-Hill Osborne

**Reference Book**

1. Saikat Basak. 2010. Oracle DBA Concise Handbook ,Ensel Software

**Web Sites :**

1. [www.oracle.com/technology/software/products/database/oracle10g/index.html](http://www.oracle.com/technology/software/products/database/oracle10g/index.html)
2. [www.oracle-base.com/articles/10g/](http://www.oracle-base.com/articles/10g/)
3. [www.adp-gmbh.ch/ora/misc/10g.html](http://www.adp-gmbh.ch/ora/misc/10g.html)

**Course Objectives:**

Enable the student

- To teach fundamental aspects of security in a modern networked environment with the focus on system design aspects and cryptography in the specific context of network.
- To build protection mechanisms in order to secure computer networks.
- Write coding to encrypt “Plain Text” into “Cipher Text” and vice versa, using different encryption algorithms.
- The ability to choose a suitable ciphering algorithm according to the required security level.
- Build cryptosystems by applying encryption algorithms,
- Build secure authentication systems by use of message authentication techniques.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Classify the symmetric encryption techniques
2. Illustrate various Public key cryptographic techniques
3. Evaluate the authentication and hash algorithms.
4. Summarize the intrusion detection and its solutions to overcome the attacks.
5. Demonstrate the basic concepts of system level security
6. understand the goals, issues, technologies, algorithms, protocols and design criteria used in cryptography and data security and solution.

**Unit I**

Introduction to Cryptography – Security Attacks – Security Services – Security Algorithm – Stream cipher and Block cipher – Symmetric and Asymmetric – Key Cryptosystem; Symmetric Key Algorithms: Introduction – DES – Triple DES – AES – IDEA – Blowfish – RC5.

**Unit II**

Public Key Cryptosystem: Introduction to Number Theory – RSA Algorithm – Key Management – Diffie-Hellman key exchange – Introduction to Elliptic Curve Cryptography; Message Authentication and Hash functions – Hash and Mac Algorithm – Digital Signatures and Authentication Protocol.

**Unit III**

Network Security Practice: Authentication Applications – Kerberos – X.509 Authentication Services and Encryption Techniques;; E-mail security – PGP – s/MIME – IP Security.

**Unit IV**

Web Security – Secure Socket Layer – Secure Electronic Transaction; System Security – Intruders and Viruses – Firewalls – Password Security.

**Unit V**

Case Study: Implementation of Cryptographic Algorithms – RSA – DSA – ECC (C / JAVA Programming). Network Forensic – Security Audit; Other Security Mechanism: Introduction to Stenography – Quantum Cryptography – Water Marking – DNA Cryptography.

**Text Book**

1. William Stallings. 2013. Cryptography and Network Security, 6<sup>th</sup> Edition. Pearson Education, New Delhi.

**Reference Books**

1. Bruce Schneir. 2006. Applied Crptography, 2<sup>nd</sup> Edition. CRC Press, New Delhi.
2. A.Menezes, P.Van Oorschot and S.Vanstone.2010.Hand Book of Applied Cryptography, 2<sup>nd</sup> Edition. CRC Press, NewDelhi.
3. Ankit Fadia.2010. Network Security, 2<sup>nd</sup> Edition. McMillan India Ltd, New Delhi:2003.

**Web Sites**

1. [williamstallings.com/Crypto3e.html](http://williamstallings.com/Crypto3e.html)
2. [u.cs.biu.ac.il/~herzbea/book.html](http://u.cs.biu.ac.il/~herzbea/book.html)
3. [www.flipkart.com/search-books/cryptography+and+network+security+William+stallings+ebook](http://www.flipkart.com/search-books/cryptography+and+network+security+William+stallings+ebook)

**Course Objectives:**

- To perform test each time they are run, thereby eliminating human error.
- To test how the software reacts under repeated execution of the same operations.
- To program sophisticated tests which bring out hidden information from the application.
- To reuse tests on different versions of an application, even if the user interfaces changes.
- to provide stakeholders with information about the quality of the product or service under test.
- To know the Types of errors and fault models

**Course Outcomes(COs):**

Upon completion of this Course, student will be able to:

1. Test the software by applying testing techniques to deliver a product free from bugs
2. Evaluate the web applications using bug tracking tools.
3. Investigate the scenario and the able to select the proper testing technique
4. Explore the test automation concepts and tools
5. Deliver quality product to the clients by way of applying standards such as TQM, Six Sigma
6. Various test processes and continuous quality improvement

**Unit I**

Introduction: Purpose of Testing – Dichotomies - Model for Testing – consequences of bugs- Taxonomy for bugs

**Unit II**

Flow/Graphs and Path Testing : Path testing basics-predicates, path predicates and Achievable paths – Path sensitizing– path instrumentation-implementation and application of path testing

**Unit III**

Transaction flow testing: – Transaction flow - Transaction flow testing techniques – implementation comments – testability tips -Data flow testing basics- Data flow testing strategies.

**Unit IV**

Domains and paths-Nice Domains and Ugly Domains-Domain testing-Domains and interface testing-Domains and testability-Metrics-Linguistic metrics-structural metrics-Hybrid metrics-metrics implementations-Testability tips

**Unit V**

Risk Analysis : Benefits of Risk analysis – Project Management Strategies and Risk – MITs risk Analysis – MITs Ranking Criteria - Using Risk Ranking in Forensics –Test estimation process-MIT totals worksheet-Sizing worksheet

**Text Books**

1. Boris Beizer , 2003, Software Testing Techniques, II Edn., DreamTech India, New Delhi. (Unit – I, II, III, IV)
2. Marnie L Hutcheson , 2003 software testing fundamentals I Edn, Wiley, DreamTech India, New Delhi. (Unit – V)

**Reference Books**

1. Burnstein, 2003, Practical Software Testing, Springer International Edn.
2. E. Kit, 1995, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi.
3. R.Rajani, and P.P.Oak, 2004, Software Testing, Tata Mcgraw Hill, New Delhi.

**Web sites**

1. <http://my.safaribooksonline.com>
2. <http://www2.sas.com>
3. <http://www.softwaretesting fundamentals.com>
4. [www.cs.cmu.edu](http://www.cs.cmu.edu)
5. [www.softwaretesting management.con](http://www.softwaretesting management.con)

**Course Objectives:**

Enable the students to

- Be aware of a range of XML tools (Many of them are free).
- Know how to set out an XML document
- Define custom markup language
- Understand the purpose of using DTDs and Schemas to validate XML
- Use XSLT to write a style sheet for XML document to produce multiple output
- Combine XML with existing web technologies.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Understand the use of web services in B2C and B2B applications.
2. Understand the design principles and application of SOAP and REST based web services.
3. Design collaborating web services according to a specification.
4. Implement an application that uses multiple web services in a realistic business scenario.
5. Use industry standard open source tools such as Apache Axis2, Tomcat, Derby and Eclipse to build, test, deploy and execute web services and web applications that consume them.
6. To learn how to create websites using XML, understand the essentials of the XML standards.

**Unit I**

World Wide Web: Introduction to the Internet and World Wide Web: W3C – History of Internet- World Wide Web- SGML – XML Resources – Internet and World Wide Web resources. Creating Mark up with XML: Introduction – Parsers and well formed XML Documents – Parsing an XML Document - Characters – Mark up – CDATA Sections – XML Namespaces

**Unit II**

Document Type Definition – Parsers, Well formed and valid XML documents – Element type declarations – Attribute declarations- Attributes Types. Schemas:- Schemas VS DTD's – MSXML Schemas, W3C XML Schema –Declaring Types and Elements –Attribute constraints and Defaults - Simple type - Empty elements -Mixed content elements – Creating Attribute Groups

**Unit III**

Document Object Model: DOM implementations – DOM with JavaScript – Components- Creating nodes – Traversing the DOM. Simple API for XML: DOM vs SAX – SAX based Parsers.

**Unit IV**

XML Path Language: Nodes – Location Paths; XSLT: Templates - Creating Elements and attributes – Iteration and Sorting – Conditional Processing – Copying Nodes – Combining style sheets – variables. XLink, XPointer, XInclude and XBase.

**Unit V**

XML Technologies and Applications: XML Query Language – Directory Services Markup Language – Resources Definition Framework – XML topic Maps – Virtual Hyper Glossary – Channel Definition Format – Information and Content Exchange Protocol – Platform for Privacy preferences – XML Metadata Interchange.

**Text Book**

1. Deitel & Deitel. 2008. XML How to Program . 1<sup>st</sup> Edition, Pearson Education, New Delhi.

**Reference Books**

1. Ann Novarro, Chuck white, Linda Burman. 2000. Mastering XML, 1<sup>st</sup> Edition, BPB Publi, New Delhi.
2. Steve Holzner. 2001. Inside XML, 1<sup>st</sup> Edition, TechMedia, New Delhi.

**Web Sites**

1. [en.wikipedia.org/wiki/XML](http://en.wikipedia.org/wiki/XML)
2. [www.w3.org/XML/](http://www.w3.org/XML/)
3. [www.w3schools.com/xml/default.asp](http://www.w3schools.com/xml/default.asp)

**Course Objectives:**

Enable the student

- Understand general concepts of transmission and wireless communication.
- Understand how mobility affects all layers of the Internet protocol stack, from the MAC layer up through the application layer.
- Understand the emerging applications enabled by wireless networks, and ad hoc mobile wireless networks.
- Work in groups to design and implement wireless applications.
- Routing protocols in WSN.
- Data centric and content-based networking.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Understand and explain common wireless sensor node architectures.
2. Be able to carry out simple analysis and planning of WSNs.
3. Demonstrate knowledge of MAC protocols developed for WSN.
4. Demonstrate knowledge of routing protocols developed for WSN.
5. Understand and explain mobile data-centric networking principles.
6. Be familiar with WSN standards.

**Unit I**

**Mobile Data Introduction:** The Rise of Mobile Data-Key Services for the Mobile Internet- Overview of the WAP-The origins of the WAP- WAP architecture-WAP Internal Structure- Components of the WAP Standards- WAP Gateways-Network Infrastructure Services Supporting WAP Clients-WAP Architecture Design Principles –Relationship with other standards.

**Unit II**

**The Wireless Markup Language:** Overview-The WML Document Model-WML Authoring-URLS Identity Content-Mark Up Basics- WML Basics-Basic Content-Events, Tasks and Binding.

**Unit III**

**Variables** –Other Content you can include-Controls-Miscellaneous Markup- Sending Information-Application Security-Other Data; The Meta element- Document Type Declarations- Errors and browsers Limitations-Content generation- WML Version Negotiation.

**Unit IV**

**User Interface Design:** Making Wireless Applications, Easy to Use- Website Design- Computer Terminals Vs Mobile Terminals-Designing a usable WAP site-structured usability method-user interface design guidelines- Design guidelines for selected WML Elements.



**Unit V**

Wireless Telephony Applications: Overview of the WTA Architecture- WTA Client Framework –WTA Server and Security- Design Considerations- Application Creation Tool Box- Future of WTA Enhancements.

The Mobile Internet Future: Better Content- Easier Access-Beyond Browsing – Beyond Cellular- Mobile Data Unleashed.

**Text Book**

1. Sandeep Singhal et al, 2007.The Wireless Application Protocol, 1<sup>st</sup> Edition. Pearson Education, New Delhi.
2. Charles Arehart-Nirmal Chidambarametal.Professional WAP, 1<sup>st</sup> Edition. Shroff Publishers & Distributers Pvt Ltd, New Delhi.

**References**

1. Dale BulBrook. 2004. WAP –A Beginner's Guide, 1<sup>st</sup> Edition. TMH Publication, New Delhi.
2. Ruseyev S. 2003. WAP Technology &Applications ,1<sup>st</sup> Edition. Eswar Publications, New Delhi.

**Web Sites:**

1. [www.en.wikipedia.org/wiki/Wireless\\_Application\\_Protocol](http://www.en.wikipedia.org/wiki/Wireless_Application_Protocol)
2. [www.wap.com](http://www.wap.com)
3. [www.w3schools.com/wap/](http://www.w3schools.com/wap/)

**Course Objectives:**

Enable the students

- To design good performing distributed database schemas.
- To create optimized query execution plan.
- To efficiently distribute and manage the data.
- To manage distributed access control
- To know how to make secure the databases.
- To expose the students to the architecture, design, and implementation of massive-scale data systems.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Analyze the physical structure of the database to handle data
2. Apply the knowledge of design alternatives and fragmentation for data distribution
3. Demonstrate the concept of normalization of the database
4. Characterize the concepts of deadlock handling in real time transactions of database
5. Apply the knowledge of database security for protecting data security.
6. Apply concepts of distributed database theory including design and architecture, security, integrity, query processing.

**Unit - I**

Database concepts : Data Models- Database Operations- Database Management-DB Clients, COS Distribution and Deployment- COS Closedness or Openness-Schema and Data Visibility- Schema and Data Control.

**Unit - II**

Data Distribution Alternatives : Design Alternatives- Localized Data- Distributed Data. Fragmentation: Vertical Fragmentation- Horizontal Fragmentation. Distribution Transparency: Location Transparency-Fragmentation Transparency-Replication Transparency-Location, Fragmentation, and Replication Transparencies.

**Unit - III**

Query Optimization : Sample Database- Query Processing in Centralized Systems: Query Parsing and Translation - Query Optimization- Query Processing in Distributed Systems- Heterogeneous Database Systems - Concurrency Control in Distributed Database Systems.

**Unit - IV**

Deadlock Handling: Deadlock Definition- Deadlocks in Centralized Systems- Deadlocks in Distributed Systems- Distributed Deadlock Detection. Replication Control: Replication Control Scenarios. Failure and Commit Protocols: Terminology- Commit Protocols.

**Unit - V**

DDBE Security: Cryptography- Securing Data . Traditional DDBE Architectures: Classifying the Traditional DDBMS Architecture- The MDBS Architecture Classifications- Approaches for Developing A DDBE- Deployment of DDBE Software.

**Text Book**

1. Saeed K. Rahimi And Frank S. Haug. 2010. Distributed Database Management Systems :A Practical Approach. 1<sup>st</sup> Edition, A John Wiley & Sons, Inc., Publication.

**References**

1. Ceri.1985.Distributed Databases Principles and Systems , 1<sup>st</sup> Edition Mchraw Hill Pub.
2. Tamer Ozus M,Patrick Valduriez,S.Sridhar.2006. Principle Of Distributed Database Systems, 1<sup>st</sup> Edition , Pearson Education.
3. William M.NewMan, Robert F.Sproull, 2004, Principles of Interactive Computer Graphics, 1<sup>st</sup> Edition , Pearson Education.

**Web Sites**

1. [en.wikipedia.org/wiki/Distributed\\_computing](http://en.wikipedia.org/wiki/Distributed_computing)
2. [www.webopedia.com/TERM/D/distributed\\_computing.html](http://www.webopedia.com/TERM/D/distributed_computing.html)
3. [www.tech-faq.com/distributed-computing.shtml](http://www.tech-faq.com/distributed-computing.shtml)

**Course Objectives:**

Enable the students

- Learn about IPv4 forwarding and routing.
- Learn about host name resolution and the Domain Name System (DNS).
- Learn about IPv6 addresses.
- know Architectural Overview of the TCP/IP Protocol Suite
- Learn the basics of the layered TCP/IP stack architecture for IPv4
- Learn the key protocols in the TCP/IP suite

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Explain TCP/IP protocols, ports, sockets, and data encapsulation
2. Demonstrate the process of packet fragmentation and reassembly
3. Explain the key features and functions of TCP and UDP
4. Apply the knowledge of DNS queries, name resolution, zone data transfers and reverse DNS queries
5. Analyze the knowledge of TCP/IP routing for the working of routing protocols
6. Knowledge of IPv6 address auto configuration works for stateless address auto configuration

**Unit I**

Introduction: WAN, WAN technologies - Internetworking concepts - Protocols and Standards - TCP/IP protocol suite - Internetworking Devices – Routing Concept - Classful IP Addressing – Subnetting – Supernetting – Classless Addressing

**Unit II**

ARP & RARP – Proxy ARP – ARP over ATM – ARP and RARP Protocol Format. IP Datagram – Fragmentation – Options – IP Datagram Format – Routing IP Datagrams – Checksum. ICMP : Types of Messages - Message Format – Error Reporting – Query – Checksum - ICMP Package

**Unit III**

Routing and Routed Protocols - Autonomous Systems – Routing Table - Interior Gateway Protocols – Exterior Gateway Protocols – Routing in Internet. Group Management – IGMP Message – IGMP Operation – Process to Process Communication.

**Unit IV**

UDP Operation – TCP Services - Flow Control – Multicast Routing – Multicast Routing Protocols. BOOTP - DHCP – Address Discovery and Binding. DNS – Name Space – DNS in Internet – Resolution – Resource Records.

**Unit V**

Remote Login - FTP – SMTP – SNMP. IP over ATM Wan – Cells – Routing the Cells. Mobile IP : Addressing – Agents – Agent discovery – Registration – Data Transfer – VPN.

**Text Books**

1. Behrouz A. Forouzan. 2010. TCP/IP Protocol Suite. 4<sup>th</sup> Edition. New Delhi: Tata McGraw Hill Publication.

**Reference Books**

1. Douglas E. Comer. 2000. Internetworking With TCP/IP, Vol 1: Principles Protocols and Architecture. 4th Edition. New Delhi: Pearson Education.
2. William Stallings. 1997. Data and Computer Communication. 5th Edition. New Delhi: Prentice Hall of India.

**Web Sites**

1. [en.wikipedia.org/wiki/Internet\\_protocol\\_suite](http://en.wikipedia.org/wiki/Internet_protocol_suite)
2. [http://docwiki.cisco.com/wiki/Introduction\\_to\\_WAN\\_Technologies](http://docwiki.cisco.com/wiki/Introduction_to_WAN_Technologies)
3. [www.yale.edu/pclt/COMM/TCPIP.HTM](http://www.yale.edu/pclt/COMM/TCPIP.HTM)
4. [www.w3schools.com/tcpip/default.asp](http://www.w3schools.com/tcpip/default.asp)

**Course Objectives:**

- Use object-oriented technologies
- Use Unified Modeling Language 2.2
- Perform object-oriented analysis and design
- Explain how the Unified Modeling Language (UML) represents an object-oriented system using a number of modeling views.
- Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation
- Concepts of Object Oriented Analysis and Design to solve problems

**Course Outcomes(COs):**

Upon completion of this Course, student will be able to:

1. Understand of programming language concepts;
2. Demonstrate the software engineering principles and the ability to apply them to software design;
3. Apply the knowledge of OOAD to complete large software project
4. Analyze the deployment of UML diagrams for software design
5. Apply the principles of software engineering quality principles for developing quality software
6. Apply the process of Object Oriented Analysis and Design documents for a given problem using Unified Modelling Language

**Unit-I**

Complexity: The structure of complex systems-the inherent complexity of software-The five attributes of a complex system-Organized and Disorganized complexity-Bringing order to Chaos-On Designing complex systems. The Object model: The evolution of the object model-Foundations of the object model-Elements of the object model-Appling the object model.

**Unit II**

Classes and Objects: The nature of an object-Relationship among objects-The nature of a class- Relationships among classes-The interplay of classes and objects-On building quality classes and objects. Classification: The importance of proper classification-Identifying classes and objects-Key abstraction and mechanisms.

**Unit III**

Notation: The unified modeling language-Package diagrams-Component diagrams-Deployment diagrams-Use case diagrams-Activity diagrams-Class diagrams-Sequence diagrams-Interaction overview diagrams-Composite structure diagrams -State machine diagrams-Timing diagrams-Object diagrams-communication diagrams.

## **Unit IV**

Process: First principles-The Macro Process: The software development lifestyle- The Micro Process: The analysis and design process. Pragmatics: Management and planning-Staffing-Release management-Reuse-Quality assurance and metrics-Documentation-Tools-Special Topics- The benefits and risks of Object Oriented development.

## **Unit V**

Introduction: Development Process –Class diagrams: The Essentials-Sequence Diagrams-Class Diagrams: Advanced Concepts-Object Diagrams-Package Diagrams-Deployment Diagrams-Use Cases-State machine Diagrams-Activity Diagrams-Communication Diagrams.

## **Text Book**

1. Grady Booch. 2001. Object Oriented Analysis and Design, 2<sup>nd</sup> Edition, Addison Wesley, New Delhi. [Unit 1 to 4]
2. Martin Fowler, Kendall Scott. 2004. UML Distilled, 2<sup>nd</sup> Edition, Pearson Education, New Delhi. [ Unit 5]

## **Reference Books**

1. James Rumbaugh, Ivar Jacobson and Grady Booch. 2003. The Unified Modeling Language Reference Manual, 1<sup>st</sup> Edition, Addison Wesley, New Delhi.

## **Web Sites**

1. [uml-tutorials.trireme.com/](http://uml-tutorials.trireme.com/)
2. <http://www.devshed.com/c/a/Practices/Introducing-UMLObjectOriented-Analysis-and-Design/>
3. <http://community.sparxsystems.com/tutorials/object-oriented-analysis-and-design>

### **Course Objectives:**

Enable the student

- Be able to describe the interoperable web services architecture
- Able to know the roles of SOAP and WSDL.
- Use lower-level SOAP and XML APIs for services and/or clients.
- Build and Host Web Services.
- Able to understand the web services architectures
- Learn the standard APIs

### **Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Understand the use of web services in B2C and B2B applications.
2. Understand the design principles and application of SOAP and REST based web services.
3. Design collaborating web services according to a specification.
4. Implement an application that uses multiple web services in a realistic business scenario.
5. Use industry standard open source tools such as Apache Axis2, Tomcat, Derby and Eclipse
6. Develop , test, deploy and execute web services and web applications .

### **Unit I**

Introduction: What are Web Services – Importance of web services – Web services and enterprises; XML Fundamentals:: XML Documents - Namespaces – Schema – Processing XML.

### **Unit II**

SOAP: SOAP Model – messages – Encoding – RPC – Alternative SOAP encodings – Document, RPC, Literal, Encoded – SOAP, Web Services and the REST Architecture  
WSDL: Structure – Using SOAP and WSDL. UDDI- UDDI Business Registry – Specification – Data Structures – Life cycle Management – Dynamic Access Point Management.

### **Unit III**

Advanced Web Services Technologies and Standards: Conversation – Overview – Web Services Conversation Language – WSCL Interface Components- Workflow-Business Process Management – Workflow and Workflow Management systems – BPEL. Transaction –ACID transaction – Distributed Transaction – OASIS Business Transaction Protocol.



**Unit IV**

Security – Security Basics – Security Issues – Types of Security Attacks – WS –Security.  
Mobile and Wireless – Mobile Web Services – Challenges with mobile – Proxy Based  
Mobile Systems -Direct Mobile Web service access - J2ME Web Services.

**Unit V**

Building Real World Enterprise Web Service and Applications: Real World Web Service  
Application Development – Development of Web services and Applications onto Tomcat  
application Server and Axis Soap Server.

**Text Book**

1. Sandeep Chatterjee, James Webber. 2009. Developing Enterprise Web Services: An Architect's Guide, 4<sup>th</sup> Edition, Pearson Education, New Delhi.

**Reference Books**

1. Martin Kalin, 2013, 2nd Edition Java Web Services: Up and Running, O'Reilly Media, USA.
2. Vikram Ramchand, Sonal Mukhi, 1st Edition, 2008, XML WebServices and SOAP , BPB Publications, New Delhi.
3. Eric A Marks and Mark J Werrell. 1st Edition, 2003. Executive Guide to Web Services, John Wiley and Sons, New Delhi.

**Web Sites**

1. [www.w3schools.com/webservices/default.asp](http://www.w3schools.com/webservices/default.asp)
2. [en.wikipedia.org/wiki/Web\\_service](http://en.wikipedia.org/wiki/Web_service)
3. [www.webservices.org/](http://www.webservices.org/)

**Course Objectives:**

Enable the students

- To understand sensor network architectures
- Select appropriate routing algorithms for different network environments
- The various security practices and protocols of Ad-hoc and Sensor Networks.
- Deploy security mechanisms in the wireless ad-hoc and sensor networks
- To teach students the various fundamental layers in ad-hoc network, the issues pertaining to major obstacles in establishment
- To understand efficient, management of ad-hoc and sensor networks and applications of ad-hoc and sensor networks.

**Course Outcomes(COs):**

Upon completion of this Course, student will be able to:

- Analyze the architecture, merits and demerits of Wireless technologies like Infra Red, blue tooth, Wi-Fi, RFID and Wi-Max .
- Characterize the principles of mobile technologies like GPRS, GSM, CDMA, and TDMA
- Compare the characteristics and techniques MANET with VANET
- Analyze technology of 1G, 2G, 3G and 4G for gaining the working knowledge of four generation wireless technologies.
- Apply the features of Android programming for developing Android Applications
- Understand and explain common wireless sensor node architectures.

**Unit I**

Adhoc Networks Fundamentals And Mac Protocols- Fundamentals Of WLANs – IEEE 802.11 Architecture - Self Configuration And Auto Configuration Issues In Ad-Hoc Wireless Networks – MAC Protocols For Ad-Hoc Wireless Networks – Contention Based Protocols - TCP Over Ad-Hoc Networks-TCP Protocol Overview - TCP And MANETs – Solutions For TCP Over Ad-Hoc Networks

**Unit II**

Routing in Ad hoc Networks - Introduction - Topology-Based versus Position-Based Approaches - Topology-Based Routing Protocols - Proactive Routing Approach - Reactive Routing Approach - Hybrid Routing Approach - Comparison - Position-Based Routing - AD HOC & SENSOR NETWORKS - Principles and Issues - Location Services - Forwarding Strategies - Comparisons - Other Routing Protocols - Signal Stability Routing - Power Aware Routing - Associativity-Based Routing - QoS Routing

**Unit III**

Broadcasting, Multicasting and Geocasting - Introduction - The Broadcast Storm - Broadcasting in a MANET - Flooding-Generated Broadcast Storm - Rebroadcasting Schemes - Multicasting - Issues in Providing Multicast in a MANET - Multicast Routing Protocols - Comparison - Geocasting - Geocast Routing Protocols

**Unit IV**

TCP over Ad Hoc Networks - Introduction - TCP Protocol Overview - Designed and Fine-Tuned to Wired Networks - TCP Basics - TCP Header Format - Congestion Control - Round-Trip Time Estimation - TCP and MANETs - Effects of Partitions on TCP - Impact of Lower Layers on TCP - Solutions for TCP over Ad Hoc - Mobility-Related - Fairness-Related

**Unit V**

Security in Ad Hoc and Sensor Networks: Security Requirements - Security Solutions Constraints - Challenges - Authentication - Key Management - Conceptual Background - Diffie-Hellman Key Agreement -Party Diffie-Hellman Key Agreement - The Ingemarsson Protocol - The Burmester and Desmedt Protocol - The Hypercube Protocol - The Octopus Protocol - The CLIQUES Protocol Suite -The Tree-based Generalized Diffie-Hellman Protocol- Routing - Problems with Existing Ad Hoc Routing Protocols - Detect and Isolate Misbehaving Nodes - Information Leaking on Network Topology - Concealing Network Topology - Secure Routing Protocol - The Wormhole Attack. Intrusion Detection Systems: Overview - Unsuitability of Current IDS Techniques - An IDS Architecture for Ad Hoc and Sensor Networks.

**Text Books**

1. Carlos De Moraes Cordeiro, Dharma Prakash Agrawal, 2011. Ad Hoc and Sensor Networks: Theory and Applications, 2<sup>nd</sup> Edition, World Scientific Publishing Ltd.

**Reference Books**

1. Holger Karl, Andreas willig, 2005. Protocols and Architectures for Wireless Sensor Networks, John Wiley & Sons, Inc .
2. 5. Erdal Çayırıcı , Chunming Rong, 2009 .Security in Wireless Ad Hoc and Sensor Networks, John Wiley and Sons,
3. 6. Waltenegus Dargie, Christian Poellabauer, 2010 .“Fundamentals of Wireless Sensor Networks Theory and Practice”, John Wiley and Sons,
4. 10. Amiya Nayak, Ivan Stojmenovic, 2010. Wireless Sensor and Actuator Networks Algorithm and Protocols for Scalable Coordination and Data communication ,John Wiley & Sons

**Web sites**

1. [en.wikipedia.org/wiki/Wireless\\_ad\\_hoc\\_network](http://en.wikipedia.org/wiki/Wireless_ad_hoc_network)
2. [searchmobilecomputing.techtarget.com/definition/ad-hoc-network](http://searchmobilecomputing.techtarget.com/definition/ad-hoc-network)
3. [www.cs.jhu.edu/~cs647/intro\\_adhoc.pdf](http://www.cs.jhu.edu/~cs647/intro_adhoc.pdf)

**Course Objectives:**

Enable the students

- Understand J2EE as an architecture and platform for building and deploying web-based, n-tier, transactional, component-based enterprise applications
- Understand the fundamental concepts of XML and related technologies
- Acquire knowledge on how XML is currently being used in various application areas
- Know how to parse and transform XML documents via tools and through programming APIs
- Understand the EJB architecture and have a good grasp on when to use and how to use various EJB bean types and acquire relevant Java programming experience
- Learn Java web programming with J2EE.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Develop Swing-based GUI
2. Update and retrieve the data from the databases
3. Develop distributed applications using RMI
4. Develop component-based Java software using JavaBeans
5. Develop server side programs in the form of servlets
6. To understand object-oriented programming with J2EE.

**Lists of Programs:**

1. Create a sign in form in servlets.
2. Write a servlet Program to lock a server.
3. Write a servlet program that returns list of information in table format.
4. Design a counter that counts number of times user has visited the site in current browsing session.
5. Write a program to retrieve cookies information
6. Build a JAVA Bean for opening an applet from JAR file.
7. Write a program to add controls in BEAN.
8. Design a counter in JAVA BEAN.
9. Write a program to stream contents of a file using JSP.
10. Write a program to insert a menu applet into JSP page.

**Text Book**

1. Jim Keogh. 2008. The Complete Reference J2EE, 1<sup>st</sup> Edition, Tata McGraw Hill Edition, New Delhi .

**Reference Books**

1. Joseph J Bambaraetal. 2001. J2EE Unleashed, 1<sup>st</sup> Edition, Tech Media.
2. Paul J Perrone, Venkata S R R Chaganti, S .R.Venkata Krishna, R Chaganti and Tom Schwenk. 2003. J2EE Developer's Handbook, Sams Publications.
3. Rod Johnson. 2004. J2EE Development without EJB, 1<sup>st</sup> Edition, Wiley Dream Tech India, New Delhi.
4. Rod Johnson. 2004.Expert One-On-One J2ee Design and Development , John Wiley & Sons, Incorporated.

**Web Sites**

1. [java.sun.com/javaee/](http://java.sun.com/javaee/)
2. [java.sun.com/j2ee/1.4/docs/tutorial/doc/](http://java.sun.com/j2ee/1.4/docs/tutorial/doc/)
3. [www.j2eebrain.com/](http://www.j2eebrain.com/)

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Instruction Hours / week: L: 0 T: 0 P: 4 C : 2      Marks: Internal: 40 External: 60 Total: 100  
End Semester Exam: 3 Hours

**Course Objectives:**

Enable the student

- Become a good .NET programmer.
- Know how COM components and the .NET Framework interoperate with each other.
- Identify and use the classes and namespaces in the .NET Framework class library.
- Build WEB Applications using Microsoft ASP.NET programming.
- Understanding the components of the .NET Framework and the common language runtime (CLR)
- Know how COM components. Also provides better knowledge of Architecture

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Able to analyze program requirements
2. Develop programs with GUI interfaces
3. Code programs and develop interface using Visual Basic .Net,C#.Net,ASP.Net
4. Perform tests, resolve defects and revise existing code.
5. Able to develop projects using ASP .NET
6. Able to apply all the window controls.

**List of Programs:****VB.Net**

1. Write a Program to perform various string manipulation functions.
2. Using windows application form, Develop a program to create a form, place controls and manipulate data.
3. Write a program to create inventory control using class library.
4. Write a program to create Web Services Using Vb.Net.
5. Write a program to create a screen saver using controls
6. Create an ActiveX program with simple example.
7. Using windows Application: Design Employee Details, use Sql Server as back end and also use checked list box.

**Asp.Net**

1. Write a program to create an on-line quiz using content page holder.
2. Write a program to retrieve Cookies information.
3. Write a program to count web page hits.
4. Write program to retrieve environment variables browser capability information.
5. Write a program for database connectivity to retrieve student information

**Text Books**

1. Evangelos Petroustos, Mastering Visual Basic.Net, BPB Publications, New Delhi.
2. Bill Evjen, Scott Hanselman , Devin Rader, Farhan Muhammad and S.Srinivasa Sivakumar. 2006. Professional ASP.net 2.0, Special Edition.

**Reference Books**

1. Dave Mercer, ASP.Net Beginner's Guide . 2003. 2<sup>nd</sup> Edition McGraw Hill, New Delhi.
2. Duncan Mackenzie Kent Sharkey. 2006. Sams Teach yourself Visual Basic.JNet, 1<sup>st</sup> Edition, McGraw Hill, NewDelhi.
3. Shirish Chavan. 2007. Visual Basic.Net, 1<sup>st</sup> Edition, Pearson Education, New Delhi.

**Web Sites**

1. [www.microsoft.com/NET/](http://www.microsoft.com/NET/)
2. [www.en.wikipedia.org/wiki/.net](http://www.en.wikipedia.org/wiki/.net)
3. [www.w3schools.com/ngws/default.asp](http://www.w3schools.com/ngws/default.asp)
4. [www.vbtutot.com](http://www.vbtutot.com)

**Course Objectives:**

- Install and configure database
- Create users and assign roles
- Optimize schemas, tables, indexes and views
- Manage database services and clients
- Will be able to move the data from one database to another database.
- To keep database operational

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Design a data mart or data warehouse for any organization
2. Develop skills to write queries using DMQL
3. Extract knowledge using data mining techniques
4. Adapt to new data mining tools.
5. Explore recent trends in data mining such as web mining, spatial-temporal mining
6. Knowledge of monitoring performance of tasks

**List of Programs:**

1. Demo for Globalization Support
2. Setup Listener Security
3. Configuring Recovery Manager
4. Write a program Using Recovery Manager
5. Write a program for Managing Diagnostic Sources
6. Implement Database Recovery
7. Demo for Flashback Database
8. Implement User Error Recovery
9. Write a program for Dealing with Corruption
10. Show the demo for Automated Management
11. Creating a database and do the manipulation.
12. Managing index tables



**Text Book**

1. Bob Bryla, Kevin Loney 2008 Oracle Database 11g DBA Handbook McGraw-Hill Osborne

**Reference Book**

1. Saikat Basak. 2010. Oracle DBA Concise Handbook ,Ensel Software

**Web Sites :**

1. [www.oracle.com/technology/software/products/database/oracle10g/index.html](http://www.oracle.com/technology/software/products/database/oracle10g/index.html)
2. [www.oracle-base.com/articles/10g/](http://www.oracle-base.com/articles/10g/)
3. [www.adp-gmbh.ch/ora/misc/10g.html](http://www.adp-gmbh.ch/ora/misc/10g.html)

**Course Objectives:**

Enable the student

- To teach fundamental aspects of security in a modern networked environment with the focus on system design aspects and cryptography in the specific context of network.
- To build protection mechanisms in order to secure computer networks.
- Write coding to encrypt “Plain Text” into “Cipher Text” and vice versa, using different encryption algorithms.
- The ability to choose a suitable ciphering algorithm according to the required security level.
- Build cryptosystems by applying encryption algorithms,
- Build secure authentication systems by use of message authentication techniques.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Classify the symmetric encryption techniques
2. Illustrate various Public key cryptographic techniques
3. Evaluate the authentication and hash algorithms.
4. Summarize the intrusion detection and its solutions to overcome the attacks.
5. Demonstrate the basic concepts of system level security
6. Understand the goals, issues, technologies, algorithms, protocols and design criteria used in cryptography and data security and solution.

**List of Programs:**

1. Write a program to convert your college name from plain text to cipher text using Transposition cipher method of encryption.
2. Write a program to convert your name from plain text to cipher text using the One Time Pads method of encryption.
3. Write a program to encrypt a paragraph using the Data Encryption Standard Algorithm.
4. Write a program to encrypt your biodata using the Advanced Encryption Standard Algorithm.
5. Write a program to decrypt the “Network Security” theory syllabus using the RSA Algorithm.
6. Write a program that takes a binary file as input and performs bit stuffing and Cyclic Redundancy Check Computation.
7. Write a program to Simulate the working of Sliding-Window protocol.
8. Write a program to find the shortest path in a network using Dijkstra's Algorithm.
9. Write a program to implement the Token Bucket Algorithm for Congestion Control.

10. Write a program for the following chat application:

One to One : Open a Socket connection and display what is written by one to another.

Many to Many : Each Client Opens a Socket connection to the client server and writes to the socket. Whatever is written by one can be seen by all. Implement symmetric key cryptography.

### **Text Book**

1. William Stallings. 2013. Cryptography and Network Security, 6<sup>th</sup> Edition. Pearson Education, New Delhi.

### **Reference Books**

1. Bruce Schneir. 2006. Applied Crptography, 2<sup>nd</sup> Edition. CRC Press, New Delhi.
2. A.Menezes, P.Van Oorschot and S.Vanstone.2010.Hand Book of Applied Cryptography, 2<sup>nd</sup> Edition. CRC Press, NewDelhi.
3. Ankit Fadia.2010. Network Security, 2<sup>nd</sup> Edition. McMillan India Ltd, New Delhi:2003.

### **Web Sites**

1. [williamstallings.com/Crypto3e.html](http://williamstallings.com/Crypto3e.html)
2. [u.cs.biu.ac.il/~herzbea/book.html](http://u.cs.biu.ac.il/~herzbea/book.html)
3. [www.flipkart.com/search-books/cryptography+and+network+security+William+stallings+ebook](http://www.flipkart.com/search-books/cryptography+and+network+security+William+stallings+ebook)

**Course Objectives:**

- To perform test each time they are run, thereby eliminating human error.
- To test how the software reacts under repeated execution of the same operations.
- To program sophisticated tests which bring out hidden information from the application.
- To reuse tests on different versions of an application, even if the user interfaces changes.
- to provide stakeholders with information about the quality of the product or service under test.
- To know the Types of errors and fault models

**Course Outcomes (COs):**

Upon completion of this Course, student will be able to:

1. Test the software by applying testing techniques to deliver a product free from bugs
2. Evaluate the web applications using bug tracking tools.
3. Investigate the scenario and the able to select the proper testing technique
4. Explore the test automation concepts and tools
5. Deliver quality product to the clients by way of applying standards such as TQM, Six Sigma
6. Various test processes and continuous quality improvement

**Software Testing**

1. Create a VB form with the following fields and create the database also for them. Insert 3 records. Using Win Runner tool record the above 3 transaction and test them and produce the Report. (Blackbox Testing).
2. Create a VB form and then add login dialog form. Using Win Runner tool check the Username and Password and produce the Report. (Security testing).
3. Create a VB form with the following fields and check the calculation is correct or not by using the test toll Win Runner. (Functional Testing)      Fields                      –                      Name, Designation,Department,Basic,HRA,DA,PF and netsal.
4. using Win Runner test tool check the database values after changing. Using Flight database. (Regression testing).
5. Write a C program for Boundary Testing.
6. Write a C program for Loop Testing.
7. Write a C program for Integration Testing.
8. Write a C program for Interface Testing.
9. Write a C program for Unit testing.

**Software Quality Assurance**

1. To develop a banking application, perform the requirement analysis and give a quality status report.
2. Perform the system testing to develop a electricity application and give a quality status report.
3. Perform the report design and give a quality status report.
4. Develop a library management system and give a quality status report.
5. Develop a hospital management system and a quality status report and give a comparison performance report in Linux and windows operating system.

**Text Books**

1. Boris Beizer , 2003, Software Testing Techniques, II Edn., DreamTech India, New Delhi. (Unit – I, II, III, IV)
2. Marnie L Hutcheson , 2003 software testing fundamentals I Edn, Wiley, DreamTech India, New Delhi. (Unit – V)

**Reference Books**

1. Burnstein, 2003, Practical Software Testing, Springer International Edn.
2. E. Kit, 1995, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi.
3. R.Rajani, and P.P.Oak, 2004, Software Testing, Tata Mcgraw Hill, New Delhi.

**Web sites**

1. <http://my.safaribooksonline.com>
2. <http://www2.sas.com>
3. <http://www.softwaretesting fundamentals.com>
4. [www.cs.cmu.edu](http://www.cs.cmu.edu)
5. [www.softwaretesting management.con](http://www.softwaretesting management.con)

**Course Objectives:**

Enable the student

- Be aware of a range of XML tools (Many of them are free).
- Know how to set out an XML document
- Define custom markup language
- Understand the purpose of using DTDs and Schemas to validate XML
- Use XSLT to write a style sheet for XML document to produce multiple output
- Combine XML with existing web technologies.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Understand the use of web services in B2C and B2B applications.
2. Understand the design principles and application of SOAP and REST based web services.
3. Design collaborating web services according to a specification.
4. Implement an application that uses multiple web services in a realistic business scenario.
5. Use industry standard open source tools such as Apache Axis2, Tomcat, Derby and Eclipse to build, test, deploy and execute web services and web applications that consume them.
6. to learn how to create websites using XML, understand the essentials of the XML standards.

**List of Programs:**

1. Create a menu in XML.
2. Create a demo for XSLT.
3. Display XML information in Tree structure format.
4. Integrate XML in Web Applications
5. Write a program to navigate the records in the file.
6. Write a database access with XML.
7. Write a program to save data to an XML file.
8. Write a program to show the function of CDATA.
9. Write a program to generate XML file on the server.
10. Write a program to generate XML file from the Database
11. Write a program to load a text file into a div element with XML HTTP.
12. List data from an XML file with XML HTTP.

**Text Book**

1. Deitel & Deitel. 2008. XML How to Program . 1<sup>st</sup> Edition, Pearson Education, New Delhi.

**Reference Books**

1. Ann Novarro, Chuck white, Linda Burman. 2000. Mastering XML, 1<sup>st</sup> Edition, BPB Publi, New Delhi.
2. Steve Holzner. 2001. Inside XML, 1<sup>st</sup> Edition, TechMedia, New Delhi.

**Web Sites**

1. [en.wikipedia.org/wiki/XML](http://en.wikipedia.org/wiki/XML)
2. [www.w3.org/XML/](http://www.w3.org/XML/)
3. [www.w3schools.com/xml/default.asp](http://www.w3schools.com/xml/default.asp)

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**Instruction Hours / week: L: 0 T: 0 P: 4 C :2      Marks: Internal: 40 External: 60 Total: 100**  
**End Semester Exam: 3 Hours**

**Course Objectives:**

- Understand general concepts of transmission and wireless communication.
- Understand how mobility affects all layers of the Internet protocol stack, from the MAC layer up through the application layer.
- Understand the emerging applications enabled by wireless networks, and ad hoc mobile wireless networks.
- Work in groups to design and implement wireless applications.
- Routing protocols in WSN.
- Data centric and content-based networking.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Understand and explain common wireless sensor node architectures.
2. Be able to carry out simple analysis and planning of WSNs.
3. Demonstrate knowledge of MAC protocols developed for WSN.
4. Demonstrate knowledge of routing protocols developed for WSN.
5. Understand and explain mobile data-centric networking principles.
6. Be familiar with WSN standards.

**List of Programs:**

1. Demonstrate the creation of output files for Xgraph.
2. Illustrate NS2 script to send data between two nodes.
3. Create a simple simulation topology to generate TCP and UDP traffic
4. Simulate a NS2 scenario to handle link failures.
5. Write a NS2 script to handle Multicast traffic.
6. Demonstrate OSPF routing.
7. Create a simulation topology and analyze QOS parameters.
8. Demonstrate the creation of wireless topology.

**Text Book**

1. Sandeep Singhal et al, 2007. The Wireless Application Protocol, 1<sup>st</sup> Edition. Pearson Education, New Delhi.
2. Charles Arehart-Nirmal Chidambarametal. Professional WAP, 1<sup>st</sup> Edition. Shroff Publishers & Distributors Pvt Ltd, New Delhi.



**References**

1. Dale BulBrook. 2004. WAP –A Beginner’s Guide, 1<sup>st</sup> Edition. TMH Publication, New Delhi.
2. Ruseyev S. 2003. WAP Technology &Applications ,1<sup>st</sup> Edition. Eswar Publications, New Delhi.

**Web Sites:**

1. [www.en.wikipedia.org/wiki/Wireless\\_Application\\_Protocol](http://www.en.wikipedia.org/wiki/Wireless_Application_Protocol)
2. [www.wap.com](http://www.wap.com)
3. [www.w3schools.com/wap/](http://www.w3schools.com/wap/)

**Course Objectives:**

Enable the student

- Understand the fundamentals of HTML
- Use of different formatting options
- Creation of tables and frames
- Know the importance of object oriented aspects of Scripting.
- To understand and practice embedded dynamic scripting on client side Internet Programming
- Relate with DHTML and CSS

**Course Outcomes(COs)**

Upon completion of this course, student will be able to :

1. Design web pages.
2. Use technologies of Web Programming.
3. Apply object oriented aspects to Scripting.
4. Create a basic website using HTML and Cascading Style Sheets.
5. Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
6. Design structure of the website including the information architecture, the layout or the pages and the conceptual design with branding.

**Unit-I : HTML:** Introduction to HTML- History Of HTML-Structure of HTML-Formatting Text :Font type, Font Size, Big ,Small, bold ,italic, color, superscript , Subscript, striking out, Underlining the text , Predefined fonts , Pre formatted Text, Blinking Text and Block Quotes. Lists: Ordered, Unordered and Definition List. Creating Link - Images.

**Unit-II :Tables:** Creating Table –Dividing Table into Columns- Dividing Table into RowsCreating Headers- Adding Border –Putting a Background Image- Heading across two or more columns- Changing color of the cell-aligning the content –Display of Tables. Frames-Forms: Working with forms-Creating forms-working with menus- working with Radio buttons- check boxes-textboxes-text areas- password boxes-submit buttonResetting the form.

**Unit-III :DHTML:** Heading and Horizontal line-Hidden Message-Message at the center of the page- Moving Boxes- Changeable Box- CSS: Introduction- Creating Style Sheets - Common Tasks with CSS- Colors-The Font Family.

**Unit-IV :JavaScript:** Introduction-Operators-Starting with JavaScript- Using Quotes-Using Alerts Functions-Variables-data types- Statements-Comments.

**Unit-V**

Objects: Working with Objects- Date Object-Math Object-String Object--Handling Events in JavaScript-Event Handling attributes-Window Events-Window Object – Document Object-Navigator Object

**Text Book**

1. Ramesh Bangia. 2008. Web Technology, 1st Edition, Firewall Media Publications, New Delhi.

**References**

1. Deitel H.M., P.J.Deitel and A.B.Goldberg. 2007. Internet & World Wide Web, 3rd Edition, Pearson Education Asia, New Delhi.
2. Jeffrey C. Jackson. 2007. Web Technologies, 3rd Edition, Pearson Education Publishers, New Delhi.

**Web Sites**

1. [www.w3schools.com/](http://www.w3schools.com/)
2. [alexle.net/archives/category/web-technolgy](http://alexle.net/archives/category/web-technolgy)

**Course Objectives:**

- Identify key elements of the cloud computing
- Understand and appreciate the need for cloud computing, and identify their use in industrial applications
- Analyse the current issues in cloud computing
- Develop an in-depth understanding of selected parts of the material
- Public cloud, private cloud and hybrid clouds
- Security and Privacy issues in the Cloud

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Elaborating the basic concepts of cloud computing and defining the basic terms
2. Understanding the various cloud implementations and migration techniques
3. To define the various industrial applications of cloud virtualization.
4. In depth learning of security challenges and preventive measures in cloud computing
5. Practical implementation of cloud computing and live case studies
6. Understand the cloud computing technologies for Infrastructure as a Service, Platform as a Service, Software as a Service, Physical Systems as a Service and cloud security.

**Unit I**

Introduction to Cloud Computing -Characteristics of Cloud Computing -Paradigm shift - Benefits of cloud computing - Disadvantages of cloud computing- Role of Open Standards- Cloud Computing Architecture: Cloud computing stack-Public cloud -Private cloud -Hybrid cloud -Community cloud

**Unit II**

Virtualization Technologies -Load Balancing and Virtualization -Advanced load balancing - The Google cloud - Hypervisors -Virtual machine types -VMware vSphere - Machine Imaging -Porting Applications -The Simple Cloud API - AppZero Virtual Application Appliance

**Unit III**

Infrastructure as a Service (IaaS) -Platform as a Service (PaaS) -Software as a Service (SaaS) -Identity as a Service (IDaaS) -Compliance as a Service (CaaS)- Cloud storage.

**Unit IV**

Cloud Information Security Objectives -Confidentiality, Integrity, and Availability -Cloud Security Services - Relevant Cloud Security Design Principles -Cloud Computing Risk Issues -The CIA Triad

Privacy and Compliance Risks -Threats to Infrastructure, Data, and Access Control -Cloud Access Control Issues -Database Integrity Issues -Cloud Service Provider Risks Architectural Considerations

General Issues- Trusted Cloud Computing -Identity Management and Access Control

### Unit V

Case Study on Open Source and Commercial Clouds: Microsoft Azure- Amazon EC2- Google Web services.

### Text Book

- 1.Barrie Sosinsky .2010. Cloud Computing Bible, Wiley- India
- 2.Rajkumar Buyya, James Broberg, Andrzej M Goscinski. 2011. Tata Mc-Graw Hill, New Delhi.
3. Ronald L. Krutz, Russell Dean Vines. 2010. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Wiley -India

### Reference Book

1. Dr Kumar Saurabh.2012. Cloud Computing, 2<sup>nd</sup> Edition, Wiley India.
2. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter. 2010. Cloud Computing Practical Approach, 1<sup>st</sup> Edition, Tata McGraw Hill, New Delhi.
3. Nikos Antonopoulos, Lee Gillam. 2012. Cloud Computing: Principles, Systems and Applications, Springer.

### WEB SITES

1. [en.wikipedia.org/wiki/Cloud\\_computing](http://en.wikipedia.org/wiki/Cloud_computing)
2. [www.ibm.com/cloud-computing/in/en/](http://www.ibm.com/cloud-computing/in/en/)
3. [www.oracle.com/CloudComputing](http://www.oracle.com/CloudComputing)
4. [www.microsoft.com/en-us/cloud/default.aspx](http://www.microsoft.com/en-us/cloud/default.aspx)

**Course Objectives:** To help students to

- Get hands-on experience in scripting, debugging, testing.
- Establish a working environment for PHP web page development
- Use variables, constants, and environment variables in a PHP program
- Learn to create dynamic interactive pages with PHP.
- Learn to manipulate files with PHP.
- Understand how MySQL works.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Implement regular expressions in PHP programming including modifiers, operators, and meta characters.
2. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
3. Analyze and solve various database tasks using the PHP language.
4. Create server side web applications using PHP and MySQL
5. Implement SQL to output reports with MySQL
6. design a client-side programming

**Unit I**

Creating a Simple PHP Programs: How PHP Code Works- How Online PHP Programs Run Web; Communications: Internet Protocols and HTTP: TCP/IP- The HTTP Protocol; Using Variable in PHP Issues concerning Creating Variables-Defined Constants; Operators and Expressions: PHP Operators – PHP Expressions- Operators Types- Arrays

HTML Primer: The HTML Document type definition- The Form and Input Elements; Accessing PHP and HTTP Data: Predefined Variables- Variables in HTTP Request and Response- Super Global Arrays; Links; Query Strings; HTML(Web) Forms; HTML Form Elements-HTML Form Fields(Controls) and PHP; The Concept Of State: State Maintenance- Native Sessions in PHP.

Designing PHP Program Logic: Problem Statement- Writing Pseudo Code- Boolean Logic; Conditional Or Branching Statements: if statements- Switch statements- Loops and Arrays: Loops- Arrays.

**Unit II**

Testing and Debugging: Values that break your code- Basic error types; Debugging PHP Script: Understanding PHP error Messages- Syntax Errors- Logic Errors- Runtime Errors; Debugging and Handling Errors in PHP5: Preventing the display of private information-

Roll your-Own Debugging tools; Form Validation: Using the Exit statement- string validation and regular expressions- validating data entry- using reg exps to check file path parameters; Handling Errors: Gracefully- Configuring PHP for error handling- Try/Catch-New in PHP5.

Development planning: Formal software Development processes – optimizing your code- Using Coding standard; Writing user-defined functions in PHP: The Structure of Functions- Switching Functions – How Values Get Inside functions; Scope of variables: Global and Local Variables-Creating Static Function Variable-Nesting-Recursion-The Include and Require Statements-Things to be careful about with include and require.

### Unit III

Files and Directories: Files and Directory Handling- Working with Files- Opening and Closing files-Getting Information about a file-reading and writing to files-Reading and writing characters in files-Reading Entire files-Random Access to file data-Getting Information on Files-Ownership and permissions; Working with files you own: Splitting the Name and path from a file-copying ,renaming and deleting files; Working with Directories: other Directory Functions –Traversing a directory hierarchy-creating a directory navigator-Building a Text Editor-Uploading Files.

Classes- Objects: Creating class- Adding a Method- Adding a Property- Protecting Access to Member Variables- Using `_get` and `_set`- Initializing objects- Destroying Objects-Inheritance- Overriding Methods- Interfaces- Encapsulation

### Unit IV

The SQL Framework- Managing databases-Creating & Managing tables- Managing indexes; Inserting & Updating data in a MYSQL database-Deleting & Retrieving data from a MySQL database; SELECT statement- Optional clauses of a SELECT statement; Creating MySQL Expressions-using operators in expressions-Comparing and Converting Data; Managing different types of data: String functions-Numeric function- Date/Time functions-Summarizing date-Summary functions

Performing System Operations: Encryption functions- System related Functions- Query and Insert Functions; Accessing data from Multiple tables: Creating joins in your SQL statement- Creating subqueries in your SQL statements; Creating Unions that join SELECT statements.

Exporting, Copying and importing data; Managing transactions: Introducing transactions-Performing a transaction- Setting the auto commit mode and transaction isolation level-Locking Nontransactional tables

### Unit V

Connecting to MySQL from a PHP application- Inserting and updating records in table-Deleting and retrieving data from table- Creating a user Registration Script. Structure of an E-Mail Message-sending E-mail with PHP- Working with Raster Images- Manipulating Raster Images- Using Text in Images

**Text Book**

1. Dave W.Mercer, Allan Kent, Steven D.Nowicki, Davd Mercer, Dan Squie, Wankyu Choi.2009. Beginning PHP5. Wiley India (P) Ltd, New Delhi

**Reference Books**

1. Luke welling, Laura Thomson, 2010. PHP and MySQL Web Development, 4<sup>th</sup> Edition, Pearson Education.
2. Julie Meloni . 2012. Sams Teach Yourself PHP, MySQL and Apache All in One, 5th Edition, Pearson Education India.
3. Paul Dubois. 2006. MySQL, 1st Edition, Tech Media, New Delhi.
4. Tim Converse & Joyce Park with Clark Morgan . 2006. PHP5 & MySQL Bible, 1st Edition, John Wily, India.
5. Baron Schwartz, Peter Zaitsev, Vadim Tkachenko. 2012 High Performance MySQL: Optimization, Backups, 3<sup>rd</sup> Edition, O'REILLY.

**Web Sites**

1. [www.php.net/](http://www.php.net/)
2. [en.wikipedia.org/wiki/PHP](http://en.wikipedia.org/wiki/PHP)
3. [www.w3schools.com/PHP/DEfaULT.asP](http://www.w3schools.com/PHP/DEfaULT.asP)



**Course Objectives:**

Enable the students

- The principles of mobile computing technologies;
- Knowledge of applications that mobile computing offers to people, employees, and businesses;
- Knowledge of GPRS network architecture and services .
- Future of mobile computing technologies and applications.
- Able to design, create, deploy, and test applications for the mobile phone platform.
- To explain how Android applications work, their life cycle, manifest, Intents, and using external resources.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Analyze the architecture, merits and demerits of Wireless technologies like Infra Red, blue tooth, Wi-Fi, RFID and Wi-Max .
2. Characterize the principles of mobile technologies like GPRS, GSM, CDMA, and TDMA
3. Compare the characteristics and techniques MANET with VANET
4. Analyze technology of 1G, 2G, 3G and 4G for gaining the working knowledge of four generation wireless technologies.
5. Apply the features of Android programming for developing Android Applications
6. Implement a program in the Android environment.

**Unit I**

Mobile Computing- Middleware and Gateways-Developing Mobile Computing Applications-Security in Mobile Computing – Architecture of Mobile Computing-Three-Tier Architecture-Design Consideration for Mobile Computing-Mobile Computing through Internet- Mobile Computing through Telephone-Developing an IVR Applications

**Unit II**

Bluetooth-Rfid-Wireless Broadband (WiMax)- Mobile IP – IPV6-Java Card –Global System for Mobile Communications – GSM Architecture – Call Routing in GSM – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency Allocation – Authentication and Security- Mobile Computing Over SMS – SMS-Value Added Services through SMS.

**Unit III**

GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations –Data Services in GPRS- Applications for GPRS – Limitations of GPRS- Spread Spectrum Technology- CDMA Versus GSM – Wireless Data – Third Generation Networks – Applications on 3G – Wireless LAN Advantages – Wireless LAN Architecture- Mobility in Wireless LAN –Deploying Wireless LAN – Wireless LAN Security.

**Unit IV**

Mobile Phones – PDA- Design Constraints in Applications for Handheld Devices – Palm OS Architecture – Communications in Palm OS – Introduction to Symbian – Symbian OS Architecture– Applications for Symbian – Security on the Symbian OS- JAVA in the Handset – Java 2 Micro Edition Technology – Different Flavours of Windows CE- Windows CE Architecture.

**Unit V**

Android : Getting to know Android - Android development environment - Android development environment for real applications - start up code, M J Android applications- debugging Android applications

**Text books**

1. Ashok K Talukder and Roopa R Yuuvagal, 2005 “Mobile Computing”, Tata McGraw Hill Publishing Company Limited. [Unit I,II,III,IV]
2. R.Roger, J Lombarddo, Z Mednieks and B. Meike, 2010, Android Applications Development, O'Reilly, Shroft Publishers & Distributors Pvt Ltd, New Delhi. [Unit V]

**Reference Books**

1. JochenSchiller, Mobile Communication, Addison Wesley, 2000.
2. Brian Fling , Mobile Design and Development, O'Reilly Media, Inc 2009
3. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
4. Ivan Stojmenovic, 2002, HANDBOOK OF WIRELESS NETWORKS AND MOBILE COMPUTING, A WILEY-INTERSCIENCE PUBLICATION.
5. Asoke K. Talukder, Roopa R. 2011. Mobile Computing: technology, applications, and service creation, New Delhi : Tata McGraw Hill.

**Websites:**

1. [en.wikipedia.org/wiki/Mobile\\_computing](http://en.wikipedia.org/wiki/Mobile_computing)
2. [www.cse.iitk.ac.in/users/rkg/Talks/mobile\\_main.pdf](http://www.cse.iitk.ac.in/users/rkg/Talks/mobile_main.pdf)
3. [www.tutorialspoint.com/android/](http://www.tutorialspoint.com/android/)
4. [pl.cs.jhu.edu/oose/resources/android/Android-Tutorial.pdf](http://pl.cs.jhu.edu/oose/resources/android/Android-Tutorial.pdf)

**Course Objectives:**

To help the students

- To Possess knowledge of the concepts and terminology associated with database systems, statistics, and machine learning
- To develop skills of using recent data mining software for solving practical problems.
- To gain experience of doing independent study and research.
- to teach the techniques for preprocessing data before mining
- To know the concepts related to data warehousing, on-line analytical processing (OLAP)
- To know the data generalization.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. To understand the data mining process of voluminous data using OLAP
2. To implement the preprocessing concept in data mining applications
3. To apply the data mining algorithms on big data to extract useful data
4. To implement data mining techniques for complex data types
5. To implement Decision Support System concept in data mining for developing intelligence business application.
6. To Understand the methods for mining frequent patterns, associations, and correlations.

**Unit I**

Introduction to Data Mining: Motivation and importance, Data Mining, Relational Databases, Data Warehouses, Transactional Databases, Advanced Database Systems and Advanced Database Applications, Data Mining Functionalities, Pattern Classification of Data Mining Systems, Major issues in Data Mining. Pre-process the Data- Data Cleaning, Data Integration and Transformation.

**Unit II**

Classification and Regression Algorithms : Naïve Bayes – Multiple Regression Analysis – Logistic Regression – k-Nearest Neighbour Classification – GMDH –Computing and Genetic Algorithms. Support Vector Machines : Linear SVM - SVM with soft margin – Linear kernel – Proximal SVM – Generating Datasets.

Cluster Analysis : Partitional Clusterings – k-medoids – Birch – DBSCAN – Optics – Graph Partitioning – CHAMELEON – COBWEB – GCLuto.

**Unit III**

Mining Association rule in large Databases Association Rule Mining, Mining Single - Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Dataware houses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

**Unit IV**

Mining Complex Types of Data : Mining Spatial Databases – Multimedia Databases – Time-series and Sequence Data – Text Databases – Web Data Mining – Search Engines.

**Unit V**

Data Warehouse and OLAP Technology for Data Mining. What is a Data Warehouse? Multi-Dimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Development of Data Cube Technology, Data Warehousing to Data Mining Data Preprocessing Data Warehousing: Failures of past Decision Support System- Operational vs. DSS- Building blocks: features- Data warehouse and Data Mart- Overview of the Components- Metadata Architectural Components: Distinguishing Characteristics- Architectural Framework- Technical Architecture.

**Text Books**

1. Jiawei Han and Micheline Kamber. 2011 . Data Mining Concepts and Techniques, 3<sup>rd</sup> Edition, Elsevier, India (Unit I, III, IV, V)
2. G.K.Gupta .2006. Prentice Hall India, New Delhi . Introduction to Data Mining with Case Studies (Unit – IV)
3. Soman.K.P, Shyam Divakar and V. Ajay. 2008. Insight to Data Mining- Theory and Practical, Prentice Hall India, New Delhi. (Unit – II)

**Reference Books**

1. Gupta.G.K. 2006. Introduction to Data Mining with Case Studies, Prentice Hall India, New Delhi .
2. Kantardzic, Mining Concepts, Models, Methods and Algorithms, IEEE Press – A John Wiley & Sons.
3. Paulraj Ponniah. 2008.Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals, John Wiley & Sons, New Delhi.
4. Professionals, John Wiley & Sons, New Delhi.

**Web Sites:**

1. [www.wikipedia.org/wiki/Data\\_mining](http://www.wikipedia.org/wiki/Data_mining)
2. [www.anderson.ucla.edu/faculty/jason.frand/teacher/technologies/palace/datamining.htm](http://www.anderson.ucla.edu/faculty/jason.frand/teacher/technologies/palace/datamining.htm)
3. [www.thearling.com/text/dmwhite/dmwhite.htm](http://www.thearling.com/text/dmwhite/dmwhite.htm)

**Course Objectives:**

- Understand concepts and terminology associated with SNMP and TMN
- Decide routing protocol for complex network.
- Gain knowledge the internal architecture of routers
- Understand the fundamentals and requirements for packet routing in computer communication network.
- To teach the concepts and techniques of network architecture management
- Know how to Remote Network Monitoring in TCP/IP Networks

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. To solve the problems in computer network system management
2. To analyze the challenges in the implementation of ATM networks
3. To implement SNMP Model in the management of computer networks
4. To configure routers using computer network software tools
5. To implement service level agreement in Computer Network management systems
6. To implement the architecture behind standards based network management

**Unit I**

Introduction: Objectives - Component architectures – Reference architecture – Architectural models; Addressing and Routing Architecture: Addressing mechanisms – Routing mechanisms – Addressing strategies – Routing strategies – Architectural considerations; Network Management Architecture: Defining Network Management – Network Management Mechanism - Architectural considerations; Performance Architecture; Developing goals – Performance mechanisms – Architectural considerations

**Unit-II**

Security And Private Architecture: Developing a security and privacy plan – Security and privacy Administration & Mechanism - Architectural considerations; Selecting Technologies for the Network Design: Goals – Design Concepts – Design Process – Vendor, Equipment and Service-Provider Evaluations – Network Layout – Design Traceability - Design Metrics.

**Unit-III**

Case history of Networking and Management: Challenges of Information Technology Managers – Goals, organization and functions – Network and System Management – Network Management System Platform; SNMP, Broadband and TMN Management: Network Management Standards & Model – Organization, Information and Communication Model – ASN.1 – Encoding structure – Macros – Functional model; Organization and Information Model: Managed Networks – The History of Network Management – Internet Organization and standards – SNMP Model – The Organization and Information Model; Communication and Functional Model: The SNMP Communication Model – Functional Model.

**Unit-IV**

SNMPv2 Management: Major changes – System architecture – Structure of Management Information – Management Information Base – SNMPv2 protocol – Compatibility; RMON: Remote monitoring – RMON1 – RMON2 – ATM remote monitoring; Broadband Network Management: ATM Networks - Network and Services – ATM Technology – ATM Network Management; Telecommunication Management Network: Operations systems – Conceptual model – Standards – Architecture – TMN Management service architecture – Integrated view of TMN – Implementation issues.

**Unit-V**

Network Management Tools and Systems: Network management tools – Network statistics measurement system – Network Management Systems – System Management; Network Management Applications: Configuration Management - Fault Management - Performance Management – Security Management – Accounting Management – Report Management - Policy Based Management – Service Level Management.

**Text Books**

- James D. Mc CABE. 2010 Network Analysis, Architecture and Design, 3<sup>rd</sup> Edition, Morgan Kaufmann Publishers.

**Reference Books**

1. Mani Subramanian. 2012. Network Management Principles and Practice, Pearson Education Asia Pvt. Ltd., 2<sup>nd</sup> Edition.
2. William Stallings. 2002. SNMP, SNMPv2, SNMPv3 and RMON 1 and 2, 3<sup>rd</sup> Edition, Pearson Education Asia Pvt. Ltd.

**Course Objectives:**

To help students to

- Design, select and apply the most appropriate software engineering process for a given project, plan for a software project, identify its scope and risks, and estimate its cost and time.
- Implement software.
- Analyze, specify and document software requirements for a software system.
- Express and understand the importance of negotiation, effective work habits, leadership
- Understand the good communication with stakeholders, in written and oral forms, in a typical software development environment.
- Understand the concept and techniques of project management for a broad range of systems

**Course Outcomes (COs):**

Upon completion of this Course, student will be able to:

1. Implement the concept of software effort estimation in developing software project.
2. Develop a responsible attitude towards the use of computer as well as the technology.
3. Evaluate the risks during the development of software projects
4. Understand the organization behavior in software project management.
5. Implement team management process in developing quality software
6. Apply project management concepts and techniques to an IT project.

**Unit I**

Introduction-Software Project Management -Project evaluation and programme Management- An overview of Project planning- Stepwise planning-Selection of an appropriate project Approach.

**Unit II**

Software effort estimation: Problems with over- and underestimates-Software effort estimation Techniques - Estimating by analogy -Albrecht function point analysis -Function points Mark II –COSMIC full function points - COCOMO 13: a parametric productivity model. Activity planning: The Objectives of activity Planning-Project schedules - Projects and activities - Sequencing and scheduling activities - Network planning models - Formulating a network model - Adding the time dimension - The forward pass - The backward pass - Identifying the critical path.

**Unit III**

Risk management: Introduction to Risk - Categories of risk - A framework for dealing with risk -Risk identification - Risk assessment - Risk planning - Risk management - Evaluating risks to the schedule - Applying the PERT technique - Monte Carlo simulation - Critical

chain concepts. Resource allocation :-Introduction -The nature of resources - Identifying resource requirements -Scheduling resources -Creating critical paths -Counting the cost - Being specific -Publishing the resource schedule - Cost schedules -The scheduling sequence.

#### Unit IV

Monitoring and control: Creating the framework-Collecting the data- Visualizing progress-Cost monitoring -Earned value analysis-Prioritizing monitoring - Getting the project back to target - Change control. Managing people in software environments: Understanding behavior -Organization behavior: a background - Selecting the right person for the job - Instruction in the best methods - Motivation - Stress -Health and safety -Some ethical and professional concern

#### Unit V

Working in teams: Becoming a team - Decision making - Organizational structures - Coordination dependencies - Dispersed and virtual teams - Communication genres - Communication plans - Leadership. Software quality: Introduction -The place of software quality in project planning - The importance of software quality - Defining software quality - ISO 9126 -Product versus process quality management -Quality management systems - Process capability models -Techniques to help enhance software quality -Testing -Quality plans

#### Text Book

1. Bob Hughes and Mike Cotterell.2011. Software Project Management, 5<sup>th</sup> Edition, New Delhi: Tata McGraw Hill.

#### Reference Book

1. Royce.2000. Software Project Management, 1st Edition, New Delhi: Addison Wesley.
2. Kelkar, "Software Project Management", 3<sup>rd</sup> edition, Prentice Hall India,2012

#### Web sites

1. [http://en.wikipedia.org/wiki/Software\\_project\\_management](http://en.wikipedia.org/wiki/Software_project_management)
2. <http://www.onesmartclick.com/engineering/software-engineering.html>
3. [http://www.cc.gatech.edu/classes/AY2000/cs3802\\_fall/](http://www.cc.gatech.edu/classes/AY2000/cs3802_fall/)



### **Course Objectives:**

To help students to

- Develop server-side Ruby scripts for publishing on the Web
- Employ control structures, methods, procs, arrays and hashes to create Ruby programs
- Distinguish and use various Ruby datatypes
- Master the use of arrays and hashes
- Use the extensive pre bundled classes
- Use the I/O facilities of Ruby to read and write binary and text files

### **Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Master the use of Iterators to loop through various data structures
2. Use Exceptions in handling various run time errors
3. Create Ruby modules
4. Use the wide variety of Ruby Modules that come with the Ruby distribution
5. Use object-oriented programming conventions to develop dynamic interactive Ruby applications
6. fundamental components of the Ruby Programming Language

### **Unit I**

Introduction to Ruby: Installing Ruby - THE STRUCTURE AND EXECUTION OF RUBY PROGRAMS: Lexical Structure- Syntactic Structure - Block Structure in Ruby- File Structure - Program Execution. DATA TYPES: Numbers - Text - String Literals - Character Literals - String Operators - Accessing Characters and Substrings - Iterating Strings – Arrays – Hashes – Ranges – Symbols – True & False – Ruby Documentation: RDoc and ri.

### **Unit II**

STATEMENTS AND CONTROL STRUCTURES: Conditionals – Loops - Iterators and Enumerable objects: custom iterators – enumerators – External iterators – Blocks: Variable scope – passing argument to blacks. Flow-altering statements like return and break- The special-case BEGIN and END statements. CLASSES : Creating and initializing class – Accessor and attributes – class methods – class variables – Defining operators. SUBCLASSING AND INHERITANCE: visibility – Overriding methods. OBJECTS: Object creation and initialization.

**Unit III**

**METHODS:** Defining a Method, Calling a Method; Undefined methods – Methods with Exception – Operator methods and names – Method Arguments – Method objects - Defining Attribute Accessor Methods - Dynamically Creating Methods. **EXCEPTIONS AND EXCEPTION HANDLING:** Hierarchy – Exception classes and objects – Raising Exception with raise – Handling Exception with rescue – Exception propagation – Else clause and ensure class.

**Unit IV**

**MODULES:** Namespaces - Modules as Mixins - Includable Namespace Modules - Loading and Requiring Modules - Executing Loaded Code. **Reflection and Meta programming:** Evaluating Strings and Blocks - Querying, Setting, and Testing Variables – Regular Expressions. **FILES AND DIRECTORIES:** Listing and manipulating Directories and testing files. **BASIC INPUT AND OUTPUT:** Opening Stream – Reading from a Stream – Writing to a stream – Random Access Methods – Closing, Flushing and testing streams.

**Unit V**

**THREADS AND PROCESSES:** Thread Life Cycle – Thread scheduling – Thread Exclusion – Deadlock. **Ruby Tk:** Introduction- Widgets and classes. **Networks:** A Very Simple Client - A Very Simple Server – Datagram - A Multiplexing Server - Fetching Web Pages. **Ruby on Rails:** Building a development Environment: Installation – Installing Databases – Code editors – web server Configuration – Creating an web application.

**Text Books:**

1. Dave Thomas, Andrew Hunt, 2013, Programming Ruby 1.9 & 2.0: The Pragmatic Programmers Guide 2<sup>nd</sup> Edition, The Pragmatic Bookshelf.

**References:**

1. David Flanagan, 2008, "The Ruby Programming Language", 1<sup>st</sup> Edition, O'Reilly Media.
2. Eldon Alameda 2011 "Practical Rails Projects" Apress, Berkeley, CA, USA.
3. David Black, 2006, "Ruby for Rails", Manning Publications.

**Web sites :**

1. [http://www.tutorialspoint.com/ruby/ruby\\_tk\\_guide.htm](http://www.tutorialspoint.com/ruby/ruby_tk_guide.htm)
2. [www.finchier.org/tips/Languages/Ruby](http://www.finchier.org/tips/Languages/Ruby)
3. [www.troubleshooters.com/codecorn/ruby/basictutorial.htm](http://www.troubleshooters.com/codecorn/ruby/basictutorial.htm)
4. [www.ruby-lang.org/en/documentation/quickstart](http://www.ruby-lang.org/en/documentation/quickstart)

**Course Objectives:**

- To know the fundamental concepts of Wireless Communication Systems.
- To learn the latest technology of Mobile Communication.
- To provide a strong foundation in the field of Wireless Networks.
- To know about the various IEEE Standards.
- To know the transfer information over short distance or long distances
- To develop the application of wireless technology in today's world.

**Course Outcomes (COs):**

Upon completion of this Course, student will be able to:

1. Create a Sensor network environment for different type of applications
2. Design ad-hoc and sensor network architectures using QoS and Congestion control
3. mechanisms
4. Apply appropriate routing algorithms for different network environments
5. Analyze the working of ad-hoc and sensor network for various applications
6. Deploy security mechanisms in the wireless ad-hoc and sensor networks.

**Unit I**

Introduction-Wireless Transmission -Signal Propagation - Spread Spectrum - Satellite Networks - Capacity Allocation – FAMA - DAMA - MAC

**Unit II**

Mobile Networks-Cellular Wireless Networks - GSM-Architecture – Protocols - Connection Establishment - Frequently Allocation – Routing – Handover – Security – GPRA.

**Unit III**

Wireless Networks-Wireless LAN - IEEE 802.11 Standards – Architecture - Services-AdHoc Network- HiperLan - Blue Tooth Technology.

**Unit IV**

Routing -Mobile IP – DHCP - AdHoc Networks - Proactive and Reactive Routing Protocols - Multicast Routing – Sensor Networks.

**Unit V**

Transport and Application Layers-TCP over Ad Hoc Networks - WAP-Architecture - WWW Programming Model-WDP - WTLS - WTP – WSP – WAE - WTA Architecture – WML - WML scripts.

**Text Books**

1. William Stallings.2010.Wireless Communications and Networks, 5<sup>th</sup> Edition, Pearson Education

**Reference Books**

1. C.Puttamadappa, Subir Kumar Sarkar, T. G. Basavaraju.2013.Ad Hoc Mobile Wireless Networks: Principles, Protocols, and Applications, 2nd Edition,CRC Press.
2. Benvenuto.2011.Principles of Communications Networks and Systems, 2nd Edition, Wiley India Pvt. Ltd.
3. Jochen Schiller. 2003. Mobile Communications, 2<sup>nd</sup> Edition, Pearson Education

**Course Objectives:** To impart to students the skills required

- To design scalable systems that can accept, store, and analyze large volumes of unstructured data.
- Fundamentals of big data analytics
- Methodologies used in storing, manipulating, and analyzing big data.
- To provide an overview of an exciting growing field of big data analytics.
- To introduce the tools required to manage and analyze big data like Hadoop, No Sql MapReduce.
- To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Analyze the big data analytic techniques for useful business applications.
2. Implement the concept of virtualization and abstraction in analyzing big data
3. Analyze the HADOOP and Map Reduce technologies associated with big data analytics
4. Understand the fundamentals of various bigdata analysis techniques
5. Implement the integration of data sources in operationalizing Big Data
6. Analyze the concept to solve complex real-world problems in for decision support.

### **Unit-I**

Fundamentals of Big Data - The Evolution of Data Management Understanding the Waves of Managing Data- Defining Big Data - Big Data Management Architecture- The Big Data Journey -Big Data Types-Defining Structured Data-Defining Unstructured Data-Putting Big Data Together.

### **Unit-II**

Big Data Stack- Basics of Virtualization - The importance of virtualization to big data - Server virtualization - Application virtualization - Network virtualization -Processor and memory virtualization - Data and storage virtualization-Abstraction and Virtualization-Implementing Virtualization to Work with Big Data.

### **Unit-III**

Hadoop - Hadoop Distributed File System - Hadoop MapReduce- The Hadoop foundation and Ecosystem.

### **Unit-IV**

Big Data Analytics-Text Analytics and Big Data-Customized Approaches for Analysis of Big Data

**Unit-V**

Integrating Data Sources-Real-Time Data Streams and Complex Event Processing-Operationalizing Big Data.

**Text Book**

1. Judith Hurwitz, Alan Nugent, Fern Halper, Marcia Kaufman. 2013. Big Data For Dummies, Wiley India, New Delhi.

**References**

1. Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan. 2012. Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, New Delhi.
2. Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author). 2013. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley Publications, New Delhi.
3. Zikopoulos, Paul, Chris Eaton. 2011 .Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, New Delhi.

**Web Sites**

1. [www.oracle.com/BigData](http://www.oracle.com/BigData)
2. [www.planet-data.eu/sites/default/files/Big\\_Data\\_Tutorial\\_part4.pdf](http://www.planet-data.eu/sites/default/files/Big_Data_Tutorial_part4.pdf)
3. [www.ibm.com/developerworks/data](http://www.ibm.com/developerworks/data)
4. [www.solacesystems.com](http://www.solacesystems.com)
5. [en.wikipedia.org/wiki/Big\\_data](http://en.wikipedia.org/wiki/Big_data)
6. [www.sap.com/solution/big-data.html](http://www.sap.com/solution/big-data.html)

**Course Objectives:**

To help students to

- Understand the architecture and topology of network
- Understand the design process of a distributed systems
- Examine distributed and parallel computing operating system
- Know the need and challenges of distributed database
- to distinguish between local programming (on a single machine) and distributed programming using multiple components via a network
- To develop the applications in a distributed parallel computing environment.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Distinguish between distributed computing and parallel computing
2. Understand concepts of SOA.
3. Demonstrate different cloud technologies
4. Designing security and storage in cloud technologies.
5. Demonstrate the understanding of advance data communication technologies
6. Demonstrate the understanding of protocol used for management of network.

**UNIT – I**

Introduction : Distributed Computing – Relation to multiprocessor and multi computer systems-message passing systems versus shared memory systems – primitives for distributed computing. Distributed Computations : distributed program – global state of a distributed system – models of process communications.

**UNIT – II**

Message ordering and Group Communication : message ordering paradigm – Asynchronous execution with synchronous communication – classification of application level multicast algorithm – distributed multicast algorithm at the network layer.

**UNIT – III**

System model for distributed computation – termination detection using distributed snapshots – termination detection in a faulty distributed system – Distributed mutual execution algorithm : Lamport's algorithm – Token Based algorithm – Raymond's tree-based algorithm.

**UNIT – IV**

DeadLock : system model – models of deadlocks – knapp's classification of distributed deadlock detection algorithms – chandy model – stable and unstable predicates – distributed algorithms for conjunctive predicates .

**UNIT – V**

Distributed shared memory : Abstraction – memory consistency – shared memory mutual execution – register hierarchy and wait free simulations- issues in failure recovery – check point based recovery – Authentication : protocols – password-based authentication-authentication protocol failures.

**Text Book**

1. Ajay. D. Kshemkalyani and Mukesh Singhal. Distributed Computing: Principles, Algorithms and Systems.

**References Books**

1. Uyless D. Black, 2004, “Data Communication and Distributed Networks”, 3rd Edition, Prentice hall of India, New Delhi.
2. Joel M Crichlow, 1998, “An Introduction to Distributed and Parallel Computing”, 1st Edition, Prentice – Hall Publication, New Delhi.

**Web Sites**

1. [wikipedia.org/wiki/Distributed\\_computing](http://wikipedia.org/wiki/Distributed_computing)
2. [www.webopedia.com/TERM/D/distributed\\_computing.html](http://www.webopedia.com/TERM/D/distributed_computing.html)
3. [www.tech-faq.com/distributed-computing.shtml](http://www.tech-faq.com/distributed-computing.shtml)



**Instruction Hours / week: L: 4 T: 0 P: 0 C: 4      Marks: Internal: 40 External: 60 Total: 100****End Semester Exam: 3 Hours****Course Objectives:** To help students to

- Understand the basic terminology and state fundamental facts about software metrics and process models.
- Identify the essential elements of a given metric or model, describe the interrelationships among its various elements
- Understand software process assessment cycles, complexity metrics and models.
- basis for the development and validation of models of the software development process
- to improve software productivity and quality.
- To understand the role and functioning of various system programs over application program.

**Course Outcomes (COs):**

Upon completion of this Course, student will be able to:

1. To analyze the importance of modeling and modeling languages
2. To apply the basic quality tools in software development
3. Analyze the software process metrics in the process of software testing
4. Implement function point metrics to measure software process improvement
5. Explain the business requirements pertaining to software development.
6. Identify risks, manage the change to assure quality in software projects.

**Unit I**

Introduction:- software quality-popular views-the role of the customer-software quality-Total quality management.Software development process models-the spiral model-iterative Development process-The Cleanroom Methodology-Process Maturity Framework and Quality standards. Fundamentals of Measurement theory-Level of measurement-Reliability and validity-Measurement Errors

**Unit-II**

Applying the seven basic quality tools in software development-Defect removal effectiveness-The rayleigh model-Exponential distribution and reliability growth models-Quality management models

**Unit-III**

In-process metrics for software testing-Complexity metrics and models-Metrics and lessons learned for object oriented projects-Availability metrics

**Unit-IV**

Measuring and analyzing customer satisfaction-Conducting in-process quality assessments

**Unit-V**

Software project assessments-Dos and don'ts of software process improvement-Using function point metrics to measure software process improvement-Concluding remarks

**Text Books:**

1. Stephen H.Kan . Metrics And Models In Software Quality Engineering. 2013. SECOND EDITION , Pearson India.

**Reference Book**

1. Norman Fenton, Software Metrics: A Rigorous and Practical Approach, Third Edition (Chapman & Hall/CRC Innovations in Software Engineering and Software Development Series) 2014
2. C. Ravindranath Pandian, Software Metrics: A Guide to Planning, Analysis, and Application, .2003Paperback.

**Course Objectives:**

- To represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology.
- To understand the semantic relationships among these data elements using Resource.
- To design and implement a web services application that “discovers” the data and/or other Description Framework (RDF).web services via the semantic web
- Able to discover the capabilities and limitations of semantic web technology for many applications.
- to discover, classify and build ontology for searching.
- To build and implement a small ontology that is semantically descriptive of chosen problem domain.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements.
2. To have an appreciation for the engineering issues underlying the design of AI systems.
3. To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
4. To have an understanding of the basic issues of knowledge representation.
5. To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning.
6. implement applications that can access, use and manipulate the ontology.

**Unit I**

Introduction : Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Metadata for web information - The semantic web architecture and technologies –Contrasting Semantic with Conventional Technologies –Semantic Modeling - Potential of semantic web solutions and challenges of adoption

**Unit II**

Ontological Engineering: Ontologies – Taxonomies –Topic Maps – Classifying Ontologies – Terminological aspects: concepts, terms, relations between them – Complex Objects – Subclasses and Sub-properties definitions – Upper Ontologies – Quality – Uses - Types of terminological resources for ontology building – Methods and methodologies for building ontologies – Multilingual Ontologies -Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning

**Unit III**

Structuring And Describing Web Resources :Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing - RDF – RDF Data Model – Serialization Formats- RDF Vocabulary –Inferencing - RDFS – basic Idea – Classes – Properties- Utility Properties – RDFS Modeling for Combinations and Patterns- Transitivity

**Unit IV**

Web Ontology Language :OWL – Sub-Languages – Basic Notions -Classes- Defining and Using Properties – Domain and Range – Describing Properties - Data Types – Counting and Sets- Negative Property Assertions – Advanced Class Description – Equivalence – Owl Logic.

**Unit V**

Semantic Web Tools And Applications :Development Tools for Semantic Web – Jena Framework – SPARL –Querying semantic web - Semantic Wikis - Semantic Web Services – Modeling and aggregating social network data - Ontological representation of social relationships, Aggregating and reasoning with social network data Understand semantic web basics, architecture and technologies

**TEXT BOOK:**

1. Grigoris Antoniou, Frank van Harmelen. 3rd Edition 2012. A Semantic Web Primer.,MIT Press, USA

**REFERENCES:**

1. Liyang Yu, “A Developer's Guide to the Semantic Web”, Springer, First Edition, 2011
2. John Hebel, Matthew Fisher, Ryan Blace and Andrew Perez-Lopez, “Semantic Web Programming”, Wiley, First Edition, 2009.
3. Robert M. Colomb, “Ontology and the Semantic Web”, Volume 156 Frontiers in Artificial Intelligence and Applications (Frontier in Artificial Intelligence and Applications), IOS Press, 2007.
4. Dean Allemang and James Hendler, “Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL, Morgan Kaufmann”, Second Edition, 2011.
5. Karin Breitman, Marco Antonio Casanova and Walt Truszkowski, “Semantic Web: Concepts, Technologies and Applications (NASA Monographs in Systems and Software Engineering)”, Springer, Softcover, 2010.

**Instruction Hours / week: L: 4 T: 0 P: 0 C: 4****Marks: Internal: 40 External: 60 Total: 100****End Semester Exam: 3Hours****Course Objectives:**

- To understand about the ATM protocols
- To learn the latest technology ATM network.
- To provide a strong foundation in routing issues.
- To know about the various Real Time Transport Protocol.
- To introduce issues related to traffic engineering and capacity planning.
- To make learners aware about advances in computer networking technologies.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Analyze ATM in terms of the technology as well as how it is applied to real-life applications.
2. .Identify appropriate algorithm to be applied for the various application like geometric modeling, robotics, networking, etc.
3. Analyze various algorithms.
4. Demonstrate the understanding of WAN Technology typically ATM .
5. Analyze issues of traffic requirements and perform capacity planning.
6. Demonstrate the understanding of protocol used for management of network.

**Unit I**

Introduction : ATM – Historical Perspective – Protocol Architecture – Logical Connections – Cells – Transmission of ATM Cells – SDH – SONET – Switches.

**Unit II**

ATM Protocol: Connection Setup – Routing Switching , Signaling , ATM Service Categories – QOS Parameters – Adaptation Layer.

**Unit III**

Routing Issues: Routing for High Speed Networks – RSVP, Traffic and Congestion Control – Achieving QOS – Traffic Shaping – Generic Cell Rate Algorithms – Rate Based Congestion Control – Connection Admission Control.

**Unit IV**

High Speed LANs: Fast Ethernet – ATM LAN's – LANE.

**Unit V**

Protocols Over ATM: Multiple Protocols Over ATM, IP Over ATM , TCP Over ATM – Real Time Transport Protocol – Wireless ATM – Current Trends.

**Text Books**

1. Rainer Handel, Manfred N.Huber, Stefan Schroder.1999.ATM Networks, Addison Wesley,1999.

**References**

1. William Stallings.1998.High Speed Networks TCP/IP and ATM Design Principles,Prentice Hall International.
2. Uyles Black.1999. ATM Vol.1 and 2,PHP TR.
3. William Stallings.1999. ISDN with Broad Lane ISDN with Frame Relay and ATM”,PHI,Fourth Edition.

**Course Objectives:**

To help students to

- Get hands-on experience in scripting, debugging, testing.
- Establish a working environment for PHP web page development
- Use variables, constants, and environment variables in a PHP program
- Learn to create dynamic interactive pages with PHP.
- Learn to manipulate files with PHP.
- Understand how MySQL works.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Implement regular expressions in PHP programming including modifiers, operators, and meta characters.
2. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
3. Analyze and solve various database tasks using the PHP language.
4. Create server side web applications using PHP and MySQL
5. Implement SQL to output reports with MySQL
6. design a client-side programming

**List of Programs:**

1. Design an online loan application form.
2. Design a form to submit your resume in net.
3. Design an application for Library Management System
4. Design form for online reservation in air ways.
5. Design form for online shopping
6. Design an application for creating an online Advertisement.
7. Design an application for student Information System.
8. Design an application to display cookies information.
9. Write a program for display environment variables in MySQL.
10. Write a program to count web page hits.
11. Design an email form that validates the inputs, produces errors when inputs are typed incorrectly, and send an email to you when submitted.
12. Design an application to upload multiple files

**Text Book**

1. Dave W.Mercer, Allan Kent, Steven D.Nowicki, Davd Mercer, Dan Squie, Wankyu Choi.2009. Beginning PHP5. Wiley India (P) Ltd, New Delhi

**Reference Books**

1. Luke welling, Laura Thomson, 2010. PHP and MySQL Web Development, 4<sup>th</sup> Edition, Pearson Education.
2. Julie Meloni . 2012. Sams Teach Yourself PHP, MySQL and Apache All in One, 5th Edition, Pearson Education India.
3. Paul Dubois. 2006. MySQL, 1st Edition, Tech Media, New Delhi.
4. Tim Converse & Joyce Park with Clark Morgan . 2006. PHP5 & MySQL Bible, 1st Edition, John Wily, India.
5. Baron Schwartz, Peter Zaitsev, Vadim Tkachenko. 2012 High Performance MySQL: Optimization, Backups, 3<sup>rd</sup> Edition, O'REILLY.

**Web Sites**

1. [www.php.net/](http://www.php.net/)
2. [en.wikipedia.org/wiki/PHP](http://en.wikipedia.org/wiki/PHP)
3. [www.w3schools.com/PHP/DEfaULT.asP](http://www.w3schools.com/PHP/DEfaULT.asP)



**Course Objectives:**

To impart to students

- The principles of mobile computing technologies;
- Knowledge of applications that mobile computing offers to people, employees, and businesses;
- Knowledge of GPRS network architecture and services .
- future of mobile computing technologies and applications.
- Able to design, create, deploy, and test applications for the mobile phone platform.
- To explain how Android applications work, their life cycle, manifest, Intents, and using external resources.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Analyze the architecture, merits and demerits of Wireless technologies like Infra Red, blue tooth, Wi-Fi, RFID and Wi-Max .
2. Characterize the principles of mobile technologies like GPRS, GSM, CDMA, and TDMA
3. Compare the characteristics and techniques MANET with VANET
4. Analyze technology of 1G, 2G, 3G and 4G for gaining the working knowledge of four generation wireless technologies.
5. Apply the features of Android programming for developing Android Applications
6. Implement a program in the Android environment.

**List of Programs:**

1. Write a program to build your first Android Application “Hello World” with common activity.
2. Write a program which will implement Sub menu in android application.
3. Write a program which will implement Context menu (Floating List of Menu Items) in android application.
4. Write a program to display the use of Relative Layout Views with different attributes.
5. Write a program to display the use of Linear Layout Views with different attributes.
6. Write a program to implement a Custom Button and handle the display message on button press.
7. Write a program to implement the List View in your android application.
8. Write a program to implement between animations and rotate the text in your android application.
9. Write a sample program to create a progress bar for your android applications.
10. Write a program to show how to use Date picker control of ADK in your android applications.

11. Write a program which enables you to draw an image using bitmap class object.
12. Write a program which allows you to get image from web and displayed them using the Image View.

**Text books**

1. Ashok K Talukder and Roopa R Yuuvagal, 2005 “Mobile Computing”, Tata McGraw Hill Publishing Company Limited. [Unit I,II,III,IV]
2. R.Roger, J Lombarddo, Z Mednieks and B. Meike, 2010, Android Applications Development, O’Reilly, Shroft Publishers & Distributors Pvt Ltd, New Delhi. [Unit V]

**Reference Books**

1. JochenSchiller, Mobile Communication, Addison Wesley, 2000.
2. Brian Fling , Mobile Design and Deevlopment, O’Reilly Media, Inc 2009
3. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
4. Ivan Stojmenovic, 2002, HANDBOOK OFWIRELESS NETWORKS AND MOBILE COMPUTING, A WILEY-INTERSCIENCE PUBLICATION.
5. Asoke K. Talukder, Roopa R. 2011. Mobile Computing: technology, applications, and service creation, New Delhi : Tata McGraw Hill.

**Websites:**

1. [en.wikipedia.org/wiki/Mobile\\_computing](http://en.wikipedia.org/wiki/Mobile_computing)
2. [www.cse.iitk.ac.in/users/rkg/Talks/mobile\\_main.pdf](http://www.cse.iitk.ac.in/users/rkg/Talks/mobile_main.pdf)
3. [www.tutorialspoint.com/android/](http://www.tutorialspoint.com/android/)
4. [pl.cs.jhu.edu/oose/resources/android/Android-Tutorial.pdf](http://pl.cs.jhu.edu/oose/resources/android/Android-Tutorial.pdf)

**Course Objectives:**

To help the students

- To Possess knowledge of the concepts and terminology associated with database systems, statistics, and machine learning
- To develop skills of using recent data mining software for solving practical problems.
- To gain experience of doing independent study and research.
- to teach the techniques for preprocessing data before mining
- To know the concepts related to data warehousing, on-line analytical processing (OLAP)
- To know the data generalization.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. To understand the data mining process of voluminous data using OLAP
2. To implement the preprocessing concept in data mining applications
3. To apply the data mining algorithms on big data to extract useful data
4. To implement data mining techniques for complex data types
5. To implement Decision Support System concept in data mining for developing intelligence business application.
6. To Understand the methods for mining frequent patterns, associations, and correlations.

**List of Programs:**

1. Use the following learning schemes, with the default settings to analyze the weather data (in weather.arff). For test options, first choose "Use training set", then choose "Percentage Split" using default 66% percentage split. Report model percent error rate
2. Using iris dataset preprocess and classify it with J4.8 and Naïve Bayes Classifier. examine the tree in the Classifier output panel
3. Using the datasets *ReutersCorn-Train* and *ReutersGrain-Train*. Classify articles using binary attributes and word count attributes.
4. Apply any two association rule based algorithm for the supermarket analysis
5. Using weka Experimenter perform comparison analysis of J48, oneR and ID3 for vote dataset
6. Using Weka Experimenter perform comparison analysis of Naïve Bayes with different datasets
7. Apply ZeroR, OneR, and J48, to classify the Iris data in an experiment using 10 train and test runs, with 66% of the data used for training and 34% used for testing.

8. Using Weka Knowledge flow Set up a flow to load an ARFF file (batch mode) and perform a cross-validation using J48 (WEKA's C4.5 implementation).
9. Draw multiple ROC curves in the same plot window, using J48 and RandomForest as classifiers.
10. Use any three clustering algorithm on Vehicle data set and find best among them
11. Perform Preprocessing, feature selection and apply any one of the algorithm each from clustering, Association and classification to find their performance
12. Examine the performance of different filters for the breast cancer dataset

**Text Books**

1. Jiawei Han and Micheline Kamber. 2011 . Data Mining Concepts and Techniques, 3<sup>rd</sup> Edition, Elsevier, India (Unit I, III, IV, V)
2. G.K.Gupta .2006. Prentice Hall India, New Delhi . Introduction to Data Mining with Case Studies (Unit – IV)
3. Soman.K.P, Shyam Divakar and V. Ajay. 2008. Insight to Data Mining- Theory and Practical, Prentice Hall India, New Delhi. (Unit – II)

**Reference Books**

1. Gupta.G.K. 2006. Introduction to Data Mining with Case Studies, Prentice Hall India, New Delhi .
2. Kantardzic, Mining Concepts, Models, Methods and Algorithms, IEEE Press – A John Wiley & Sons.
3. Paulraj Ponniah. 2008.Data Warehousing Fundamentals: A Comprehensive Guide for IT
4. Professionals, John Wiley & Sons, New Delhi.

**Web Sites:**

1. [www.wikipedia.org/wiki/Data\\_mining](http://www.wikipedia.org/wiki/Data_mining)
2. [www.anderson.ucla.edu/faculty/jason.frand/teacher/technologies/palace/datamining.htm](http://www.anderson.ucla.edu/faculty/jason.frand/teacher/technologies/palace/datamining.htm)
3. [www.thearling.com/text/dmwhite/dmwhite.htm](http://www.thearling.com/text/dmwhite/dmwhite.htm)

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Instruction Hours / week: L: 0 T: 0 P: 4 C: 2    Marks: Internal: 40 External: 60 Total: 100  
End Semester Exam: 3 Hours

**Course Objectives:**

- Understand concepts and terminology associated with SNMP and TMN
- Decide routing protocol for complex network.
- Gain knowledge the internal architecture of routers
- Understand the fundamentals and requirements for packet routing in computer communication network.
- To teach the concepts and techniques of network architecture management
- Know how to Remote Network Monitoring in TCP/IP Networks

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. To solve the problems in computer network system management
2. To analyze the challenges in the implementation of ATM networks
3. To implement SNMP Model in the management of computer networks
4. To configure routers using computer network software tools
5. To implement service level agreement in Computer Network management systems
6. To implement the architecture behind standards based network management

**List of Programs:**

1. Simple router configuration.
2. Access and utilize the router to set basic parameters.
3. Connect, configure, and verify operation status of a device interface.
4. Implement static and dynamic addressing services for hosts in a LAN environment.
5. Identify and correct common problems associated with IP addressing and host configurations.
6. Describe basic routing concepts (including: packet forwarding, router lookup process).
7. Configure, verify, and troubleshoot RIPv2.
8. Perform and verify routing configuration tasks for a static or default route given.
9. Configure, verify and troubleshoot DHCP and DNS operation on a router.
10. Configure and verify a PPP connection between routers.

**Text Books**

1. James D. Mc CABE. 2010 Network Analysis, Architecture and Design, 3<sup>rd</sup> Edition, Morgan Kaufmann Publishers.

**Reference Books**

1. Mani Subramanian. 2012. Network Management Principles and Practice, Pearson Education Asia Pvt. Ltd., 2<sup>nd</sup> Edition.
2. William Stallings. 2002. SNMP, SNMPv2, SNMPv3 and RMON 1 and 2, 3<sup>rd</sup> Edition, Pearson Education Asia Pvt. Ltd.

**Course Objectives:**

To help students to

- Design, select and apply the most appropriate software engineering process for a given project, plan for a software project, identify its scope and risks, and estimate its cost and time.
- Implement software.
- Analyze, specify and document software requirements for a software system.
- Express and understand the importance of negotiation, effective work habits, leadership
- Understand the good communication with stakeholders, in written and oral forms, in a typical software development environment.
- Understand the concept and techniques of project management for a broad range of systems

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Implement the concept of software effort estimation in developing software project.
2. Develop a responsible attitude towards the use of computer as well as the technology.
3. Evaluate the risks during the development of software projects
4. Understand the organization behavior in software project management.
5. Implement team management process in developing quality software
6. Apply project management concepts and techniques to an IT project.

**List of Programs:**

Prepare a more detailed, organized and easy-to-read documentation, for any application software, which should describe the following using Moodle tool:

1. User Requirement Documentation (USD)
2. Requirement Analysis Documentation. (RAD)
3. User Interfaces Specification. (UIS)
4. Object Oriented Design (OOD) or Low Level Design (LLD)
5. Code Documentation (CD)
6. Testing Documentation (TD)
7. User's Guide (UG)

**Text Book**

1. Bob Hughes and Mike Cotterell.2011. Software Project Management, 5<sup>th</sup> Edition, New Delhi: Tata McGraw Hill.

**Reference Book**

1. Royce.2000. Software Project Management, 1st Edition, New Delhi: Addisison Wesley.
2. Kelkar, “Software Project Management”, 3<sup>rd</sup> edition, Prentice Hall India,2012

**Web sites**

1. [http://en.wikipedia.org/wiki/Software\\_project\\_management](http://en.wikipedia.org/wiki/Software_project_management)
2. <http://www.onesmartclick.com/engineering/software-engineering.html>
3. [http://www.cc.gatech.edu/classes/AY2000/cs3802\\_fall/](http://www.cc.gatech.edu/classes/AY2000/cs3802_fall/)



**Course Objectives:**

To help students to

- Develop server-side Ruby scripts for publishing on the Web
- Employ control structures, methods, procs, arrays and hashes to create Ruby programs
- Distinguish and use various Ruby datatypes
- Master the use of arrays and hashes
- Use the extensive pre bundled classes
- Use the I/O facilities of Ruby to read and write binary and text files

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Master the use of Iterators to loop through various data structures
2. Use Exceptions in handling various run time errors
3. Create Ruby modules
4. Use the wide variety of Ruby Modules that come with the Ruby distribution
5. Use object-oriented programming conventions to develop dynamic interactive Ruby applications
6. fundamental components of the Ruby Programming Language

**List of Programs:**

1. Write a ruby program to perform basic array and hash operations
2. Write a code to choose random numbers and find the behaviour of the number
3. Develop a program which gets raised when you handle an exception
4. Write a ruby code to display grade sheet of students using case.
5. Write a ruby program to evaluate polynomial.
6. Write a ruby program to draw box and fill with special characters.
7. Write a program to copy each line from input file to output file.
8. Write a program to create a button and fill the button with colors.
9. Write a program to create different color balls and make it bounce on window.
10. Write ruby program to display notebook widget.
11. Develop a ruby program to manipulate text with font color and images.
12. Write ruby program to create a main thread and execute multiple process through the main thread.
13. Write a ruby code to display color pallet and open dialog with the help of tk controls.

14. Design an application form using tk classes and validate all fields on Rails framework.

**Text Books:**

1. Dave Thomas, Andrew Hunt, 2013, Programming Ruby 1.9 & 2.0: The Pragmatic Programmers Guide 2<sup>nd</sup> Edition, The Pragmatic Bookshelf.

**References:**

1. David Flanagan, 2008, "The Ruby Programming Language", 1<sup>st</sup> Edition, O'Reilly Media.
2. Eldon Alameda 2011 " Practical Rails Projects" Apress, Berkeley, CA, USA.
3. David Black, 2006, "Ruby for Rails", Manning Publications.

**Web sites :**

1. [http://www.tutorialspoint.com/ruby/ruby\\_tk\\_guide.htm](http://www.tutorialspoint.com/ruby/ruby_tk_guide.htm)
2. [www.finner.org/tips/Languages/Ruby](http://www.finner.org/tips/Languages/Ruby)
3. [www.troubleshooters.com/codecorn/ruby/basictutorial.htm](http://www.troubleshooters.com/codecorn/ruby/basictutorial.htm)
4. [www.ruby-lang.org/en/documentation/quickstart](http://www.ruby-lang.org/en/documentation/quickstart)

**Course Objectives:**

- To know the fundamental concepts of Wireless Communication Systems.
- To learn the latest technology of Mobile Communication.
- To provide a strong foundation in the field of Wireless Networks.
- To know about the various IEEE Standards.
- To know the transfer information over short distance or long distances
- To develop the application of wireless technology in today's world.

**Course Outcomes(COs)**

Upon completion of this Course, student will be able to:

1. Create a Sensor network environment for different type of applications
2. Design ad-hoc and sensor network architectures using QoS and Congestion control
3. mechanisms
4. Apply appropriate routing algorithms for different network environments
5. Analyze the working of ad-hoc and sensor network for various applications
6. Deploy security mechanisms in the wireless ad-hoc and sensor networks.

**List of Programs:**

1. AM Modulation
2. AM Demodulation
3. FM Modulation
4. FM Demodulation
5. Pulse Amplitude Modulation and Detection
6. Pulse Width Modulation
7. Pulse Position Modulation and Detection
8. Pulse Code Modulation and Detection
9. Amplitude Shift Keying and Detection
10. Frequency Shift Keying and Detection

**Text Books**

1. William Stallings.2010.Wireless Communications and Networks, 5<sup>th</sup> Edition, Pearson Education

**Reference Books**

1. C.Puttamadappa, Subir Kumar Sarkar, T. G. Basavaraju.2013.Ad Hoc Mobile Wireless Networks: Principles, Protocols, and Applications, 2nd Edition,CRC Press.
2. Benvenuto.2011.Principles of Communications Networks and Systems, 2nd Edition, Wiley India Pvt. Ltd.
3. Jochen Schiller. 2003. Mobile Communications, 2<sup>nd</sup> Edition, Pearson Education