

# PONDICHERRY UNIVERSITY (A CENTRAL UNIVERSITY)



## Five Year Integrated M.Sc. Programme (Mathematics, Computer Science & Statistics) (Choice Based Credit System)

Curriculum & Syllabus

2020-21 onwards

**PONDICHERY UNIVERSITY**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**FIVE YEAR INTEGRATED MASTER OF SCIENCE PROGRAMME**  
**(Mathematics, Computer Science & Statistics)**  
**COURSE STRUCTURE**

<b>Course Nomenclature</b>	<b>Total Credits</b>
Hard core (Theory & Practical) offered by Computer Science Department	60
Hard core Subjects offered by Mathematics Department	24
Hard core Subjects offered by Statistics Department	12
English-1, English-2	6
Environmental Science	3
Public Administration	3
Soft core	12
<b>Total</b>	<b>120</b>

**PONDICHERY UNIVERSITY**  
**DEPARTMENT OF COMPUTER SCIENCE**  
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**(Mathematics, Computer Science & Statistics)**  
**CURRICULUM**  
(Effective from the academic year 2020-2021)

The revised semesterwise courses offered by the Department of Computer Science for the 5 Year Integrated M.Sc. Programme is given below. H stands for Hard core course; S stands for soft core course.

Semester	Course Code	Title of the paper	Nos. of Credits	Core of Paper	
				Computer Science	Mathematics /Statistics
I	CSIG 111	Programming in C	4	H	H
I	CSIG 112	Practical I - C Lab *	2	H	H
II	CSIG 121	Problem solving with Data Structures and Algorithms	4	H	S
II	CSIG 122	Practical II – DS Lab*	2	H	S
III	CSIG 231	Fundamentals of Digital logic and Microprocessors	4	H	S
III	CSIG 232	Introduction to OOP and Programming in C++	4	H	H
III	CSIG 233	Practical III - C++ Lab*	2	H	H
IV	CSIG 241	Operating System and System Software	4	H	H
IV	CSIG 242	Introduction to Database Concepts	4	H	H
IV	CSIG 243	Practical IV - DBMS Lab*	2	H	H
V	CSIG 351	Event driven programming	4	H	S
V	CSIG 352	System Analysis and Design	4	H	S
V	CSIG 353	Computer Networks	4	H	S
V	CSIG 354	Practical V VB Lab *	2	H	S
VI	CSIG361	Java Programming	4	H	S
VI	CSIG 362	Web Technology	4	H	S
VI	CSIG 363	Practical VI –Web Technology Lab*	2	H	S
VI	CSIG 364	Mini project using Java*	4	H	S

\*Students can register for the Practical courses only if they register for the corresponding Theory courses.

4th and 5th year Syllabi same as that of M.Sc. Computer Science I & II Year

## CSIG 111 PROGRAMMING IN C

**Prerequisite:** - Basic knowledge of Mathematics and computers

**Objectives:**

- To learn the concepts of “ C ” Programming
- To develop software program using “C” language

**Outcomes:**

- In-depth understanding of various concepts of C language.
- Skill to write program code in C to solve real world problems and to debug a program

### UNIT I

Basics of C: Structure of C program – Identifier – Keywords- Variables – DataTypes – Comments – Datatypes – User Defined Datatype (TypeDef) - Constants – Storage classes – Automatic variables – External variables – Static variables – Register variables – Scope Rules. Expressions- Type conversion – Operators – Control statements – Formatted data input and output functions – Header Files.

### UNIT II

Arrays: Defining array- Initializing array- One Dimensional Array – Two Dimensional Array- Multidimensional array- Dynamic array. Character Arrays and String – Operations on characters and String functions. Functions – Defining a function- Accessing a function- function prototype- Function call- Library functions – User defined functions – Passing arguments to functions- Static functions – I/O functions – Recursion- Function and array.

### UNIT III

Structures – Defining structure- Processing a structure- Passing structure to functions- Self-referential structure- Nested Structure- Array of structure. Union. Pointers – Declaration- Operations on pointers- pointer expressions- character pointer- pointer to pointer – pointer to function- pointer and function argument- pointer and array – address arithmetic- Structure and Pointers

### UNIT IV

File- Opening closing a file – Input and output operations with files – special functions for working with files- Processing a data file- Unformatted data file- Concepts of binary files- Random access to files

### UNIT V

Error handling during I/O operations. Command Line arguments. Dynamic Memory Allocation. Preprocessor- Directives

## **TEXT BOOKS**

1. Byron S Gottfried, “Programming with C”, 4<sup>th</sup> Edition, Schaum’s Outlines, McGraw Hill, 2017.
2. E Balagurusamy, “Computing Fundamentals & C programming”, 2<sup>nd</sup> Edition, McGraw Hill, 2017.

## **REFERENCES**

1. E. Balagurusamy, “Programming in ANSI C”, 7<sup>th</sup> Edition, McGraw Hill, 2017.
2. Stephen G Kochan, “Programming in C: A complete introduction to the C programming Language”, 4<sup>th</sup> Edition, Pearson, 2015.
3. Brain W.Kernighan, Dennis M Ritchie, “The C Programming Language, 2<sup>nd</sup> Edition, Prentice Hall, 2015.

**PRACTICAL I**  
**CSIG 112C Lab**

1. Simple programs to learn the various data type and control statements
2. String Manipulations
  - a. Counting number of vowels, consonants, words, white spaces in a string
  - b. Reversing a string and check for palindrome
  - c. Finding the number of occurrences of a sub string in a given string
  - d. Sub string replacing and removal
3. Recursion
  - a. Factorial
  - b. Reversing a string
  - c. Fibonacci Sequence
  - d. Tower of Hanoi
4. Matrix Manipulations using functions and Case structure
  - a. Addition & Subtraction
  - b. Multiplication
  - c. Transpose
  - d. Check if the given matrix is a Magic square
5. Searching
6. Sorting
7. Structures
8. Pointers
9. Files

## CSIG121 PROBLEM SOLVING WITH DATA STRUCTURES AND ALGORITHMS

**Pre-requisite:** Knowledge of any programming language

**Objectives:**

- To acquaint students with data structures used for programming and manipulation of data.
- To make students to understand the basics of algorithms.

**Outcomes:**

- Skill to analyze data and to determine appropriate data structure.
- Knowledge of various data structures and their implementations.
- Ability to implement algorithms to perform various operations on data structures.

### UNIT I

Introduction, Basic terminologies, Linear and Nonlinear data structures. **Algorithm:** Definition, Pseudo code, Analysis, Design techniques. **Arrays:** One Dimensional Array, Two - Dimensional Array, Application: Sparse Matrices.

### UNIT II

**Stacks:** operations on stack, implementation of stack as an array, Application- Maze Problem, Evaluation of Expression & Conversion.

**Queues:** Operations on Queues, Implementing the Queue, Application, Circular Queue.

**Linked List:** List representations, Anatomy of a node, Implementing the list operations, inserting into an ordered list, Doubly Linked List, Keeping a stack in a linked list, keeping a Queue in a linked list, Polynomial – Linked list representation.

### UNIT III

**Trees:** Basic Terminologies, Binary Tree, Representation, Traversal, Binary Search Tree, Threaded Binary Tree, Application: Game Tree.

### UNIT IV

**Graph:** Definition and Terminologies, Representation, Traversals, Shortest path, Minimum Spanning Tree – Kruskal's Algorithm and Prim's Algorithm. **Hashing:** Hash functions- Separate chaining- Open addressing- Rehashing-Extendible hashing.

### UNIT V

**Searching algorithms:** Linear Search, Binary Search – **Sorting algorithms:** Selection, Exchange, Shell sort, Quick sort.

### **TEXT BOOKS**

1. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structures”, Galgotia Book Source, 2004.
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, “Fundamentals of Computer Algorithms”, 2<sup>nd</sup> edition, Galgotia Publications, 2008.
3. Jean Paul Tremblay and Paul G. Sorenson, “An Introduction to data structures with applications”, 2<sup>nd</sup> edition, Tata McGraw-Hill, 2017.

### **REFERENCE BOOKS**

1. V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, 1<sup>st</sup> edition, Pearson Education, 2002.
2. Gilles Brassard and Paul Bratley, “Fundamentals of Algorithmics”, 1<sup>st</sup> edition, Prentice-Hall of India, 1996.



**PRACTICAL II**  
**CSIG122 DS LAB**

1. Linear Search & Binary Search
2. Sort by selection, exchange, quick sort
3. Stacks, Queues using Arrays & Linked List
4. Singly Linked List : Insertion & Deletion
5. Doubly Linked List: Insertion & Deletion
6. Binary Tree Traversal (Inorder, Preorder, Postorder)
7. Graph : BF Search, DF Search, Shortest Path & Minimum Cost Spanning Tree

## CSIG 231 FUNDAMENTALS OF DIGITAL LOGIC AND MICROPROCESSORS

**Prerequisite:** Basic knowledge about computers

**Objectives:**

- To learn the fundamentals of digital logic and computer design.
- To learn combinational and sequential logic.
- To learn the fundamentals of microprocessor and instruction set.

**Outcomes:**

- Skill to use the methods of systematic reduction of Boolean expression using K-Map. Ability to interpret logic gates and its operations.
- Familiarization with combinational and sequential logic circuits in electronics.
- Knowledge about microprocessor architecture and addressing modes.

### UNIT I

Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates – NAND and NOR Implementations.

### UNIT II

Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations, Code Conversion – Decoders and Encoders – Multiplexers and Demultiplexers – Introduction to Sequential Circuit – flip flop – Shift Registers - Counters

### UNIT III

Components of a computer system – Technology – Performance – Uniprocessors to multiprocessors; Instructions – Operations and Operands – Representation - Logical operations – Control operations – Addressing and Addressing modes. **Arithmetic Operations:** ALU - Addition and subtraction – Multiplication – Division – Floating Point operations

### UNIT IV

Memory hierarchy - Memory technologies – Cache basics – Measuring and improving cache performance - Virtual memory, Associative memory - Input/output system, Programmed I/O, DMA - Interrupts and Interrupt Service Routines, I/O processors.

### UNIT V

Introduction to 8086 – Microprocessor architecture – 8086 system bus structure-Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Procedures – Macros – Byte and String Manipulation. - Coprocessor

### **TEXT BOOK**

1. Morris Mano M. and Michael D. Ciletti, “Digital Design”, 4<sup>th</sup>Edition, Pearson Education, 2008.
2. Yu-Cheng Liu, Glenn A.Gibson, “Microcomputer Systems: The 8086 / 8088 Family – Architecture, Programming and Design”, 2<sup>nd</sup> Edition, Prentice Hall of India, 2007.
3. David A. Patterson and John L. Hennessey, “Computer organization and design’, 5<sup>th</sup> edition, Morgan Kauffman / Elsevier,2014.

### **REFERENCE BOOKS**

1. John F. Wakerly, “Digital Design Principles and Practices”, 4<sup>th</sup>Edition, Pearson Education, 2007.
2. Charles H. Roth Jr, “Fundamentals of Logic Design”, 5<sup>th</sup>Edition, Jaico Publishing House, Mumbai, 2003.
3. V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, “Computer Organisation“, 6<sup>th</sup> edition, Mc Graw-Hill Inc, 2012.
4. William Stallings “Computer Organization and Architecture” , 7<sup>th</sup>Edition , PearsonEducation, 2006.
5. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, 2<sup>nd</sup>Edition, Pearson Education, 2011.

## **CSIG 232 INTRODUCTION TO OOP AND PROGRAMMING IN C++**

**Prerequisite:** Basic knowledge of programming

**Objectives:**

- To learn the basic concepts of OOP.
- To develop C++ Program using inheritance and polymorphism.

**Outcomes:**

- Skill to write C++ application programs using OOP principles and proper program structuring.
- Ability to create programs implementing the concepts of Object Oriented programming.

### **UNIT I**

Introduction to Object Oriented Programming: Software Evolution – OOP paradigm – Concepts, Benefits - Comparison to other programming paradigms -Object Oriented Languages – Applications of Object Oriented Programming.

### **UNIT –II**

Introduction to of C++ language – Origin of C++ - Advancement over C - Tokens, keywords, Identifiers, Data Types, Variables - Expressions and control structures. Functions: Library functions - numeric functions – string functions - User defined functions: function prototyping – function definition - call by value - call by reference - function overloading - friend and inline functions.

### **UNIT III**

Classes and Objects – General structure of a class: member variables, member functions, access specifiers- Constructors and Destructors – Abstract class – Nested classes -Operator Overloading – Type Conversions.

### **UNIT IV**

Inheritance – Definition – Types - Single Inheritance – Multilevel Inheritance - Multiple Inheritance – Hierarchical, Hybrid Inheritance – Pointers – Virtual Functions - Console I/O Operations.

### **UNIT V**

Files – Classes for File Stream Operations – File pointers - Opening and Closing files – Read and write operations – End of file detection – Updating a file – Error handling during file operations – Templates – Exception handling.

**TEXT BOOK**

1. E.Balaguruswamy, “Object Oriented Programming with C++”, 7<sup>th</sup> edition, Tata McGraw Hill, 2017.
2. Deitel and Deitel, “ C++ How to program”, 9<sup>th</sup> edition, Prentice Hall, 2014.

**REFERENCE BOOKS**

- 1) Yeswant Kanetkar , “Let us C++”, 2<sup>nd</sup> edition, BPB Publications, 2003.
- 2) Robert Lafore , “Object Oriented Programming in C++”, 4<sup>th</sup> edition, Pearson, 2008.
- 3) Herbert Schilt, “C++ - The Complete Reference”, 4<sup>th</sup> edition, Tata McGrawhill, Pub-ltd., 2017.
- 4) John R.Hubbard , “Programming with C++”, 3<sup>rd</sup> edition, Schaum’s Outline Series, McGraw Hill, 2017.

**PRACTICAL III**  
**CSIG 233 C++ LAB**

1. Programs using decision and looping statements
2. Program using single, multidimensional arrays
3. Usage of library functions
4. Programs using user defined functions
5. Programs for function overloading
6. Usage of classes and objects
7. Constructors and Destructors
8. Programs for all inheritance types
9. Programs using pointers
10. Programs for operator overloading
11. Implementation of Virtual Functions, friend functions, this pointer and static functions
12. File manipulation operations with clear formatting
13. Programs using command line arguments
14. Implementing CPU scheduling algorithms in C++

## CSIG 241 OPERATING SYSTEM AND SYSTEM SOFTWARE

**Pre-requisite:** Knowledge of computers & computer organization

**Objectives:**

- To learn OS management functions.
- To learn Memory management, Processor management, Device Management and I/O Management
- To learn various basic system software.

**Outcomes:**

- Understand how memory is utilized.
- Understand CPU scheduling algorithms to manage tasks.
- Knowledge of methods in prevention and recovery from a system deadlock, and management of I/O devices.
- Knowledge of functions of system software.

### UNIT I

Introduction - Early Operating Systems – Buffering & Spooling – Multiprogramming – Time Sharing – Protection – Operating System Structures.

**Process Management:** Process Concept – Hierarchy of Process – Critical Section Problem – Semaphores – Process Coordination Problems – Inter Process Communication

### UNIT II

**CPU Scheduling:** Scheduling Concepts – Scheduling Algorithms – Algorithm Evaluation – Multiple Processor Scheduling

**Deadlock:** Deadlock Problem: Characterization – Prevention – Avoidance – Detection – Recovery – Combined Approach to Deadlock Handling.

### UNIT III

**Memory Management:** Introduction – Multiple Partition – Paging – Segmentation – Segmentation with Paging – Virtual Memory Concept – Overlays – Demand Paging and Performance – Page Replacement Algorithms – Allocation Algorithms – Trashing.

### UNIT IV

**Secondary Storage Management:** Physical Characteristics – Disk Scheduling – Disk Scheduling Algorithms – Sector Queuing **File Systems:** File Operations – Access methods – Allocation Methods – Directory Systems – File Protection -Implementation **Case Study:** Windows XP Operating Systems.

### UNIT V

**System Software:** Assemblers- Design-functions- Interpreters- Virtual machine concept- Byte codes- Loaders-features-relocation- Linkers – dynamic linking-Macro processor Compilers-Phases

## **TEXT BOOKS**

1. Abraham Silberschatz, Peter Baer Galvin & Greg Gagne, "Operating System Concepts", 7<sup>th</sup> edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2005.
2. John J Donovan, "Systems Programming", Tata McGraw Hill, 2004.

## **REFERENCES**

1. William Stallings, "Operating Systems Internals and Design Principles", 4<sup>th</sup> edition, PHI India, 2005.
2. H.M. Deitel, "Operating Systems", 2<sup>nd</sup> edition, Addison-Wesley.



## CSIG242 INTRODUCTION TO DATABASE CONCEPTS

**Prerequisite:** Knowledge of data structures and file-handling

**Objectives:**

- To learn the fundamental concepts of Database management systems.
- To learn SQL commands to manage data and PL/SQL.

**Outcomes:**

- Understand data modeling and database development process.
- Construct and normalize conceptual data models.
- Implement a relational database into a database management system.
- Become proficient in using database query language.

### UNIT I

Introduction - DBMS Basic Concepts - Purpose of Database Systems – Database System Vs File system - Overall System architecture – DBA– Database Languages – Classifications – Data Models.

### UNIT II

Entity relationship model: Basic concepts- Mapping constraints – Primary Keys – Foreign Keys –Structural Constraints. – ER notations - ER model examples – Enhanced Entity Relationship Model: EER Concepts like Generalization, Specialization, Union, Category, Disjoint, Overlapping etc. EER model examples

### UNIT III

Relational DataBase Design – ER to Relational Mapping - Relational Model: Structure – Formal Query Languages – Relational Algebra – Informal Design Guidelines - Referential Integrity– Functional Dependencies – Normalization (I, II & III Third Normal Form)

### UNIT IV

Relational algebra: Introduction, Fundamental Operations - Set operations- Natural Join, Division- Operators for grouping and ungrouping, relational comparison.  
SQL – Basics of SQL –DDL – DML – DCL – TCL Commands in detail with examples - PL/SQL: Stored Procedure Concepts – Procedure – Functions – Cursors – Triggers- Creating & Manipulating views

### UNIT V

Storage and File Structure- - File Organization - Overview of Physical Storage - Organization of Records in Files - Media - Data-Dictionary Storage - Magnetic Disks – RAID - Indexing and Hashing- Ordered Indices - Static Hashing - Dynamic Hashing.  
Transaction Concepts – ACID Properties – Concurrent Executions – Basic Concepts of locking and Log Based Recovery.

### **TEXT BOOK**

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database system concepts", 6<sup>th</sup> edition, McGraw Hill Publication, 2011.

### **REFERENCE BOOK**

1. Ramez Elmasri and B. Navathe, "Fundamentals of Database Systems", (Chapters 1, 2, 3, 4.1, 7, 8, 9, 14), 7<sup>th</sup> edition, Addison-Wesley, 2012.

**PRACTICAL IV**  
**CSIG 243: DBMS LAB**

1. Study of Oracle DDL commands
  - a. To create a table
  - b. To alter a table
  - c. To drop a table
  - d. To create a view
  - e. To drop a view
  
2. Study of Oracle DML commands
  - a. To insert, delete and update rows into a table
  - b. To write a simple queries using SELECT
  - c. To write queries using SELECT and WHERE clause
  - d. To write queries using Logical operators
  - e. To write queries using NULL
  - f. To write queries using NVL function
  - g. To write queries for pattern matching
  - h. To write queries using order by clause
  - i. To write queries using Distinct clause
  - j. To write queries using Arithmetic Expressions
  - k. To write queries using Arithmetic function
  - l. To write queries using group function
  - m. To write queries using Group By clause
  - n. To write queries using Having clause
  - o. To write queries using Character function
  - p. To write queries using Date function
  - q. To write queries using Sub queries
  - r. To write queries using join
  
3. Program to learn Oracle DCL and TCL commands
  
4. Program to learn PL / SQL
  - a. To create a cursor and trigger and work on that
  - b. To create PL/ SQL code for expression
  - c. To create PL/SQL code using control statement
  - d. To create PL/SQL code using sub programs

## CSIG 351 EVENT DRIVEN PROGRAMMING

**Pre-requisite:** Knowledge of any programming language

**Objectives:**

- To introduce the concepts of Event Driven Programming.
- To help the students to find solution to real life problems using Visual Basic.
- Students will learn about connecting and accessing databases.

**Outcomes:**

- Understand Forms, module, components, menu editor and its concepts. Usage of controls such as text box, buttons, checkbox etc. and control them through codes.
- Ability to develop simple project with database using data source.

### UNIT I

Various programming methods: Introduction – Comparison. Event driven programming Concepts: Events – User defined – System defined – Keyboard Events – Mouse Events. Introduction to Visual Basic Language – Variables – Constants – Data Types – Scope – Conditional Statements – Looping - Declaring Arrays – Dynamic Arrays.

### UNIT II

Introduction to Various GUI controls: Labels - Text Boxes – Command Buttons – List – Combo Boxes – Image and Picture Boxes. Scroll Bars – Option Buttons – Check Boxes – Frames – Form Properties – Timer Controls – Dialog boxes- Inbuilt functions: string, date and time and numeric.

### UNIT III

Functions and procedures- Managing Forms – SDI and MDI - Control Arrays – Adding Multiple Forms – Startup Forms. Menu Management : Adding Menus – Access Keys – Separators – Disabling Menus .

### UNIT IV

Rich Text Boxes : Alignment – Clipboard Operations – Font Manipulations – Search and Replace – Printing from a Rich Text.– Drive List – Directory List - File List Boxes – File Handling Techniques - Windows Common Dialog Controls.

### UNIT V

Database Handling Techniques – DAO – RDO and ADO introduction – Data Controls – Database Operations: Adding – Deleting – Modifying – Retrieving Records - Case Study of database application development using ODBC.

### TEXT BOOKS

1. Steven Holzner, “Visual Basic 6 Programming : Black Book”, Dreamtech Press, 2007.
2. Gary Cornell, “Visual Basic 6 from the Ground Up”, McGraw Hill Professional, 2017.

### ONLINE RESOURCES

1. <http://msdn.microsoft.com/en-us/vstudio/hh388573.aspx>
2. <http://visualbasic.freetutes.com/>
3. <http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv556-Page1.htm>

## CSIG 352 SYSTEM ANALYSIS AND DESIGN

**Pre-requisite:** Basic knowledge of programming

**Objectives:**

- To gain knowledge about software development life cycle models, software design, implementation, and testing of software.
- To gain overall knowledge of how software is developed.

**Outcomes:**

- Understanding of various methods or models for developing a software product.
- Ability to analyze existing system to gather requirements for proposed system.
- Skill to design and code a software.

### UNIT 1

People : Organisational Analysis- concepts of systems and subsystems- Management structures - including matrix techniques- Socio-technological analysis-MIS concepts- Workflow considerations Technology and Processes: Business process analysis- Information, data, and communications- Legacy systems- Network analysis- Software quality analysis- System Life Cycles: Life cycle models - descriptions of stages- Impact of changes on different life-cycle models- deliverables at each stage

### UNIT II

Feasibility studies: Requirements analysis- Data Analysis - reality/data/metadata- Project proposals- Requirements grading- User interface requirements

### UNIT III

Hard methodologies: structured (SSADM)- object oriented (Unified Process)- Soft systems methodologies (Soft Systems Methodology)- Hybrid approaches (Multiview)- Rapid Application Development (DSDM).

### UNIT IV

Structured techniques: data (entity-relationship diagram or logical data structure)- process (data flow diagram) and time (entity life history) models- Object oriented techniques: UML analysis models such as use cases, analysis class diagram.

### UNIT V

Walkthrough approaches: Steering groups- User groups- Project boards- Quality assurance techniques- Standards Structured English description methods: Organisation charts- Discussion records- Feasibility Study report- Requirements Specification.

### TEXT BOOKS

1. Avison, D.E. & Fitzgerald, G. "Information Systems Development: Methodologies, Techniques and Tools", 4<sup>th</sup> edition, McGraw-Hill.
2. Bennett, S., McRobb, S. & Farmer, R., "Object-Oriented Systems Analysis and Design Using UML", 3<sup>rd</sup> edition, McGraw-Hill, 2006.

### REFERENCE BOOKS

1. Roger. S. Pressman, "Software Engineering: A Practitioner's Approach" 7<sup>th</sup> edition, McGraw-Hill, 2014.

## CSIG 353 COMPUTER NETWORKS

**Pre-requisite:** Basic Knowledge of Computers

**Objectives:**

- To educate the functions of various OSI layers in detail.

**Outcomes:**

- Knowledge of OSI Layers in Computer Network.
- Ability to identify transmission media, types and topologies of network.
- Familiarization with the techniques of error detection and congestion control

**UNIT I**

Introduction to Computer Networks- Communication basics – Topology – Uses: Business - Home - Mobile - Social – Network Types: Personal Area Networks – Local Area Networks – Metropolitan Area Networks – Wide Area Networks – Internetworks – The OSI Reference Model-TCP/IP reference model.

**UNIT II**

The Physical Layer: Transmission Media – Wireless Communication – The Mobile Telephone System – Wireless LANS – Bluetooth - RFID.

**UNIT III**

Data Link Layer: Services – Framing – Error Detection and Correction - Medium Access Control – CSMA/CD.

**UNIT IV**

Network Layer: Routing Algorithms – Congestion Control Algorithms – Quality of Service. Internetworking - IPv4 - IPv6.

**UNIT V**

Transport layer: Services- TCP and UDP. Application layer: Domain Name Systems – Electronic Mail- World Wide Web – HTTP.

**TEXT BOOKS**

1. Andrew S. Tanenbaum, “Computer Networks”, 5<sup>th</sup> edition, Prentice Hall, 2011.

**REFERENCES**

1. Behouuz A. Forouzan, “Data Communication & Networking “, 4<sup>th</sup> edition, McGraw-Hill.
2. William Stallings, “Data and Computer communications”, 7<sup>th</sup> edition, PHI.

**PRACTICAL V**  
**CSIG 354 VB LAB**

1. Working with standard controls
2. Design an application with image box, picture box, list box and combo box
3. Design an application with menu options, procedures and functions
4. Design an application with Common Dialog box
5. Design an application using FileListBox
6. Design a simple arithmetic calculator
7. Design a database application using data controls
8. Write a menu driven program to create a ADO database and perform the operations of insertion, modification, deletion and viewing
9. Design an employee payroll system

## CSIG 361JAVA PROGRAMMING

**Prerequisite:** Basic knowledge of programming

**Objectives:**

- To learn the basic concepts of Java
- To develop Java programs, Swing and Applets

**Outcomes:**

- Skill to write Java application programs using OOP principles and proper program structuring.
- Ability to create packages and interfaces.
- Ability to implement error handling techniques using exception handling.

### UNIT I

Java Evolution: History – Java features – Java Environment – JDK. Introduction to Java program – Creating and Executing a Java program – Java Tokens – Java Statements - Virtual Machine (JVM) – Command Line Arguments – Comments in Java program. Constants, Variables and Data Types – Operators and Expression – Decision Making, Branching and Looping – Arrays, Strings and Vector.

### UNIT II

Class and objects and Methods – Constructors – Method overloading – Static members – Nesting of Methods– this keyword – command line input Inheritance: Defining a subclass – deriving a sub class – Single Inheritance – Multilevel Inheritance – Hierarchical Inheritance – Overriding methods – Final variables and methods – Final classes – Finalizer methods - Abstract methods and classes – Visibility Control. Interfaces: Multiple Inheritance. Packages: System Packages – User Defined packages.

### UNIT III

Multithreading: Creating Threads – Life of a Thread – Defining & Running Thread – Thread Methods – Thread Priority – Synchronization – Implementing runnable interface – Thread Scheduling. Exception Handling: Advantages of Exception Handling - Types of Errors – Basics of Exception Handling – try blocks – throwing an exception – catching an exception – finally statement. Managing I/O Files

### UNIT IV

**Applets Programming** - Graphics Programming: Drawing and filling lines – Rectangles – Polygon – Circles – Arcs – Line Graphs – Drawing Bar charts. **AWT Components and Event Handlers:** Abstract window tool kit – Event Handlers –Event Listeners – AWT Controls and Event Handling: Labels – Text Component –Action Event – Buttons – Checkboxes – Item Event - Choice – Scrollbars – Layout Managers- Input Events – Menus

### UNIT V

**JDBC:** JDBC – ODBC Drivers – JDBC ODBC Bridges – Seven Steps to JDBC –Importing java SQL Packages – Loading & Registering the drivers – Establishing connection. Creating &executing the statement.



## **TEXT BOOK**

1. E.Balagurusamy, “Programming with Java”, 2<sup>nd</sup> Edition, Tata McGraw-Hill publishing company Ltd.

## **REFERENCES**

1. Herbert Schildt,“JAVA 2 (The Complete Reference)”, 4<sup>th</sup> Edition, TMH, Fifth Reprint, BPB Publications, 2002.
2. Cay S. Horstmann, “Core Java: Volume II-Advanced features”, 11<sup>th</sup> edition, McGraw Hill, 2019.
3. Ken Arnold, James Gosling, “Java Programming Language”, Addison Wesley.

## CSIG 362 WEB TECHNOLOGY

**Pre-requisite:** Knowledge of Operating system, computer network, DBMS, and Java.

**Objectives:**

- To gain knowledge in HTML and DHTML.
- To design interactive web pages using Style sheets, Java-script and ASP.

**Outcomes:**

- Understand the various steps in designing Creative and dynamic website.
- Ability to write HTML, JavaScript and ASP.

### UNIT I

Introduction to Internet – The World Wide Web – Web Browsers, Web Servers, Uniform Resource locators, Multipurpose Internet mail extensions. HTTP Request Message - HTTP Response Message.

### UNIT II

Introduction to HTML – Elementary tags in HTML – List in HTML – Displaying Text in Lists – Using Ordered List – Using Unordered Lists- HTML Description Lists - Nested HTML Lists, Control List – Combining List Types – Graphics and Image Formats – Graphics and HTML document- image and hyperlink anchors – Image maps – Tables – Frames – Forms.

### UNIT III

Introduction to DHTML – Introduction to style sheets – Setting the default style sheet language – Inline style information – External Style sheets – Cascading Style sheets.

### UNIT IV

Introduction to Java script - script tag, interactive data, DOM, A simple document, Add a form, Add a text input element, Add a button element, properties, methods and event handlers. Scripts and HTML.

### UNIT V

Introduction to ASP – Database Management with ASP: Database access with ADO, working with ADO's Connection object, Using Command objects, Working with ADO's Recordset Object.

### TEXT BOOKS

1. Robert W. Sebesta, "Programming the World Wide Web", (Chapter 1 only), Addison Wesley, 2011.
2. Elisabeth Freeman and Eric Freeman, "Head First HTML with CSS & XHTML (Head First)", O'Reilly, 2005.
3. A.Russell Jones, "Active Server Pages 3", BPB Publications, 2000
4. Danny Goodman, "JavaScript Bible", 7<sup>th</sup> edition, Wiley Publishing Inc, (Chapters 6,7 only), 2010.

**PRACTICAL VI**  
**CSIG 363 WEB TECHNOLOGY LAB**

1. Usage of Simple HTML commands, Graphics and image formats and hyperlinks
2. Usage of Tables, Frames, Forms, Background Graphics and Color
3. Simple application using HTML
4. Simple application using DHTML and Cascading style sheet
5. Simple application using Java script
6. Simple application using ASP (Any Application Of Student's Choice)