

**Regulations, Scheme of Study and Examination for
B Sc (Computer Science) Degree course under Semester System
(Y2K13 Scheme) (Revised w.e.f. 2013– 2014)**

- R1. a) Title of the course: **Bachelor of Computer Science**
b) Duration of the Course: The course shall be of three years duration spread over six Semesters.
c) Scheme of study:
i) There shall be one theory paper and one practical paper from first semester to fourth semester. The practical paper corresponds to theory papers.
ii) There shall be two theory papers and two practical papers during fifth semester.
iii) There shall be two theory papers, one practical paper and one project work during sixth semester.
iv) The project work shall be carried out either independently or jointly (maximum of three students per group).
v) Medium of Instruction: The medium of instruction shall be English.
d) Scheme of Examination
At the end of each semester there shall be University examination of three hours duration in each of the theory and practical papers.
At the end of the sixth semesters each student shall have to submit the completed project report for the evaluation which shall be certified by internal and external guide and duly signed by the Principal/Chairman/Head/Course Coordinator.
- The question paper pattern for theory paper has two sections. (70 Marks)**
Section –A contains 12 questions, students has to attend 10 questions. Each carries 2 Marks (10 * 2 = 20)
Section–B contains 5 either or type questions, each carries 10 Marks (5*10= 50)
- R2. Each semester shall be of 90 working days from the date of commencement of the each Semester.
R3. Attendance: As per Bangalore University regulations in force for science degree courses.
R4. A Candidate is allowed to carry over all the previous unleared (failed) theory papers and/practical to subsequent semesters as per Bangalore University regulations in force for science degree courses.
R5. The maximum period for completion of the course shall be six years from the date of admission.
R6. Eligibility for admission:
Any student who has passed II PUC/Equivalent with one paper of Mathematics as Compulsory with a minimum of 35% marks.
OR
Any student who has passed JOC or Diploma in Engg. (of three year duration of Department of Technical Education) with one paper of Mathematics as Compulsory and a minimum of 35% marks in aggregate in all the semesters/years.
R7. Admission Procedure:
1. Through Counseling in respective colleges.
2. Reservation: As per the notifications/Govt. orders from the University/Govt. from time to time.
3. Tuition and other fees: As fixed by the University from time to time.

R8. The total number of students to be admitted to the course shall be as decided by the University.

R9. Results: Results of candidate shall be declared as per the procedure followed by the University for B.Sc. courses.

R10. POWER TO REMOVE DIFFICULTIES

If any difficulty arises in giving effect to the provisions of these regulations, the Vice – Chancellor may by order make such provisions not inconsistent with the Act, Statutes, Ordinances or other Regulations, as appears to be necessary or expedient to remove the difficulty.

Every order made under this rule shall be subject to ratification by the appropriate University Authorities.

Title of Papers and Scheme of Study & Examination for B.Sc (Bachelor of Computer Science), Revised w.e.f. 2013– 2014

Sem.	Paper	Title of the paper	Hrs/Wk	Theory	Practical	Total Marks
				Max. Marks	Max. Marks	
I	CS1T	Problem Solving through C Programming	4	70	30	100
	CS1P	C Programming Lab	3			
II	CS2T	Logic Design and Unix Programming	4	70	30	100
	CS2P	UNIX Programming Lab	3			
III	CS3T	Data Structures and Algorithms	4	70	30	100
	CS3P	Data Structures Lab using C	3			
IV	CS4T	Software Engineering and Database System	4	70	30	100
	CS4P	Database System Lab	3			
V	CS5T1	Computer Graphics	3	70	30	100
	CS5P1	Computer Graphics Programming Lab	3			
	CS5T2	Web Programming	3			
	CS5P2	Web Programming Lab	3			
VI	CS6T1	Object Oriented Programming using JAVA	3	70	30	100
	CS6P1	Java Programming Lab	3			
	CS6T2	Computer Networks	3			
	CS6P2	Project	3			

Note:

1. The practical classes during the course of the semester shall be as in other science courses.
2. Examination for Theory/Practical shall be of three hours duration.
3. The papers should be taught only by people who have specialization in the area.
4. For theory papers the paper number may be suffixed with T and for practical papers with P.
5. Any further requirement in the matter may be decided by the Chairman, BOS in Consultation with BOS members.

III Sem B Sc
CS3T: Data Structures and Algorithms

Total Teaching Hours : 60

No of Hours / Week : 04

Unit-I

Introduction and Overview: Definition, Elementary Data Organization, Data Structures, Data Structures Operations, Abstract Data Types, Algorithms Complexity, Time-Space Tradeoff. Preliminaries: Mathematical Notations and Functions, Algorithmic Notations, Control Structures, Complexity of Algorithms, Asymptotic Notations for Complexity of Algorithms. String Processing: Definition, Storing Strings, String as ADT, String Operations, Word/Text Processing, Pattern Matching Algorithms.

[12 Hours]

Unit-II

Arrays: Definition, Linear Arrays, Arrays as ADT, Representation of Linear Arrays in Memory, Traversing Linear Arrays, Inserting and Deleting, Sorting: Bubble Sort, Insertion Sort, Selection Sort; Searching: Linear Search, Binary Search; Multidimensional Arrays, Matrices and Sparse matrices.

[12 Hours]

Unit-III

Linked list: Definition, Representation of Singly Linked List in Memory, Traversing a Singly Linked List, Searching a Singly Linked List, Memory Allocation, Garbage Collection, Insertion into a Singly Linked List, Deletion from a Singly Linked List; Doubly Linked List, Header Linked List, Circular Linked List.

[12 Hours]

Unit-IV

Stacks – Definition, Array Representation of Stacks, Linked Representation of Stacks, Stack as ADT, Arithmetic Expressions: Polish Notation, Application of Stacks, Recursion, Towers of Hanoi, Implementation of Recursive Procedures by Stack. Queues – Definition, Array Representation of Queue, Linked List Representation of Queues Types of Queue: Simple Queue, Circular Queue, Double Ended Queue, Priority Queue, Operations on Queues, Applications of Queues.

[12 Hours]

Unit-V

Graphs: Graph Theory Terminology, Sequential Representation of Graphs: Adjacency Matrix, Traversing a Graph. Tree – Definitions, Binary Trees, Representing Binary Trees in Memory, Traversing Binary Trees, Binary Search Trees, Searching, Inserting and Deleting in a Binary Search Tree,

[12 Hours]

TEXT BOOKS

1. Seymour Lipschutz, “Data Structures with C”, Schaum’s *ouTlines*, Tata McGraw-Hill, 2011.

REFERENCES BOOKS

1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition, Pearson Education, 2013.
2. Robert Kruse, C.L.Tondo, Bruce Leung, Shashi Mogalla, “Data Structures and Program Design using C”, Pearson Education, 2009.
3. Forouzan, “A Structured Programming Approach using C”, 2nd Edition, Cengage Learning India, 2008.

CS3P: Data Structures Lab using C

PART - A

1. Write a menu driven C program to perform the following string operations without using string functions: (i) String Length (ii) String Concatenation (iii) String Reverse
2. Write a C program to search for an element in an array using Binary Search
3. Write a C program to sort a list of N elements using Bubble Sort Algorithm
4. Write a C program to demonstrate the working of Stack using an Array.
5. Write a C program for Towers of Hanoi Problem.
6. Write a C program to find GCD of two numbers using recursion
7. Write a C program to convert and print a given valid fully parenthesized infix arithmetic expression to post fix expression, the expression consists of single character (letter or digit) as operands and +, -, *, / as operators, assume that only binary operators are allowed in the expression.
8. Write a C program to simulate the working of Circular Queue using an array.
9. Write a C program to construct a Singly Linked List and perform following operations
 - a. LINSERT Inserting a node in the front of the list
 - b. LDELETE Deleting the node based on value
 - c. LSEARCH Searching a node based on value
 - d. LDISPLAY Displaying all the nodes in the list
10. Write a C program to create and traverse a binary search tree.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

- a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
- b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
- c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Record	- 5 Marks
Viva	- 5 Marks
Total	- 30 Marks

IV Sem B Sc

CS4T : Software Engineering and Database System

Total Teaching Hours : 60

No of Hours / Week : 04

1. DATA BASE MANAGEMENT SYSTEM

Unit - I

Introduction: Data, Database, DBMS, Characteristics of Database Approach, Database Users, Advantages of DBMS. Database System Concepts and Architecture: Data Models, Schemas, and Instances., DBMS Architecture and Data Independence, Database languages and interfaces, The Database system Environment, Classification of Database Management Systems. Data Modeling Using the Entity-Relationship

Model: High level Conceptual Data Models for Database Design with an example, Entity types, Entity sets, Attributes, and Keys, ER Model Concepts, Notation for ER Diagrams, Proper naming of Schema Constructs.

[12 hours]

Unit - II

RDBMS: Relational database concepts – attribute, tuple, types of attributes – single, multi-valued, stored, derived etc., keys – primary, index, candidate, alternate, foreign, Relationships, Relational algebra operations– UNION, INTERSECTION, DIFFERENCE, CARTESIAN PRODUCT, SELECTION, PROJECTION, JOIN, DIVISION, relational calculus, Domain, Domain integrity, Integrity rules – Entity integrity, referential integrity, Normalization and its properties, I, II, III Normal Forms.

[12 hours]

Unit - III

DDL and DML in SQL: DDL commands - create table/views/index, drop, alter, DML commands – select, insert, delete, update, etc., DCL commands – grant, revoke, commit, TCL commands, SQL – query, sub-query, nested query, Joins – natural, inner, outer join, aggregate functions in SQL.

[12 hours]

2. SOFTWARE ENGINEERING

Unit - IV

Software and Software Engineering: Defining Software, Software Application Domains, Software Engineering, Software Process, Software Engineering Practice, Software Myths. Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, Agile Development: Agility, Agility and the cost of change, Agile Process, Extreme Programming, Other Agile Process Models. Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing the use cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

[12 Hours]

Unit - V

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling, UML Models that Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling, Flow-Oriented Modeling, Creating a Behavioral Model, Design Concepts: The Design Process, Design Concepts, The Design Model, Architectural Design, Component-Level Design, User Interface Design, Pattern-Based Design, Quality Concepts: Software Quality, Review Techniques, Software Quality Assurance. Software Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, System Testing, The Art of Debugging, Software Testing Fundamentals, White Box Testing, Block-Box Testing.

[12 hours]

Text Books

1. Ramez Elmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, 5th Edition, Pearson Education, 2007.
2. Roger S. Pressman – Software Engineering, A Practitioner’s approach, 7th Edition, McGRAW-HILL Publication, 2010.

Reference Books

1. Pankaj Jalote, “An integrated approach to Software Engineering”, 3rd Edition, Narosa Publishing House, 2013.

2. Abrahamsi. Silberschatz, Henry. F. Korth, S. Sudarshan, "Database System Concepts" 6th Edition, McGraw Hill, 2012.
3. C.J.Date, "Introduction to database systems", Eight Edition, Addison Wesley, 2003.
3. Ian Sommerville – Software Engineering, 9th Edition, Pearson Education Ltd, 2010.

CS4P : Database System Lab

PART - A

1. The STUDENT detail databases has a table with the following attributes. The primary keys are underlined
 STUDENT(regno: int, name: string, dob: date, marks: int)
 - i) Create the above table.
 - ii) Remove the existing attributes from the table.
 - iii) Change the date type of regno from integer to string.
 - iv) Add a new attribute phoneno to the existing table.
 - v) Enter five tuples into the table.
 - vi) Display all the tuples in student table.
2. A LIBRARY database has a table with the following attributes.
 LIBRARY(bookid: int, title: string, author: string, publication: string, yearpub: int, price: real)
 - i) Create the above table.
 - ii) Enter the five tuples into the table
 - iii) Display all the tuples in student table.
 - iv) Display the different publishers from the list.
 - v) Arrange the tuples in the alphabetical order of the book titles.
 - vi) List the details of all the books whose price ranges between Rs. 100 and Rs. 300
3. The SALARY database of an organization has a table with the following attributes.
 EMPSALARY(empcod: int, empnamee: string, dob: date, department: string, salary: real)
 - i) Create the above table.
 - ii) Enter the five tuples into the table
 - iii) Display all the number of employees working in each department.
 - iv) Find the sum of the salaries of all employees.
 - v) Find the sum and average of the salaries of employees of a particular department.
 - vi) Find the least and highest salaries that an employee draws.
4. Consider the insurance database given below. The primary keys are underlined and the data types are specified.
 PERSON(driver-id-no: string, name: string, address:strong)
 CAR(regno: string, model: string, year: int)
 ACCIDENT(report-no: int, date: date, location: String)
 OWNS(driver-id-no: string, regno: string)
 PARTICIPATED(driver-id-no: string, regno: string, report-no: int, damage-amount: int)
 - i) Create the above tables by properly specifying the primary keys and the foreign keys.
 - ii) Enter atleast five tuples for each relation.
 - iii) Demonstrate how you

- a) Update the damage amount for the car with a specific regno in the accident with report no 12 to 25000.
 - b) Add a new accident to the database.
 - iv) Find the total number of people who owned cars that were involved in accidents in 2002.
 - v) Find the number of accidents in which cars belonging to a specific model were involved.
5. Consider the following database of students enrollment in courses and books adopted for each course.
- STUDENT(regno: string, name: string, major: strong, bdate: date)
 COURSE(course-no: int cname: string, dept: string)
 ENROLL(reg-no: string, course-no: int, sem: int, marks: int)
 BOOK-ADOPTION(course-no: int, sem: int, book-isbn: int)
 TEXT(book-isbn: int, book-title: string, publisher: string, author: string)
- i) Create the above tables by properly specifying the primary keys and the foreign keys.
 - ii) Enter atleast five tuples for each relation.
 - iii) Demonstrate how you add a new text book to the database and make this book be adopted by some department.
 - iv) Produce a list of text books (include Course-no, book-isbn, book-title) in the alphabetical order for courses offered by the 'Compute Science' department that use more than two books.
 - v) List any department that has all its adopted books published by a specific publisher.
6. The following tables are maintained by a book dealer
- AUTHOR(author-id: int, name: string, city: string, country: string)
 PUBLISHER(publisher-id: int name: string, city: string, country: string)
 CATLOG(book-id: int, title : string, author-id: int, publisher-id: int, category: int, year: int, price: int)
 CATEGORY(category-id: int, description: string)
 ORDER-DETAILS(order-no: int, book-id: int, quantity: int)
- i) Create the above tables by properly specifying the primary keys and the foreign keys.
 - ii) Enter atleast five tuples for each relation.
 - iii) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2010.
 - iv) Find the author of the book which has maximum sales.
 - v) Demonstrate how you increase the price of books published by a specific publisher by 10%
7. Consider the following database for BANK.
- BRANCH(branch-name: string, branch-city: string, assets: real)
 ACCOUNT(accno: int, banch-name: string, balance: real)
 DEPOSITOR(customer-name: string, accno: int)
 CUSTOMER(customer-name: string, customer-street: string, customer-city: string)
 LOAN(loan-no: int, branch-name: string, amount: real)
 ORROWER(customer-name: string, loan-no: int)
- i) Create the above tables by properly specifying the primary keys and the foreign keys.

- ii) Enter atleast five tuples for each relation.
 - iii) Find all the customers who have atleast two accounts at the main branch.
 - iv) Find all the customer who have an account at all the branches located in a specific city
 - v) Demonstrate how you delete all account tuples at every branch located in a specific city.
8. Consider the following database for ORDER PROCEESING.
- CUSTOMER(cust-no: int, cname: string, city: string)
- ORDER(orderno: int, odate: date, ord-amt: real)
- ORDER_ITEM(orderno: int, itemno:int, qty: int)
- ITEM(itemno: int, unitprice: real)
- SHIPMENT(orderno: int, warehouseno: int, ship-date: date)
- WAREHOUSE(warehouseno: int, city: string)
- i) Create the above tables by properly specifying the primary keys and the foreign keys.
 - ii) Enter atleast five tuples for each relation.
 - iii) List the order number and ship date for all orders shipped from particular warehouse.
 - iv) Produce a listing: customer name, no of orders, average order amount
 - v) List the orders that were not shipped within 30 days of ordering

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note :

- d) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
- e) A minimum of 8 Programs has to be done in Part-B and has to be maintained in the Practical Record.
- f) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Record	- 5 Marks
Viva	- 5 Marks
Total	- 30 Marks

V SEM B Sc CS5T1 : Computer Graphics

Total Teaching Hours : 52

No of Hours / Week : 03

Unit - I

Image Representation: The RGB Colour model, Direct coding, Lookup table, Display monitor, Printer, Image files, Setting the colour attributes of pixels, Example: visualizing the Mandelbrot set. Scan Conversion: Scan-converting a point, Scan-converting a line, Scan-converting a circle, Scan-converting a Ellipse, Scan-converting a arcs and sectors, Scan-converting a Rectangle, Region filling, Scan-converting a character, Anti-Aliasing, Example: recursively defined Drawings.

[13 hours]

Unit - II

Two-Dimensional Transformation: Geometric transformations, Coordinate transformations, Composite transformations, Instance transformations. Two-Dimensional Viewing and Clipping: Window-to-Viewport mapping, Point clipping, Line Clipping, Polygon Clipping, Example: A 2d Graphics pipeline

[13 hours]

Unit - III

Three-Dimensional Transformations: Geometric transformations, Coordinate transformations, Composite transformations, Instance transformations. Three-Dimensional Viewing and Clipping: Three-Dimensional Viewing, Clipping, Viewing Transformation, Example: A 3D Graphics Pipeline

[13 hours]

Unit - IV

Geometric Representation: Simple Geometric forms, wireframe models, curved surfaces, curved design, polynomial basis functions, the problem of interpolation, the problem of approximation, curves surface design, transforming curves and surfaces. Hidden Surfaces: Depth Comparisons, z-Buffer algorithm, back-face removal, the painters algorithms, scan-line algorithm, subdivision algorithm.

[13 hours]

Text Books:

1. Zhigang Xiang and Roy Plastock, "Computer Graphics", Schaum's outlines, 2nd Edition, 2000.

Reference Books:

1. Donald Hearn and M.Pauline Baker, "Computer Graphics C version", 2nd Second, PHI, 2000,
2. William M. Newman and Robert F. Sproull, "Principles of Interactive Computer Graphics", 2nd Edition, McGraw Hill.
3. Yashwant Kanetkar, "Graphics Under C", BPB publications, 2003.

CS5P1 : Computer Graphics Programming Lab

PART - A

1. DDA technique to draw Straight line
2. DDA technique to draw circle
3. Bresenham's techniques to draw Straight line
4. Bresenham's techniques to draw circle
5. Piechart depiction of the results of an election between four parties.
6. Transform a triangle and illustrate reflection, translation, rotation and scaling.
7. Clipping the triangle ABC against a window.
8. Animate a man walking with umbrella
9. Animate shadow of a pole as sun moves
10. Animate India National flag

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

- a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
- b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
- c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Record	- 5 Marks
Viva	- 5 Marks
Total	- 30 Marks

CS5T2 : Web Programming

Total Teaching Hours : 52

No of Hours / Week : 03

Unit - I

Fundamentals of Web: Internet, WWW, Web Browsers, and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text markup, Images, Hypertext Links, Lists, Tables, Forms, Frames, Syntactic differences between HTML and XHTML.

[13 Hours]

Unit - II

Java Script: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, Operations, and expressions; Screen output and keyboard input; Control statements; Object creation and Modification; Arrays; Functions; Constructor; Pattern matching using expressions; Errors in scripts; Examples.

[13 Hours]

Unit - III

Java Script and HTML Documents, Dynamic Documents with JavaScript
The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification. Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements.

[13 Hours]

Unit - IV

CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The Box model, Background images, The and <div> tags, Conflict resolution.
XML: Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML Processors; Web services.

[13 Hours]

Text Books

1. Robert W Sebesta, "Programming the World Wide Web", 4th Edition, Pearson Education, 2008.

Reference Books

1. M.Deitel, P.J.Deitel, A.B.Goldberg, "Internet & World Wide Web How to program", 3rd Edition, Pearson Education / PHI, 2004.
2. Chris Bates, "Web Programming Building Internet Applications", 3rd Edition, Wiley India, 2006.

3. Xue Bai et al, “The Web Warrior Guide to Web Programming”, Thomson, 2003.
4. Sklar, “The Web Warrior Guide to Web Design Technologies”, 1st Edition, Cengage Learning India.

CS5P2 : Web Programming Lab

PART - A

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
4. Create a page with dynamic effects. Write the code to include layers and basic animation.
5. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function)
6. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
9. Create a form consists of a two Multiple choice lists and one single choice list
 - I. The first multiple choice list, displays the Major dishes available.
 - II. The second multiple choice list, displays the Starters available.
 - III. The single choice list, displays the Soft drinks available.
10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

- a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
- b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
- c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Record	- 5 Marks
Viva	- 5 Marks
Total	- 30 Marks

VI SEM B. Sc

CS6T1 : Object Oriented Programming using JAVA

Total Teaching Hours: 52

No of Hours / Week : 03

Unit - I

Introduction to JAVA: JAVA Evolution: Java History, Java Features, How Java Differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment. Overview of JAVA Language: Introduction, Simple Java program, More of Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style. Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions. Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if.....else Statement, Nesting of if.....Else Statements, The else if Ladder, The Switch Statement, The?: Operator. Decision Making and Looping: Introduction. The while Statement, The do Statement, The for Statement, Jumps in Loops Labeled Loops.

[13 hours]

Unit -II

Classes, Arrays, Strings, Vectors and Interfaces: Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors: Arrays, One-dimensional Arrays, Creating an Array, Two -Dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, Wrapper Classes. Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.

[13 Hours]

Unit - III

Packages, and Multithreaded Programming: Packages: Putting Classes together: Introduction, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. Managing Exceptions, Applet Programming: Managing Errors and Exception: Introduction, Types of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.

[13 Hours]

Unit - IV

Applet Programming, Graphics Programming, Input/Output: Introduction, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, running the Applet, More About HTML Tags, Displaying Numerical Values, Getting Input from the User. Graphics Programming: Introduction, The Graphics Class, Lines and rectangles, circles, and Ellipses, Drawing Arcs, Drawing Polygons, Lines Graphs, Using Control Loops in Applets, Drawing Bar Charts. Managing Input/Output Files in JAVA: Introduction, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Interactive Input and output, Other Stream Classes.
[13 Hours]

Text Books:

1. A.Balaguruswamy, "Programming with JAVA", A Primer, TMH, 1999.

Reference Books:

1. Thomas Boutel, "CGI programming in C and Perl", Addison – Wesley, 1996.
2. Jefry Dwight et al, "Using CGI", Second Edition, Prentice Hall, India, 1997.
3. Patrick Naughton & Herbert Schildt, "JAVA 2: The Complete Reference", THM, 1999.
4. Schildt, "JAVA The Complete Reference", 7th Edition.

CS6P1 : Java Programming Lab

PART - A

1. Write a program to find factorial of list of number reading input as command line argument.
2. Write a program to display all prime numbers between two limits.
3. Write a program to sort list of elements in ascending and descending order and show the exception handling.
4. Write a program to implement all string operations.
5. Write a program to find area of geometrical figures using method.
6. Write a program to implement constructor overloading by passing different number of parameter of different types.
7. Write a program to create student report using applet, read the input using text boxes and display the o/p using buttons.
8. Write a program to calculate bonus for different departments using method overriding.
9. Write a program to implement thread, applets and graphics by implementing animation of ball moving.
10. Write a program to implement mouse events and keyboard events.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

- a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
- b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
- c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Record	- 5 Marks
Viva	- 5 Marks
Total	- 30 Marks

CS6T2 : COMPUTER NETWORKS

Total Teaching Hours : 52

No of Hours / Week : 03

Unit - I

Introduction: Growth of computer networking, Complexity in network system, Motivation and Tools: Resource sharing, Growth of the internet, probing the internet, interpreting the ping response, tracing a route. Transmission Media: Copper wires, glass fibers, radio, satellite, Geosynchronous satellites, low earth orbit satellites, Low earth orbit satellite arrays, Microwave, Infrared, Light from a laser Local Asynchronous Communications: Introduction, the need for asynchronous communications, using electric current to send bits, standards for communication, baud rate, Framing and errors, Half and Full duplex asynchronous communication, the effect of noise on communication. Long distance Communication: Sending signals across long distances, Modem hardware used for Modulations and Demodulation, Leased analog data circuits, optical, radio frequency and dialup Modems, carrier frequencies and Multiplexing, baseband and broadband technologies, wave length division multiplexing, spread spectrum, time division multiplexing

[13 hours]

Unit - II

Packets, Frames and Error Detection: Concept of Packets, packets and Time-division Multiplexing, Packets and Hardware Frames, byte Stuffing, transmission errors, Parity bits and Parity checking, error detection, Detecting errors with checksums, detecting errors with CRC, Burst errors, frame formats and error detection mechanism. LAN Technologies and Network Topologies: Direct point-to-point communications, Shared Communications channels, LAN Topologies, Ethernet, Carries sense on CSMA, Collision Detection and Backoff with CSMA/CD, Ring Topology and Token Passing, Self-Healing Token Passing Networks, ATM. Hardware addressing and Frame Type Identification: specifying a recipient, How LAN hardware uses addresses to filter packets, format of a physical addresses, broadcasting, Multicast addressing, identifying packet contents, frame headers and frame format. LAN Wiring, Physical Topology and Interface Hardware: speeds of LANs and computers, Network Interface Hardware, The connection between a NIC and a network, original thick Ethernet wiring, connection multiplexing, thin Ethernet wiring, twisted pair Ethernet, Network interface cards and wiring schemes, categories of wires.

[13 hours]

Unit - III

Extending LANs: Fiber Optic Extensions, Repeaters, bridges, frame filtering, switching, Long-distance and Local Loop Digital Technologies: Digital telephony, Synchronous communication, SONET, ISDN, Asymmetric Digital Subscriber Line Technology, other DSL technologies, cable modem technology, upstream communication, Broadcast Satellite systems. WAN technologies and Routing: Large Networks and Wide Areas, Packet switches, forming a WAN, store and forward, Physical addressing in a WAN, Next-Hop forwarding, Source independence, Routing Table Computation, Shortest path computation in a Graph, distance vector routing, like-state routing, Example of WAN technologies. Network Characteristics: Network ownership, Network performance characteristics, Jitter Protocols and Layering: the need for protocols, the seven layers, Stacks: Layered Software, Techniques protocols use

[13 hours]

Unit - IV

Internetworking: internet architecture, A virtual Network, Layering and TCP/IP protocols Internet Protocol Addresses, APR, IP Datagram's and Datagram Forwarding, IP Encapsulation, Fragmentation, and Reassembly, IPv6, ICMP, UDP, TCP, Internet routing, DNS, WWW, MAIL.

[13 hours]

Text Books:

1. Douglas E Comer and M.S.Narayana, "Computer Networks and Internets", 5th edition, Pearson Education, 2013.

Reference Books:

1. Andrew S.Tanenbaum, "Computer Networks", Fifth Edition, Prentice Hall, 2012
2. Behrouz Ferouzan, "Introduction to Data Communications and Networking TMH", 1999.
3. S. Keshav, "An Engineering Approach to Computer Networks", Pearson Education, 2nd Edition.

CS6P2 : PROJECT LAB (PRACTICAL)

Total Practical hours/ week: 03 hrs

Students are required to take up a problem and develop a system by making use of the existing infrastructure available in their respective colleges. Students should collect the requirements and work in the allotted lab hours in the college only. The Project should be database-oriented, involving suitable front end and back end tools available in the college.

Scheme of Evaluation is as follows:

Project Demo	- 15 Marks
Project VIVA	- 10 Marks
Project Report	- 5 Marks
Total	- 30 Marks
