

# **BANGALORE UNIVERSITY**

## ***REGULATIONS, SCHEME AND SYLLABUS***

*For the course*

I to VI Semesters

### ***BACHELOR OF SCIENCE IN COMPUTER SCIENCE (BSc(CS))***

**(Choice Based Credit System (Semester Scheme) –Y2K14 Scheme)**

**Revised w.e.f.**

**Academic Year 2014-2015 and onwards**



**Regulations, Scheme of study and Examination for B Sc Degree Course  
Under Choice Based Credit System - Semester System (Y2K14 SCHEME)  
(Revised w.e.f. 2014 -2015)**

R1.

- a) Title of the course: **B. Sc in Computer Science**
- b) Duration of the Course: Durations of the undergraduate programmes shall extend over FOUR semesters (TWO academic years) for the Associate Degree(Advance Diploma), SIX semesters (Three academic years) for the regular Bachelor Degree.
- c) Scheme of study:
  - i) There shall be one theory paper and one practical from first semester to fourth semester. The practical paper corresponds to theory papers.
  - ii) There shall be two theory papers and two practical during fifth and sixth semesters.
  - iii) 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.

**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 8 questions (question may contain sub questions), students has to attend 5 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. 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, Scheme of Study and Examination for B Sc in Computer Science,  
Revised w.e.f. 2014–2015.**

Sem	Paper	Title of the paper	Hours/ Week	Marks			Credits
				IA	Exam	Total	
I	CS1T	Programming Concepts using C	4	30	70	150	3
	CS1P	C Programming Lab	3	15	35		
II	CS2T	Data Structures	4	30	70	150	3
	CS2P	Data Structures Lab	3	15	35		
III	CS3T	Database Management System and Software Engineering	4	30	70	150	3
	CS3P	DBMS Lab	3	15	35		
IV	CS4T	Operating System and UNIX	4	30	70	150	3
	CS4P	UNIX Programming Lab	3	15	35		
V	CS5T1	Object Oriented Programming using JAVA	3	30	70	150	3
	CS5P1	Java Programming Lab	3	15	35		
	CS5T2	Visual Programming	3	30	70	150	3
	CS5P2	Visual Programming Lab	3	15	35		
VI	CS6T1	Web Programming	3	30	70	150	6
	CS6P1	Web Programming Lab	3	15	35		
	CS6T2	Computer Networks	3	30	70	150	
	CS6P2	Project Lab	3	15	35		

**I Sem B Sc**  
**CS1T: PROGRAMMING CONCEPTS USING C**

Total Teaching Hours : 60

No of Hours / Week : 04

**Unit-I**

Introduction to Programming Concepts: Software, Classification of Software, Modular Programming, Structured Programming, Algorithms and Flowcharts with examples. Overview of C Language: History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Symbolic Constants , Operators in C, Hierarchy of Operators, Expressions, Type Conversions and Library Functions.

[ 12 Hours ]

**Unit-II**

Managing Input and Output Operation: Formatted and Unformatted I/O Functions  
Decision making, branching and looping: Decision Making Statements - if Statement, if-else statement, nesting of if-else statements, else-if ladder, switch statement, ?: operator, Looping - while, do-while, for loop, Nested loop, break, continue, and goto statements.  
Functions: Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.

[ 12 Hours ]

**Unit-III**

Arrays: Declaring and Initializing, One Dimensional Arrays, Two Dimensional Arrays, Multi Dimensional Arrays - Passing arrays to functions. Strings: Declaring and Initializing strings, Operations on strings, Arrays of strings, passing strings to functions. Storage Classes - Automatic, External, Static and Register Variables.

[ 12 Hours ]

**Unit-IV**

Structures - Declaring and Initializing, Nested structure, Array of Structure, Passing structures to functions, Unions, typedef, enum, Bit fields. Pointers – Declarations, Pointer arithmetic, Pointers and functions, Call by value, Call by reference, Pointers and Arrays, Arrays of Pointers, Pointers and Structures. Meaning of static and dynamic memory allocation, Memory allocation functions.

[ 12 Hours ]

**Unit-V**

Files - File modes, File functions, and File operations, Text and Binary files, Command Line arguments. C Preprocessor directives, Macros – Definition, types of Macros, Creating and implementing user defined header files.

[ 12 Hours ]

**TEXT BOOKS**

1. E. Balaguruswamy, "Programming In ANSI C", 4th edition, TMH Publications, 2007
2. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education, 2006

**REFERENCES BOOKS**

1. Ashok N. Kamthane et. al., "Computer Programming and IT", Pearson Education, 2011
2. Mahapatra, "Thinking In C ", PHI Publications, 1998.
3. Yashwant Kanetkar, "Let Us C", 13<sup>th</sup> Edition, PHP, 2013.

## CS1P: C PROGRAMMING LAB

### PART – A

- 1) Write a C program to accept employee number, employee name, basic pay and calculate gross salary, deduction and find the net salary of an employee for the following details.

Dearness Allowance	40% of Basic Pay
House Rent Allowance	20% of Basic Pay
Provident Fund	12% of Basic Pay
Income Tax	4% of Basic Pay

- 2) Write a C Program to find the roots of the given quadratic equation using if-else if statement.
- 3) Write a menu driven C program to find ,  
(i) Reverse of a number (ii) Factorial of N (Use Switch case)
- 4) Write a C program to find  $\sin(x)$ . [  $x - x^3/3! + x^5/5! - \dots - x^n/n!$  ]
- 5) Write a C program to arrange the given set of numbers in ascending and descending order.
- 6) Write a C program to find product of two N x M matrices.
- 7) Write a C program to calculate  $NCR = N! / R! * (N-R)!$  Using function.
- 8) Write a C program to display Fibonacci series using recursive function.
- 9) Write a C program to compare two strings using pointers.
- 10) Write a C program to demonstrate the user defined header file.

### 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        |
| Formatting the Output    | - 05 Marks        |
| Viva                     | - 05 Marks        |
| Record                   | - 05 Marks        |
| <b>Total</b>             | <b>- 35 Marks</b> |

## II Sem B Sc

### CS2T: DATA STRUCTURES

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

[ 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", 2<sup>nd</sup> Edition, Cengage Learning India, 2008.

## **CS2P : DATA STRUCTURES USING C LAB**

### **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 (ii) 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
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
<b>Total</b>	<b>- 35 Marks</b>

### **III Sem B Sc**

## **CS3T: DATABASE MANAGEMENT SYSTEM AND SOFTWARE ENGINEERING**

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 and 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. PL / SQL: Introduction, Exceptions & Cursor Management, Database Triggers, Functions,

[ 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”, 5<sup>th</sup> Edition, Pearson Education, 2007.
2. Roger S. Pressman – Software Engineering, A Practitioner’s approach, 7<sup>th</sup> Edition, McGRAW-HILL Publication, 2010.

### **Reference Books**

1. Pankaj Jalote, “An integrated approach to Software Engineering”, 3<sup>rd</sup> Edition, Narosa Publishing House, 2013.
2. Abrahamsi. Silberschatz, Henry. F. Korth, S. Sudarshan, “Database System Concepts” 6<sup>th</sup> Edition, McGraw Hill, 2012.
3. C.J.Date, “Introduction to database systems”, Eight Edition, Addison Wesley, 2003.
4. Ian Sommerville – Software Engineering, 9<sup>th</sup> Edition, Pearson Education Ltd, 2010.

**CS3P : DATA BASE MANAGEMENT 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 dapartment.
- 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 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 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 to increase price of books published by 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 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 customer who have an account at all the branches located in a specific city.
- v) Demonstrate how to delete all account tuples at every branch located in specific city.

8. Consider the following database for ORDER PROCEEESING.

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 :

- 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 8 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
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
<b>Total</b>	<b>- 35 Marks</b>

#### **IV SEM B Sc**

#### **CS4T1: OPERATING SYSTEM AND UNIX**

Total Teaching Hours : 60

No of Hours / Week : 04

##### **Unit-I**

Introduction: Definition, Types of Operating Systems, Functions of Operating System, services, system components System call. Process Management: Process Concept, Process Scheduling, Inter process communication, CPU Scheduling Criteria, Scheduling algorithm, Multiple Processor Scheduling, Real time Scheduling, Algorithm evolution.

[ 12 Hours ]

##### **Unit – II**

Process Synchronization and deadlocks: The Critical Section Problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, Dead locks – system model, Characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock, Combined approach to deadlock handling.

[ 12 Hours ]

##### **Unit - III**

Memory management: Functions, single contiguous, Partitioned memory management: multiple relocatable partitioned memory management, paging segmentation, demand paging virtual memory management. File Management: Concept, access methods, directory structures, allocation methods, free space management, secondary storage structure. Disk Management: Disk Structure & Scheduling methods, Disk management, Swap – Space management.

[ 12 Hours ]

##### **Unit-IV**

History of Unix, salient features, Unix Components, types of shell, Internal and External commands, Files and File Organization- Categories of files, Unix file system, directories, file related commands, Directory related commands, wild cards, Printing and Comparing files. Ownership of files, File attributes File permissions and Manipulations, Standard I/O, Redirection, pipe, filter.

[ 12 Hours ]

##### **Unit-V**

Introduction to vi editor, The three modes of the vi editor, Invoking vi editor, Configuring the vi environment, Regular expressions, the grep command, The process - parent and child process, process creation, process related commands, Shell Programming - shell script features, shell variables, writing and executing a shell script, positional parameters, Branching control structures- if, case etc., Loop control structures

– while, until, for, etc., Jumping control structures – break, continue, exit, etc., Integer and Real arithmetic in shell programs, Debugging scripts.

[12 Hours]

### TEXT BOOKS

1. Abraham Silberschatz and Peter Baer Galvin, “Operating System Concepts”, 7<sup>th</sup> Edition, Pearson Education, 2002.
2. M.G.Venkateshmurthy, “Introduction to UNIX & SHELL Programming”, First Edition, Pearson Education, 2004.

### REFERENCE BOOKS

1. Forouzan, “Unix and Shell Programming”, 1<sup>st</sup> Edition, 2008 Cengage Learning India
2. H.M.Deitel, “Operating Systems”, Pearson Learning Solutions, 3<sup>rd</sup> Edition, 2003.
3. William Stallings, “Operating Systems”, 6<sup>th</sup> Edition, Pearson Education, 2010.

### CS4P1: Shell Programming in Unix Lab

#### PART - A

1. Write a menu driven program to calculate (i) Simple interest (ii) Compound interest
2. To print all prime numbers between m and n ( $m < n$ ).
3. Reverse a given number and check whether it is palindrome or not.
4. Shell script to find maximum and minimum of given set
5. To count the number of vowels in a given string.
6. Create a file containing the following fields: student No., student name, age, sex, height and weight. Print all the details in a neat format.
7. Write a C program to generate and print the GCD and LCM of two integers.
8. Shell script to take two numbers as arguments and output their sum using (i) bc (ii) expr. Include error checking to test whether two arguments were entered.
9. Find out the occurrences of three consecutive and identical word characters (like aaa or bbb) using (i) grep and (ii) sed.
10. Shell script to display all the file permissions.

#### 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 (5 Marks each)
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
<b>Total</b>	<b>- 35 Marks</b>

#### V Sem B Sc

### CS5T1: VISUAL PROGRAMMING

Total Teaching Hours: 52

No of Hours / Week : 03

#### Unit - I

Introduction to Visual Programming: The integrated Development Environment – menu bar, tool bar, from designer, project explorer, properties window, from layout window,

The VB editor. The form object: Properties, events and methods of forms; Properties – Name, Caption, Backcolor, Borderstyle, controlbox, maxbutton, minbutton, moveable, startup position, height, width, left, top, scalemode, window, state; Events –load, unload, Click, Activate, Deactivate, Resize, methods – Show, hide, cls, Unload, print, Controls – Properties and events of different controls such as command buttons, labels, textboxes image controls, timer, horizontal and vertical scroll bars, option buttons, check boxes, frames lists and combo boxes. Predefined Dialog Boxes – MsgBox and InputBO

[ 13 Hours ]

### **Unit - II**

Programming: Data types, variables; declaration and scope arithmetic operations, Study of form and code modules, private and public procedures, Main procedure, Sub and Functions. Mathematical and string Functions; Branching and Looping Statement; If – Then, if –Then –Else and Nested If Statements; Select Case –different forms; For – Next, While – Wend and Do – Loops statements; Arrays- declaration. Static and dynamic arrays. Array Function, menus and toolbars-Creating menus and toolbars, Working with the menu editor, Designing Multiple Document interface forms. Microsoft common controls.

[ 13 Hours ]

### **Unit - III**

OOP methods and properties of an object, class Modules, Encapsulation and Inheritance characteristics Dynamic Link Libraries (DLLs) and Windows API; Designing Help files; File handling – Sequential ,Random access and Binary files, Database connectivity – DAO and ADO Tables and Queries, ActiveX Data objects.

[ 13 Hours ]

### **Unit – IV**

Visual C++ Programming: Objects-Classes-VC++Components – Resources-Event Handling – Menus – Dialog Boxes – Importing VBX Controls – Files – MFC File Handling – Document View Architecture – Serialization. Interfacing Other Applications – Multiple Document Interface (MDI) – Splitter Windows – Exception Handling – Debugging – Object Linking and Embedding (OLE) – Database Application – DLL- ODBC.

[ 13 Hours ]

### **Text Books:**

1. Gurumit Singh, “Visual Basic 6”, First Edition, Firewall Media, 2007.

### **Reference Books:**

1. Charles Petzold, “Windows Programming”, 5<sup>th</sup> Edition, Microsoft Press, 1999.
2. Steve Holzner, “Visual C++ Programming”, Second Edition, PHI, 1994.
3. Go ttfried, “Programming with Visual Basic 6”, PHI, 2000.

### **CS5P1 : Visual Programming Lab**

#### **PART - A**

1. Write a VB Program to design a simple calculator to perform addition, subtraction, multiplication and division(Use functions for the calculations).
2. Design a User Interface (UI) to accept the student details such as name, department and total marks. Validate the input data and calculate the percentage and division.
3. Design a VB application which has MDI and Child forms. Create a menu having the items such as file (New, Open),Format (Font, Regular, Bold ,Italic) and Exit in the MDI form. Also create a text box and use a Common Dialog Box control for changing the font, fore color and back color of the text box.

4. VB program to Encrypt and Decrypt a string. (Use Rnd() to generate the Encryption and Decryption keys).
5. Design a small Alarm Clock Application.
6. Write a VB Program to Validate the username and password form the database and display the appropriate message.(Use Data Control)
7. Design a VB application to record the employee details such as EmpId, EmpName, Designation and BaiscPay. Calculate the DA, HRA, Deduction and Gross Salary.(Make the necessary assumptions )Use Select .. case for decision making.
8. VB program to calculate the simple interest and compound interest. Use DLLs for the calculation.
9. VC++ program to create a Dialog box and display the position of mouse pointer within the dialog box.
10. VC++ program to create and load a simple menu in a Window.

### **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
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
<b>Total</b>	<b>- 35 Marks</b>

### **CS5T2: 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 Errors and Exceptions: 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”, 7<sup>th</sup> Edition.

## CS5P2: 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 moving ball.
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
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
<b>Total</b>	<b>- 35 Marks</b>

## VI Sem B Sc

### CS6T1: 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 <span> 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", 4<sup>th</sup> Edition, Pearson Education, 2008.

### **Reference Books**

1. M.Deitel, P.J.Deitel, A.B.Goldberg, "Internet & World Wide Web How to program", 3<sup>rd</sup> Edition, Pearson Education / PHI, 2004.
2. Chris Bates, "Web Programming Building Internet Applications", 3<sup>rd</sup> 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", 1<sup>st</sup> 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
  - a) The first multiple choice list, displays the Major dishes available.
  - b) The second multiple choice list, displays the Starters available.
  - c) 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
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
<b>Total</b>	<b>- 35 Marks</b>

### **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. [ 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", 5<sup>th</sup> 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, 2<sup>nd</sup> Edition.

### **CS6P2: PROJECT LAB**

Total Practical hours / week: 03 hours

Students are required to take up a problem and develop a system by making use of the existing infrastructure available in their respective colleges.

Scheme of Evaluation is as follows:

Project Demo	- 15 Marks
Project VIVA	- 15 Marks
Project Report	- 5 Marks
<b>Total</b>	<b>- 35 Marks</b>

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