# Hajee Karutha Rowther Howdia College

(An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai.)
Re-Accredited with "A" Grade by NAAC (CGPA of 3.26 out of 4.00)

## Uthamapalayam - 625 533

# Department of Computer Science

## B.Sc. Computer Science - Syllabus

## Effective from the Academic Year 2014 - 2015

**HAJEE KARUTHA ROWTHER HOWDIA COLLEGE (AUTONOMOUS)**
**UTHAMAPALAYAM 625 533.**

**B.Sc., Computer Science (Semester) (Choice Based Credit System )**
**Course Scheme , Scheme of Examinations& Syllabus**
**(Effective from the academic year 2014 – 2015 onwards)**

## Goals and Objectives:

### Goals

The goals of the Computer Science Department is to prepare students for jobs in industry, education, business, or government, and to provide support courses for students in engineering, mathematics, and other fields requiring computing skills.

### Objectives

Upon successful completion of a major in Computer Science, students will be able to:

Demonstrate proficiency in problem-solving techniques using the computer.
Demonstrate proficiency in at least two high-level programming languages and two operating systems.
Demonstrate proficiency in the analysis of complex problems and the synthesis of solutions to those problems.
Demonstrate comprehension of modern software engineering principles.
Demonstrate a breadth and depth of knowledge in the discipline of computer science.

**Eligibility** :A pass in +2 examination conducted by the Board of Higher Secondary Education, Government of Tamil Nadu with Mathematicsor Computer Science as one of the subject OR any other examination accepted by the Syndicate as equivalent.

**Duration of the Course**: The students who are joining the degree shall undergo a study period of three academic years- Six Semesters.

## Subjects ofstudy:

Medium of instruction : English

Part – I - Tamil / Arabic
Part –II - English
Part –III i) Core Subjects – Computer Science
ii) Allied Subjects
Part –IV i) Non-major subjects
ii) Skill based Subjects
iii)Environmental Studies
iv)Value Education
Part- V Extension Activities

**Evaluation:**

**Theory:** Internal – 25 marks
External – 75 marks
Total – 100 marks

**Practical:** Internal – 40 marks
External – 60 marks
Total – 100 marks

**External Examination**: **75 Marks**

The pattern of External Examination Question Paper will be as follows **:**

Time: 3 hours Maximum Marks: 75

**S**ection – A ( 10 X 1 = 10 Marks )
Question numbers 1 to 10 - Answer all questions.(multiple choice)
Two questions from each unit.
Four choices in each question.

**S**ection – B ( 5 X 7 = 35 Marks )
Question numbers 11to 15.
Answer all questions choosing either A or B.
One question from each unit.

11 A or 11 B
12 A or 12 B
13 A or 13 B
14 A or 14 B
15 A or 15 B

**S**ection – C( 3 X 10 = 30 Marks)
Question numbers 16 to 20.
Answer any three out of five.
One question from each unit.

**Internal Examination : 25 Marks**

1. Two Tests to be conducted - 15 marks (average of 2 tests to be taken)
2. Group discussion / Seminar / Quiz- 5 marks
3. Two Assignments - 5 marks each (average of 2 to be taken )
4. Third Test may be allowed for absentees of any one of the two tests.

**Eligibility for the degree**: A candidate shall be declared as passed the program if he/she scored a minimum of 40% marks (both internal and external) in each course. Minimum required mark in external is 24 marks.

| Hajee Karutha Rowther Howdia College (Autonomous) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **B.Sc., Computer Science - Course Content & Syllabus for 2013-2014 Batch** | | | | | | | | | |
| **Sem** | **Part** | **Subject** | **Code** | **Title of the paper** | **Credits** | **Hours** | **Int. Marks** | **Ext. Marks** | **Total Marks** |
| 1 | I | Language | 14UTAL11/ 14UARL11/ 14UMLL11 | Tamil / Arabic / Malayalam | 3 | 6 | 25 | 75 | 100 |
| | II | Language | 14UENL11 | English - I | 3 | 6 | 25 | 75 | 100 |
| | III | Core | 14UCSC11 | Programming in C | 4 | 6 | 25 | 75 | 100 |
| | III | Core | 14UCSC1P | Lab 1 : Programming in C | 4 | 6 | 40 | 60 | 100 |
| | III | Allied | 14UCSA11 | Mathematical Foundations I | 4 | 4 | 25 | 75 | 100 |
| | IV | NME | 14UCSN11 | Introduction to Computers and Office Automation | 2 | 2 | 25 | 75 | 100 |
| **Total** | | | | | **20** | **30** | **165** | **20** | **600** |
| 2 | I | Language | 14UTAL12/ 14UARL12/ 14UMLL12 | Tamil / Arabic / Malayalam | 3 | 6 | 25 | 75 | 100 |
| | II | Language | 14UENL12 | English - II | 3 | 6 | 25 | 75 | 100 |
| | III | Core | 14UCSC21 | Object Oriented Programming using C++ | 4 | 6 | 25 | 75 | 100 |
| | III | Core | 14UCSC2P | Lab2:Object Oriented Programming using C++ | 4 | 6 | 40 | 60 | 100 |
| | III | Allied | 14UCSA21 | Mathematical Foundations II | 4 | 4 | 25 | 75 | 100 |
| | IV | NME | 14UCSN21 | Introduction to Internet and HTML | 2 | 2 | 25 | 75 | 100 |
| **Total** | | | | | **20** | **30** | **165** | **20** | **600** |
| 3 | I | Language | 14UTAL13/ 14UARL13/ 14UMLL13 | Tamil / Arabic / Malayalam | 3 | 6 | 25 | 75 | 100 |
| | II | Language | 14UENL13 | English - III | 3 | 6 | 25 | 75 | 100 |
| | III | Core | 14UCSC31 | Programming in Java | 4 | 4 | 25 | 75 | 100 |
| | III | Core | 14UCSC3P | Lab 3: Programming in Java | 4 | 6 | 40 | 60 | 100 |
| | III | Allied | 14UCSA31 | Opearations Research | 4 | 4 | 25 | 75 | 100 |
| | IV | SBS | 14UCSS31 | Digital Principles and Applications | 2 | 2 | 25 | 75 | 100 |
| | IV | SBS | 14UCSS3P | Lab 4: Linux Shell Programming | 2 | 2 | 40 | 60 | 100 |
| **Total** | | | | | **22** | **30** | **205** | **495** | **700** |

| Sem | Part | Subject | Code | Title of the paper | Credits | Hours | Int. Marks | Ext. Marks | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| 4 | I | Language | 14UTAL14/ 14UARL14/ 14UMLL14 | Tamil / Arabic / Malayalam | 3 | 6 | 25 | 75 | 100 |
| | II | Language | 14UENL14 | English - IV | 3 | 6 | 25 | 75 | 100 |
| | III | Core | 14UCSC41 | Data Base Management Systems | 4 | 4 | 25 | 75 | 100 |
| | III | Core | 14UCSC4P | Lab 5 : RDBMS | 4 | 6 | 40 | 60 | 100 |
| | III | Allied | 14UCSA41 | Numerical Methods | 4 | 4 | 25 | 75 | 100 |
| | IV | SBS | 14UCSS41 | Quantitative Aptitude | 2 | 2 | 25 | 75 | 100 |
| | IV | SBS | 14UCSS42 | Data Structures | 2 | 2 | 25 | 75 | 100 |
| **Total** | | | | | **22** | **30** | **190** | **510** | **700** |
| 5 | III | Core | 14UCSC51 | Operating System | 4 | 4 | 25 | 75 | 100 |
| | III | Core | 14UCSC52 | Software Engineering | 4 | 4 | 25 | 75 | 100 |
| | III | Core | 14UCSC53 | Computer Algorithms | 4 | 4 | 25 | 75 | 100 |
| | III | Elective Core | 14UCSE51 | Computer Networks | 5 | 4 | 25 | 75 | 100 |
| | | | 14UCSE52 | System Software | | | | | |
| | III | Core | 14UCSC5P | Lab 6 : Visual Programming with VB.Net | 4 | 6 | 40 | 60 | 100 |
| | III | Core | 14UCSC5Q | Lab 7: Network Programming | 4 | 6 | 40 | 60 | 100 |
| | IV | EVS | 14UEVS51 | Environmental Studies | 2 | 2 | 25 | 75 | 100 |
| **Total** | | | | | **26** | **30** | **205** | **495** | **700** |
| 6 | III | Core | 14UCSC61 | Computer Graphics | 4 | 4 | 25 | 75 | 100 |
| | III | Core | 14UCSC62 | Web Technology & Design | 4 | 4 | 25 | 75 | 100 |
| | III | Core | 14UCSC63 | Multimedia Technology | 4 | 4 | 25 | 75 | 100 |
| | III | Elective Core | 14UCSE61 | Project Viva - Voce | 5 | 4 | 25 | 75 | 100 |
| | III | Core | 14UCSC6P | Lab 8 : Web Programming | 4 | 6 | 40 | 60 | 100 |
| | III | Core | 14UCSC6Q | Lab 9 : Multimedia | 4 | 6 | 40 | 60 | 100 |
| | IV | VE | 14UVED61 | Value Education | 2 | 2 | 25 | 75 | 100 |
| | V | EA | 14UEAC61 | Extension Activities | 2 | 0 | 25 | 75 | 100 |
| **Total** | | | | | **30** | **30** | **230** | **570** | **800** |
| **Grand Total** | | | | | **140** | **180** | **1145** | **2955** | **4100** |

**HAJEE KARUTHA ROWTHER HOWDIA COLLEGE**

**UTHAMAPALAYAM - 625 533**

## Department of Computer Science

Details of number of Papers and Credits

| PART/SEM | I | II | III | IV | V | VI | Papers | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| **I / Tamil** | 1T | 1T | 1T | 1T | | | 4 | 4x3 | **12** |
| | 6 hrs | 6 hrs | 6 hrs | 6 hrs | | | | | |
| **II /English** | 1T | 1T | 1T | 1T | | | 4 | 4x3 | **12** |
| | 6 hrs | 6 hrs | 6 hrs | 6 hrs | | | | | |
| **III / Core** | 1T+1P | 1T+1P | 1T+1P | 1T+1P | 3T+2P | 3T+2P | 18 | 18x4 | **72** |
| | 6+6 hrs | 6+6 hrs | 4+6 hrs | 4+6 hrs | 12+12 | 12+12 | | | |
| **Elective** | - | - | - | - | 1T | 1T | 2 | 2x5 | **10** |
| | | | | | 4 hrs | 4 hrs | | | |
| **Allied** | 1T | 1T | 1T | 1T | | | 4 | 4x4 | **16** |
| | 4hrs | 4 hrs | 4 hrs | 4 hrs | | | | | |
| **IV / NME** | 1T | 1T | | | | | 2 | 2x2 | **4** |
| | 2 hrs | 2 hrs | | | | | | | |
| **SBS** | | | 1T+1P | 2T | | | 4 | 4x2 | **8** |
| | | | 4 hrs | 4 hrs | | | | | |
| **VE** | | | | | | 1T | 1 | | **2** |
| | | | | | | 2 hrs | | | |
| **ES** | | | | | 1T | | 1 | | **2** |
| | | | | | 2 hrs | | | | |
| | | | | | | | | | |
| **V / EA** | | | | | | 1 | 1 | | **2** |
| | | | | | | 0 hrs | | | |
| **Total Hours** | **30** | **30** | **30** | **30** | **30** | **30** | | | |
| **Total Papers** | **6** | **6** | **7** | **7** | **7** | **8** | **41** | | |
| **Total Marks** | | | | | | | **4100** | | |
| **Total Credits** | **20** | **20** | **23** | **22** | **26** | **29** | | | **140** |

**B.Sc., Computer Science** **Semester I**

**Core Paper – 1**

| 14UCSC11 | **Programming in C** | hours 6 / credits 4 |
|---|---|---|

**UNIT I**

Overview of C: History of C – Importance of C – Basic structure of C – Programming style – Constants, variables and Data types – declaration of variables, storage class – defining symbolic constants – declaring a variable as constant, volatile – overflow and underflow of data. Operators and expressions: arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – arithmetic expression – evaluation of expressions – precedence of arithmetic operators – type conversions in expression – operator precedence and associativity – mathematical functions – managing I/O operations: reading and writing a character – formatted input, output.

**UNIT II**

Decision making and branching: if statement, if….else statement – nesting of if ….else statement – Else if Ladder – Switch statement – the ?: operator – go to statement.
The While statement – do statement – The for statement – jumps in loops

**UNIT III**

Arrays: one dimensional array – declaration, initialisation – two dimensional array – multi dimensional array – dynamic arrays – initialisation. Strings: declaration, initialisation of string variables – reading and writing string – arithmetic operations on strings – putting strings together – comparison – string handling function – table of strings – features of string.

**UNIT IV**

User defined functions: need – multi function program – elements of user defined function – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables – multi file programs. Structures and unions: defining a structure – declaring structure variables – accessing structure members – initialisation – copying and comparing – operations on individual members – arrays of structures – arrays within structures – structures within structures – structures and functions – Unions – size of structures – bit fields.

**UNIT V**

Pointers: accessing the address of a variable – declaring, initialisation of pointer variables – accessing a variable through its pointer – chain of pointers – pointer expressions – pointer increment and scale factors – pointers and arrays – pointers and character strings – array of pointers – pointers as function arguments – function returning pointers – pointers to functions – pointers and structures. Files: defining, opening, closing a file. I/O operations on files – error handling during I/O operations – random access to file – command line arguments.

**Text Book:**

1. **Programming in ANSI C**, E. Balagurusamy, Edition3, Tata McGraw Hill Publishing Company, 2005.

**B.Sc., Computer Science** **Semester I**

**Core Paper - 2 (Lab)**

| 14UCSC1P | **Lab 1 : Programming in C** | hours 6 / credits 4 |
|---|---|---|

1. To find Sum of Digits of a number
2. To reverse a given number and check if it is a palindrome
3. To evaluate Sine Series
4. To find the nth Fibonacci Number
5. To check if a number is Prime Number or not
6. To Sort an Array
7. To count the occurrences of a number in a set
8. To check if a no is Adam Number
9. To reverse a given string and check if it is a palindrome
10. To find Factorial value, Fibonacci, GCD value using Recursion
11. To add and subtract two Matrices
12. To multiply two matrices
13. To find row wise sum of a matrix of order m x n
14. To solve Quadratic Equation – Switch
15. To perform binary search using Function
16. To find NCR and NPR values using Function
17. To calculate mean, variance and standard deviation using function
18. To prepare Pay Bill – Structure
19. To prepare Mark Sheet – Structure
20. To perform inventory calculations - Structure
21. To demonstrate the use of bitwise operators
22. To prepare Mark Sheet – File
23. To prepare EB Bill – File

| 14UCSA11 | **Mathematical Foundations I** | hours 4 / credits 4 |
|---|---|---|

**UNIT I**

Set Theory – Relations, equivalence relations – partial order - Function – binary operations – **groups:** definitions and examples – elementary properties

**UNIT II**

**Logic:** introduction – connectives – truth table – Tautology implication and equivalence of formulae.

**UNIT III**

**Matrices:** Elementary transformation – Inverse of a matrix - Rank of a matrix – Simultaneous linear equations – Eigen values and Eigen vectors-Cayley Hamilton theorem.

**UNIT IV**

**Graph theory**: Introduction – definition and examples – degrees and subgraphs – matrices - connectedness: walks, trials and paths, connectedness and components.

**UNIT V**

Eulerian graphs – Hamiltonian graph – **trees:** characterisation of trees, centre of a tree.

**Text Books:**

1. **Modern Algebra,** S. Arumugam & A. Thangapandi Issac, Scitech publications, 2005 **( for Units I and III)**

2. **Discrete Mathematics**, Dr.M.K.Venkaatraman, Dr.N.Sridharan and Dr.N.Chandrasekaran, National Publishing Company, 2000. **(for Unit II )**

3. **Invitation to Graph Theory**, S.Arumugam and S.Ramachandran**,** Scitech Publications, 2005, Chennai. **( for Units IV and V )**

**B.Sc., Computer Science** **Semester I**

**Non Major Elective 1**

| 14UCSN11 | **Introduction to Computers and OfficeAutomation** hours2 /credits2 |
|---|---|

**UNIT I**

**Computer Fundamentals**: History, Generations-Classification of Computers-Windows Operating System

**UNIT II**

**Introduction to Microsoft Office 2000 - Word Processing & Microsoft Word**- Introduction to Word Processing- Some Important Terms of Word Processing-Starting Word-Microsoft Word Screen-File Menu-Edit Menu-View Menu-Insert Menu-Format Menu

**UNIT III**

Tools Menu-Table Menu-Window Menu-Help Menu-Formatting the Text-Alignment of Text-Applying Fonts- Size of Text-Font of the Text-Colour of the Text.

**UNIT IV**

**Spreadsheets & Microsoft Excel:** Understanding Microsoft Excel for Windows-Starting Microsoft Excel 2000-Understanding Spreadsheets-File Menu-Edit Menu-View Menu-Insert Menu-Format Menu-Tools Menu-Data Menu-Window Menu-Help Menu.

**UNIT V**

Creating a Worksheet in Excel for Windows-Copying Formula-Formulas That Make Decisions-Styles-Functions in Excel-Using Autosum-Using autocalculate-References-Sum Function-Average Function-Creating Charts in Excel-Creating Graphs-Modifying Chart-Adding Data to Chart-Add a Data table to a Chart-Add a Trendline-Creating a Pivot Table Report-Modifying the Chart Type

**Text Book**: **Learning computer Fundamentals, MS Office and Internet & Web Technology** - Dinesh Maidasani – FIREWALL MEDIA, First Edition 2005.

| | |
|---|---|
| Unit I – | Section A-1& 2, Section B- 1. |
| Unit II - | Section B- 2, 3 ( upto Format Menu) |
| Unit III - | Section B- 3 (From Tools Menu to Colour of the Text except Marking Text for Table of Contents – Create an Index-Generate an Index-Working with Wizards) |
| Unit IV - | Section B- 4 (upto Help Menu) |
| Unit V - | Section B- 4(From Creating a Worksheet in Excel to Modifying the Chart Type except Function Wizard-Functions in Excel-Data and Time functions-Logical Functions-lookup and Reference functions-Math and Trigonometric Functions-Statistical Functions-Engineering Functions-Text Functions) |

**B.Sc., Computer Science** **Semester II**

**Core Paper- 3**

| 14UCSC21 | **Object Oriented Programming using C++** hours 6 / credits 4 |
|---|---|

**Unit-I**

Basic concepts of object oriented programming-Benefits of OOP's-Application of OOP-Structure of C++ program-Basic data type-Derived data type-User defined data type, operators in C++, Control statements.

**Unit-II**

Inline function, function overloading-specifying a class-defining member function-nesting of member function-array of object-friend function-constructor-parameterized constructor-copy constructor-destructor.

**Unit III**

Defining operator overloading-overloading unary operator-overloading binary operator-rules for operator overloading-inheritance-single inheritance-multilevel inheritance-multiple inheritance-hierarchical inheritance-hybrid inheritance-virtual base class.

**Unit IV**

polymorphism-pointer-pointer to object-this pointer-virtual function-pure virtual function.C++ streams-C++ stream classes-unformatted I/O operations-Formatted console I/O operations-Managing output with manipulators.

**Unit V**

Classes for file stream operations-opening and closing a file - detecting end –of file , more about open ( )- File modes-File pointers and their manipulations-sequential input and output operations- updating a file-random access.

**Text Book:**

**Object Oriented Programming with C++** ,E. Balagurusamy 2006 , TMH Third Edition

**B.Sc., Computer Science** **Semester II**

**Core Paper- 4 (Lab)**

| 14UCSC2P | **Lab 2: ObjectOrientedProgrammingusingC++** hours 6/credits 4 |
|---|---|

Write programs in C++ for the following:

1. To perform overloaded constructor.
2. To perform copy constructor.
3. To perform Dynamic constructor.
4. To perform Area calculation using Function overloading (Min three functions).
5. To perform String manipulation (three different types) using function overloading.
6. To swap two values between two class objects using friend function.
7. To find minimum of two numbers between two class objects using friend function.
8. To overload unary minus operator which changes sign of given vector (3 elements)
9. To overload Binary + operator which adds two complex numbers.
10. To perform single inheritance using public derivation and private derivation.
11. To perform multilevel inheritance.
12. To process students mark list using multiple inheritance
13. Process employee details using hierarchical inheritance
14. To process family details using hybrid inheritance
15. To perform the use of pointers to object.
16. To process electricity billing using binary file.
17. To process mark listing using binary file.

**B.Sc., Computer Science** **Semester II**

**Allied Subject – I - paper 2**

| 14UCSA21 | **Mathematical Foundations II** | hours 4 / credits 4 |
|---|---|---|

**UNIT I***( without proof)*
Introduction to Statistics – Primary and Secondary data – Classification, tabulation and diagrammatic representation of statistical data - Bar-charts, Pie-diagrams - Graphical Representation of data – Histograms, Frequency polygon, Ogives

**UNIT II***(without proof)*
Measures of dispersion – characteristics – coefficient of dispersion – coefficient of variation – moments - Skewness and Kurtosis – Pearson's coefficient of Skewness – Bowley's coefficient of Skewness – coefficient of Skewness based upon moments.

**UNIT III***(without proof)*
Simple correlation – Karl Pearson's coefficient. of correlation – correlation coefficient for a bivariate frequency distribution – Rank correlation – Regression – lines of regression – properties of regression coefficient

**UNIT IV***(without proof)*
Events and sets – sample space – concept of probability – addition and multiplication theorem on probability – conditional probability and independence of events – Baye's Theorem- Concept of random variable – Mathematical expectation

**UNIT V***(without proof)*
Concept of sampling distributions – standard error – Tests of significance based on t, chi-square and F distributions with respect to mean, variance .

**Text Book:**
**Statistical Methods**, S.P. Gupta, Sultan Chand and Sons, 2004.

**Reference Book:** Statistics, Dr.S.Arumugam & A.Thangapandi Issac, New Gamma Publishing House,2002

## B.Sc., Computer Science Semester II

**Non Major Elective 2**

| 14UCSN21 | Introduction to Internet and HTML | hours 2 /credits 2 |
|---|---|---|

**Unit I :**

**Introduction to internet**-History of internet-Who runs internet?-How internet works?-Information on Internet-Requirements for connecting to Internet-Basic internet terms-HTML-Net Etiquette-Internet Services and Governance-Impact of Internet on Society

**Internet Technology and Protocols** –IP Address in Internet-Introduction to networking-Networking basics-Networking terms-Types of Networking-Local Area Network-Wide Area Networks(WAN)-Types of Wide Area Networks-

**Unit II :**

**Introduction world wide web**-Evolution of world wide web-Basic features-Web browsers-Popular web browsers-Web servers-Hypertext Transfer protocol(HTTP)-Uniform resource locator(URL)-Search engines-search engine categories-searching criterion-Hypertext

**Browsers-** What is a browser?-Basic features of web browsers-Running a browser-Working of internet Explorer-Toolbar Buttons -Getting to a web site-working with favorites-working with history-Back and forward buttons- bookmarks -working on the web using the browsers-Customization of Browsers-Netscape Browser-Keyboard shortcuts for working in internet explorer

**Unit III:**

**Working with email**-e-Mail-Opening of email account-e-mail organization-parts of e-mail Text-Working with Messages-Reading a Message-Reading the Message-Replying to a Message-Forwarding a Message-Deleting a Message-Changing View –Using your Own Stationery-Starting and Addressing a Message-Creating Stationery-Creating a Signature-Attaching a File or an Item to a Message-E-mail Protocols-E-mail Clients-Signature file

**Unit IV:**

**HTML-**Introduction-HTML Command Tags-Quotation Marks-Spacing-Special Symbols-New Web Page Creation Looking at Your Page Creation-Looking at Your Page in a Browser –Defining Web Page-Main Body of the Text-Putting Headers- Adding Paragraph-formatting Text in HTML-Font Type-Font Size-Using Big and Small-Using Predefined Fonts-Making Bold and Italic-Setting Colours-Text color- Superscripts and Subscripts Striking out or Underlining Text-Inserting Graphics-Scaling and Image-Images Alignment-Creating Banner-Adding Horizontal rules-Wrapping Text Between Two Images-Ending Text Wrap-Adding Space around an Image-Using Low Resolution Images-Page Layouts-Setting Margin-Space between Paragraphs-Leaving Block of Space-Line Breaks-Indents-Centralizing Text-Creating Columns-Setting Background Color-Block Quotes.

**Unit V:-**

**Advanced HTML:** Tables--a way of Representing Data-Creating Table-Dividing Table into Columns-Dividing Table into Horizontal Sections-Creating Headers-Adding a Nordberg-Putting a Background Image-Heading Across Two or More Columns-Changing Co lour of a Cell-Aligning the Contents of Cells-Display of Tables-Working with Forms-Creating a Form-Working With Menus-Working with Radio Buttons-Check Boxes-Text boxes-Larger Text Areas-Password Boxes-Submit Button-Resetting the Form-Allowing Visitors to Upload Files-Active Images.

**Text book**:

**Internet and Web design**, Ramesh Bangia, Firewall Media, (An imprint of Lakshmi Publications Pvt. Ltd.). Second Edition 2006.

Unit 1: chapters 1.2 (given topics)
Unit 2: chapters 3, 4
Unit 3: chapter 5,
Unit 4: chapter 10 (up to block quotes)
Unit 5: chapters 10 (from tables)

**B.Sc., Computer Science** **Semester III**

**Core Paper-5**

| 14UCSC31 | **Programming in Java** | hours 4 / credits 4 |
|---|---|---|

**UNIT I**

**Java Evolution** : Java Features – How Java differs from C and C++ - Java and Internet – Java and World Wide Web – Web Browsers – Hardware and Software Requirements – Java Environment. **Overview of Java Language:** Simple Java Program – Java Program Structure – Java Tokens- Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments. Constants- Variables- Data types- Declaration of Variables- Giving Values to variables- Scope of Variables-Symbolic Constants-Type Casting.

**UNIT II**

**Operators and Expressions**: 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 – Operator Precedence and Associativity- Mathematical Functions. **Decision Making and Branching:** Decision Making with If statement – Simple If Statement-If else Statement-Nesting If Else Statement- the ElseIf Ladder-The switch Statement – The ?: operator. **Decision Making and Looping:** The while statement – The do statement – The for statement – Jumps in Loops. **Class, Objects and Methods:** Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors – Methods Overloading – Static Members –Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes –Finalizer Methods- Abstract Methods and Classes – Visibility Control.

**UNIT III**

**Arrays, Strings and Vectors:** One-dimensional Arrays-creating an Array – Two dimensional Arrays –Strings – Vectors – Wrapper Classes – Enumerated Types. **Interfaces:Multiple Inheritance :** Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables. **Packages:** Java API Packages – Using system Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

**UNIT IV**

**Multithreaded Programming:** 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:** Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for debugging. **Applet Programming:** How Applets differ from Applications – Preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a WebPage – Applet Tag – Adding Applet to HTML file – Running the Applet.

**UNIT V**

**Graphics Programming:** The Graphics Class- Lines and Rectangles- Circles and Ellipses, Drawing Arcs- Drawing Polygons- Line Graphs- Using Control Loops in Applets –Drawing Bar Charts. **Managing Input/Output Files in Java:** Concept of Streams-Stream Classes-Byte Stream Classes-Character Stream Classes- Using Streams- Other Useful I/O Classes-Using the file Class- I/O Exceptions- Creation of Files-Reading / Writing Characters- Reading / Writing Bytes- Handling Primitive Data Types- Concatenating and Buffering Files-Random Access Files – Interactive Input and Output.

**Text Book**

1. **Programming with Java, A primer, 3e**, E.Balagurusamy, TATA McGraw-Hill Company, 2008. (Chapters : 1 to 16 )

   UNIT I : Chapters : 1,2,3,4
   UNIT II : Chapters : 5,6,7,8
   UNIT III : Chapters : 9,10,11
   UNIT IV : Chapters : 12, 13, 14)
   UNIT V : Chapters 15,16

**Reference Books**

1. **Java and Object-Oriented Programming Paradigm**, Debasish Jana, Prentice-Hall of India Private Limited, New Delhi, 2008.

| 14UCSC3P | **Lab 3: Programming in Java** | hours 6 /credits 4 |
|---|---|---|

Write programs in Java for the following:

1. To perform addition of complex numbers using class and objects.
2. To perform multiplication of matrices using class and objects.
3. To perform volume calculation using method overloading
4. Using command line arguments, test if the given string is palindrome or not.
5. Write a program to fill names into a list. Also, copy them in reverse order into another list. If the name contains any numeric value throw an exception "InvalidName".
6. Using multilevel inheritance process student marks
7. Implement multiple inheritance for payroll processing
8. Create a package called "Arithmetic" that contains methods to deal with all arithmetic operations. Also, write a program to use the package
9. Create two threads such that one of the thread print even no's and another prints odd no's up to a given range.
10. Define an exception called "Marks Out Of Bound" Exception, that is thrown if the entered marks are greater than 100.
11. String manipulation using string methods ( Use of any five String methods preferred)
12. File – byte stream
13. File – character stream
14. Write an Applet illustrating sequence of events in an applet.
15. Write an Applet program to design a simple calculator.
16. Write an Interactive Applet program which will make the balls of various colours to move across the screen within the specified time limit. The number of balls and the time limit for ball animation should be obtained from the User when the applet starts.

**B.Sc., Computer Science** **Semester III**

**Allied Subject –II Paper 1**

| 14UCSA31 | **Operations Research** | hours 4 /credits 4 |
|---|---|---|

**UNIT I**
Development of OR – Definition of OR – Modeling – Characteristics & Phases – tools, techniques & methods – Scope of OR

**UNIT II**
Linear Programming Problem – Formulation – Slack & Surplus variables – Graphical solution of LPP

**UNIT III**
Simplex method – Computational procedure – Artificial variables techniques – Big M Method

**UNIT IV**
Mathematical formulation of assignment problem – Methods for solving the assignment problems

**UNIT V**
Mathematical formulation of transportation problem – Methods for solving the transportation problem

**Text Book:**

**Operation Research**, S. D. Sharma, Kedar Nath Ram Nath & Co, 2004

**Reference Books:**

1. Operations Research, Nita H.Shah,Ravi M.Gor and Hardik Soni, Prentice-Hall of India Pvt.Ltd, New Delhi, 2008.

2. Operation Research , R Sivarethinamohan, Tata McGraw Hill , 2005

**B.Sc., Computer Science** **Semester III**

**Skill Based Subject –1**

| 14UCSS31 | **Digital Principles and Applications** | hours 2 /credits 2 |
|---|---|---|

**UNIT I**

Binary Number system – Binary to decimal –decimal to binary – Octal-hexa decimal- – ASCII code – Excess-3 Code – Gray code.

**UNIT II**

The Basic Gates – NOT, OR, AND - Universal Logic Gates – NOR, NAND.

**Unit III**

Boolean Laws and Theorems. - Sum of Products method - Truth table to Karnaugh Map – Pairs, Quads, Octets – Don't Care Conditions- Product-of sums method -Product-of sums Simplifications.

**UNIT IV**

Multiplexers – Demultiplexers-1-of-16 Decoder – BDC-to-decimal Decoders – Seven-segment Decoders – Encoders – Exclusive-OR Gates- Parity Generators and Checkers.

**UNIT V**

Binary Addition- Binary Subtraction – 2'S Complement Representation - 2'S Complement Arithmetic – Aritmetic Building Blocks.

TEXT BOOK

1. **Digital Principals and Applications** – Donald P Leach, Albert Paul Malvino, Goutam Saha,Seventh edition ,The McGraw-Hill Companies - 2012

| | |
|---|---|
| UNIT I | Chapter 5 (5.1 to 5.8) |
| UNIT II | Chapter 2 (2.1 to 2.2) |
| UNIT III | Chapter 3 (3.1 to 3.8) |
| UNIT IV | Chapter 4 (4.1 to 4.8) |
| UNIT V | Chapter 6 ( 6.1 to 6.7) |

**B.Sc., Computer Science** **Semester III**

**Skill Based Subject –2 (Lab)**

| 14UCSS3P | Lab:4 Linux Shell Programming | hours 2 /credits 2 |
|---|---|---|

1. Find the sum of the digits of a given number
2. Find the reverse of a number
3. Perform basic arithmetic operations using case
4. Display multiplication table
5. Check whether a number is prime or not using while
6. Convert lowercase to uppercase using tr statement
7. Check for an adam number
8. Check pattern matching using grep
9. Find the number of users who have logged in
10. Check for palindrome
11. Find age of a person using set date
12. Write a menu driven program to display today's date, Processes of the system, user's of the system, list files of the system
13. Write a Shell Script to read 10 names from a file and sort in
    a. Ascending order b. Descending order
14. Get mark details of a student and display total and grade
15. Prepare electricity bill
16. To set the attributes of a given file
17. To check the given file is a directory or not
18. To create and append a file
19. To compare two files
20. To perform string manipulation

**Core Paper – 7**

| 14UCSC41 | **Data Base Management Systems** | hours 4 /credits 4 |
|---|---|---|

**UNIT – I**

**OVERVIEW OF DATABASE SYSTEMS:** Managing Data – A Historical Perspective – File Systems Versus a DBMS – Advantages of a DBMS – Describing and Storing Data in a DBMS – Queries in a DBMS – Transaction Management – Structure of a DBMS – People Who Work with Databases.

**INTRODUCTION TO DATABASE DESIGN:** Database Design and ER Diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets – Additional Features of ER Model

**UNIT – II**

**THE RELATIONAL MODEL:** Introduction to the Relational Model – Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data – Logical Database Design: ER to Relational – Introduction to Views – Destroying / Altering Tables and Views.

**RELATIONAL ALGEBRA AND CALCULUS:** Preliminaries – Relational Algebra: Selection and Projection – Set Operations –Renaming – Joins – Division.

**UNIT – III**

**SQL:QUERIES, CONSTRAINTS, TRIGGERS:** The Form of a Basic SQL Query - UNION, INTERSECT, and EXCEPT – Nested Queries – Aggregate Operators – Null Values – Complex Integrity Constraints in SQL – Triggers and Active Databases – Designing Active Databases

**UNIT – IV**

**SCHEMA REFINEMENT AND NORMAL FORMS:** Introduction to Schema Refinement – Functional Dependencies –Normal Forms –Normalization.

**UNIT - V**

**OVERVIEW OF TRANSACTION MANAGEMENT:** The ACID Properties – Transactions and Schedules – Concurrent Execution of transactions – Lock Based Concurrency Control – Performance of Locking – Transaction Support in SQL – Introduction to Crash Recovery.

**SECURITY AND AUTHORIZATION:** Intoduction to Database Security - Access Control – Discretionary Access Control – Mandatory Access Control – Security for Internet Applications – Additional Issues Related to Security

.

**TEXT BOOK**

**Database Management Systems** – Raghu Ramakrishnan & Johannes Gehrke, McGraw Hill International Edition – Third Edition – 2003

**CHAPTERS:**

UNIT – I : 1.1 – 1.9 , 2.1 – 2.4
UNIT – II : 3.1 – 3.7 , 4.1 – 4.2
UNIT – III : 5.2 – 5.9
UNIT – IV : 19.1,19.2,19.4,19.6,
UNIT – V : 16.1 – 16.7, 21.1 – 21.6

**B.Sc., Computer Science** **Semester IV**

**Core Paper –8 (Lab)**

| 14UCSC4P | Lab 5 : RDBMS | hours 6 /credits 4 |
|---|---|---|

| Sl No. | Title Of Experiment | Weeks |
|---|---|---|
| 1. | MSACCESS | (self learning) |
| 2. | SQL | 4 weeks |
| 3. | SQL (Cont …) | 4 weeks |
| 4. | PL/SQL BASICS | 3 weeks |
| 5. | Triggers, Procedures, Functions, Packages | 4 weeks |

**1. MS ACCESS**

Creating Tables - Forms – Relationships - Filters – Queries – Reports - SQL

**2. SQL**

Creating a Table - Creating a Table with a Primary Key - Inserting Tuples - Deleting Tuples - Updating Column values - Getting the Value of a Relation - Modifying the structure of Tables - Getting Rid of Your Tables and attributes - Getting Information about Your Database - Quitting sqlplus - Executing SQL from a File - Editing Commands in the Buffer - Working with an ASCII Editor - Recording Your Session - Oracle Data Types

2.2 Querying the Tables.

2.3 Implement the Bank Database and execute the given queries/updates

Bank Database Schema:
account(account_number, branch_name, balance)
branch (branch_name, branch_city, assets)
customer (customer_name customer_street, customer_city)
loan (loan_number, branch_name, amount)
depositor((customer_name, account_number)
borrower(customer_name, loan_number)

Queries/Updations on Bank Database

Retrieving records from a table:
1. List all branch names and their assests
2. List all accounts of Brooklyn branch
3. List all loans with amount > 1000.
4. List all accounts of Perryridge branch with balance < 1000.
5. List Numbers of accounts with balances between 700 and 900

Updating records from a table:
6. Change the assests of Perryridge branch to 340000000.
7. Transfer the accounts and loans of Perryridge branch to Downtown branch.
8. Transfer Rs. 100 from account A-101 to A-215.

Deleting records from a table:

9. Delete the branch Perryridge.
10. Waive off all the loans with amount < 1000.
11. Delete the accounts and loans of Downtown branch.

Modifying the structure of tables:

12. Add a column phoneNo to customer table.
13. Change the size of the branch_city to varchar(20).
14. Drop the column phoneNo from customer table.

Retrieving records from multiple tables

15. For all customers who have a loan from the bank, find their names, loan numbers, and loan amount.
16. Find the customer names, loan numbers, and loan amounts, for all loans at the Perryridge branch.

String Operations (Use %, _, LIKE)

17. Find the names of all customers whose street address includes the substring 'Main'.

Ordering the display of Tuples(Use ORDER BY ASC DESC)

18. List loan data, ordered by decreasing amounts, then increasing loan numbers.

**3. SQL (Continued…)**

Implement the following Queries on Bank Database:

3.1 Set Operations

UNION (Use union all to retain duplicates):

16. Find all the bank customers having a loan, an account, or both at the bank.

INTERSECT (Use intersect all to retain duplicates):

17. Find all the bank customers having both a loan and an account at the bank

EXCEPT(Minus):

18. Find all customers who have an account but no loan at the bank.

3.2 Aggregate Functions (avg,min,max,sum,count) / Group By

19. Find the average account balance at the Perryridge branch.
20. Find the average account balance at each branch.
21. Find the number of depositors for each branch (Use distinct).
22. Find those branches where the average accounts balance is more than Rs. 1200.
23. Find the number of branches of the bank.
24. Find the average balance for each customer who lives in Harrison and has at least three accounts.

**4. PL/SQL**

Usage of IF_THEN - Usage of While - Usage of For - Usage of for and goto Statement

**5. Triggers, Procedures, Functions& Packages**

**B.Sc., Computer Science** **Semester IV**

**Allied Subject – II Paper 2**

| 14UCSA41 | Numerical Methods | hours 4 /credits 4 |
|---|---|---|

**UNIT I**

Errors in computer Arithmetic –Empirical relations and Curve Fitting & Transcendental Equations: Iteration method – Bisection method – Regula Falsi method – Newton Raphson method.

**UNIT II**

**Simultaneous Equations:** Gauss elimination method –Gauss Jordan, Gauss Seidel iteration methods.

**UNIT III**

**Interpolation:** Newton's interpolation formulae – Central difference interpolation formulae – Lagrange's interpolation formula – Inverse interpolation.

**UNIT IV**

**Numerical differentiation:** Newton's Forward and Backward difference formulae – Numerical Integration: Trapezoidal rule – Simpson's rule. Eigen values and Eigen vectors of a matrix.

**UNIT V**

**Numerical solution of differential equations:** Euler's method – Taylor's series method – Range-Kutta methods.

**Text book:**


1. **Numerical Methods,** T. Veerarajan and T. Ramachandran, 2nd edition, Tata McGraw Hill, 2006


**Reference Books:**


1. Numerical Methods by S. Arumugam & A. Thangapandi Issac, A. Somasundaram, Sci Tech Publication, Chennai, 2002.

2. Introductory Methods of Numerical Analysis, S.S.Sastry, Prentice Hall of India Pvt.Ltd, New Delhi, 4th Edition, 2008.

3. Computer-Oriented Numerical Methods, P.Thangaraj, Prentice Hall of India Pvt.Ltd, New Delhi, 2008

**B.Sc., Computer Science** **Semester IV**

**Skill Based Subject-3**

| 14UCSS41 | **Quantitative Aptitude** | hours 2 /credits 2 |
|---|---|---|

**Unit I**
Numbers-HCF & LCM of numbers – Decimal Fractions

**Unit II**
Square roots & Cube roots- Average – Problems on Numbers – Problems on Ages.

**Unit III**
Percentage – Profit & Loss – Ratio & Proportion

**Unit IV**
Time & Work – Time & Distance

**Unit V**
Simple Interest – Compound Interest – Area –Volume & Surface areas.

**Text Book**

**Quantitative Aptitude**, R.S.Aggarwal, Reprint 2007, S.Chand & Company Ltd,

Unit I : Page nos.3-29, 30-45, 46-66.
Unit II : Page nos.117-138,139-160,161-181,182-194
Unit III : Page nos.208-250,251-293,294-310
Unit IV : Page nos. 341-370,384-404
Unit V : Page nos.445-465,466-486, 499-548,549-587

**B.Sc., Computer Science** **Semester IV**

**Skill Based Subject –4**

| 14UCSS42 | **Data Structures** | hours 2 /credits 2 |
|---|---|---|

**Unit I**

Arrays - Introduction – Linear Arrays – Representation of Linear arrays in memory – Traversing linear arrays – inserting and deleting

**Unit II**

Sorting – Bubble sort- Searching - Linear Search – Binary Search – Multidimensional array – Pointers – Records - Record structure– Representation of Records in memory

**Unit III**

Linked List – Introduction – representation of linked list in memory – Traversing a linked list – searching a linked list – memory allocation – insertion and deletion in a linked list

**Unit IV**

Stacks- Array representation of stacks- - linked representation of stack–Queues – Linked representation of queues.

**Unit V**

Trees – Introduction – Binary Trees – Types of Binary Trees – Representation of Binary Trees – Binary Tree Traversals – Binary search trees .

**Text Book:**

**Data Structures** – Seymour Lipschutz – Tata McGrawhill – Year 2006 (Adapted by G A V Pai)

Unit I – Chapter 4: 4.1,4.2,4.3,4.4,4.5
Unit II – Chapter 4: 4.6,4.7,4.8,4.9,4.10,4.11,4.12
Unit III – Chapter 5: 5.1,5.2,5.3,5.4,5.5,5.6,5.7,5.8
Unit IV – Chapter 6 : 6.2,6.3,6.4,6.10,6.11
Unit V - Chapter 7: 7.1,7.2,7.3,7.4,7.7

| 14UCSC51 | **Operating System** | hours 4 /credits 4 |
|---|---|---|

**UNIT I:**

Introduction to Operating Systems: Introduction,What is an Operating systems,Operating system components and goals,Operating systems architecture. Process Concepts: Introduction,Process States,Process Management,Interrupts,Interprocess Communication.

**UNIT II:**

Asynchronous Concurrent Execution: Introduction,Mutual Exclusion,Implementing Mutual Exclusion Primitives,Software solutions to the Mutual Exclusion Problem,Hardware solution to the Mutual Exclusion Problem,Semaphores. Concurrent Programming: Introduction,Monitors.

**UNIT III**

Deadlock and Indefinite Postponement: Introduction,Examples of Deadlock,Related Problem Indefinite Postponement,Resource concepts,Four Necessary conditions for Deadlock,Deadlock solution,Deadlock Prevention,Deadlock Avoidance with Dijkstra's Banker's algorithm,Deadlock Detection,Deadlock Recovery.

Processor Scheduling: Introduction,Scheduling levels,Preemptive Vs Non-Preemptive Scheduling Priorities,Scheduling objective,Scheduling criteria,Scheduling algorithms.

**UNIT IV:**

Real Memory Organization and Management: Introduction,Memory organization,Memory Management,Memory Hierarchy,Memory Management Strategies,Contiguous Vs Non-Contiguous Memory allocation,Fixed Partition Multiprogrammimg,Variable Partition multiprogramming.

Virtual Memory Management: Introduction,Page Replacement,Page Replacement Strategies,Page Fault Frequency (PFF) Page replacement,Page Release,Page Size.

**UNIT V:**

Disk Performance Optimization: Introduction,Why Disk Scheduling is necessary,Disk Scheduling strategies,Rotational optimization.

File and Database Systems: Introduction,Data Hierarchy,Files,File Systems,File Organization,File Allocation,Free Space Management,File Access control.

**Text Book:**

**Operating Systems** , Deitel Deitel Choffnes-Pearson education Third edition-2008

Chapters:

UNIT I :Chapter 1: 1.1,1.2,1.12,1.13 Chapter 3: 3.1,3.2,3.3,3.4,3.5

UNIT II: Chapter 5: 5.1,5.2,5.3,5.4(upto 5.4.2 ),5.5,5.6 Chapter 6: 6.1,6.2

UNIT III:Chapter 7: 7.1,7.2,7.3,7.4,7.5,7.6,7.7,7.8,7.9,7.10 Chapter 8: 8.1,8.2,8.3,8.4,8.5,8.6,8.7

UNIT IV:Chapter 9: 9.1,9.2,9.3,9.4,9.5,9.6,9.8,9.9 Chapter 11: 11.1,11.5,11.6,11.8,11.9,11.10

UNIT V: Chapter 12: 12.1,12.4,12.5,12.6 Chapter 13: 13.1,13.2,13.3,13.4,13.5,13.6,13.7,13.8

**Core Paper –10**

| 14UCSC52 | **Software Engineering** | hours 4 /credits 4 |
|---|---|---|

**Unit – I**

**Introduction to Software Engineering:** Some Definitions – Some Size factors – Quality and Productivity Factors – Managerial Issues.

**Planning a Software Project:** Defining the Problem – Developing a Solution Strategy – Planning the Development Process – Planning an Organizational Structure – Other Planning Activities.

**Unit – II**

**Software Cost Estimation:** Software Cost Factors – Software Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Maintenance Costs.

**Unit – III**

**Software Requirements Definitions:** The Software Requirements Specification – Formal Specification Techniques – Languages and Processors for Requirements Specification.

**Unit – IV**

**Software Design:** Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real-Time and Distributed System Design – Test Plans – Milestones, Walkthroughs, and Inspections - Design Guidelines.

**Unit – V**

**Verification and Validation Techniques:** Quality Assurance — System Testing.

**Software Maintenance:** Enhancing Maintainability During Development – Managerial Aspects of Software Maintenance – Configuration Management – Source-Code Metrics – Other Maintenance Tools and Techniques.

**Text Book**

**Software Engineering Concepts**– Richard Fairley – Tata McGraw - Hill Publishing Company Limited, NewDelhi 1997.

**Chapters**

Unit – I : 1.1 – 1.4, 2.1-2.5
Unit – II : 3.1 - 3.4
Unit – III : 4.1 – 4.3
Unit – IV : 5.1 – 5.9
Unit – V : 8.1, 8.6, 9.1 – 9.5

**Reference Books**

1. SOFTWARE ENGINEERING – K.L.JAMES, Prentice Hall of India Pvt. Ltd., New Delhi – 2009
2. FUNDAMENTALS OF SOFTWARE ENGINEERING – RAJIB MALL, Prentice Hall of India Pvt. Ltd., New Delhi – 2003

**B.Sc., Computer Science** **Semester V**

**Core Paper –11**

| 14UCSC53 | **Computer Algorithms** | hours 4 /credits 4 |
|---|---|---|

**Unit I**

Algorithms : Importance of developing efficient algorithms – Analysis – order Branch and Bound:Illustrating with 0/1 Knapsack.

**Unit II**

Divide and Conquer : Binary Search – Merge sort – divide and conquer approach – Quick Sort – Arithmetic with large numbers – When not to use divide and conquer.

**Unit III**

Dynamic Programming : Binomial coefficients – Floyds algorithm for shortest paths- Dynamic programming and optimization problems – chained matrix multiplication – Optimal binary search tree – The traveling salesperson problem.

**Unit IV**

Greedy Approach : Minimum spanning trees – Dijkstra's algorithm for single source shortest path – scheduling – Huffman code.

**Unit V**

Backtracking: The Backtracking techniques – n Queens Problem – Monte carlo algorithm to estimate the efficiency of a backtracking algorithm –Sum of Subsets – Graph Colouring – Hamiltinian circuits.

**Text Book**

**Foundations of Algorithms Using C++ Pseudocode**, Third edition, Richard Neapolitan, Kumarss Naimipour.Narosa publication, 2004.

| | | | |
|---|---|---|---|
| Unit I | Chapters | 1 | (1.1,1.2,1.3,1.4) |
| Unit II | Chapters | 2 | (2.1,2.4,2.6) Excluding Analysis of Algorithms |
| Unit III | Chapters | 3 | (3.1,3.2,3.3,3.4,3.5,3.6) Excluding Analysis of Algorithms |
| Unit IV | Chapters | 4 | (4.1,4.2,4.3,4.4)Excluding Analysis of Algorithms |
| Unit V | Chapters | 5 | (5.1,5.2,5.3,5.4,5.5,5.6) Excluding Analysis of Algorithms |

**REFERENCE BOOK**

Fundamentals of Computer Algorithms , Ellis Horowitz and Sartaj Sahni , Galgotia book house Reprint 2005.

**B.Sc., Computer Science** **Semester V**
**Elective Subject-I Paper-1**

| 14UCSE51 | **Computer Networks** | hours 4 /credits 4 |
|---|---|---|

**Unit I**
Data communication: characteristics and components – Networks: Distributed processing, Network criteria, applications. Protocols and standards and standard organizations. Line configurations, Topologies, Network classifications .OSI reference model: Layers and Functions. TCP/IP Layers

**Unit II**
Transmission Media: Guided media – Twisted pair, Coaxial cable, optical fibers. Unguided media - Microwave, Satellite, Cellular telephony - Transmission impairment types - Performance features. Errors: types, Detection techniques Vertical and Longitudinal redundancy checks, CRC, Checksum

**Unit III**
Datalink Control – Line Discipline – Flow Control – stop and wait, Sliding Window flow controls Error control using different ARQ techniques. Datalink Protocols: Character oriented protocol: BSC, Bit oriented protocol: HDLC.

**Unit IV**
Local Area Networks: Project 802 – layers, PDU formats. Ethernet – CSMA/CD Access methos, Ethernet MAC frame structure, Thick and thin Ethernet implementation.. Switched and Fast Ethernet. Token BUS, Token Ring, FDDI

**Unit V**
Switching: Circuit and Packet switching. ISDN: Services, Evolution, Channel types and uses, User interfaces, Functional Groupings and reference points. ISDN layers and functions of layers, Broadband ISDN.

Text Book

1. **Data Communications and Networking**, Behrous A. Forouzan, Tata McGraw-Hill Edition 2007, Chapters: 1, 2, 3, 7, 9.1-9.6, 10, 11.3, 11.4, 12, 14, 16

Reference Books


1.Data Communications and Computer NetWorks, Brijendra Singh, Prentice-Hall of India Pvt.Ltd, New Delhi, 2nd edition, 2007.
2. Computer Networks – A. Tananbaum, Pearson Education Asia, Prentice Hall India 2007
3. Data and Computer communications – William Stallings Pearson Education Asia, 2007

**B.Sc., Computer Science** **Semester V**

**Elective Subject-I Paper-2**

| 14UCSE52 | System Software | hours 4 / credits 5 |
|---|---|---|

**Unit I:**
**Introduction**- System Software and Machine Architecture- Simplified Instructional Computer (SIC)- SIC Machine Architecture- SIC/XE Machine Architecture- Traditional (CISC) Machines- VAX Architecture- Pentium Pro Architecture – RISC Machines – UltraSPARC Architecture- PowerPC Architecture- Cray T3E Architecture

**Unit II:**
**Assemblers**- Basic Assembler Functions- A simple SIC Assembler- Assembler Algorithm and Data Structures-One pass Assemblers- Multi-pass Assemblers.

**Unit III**
**Loaders & Linkers**: Basic Loader Functions- Design of Absolute Loader- Simple Bootstrap Loader- Machine Dependent Loader features.

**Unit IV**
**Compilers** - Basic compiler Functions – Grammars - Lexical Analysis – Syntactic Analysis- Code Generation.

**Unit V**
**Other System Software**: Data Base Management Systems -Text Editors- Interactive Debugging Systems.

**Text Book**:
**System Software – An Introduction to Systems Programming**, Leland L. Beck, 3rd Edition, Pearson Education Asia, 2000.

Unit I: Chapter 1
Unit II: Chapter 2 (2.1& 2.4)
Unit III: Chapter 3 (3.1 & 3.2)
Unit IV: Chapter 5 (5.1)
Unit V: Chapter 7 (7.1 , 7.2 & 7.3)

**REFERENCES**:
1. D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan "Systems Programming", Tata McGraw-Hill Edition, 1972.

| 14UCSC5P | **Lab 6 : Visual Programming with VB.Net** hours 6 /credits 4 |
|---|---|

1. Create a login screen with validation of login name and password with the following conditions
    a. check for empty user id and password
    b. check for leading and trailing white spaces
2. Program to create color mixture using scroll bar control
3. Creation of Arithmetic Calculator
4. Create MDI form with file and edit options and write code for file open dialog.
5. Program to create a file open dialog to load a picture.
6. Write code for Drag and Drop using Mouse-Down Event.
7. Program using timer control to animate an object
8. Program to design analog clock
9. Design a simple Media Player
10. Program for sequential file writing & reading
11. Design a simple File Splitter utility
12. Model a File Serialization Application.
13. Design a form using data grid control and bind the control with an MS Access database.
14. Creation of A Simple Address Book Using ADO.Net Data Reader
15. Processing of Employee Pay bill Using ADO.NetData Set

**B.Sc., Computer Science** **Semester V**

**Core Paper – 13 (Lab)**

| 14UCSC5Q | **Lab 7: Network Programming** | hours 6 /credits 4 |
|---|---|---|

1. Programs using TCP Sockets (like date and time server & client, echo server & Client, etc...)
2. Programs using UDP Sockets (like simple DNS)
3. Programs using raw sockets (like packet capturing and filtering)
4. Programs using RPC
5. Simulation of sliding window protocols
6. Experiments using simulators (like OPNET)
7. Performance comparison of MAC protocols
8. Performance comparison of Routing protocols
9. Study of TCP/UDP performance

**Core Paper – 14**

| 14UCSC61 | **Computer Graphics** | hours 4 /credits 4 |
|---|---|---|

**Unit – I**

**A survey of computer graphics:** Computer-Aided Design - Presentation Graphics – Computer Art – Entertainment – Education and Training – Visualization – Image Processing – Graphical User Interfaces

**Overview of Graphics Systems:** Video Display Devices – Raster Scan Systems – Random Scan Systems – Input Devices – Hard Copy Devices.

**Unit – II**

**Output Primitives:** Points and Lines – Line Drawing Algorithms – Circle Generating Algorithms – Filled Area primitives

**Unit – III**

**Attributes of Output Primitives:** Line Attributes – Curve Attributes – Color and Gray Scale Levels – Area Fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions – Antialiasing

**Unit – IV**

**Two –Dimensional Geometric Transformations :** Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations – Transformations Between Coordinate Systems

**Unit – V**

**Two –Dimensional Viewing :** The Viewing Pipeline – Viewing Coordinate Reference Frame – Window –to- Viewport Coordinate Transformation – Two-Dimensional Viewing Functions – Clipping Operations – Point Clipping – Line Clipping – Polygon Clipping – Curve Clipping – Text Clipping – Exterior Clipping.

**Text Book**

**Computer Graphics** – Donald Hearn , M.Pauline Baker
Prentice Hall of India Pvt. Ltd., New Delhi ,SECOND EDITION, 1994

**Reference Books**

1. COMPUTER GRAPHICS, MULTIMEDIA and ANIMATION – MALAY K.PAKHIRA, Prentice Hall of India Pvt. Ltd., New Delhi – 2008
2. FUNDAMENTALS OF COMPUTER GRAPHICS and MULTIMEDIA – D.P.MUKHERJEE, Prentice Hall of India Pvt. Ltd., New Delhi – 1999

**Core Paper – 15**

| 14UCSC62 | **Web Technology & Design** | hours 4 /credits 5 |
|---|---|---|

**UNIT I**

**INTERNET PRINCIPLES :** Introduction to Internet – Client Server Model- Protocol-Internet IP Address-Domain name-Internet Services-Electronic Mail-World Wide Web- Internet Security-Electronic Commerce and Electronic Data Interchange(EDI). **INTRODUCTION TO HTML:** A Brief History-HTML Tags- HTML Documents –Header Section-Body Section-Headings-Link Documents using Anchor Tag- Formatting Characters- Font Tag- Images and Pictures – Listing-Tables in HTML

**UNIT II**

**FRAMES AND FORMS:**Frameset Definition-Frame Definition- Nested Framesets-HTML forms-Elements of a Form. **ELEMENTS OF JAVASCRIPT:** Data Types-Variables-Operators-Conditional Statements-Array objects-String Objects.

**UNIT III**

**OBJECTS AND EVENTS:** Document object Model-The Document Object-Image Object-Forms and Elements-Event Handling-Browser Object-Submit Event and Data Validation. **USER INPUT PROCESSING:** ParseInt() Function-ParseFloat() Function-Recursive Functions-Simple Interest Example-Income Tax Example-Sales Commission Example-Circle Object Example-Quadratic Equation Example-Prime Number Checking Example.

**UNIT IV**

**SERVER SIDE SCRIPT WITH JSP:**Client Responsibilities-Server Responsibilities-Introduction to JSP-JSP Architecture-JSP Servers-JSP Tags-Request Object-Response Object.

**UNIT V**

**JSP WITH JDBC:** Creating ODBC Data Source Name-Introduction to JDBC-Prepared Statement Class(SQL Statement)- Telephone Directory with JDBC-A Simple Internet Banking Application-User Profile with JSP –Case Study.

**Text Book:**

**WEB TECHNOLOGY & DESIGN,** C.Xavier, New Age International Publishers, New Delhi- 110 002. First edition 2010

UNIT I : Chapters 1 & 2
UNIT II : Chapters 3 & 4
UNIT III : Chapters 5 & 6
UNIT IV : Chapter 7
UNIT V : Chapter 9

**Core Paper – 16**

| 14UCSC63 | **Multimedia Technology** | hours 4 /credits 4 |
|---|---|---|

**UNIT I**

Multimedia-an overview: Introduction,Multimedia presentation and production,characteristics of a multimedia presentation, Multiple Media, Utilities of multisensory perception,Hardware and software requirements,Uses of multimedia,Promotion of multimedia based content,steps for creating multimedia presentation.

Visual display Systems: Introduction,Cathode Ray Tube(CRT),Video Adapter Card,Video Adapter cable,Liquid Crystal Display(LCD),Plasma Display Panel(PDP).

**UNIT II**

Text: Introduction,Types of Text,Unicode Standard,Font,Insertion of Text,Text compression,File Formats.

Image: Introduction,Image Types,Seeing color,color models,Basic steps for Image Processing,Scanner,Digital Camera,Interface Standards,Image Processing software,File formats,Image output on monitor,Image output on printer.

**UNIT III:**

Audio: Introduction, Fundamentals Characteristics of sound,Elements of Audio systems,Microphone,Amplifier,Loudspeaker,Audio mixer,Audio File Format and CODECs, Software Audio Players,Audio Recording Systems,Audio and multimedia,Audio Processing software.

**UNIT IV**:

Video: Introduction,Analog video camera, Video signal format,Digital video, PC Video,Video File Format and CODECs,Video editing,Video editing software.

**UNIT V:**

Animation: Introduction,Uses of animation,Key frames and Tweening,Types of animation,Computer Assisted Animation,Creating movements,Principles of animation,Some Techniques of Animation,Animation on the web,3D Animation,Special Effects, Animation software.

**Text Book:**

**Principles of Multimedia**, Ranjan Parekh- the Tata McGraw Hill companies.-Sixth Reprint 2008

Chapters:

UNIT I: Chapter 1-1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9
Chapter 3-3.1, 3.2, 3.3, 3.4, 3.5, 3.6
UNIT II: Chapter 4-4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7
Chapter 5-5.1,5.2,5.3,5.4,5.5,5.6,5.7,5.8,5.13,5.14,5.15,5.16
UNIT III:Chapter 7-7.1,7.4,7.7,7.8,7.9,7.10,7.11,7.21,7.23.1,7.23.2,7.26, 7.28
UNIT IV: Chapter 8-8.1, 8.2, 8.4, 8.6, 8.8, 8.10(upto 8.10.4), 8.11, 8.12
UNIT V: Chapter 9-9.1,9.3,9.4,9.5,9.6,9.7,9.8,9.9,9.10,9.11,9.13, 9.16

**Reference:** Multimedia System Design By Prabhat K.Andleigh and Kiran Thakrar – PHI-2008

| 14UCSC6P | **Lab 8 : Web Programming** | hours 6 /credits 4 |
|---|---|---|

1. Creation of a simple college web site using hyperlinks, tables and images
2. Creation of different text styles using Cascaded Style Sheets
3. Simple JavaScript to handle mouse events (mousein, mouseover etc.)
4. Simple Java Script for Email ID Validation
5. Java Script to Greet the user as good morning / good afternoon depending on the time of day
6. HTML Forms using Java Script
7. Display the day of week using java script
8. Creation of cookies using java script
9. Java Script using Timers
10. Create a JSP file and print "Hello Welcome" in Bold Text
11. Create two JSP files called "a.jsp" and "b.jsp" then forward b.jsp file from a.jsp.
12. Create a Servlet file and call a JSP file from that created Servelet.
13. Program using HTTP Get Request / Post Request etc.
14. Database Connectivity using JDBC
15. Database Search Utility with JSP and JDBC

| 14UCSC6Q | **Lab 9 : Multimedia** | hours 6 /credits 4 |
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Adobe Photoshop (Bitmap Tool) (Self Learning)

1. Create a Heading Banner with different text pattern.
2. Create a Bathing Soap Model using embossing effect.
3. How to use Photoshop to change a B/W photo into Color Photo.

Adobe Illustrator (Vector Graphics Tool) (Self Learning)

1. Design a Business card/Merit certificate
2. Design a digital flex banner for a college day function.

Flash Designing

1. Perform different Transformations like rotation, skewing, flipping, and scaling an object of your choice.
2. Design a flash movie which incorporates the use of the following symbols
   a). Graphic symbol b). Button symbol c). Movie clip symbol
3. Create a movie which includes frame-by-frame animation of an object (or) an image of your choice.
4. Create a movie which includes an object animation using Motion Tweening. (Ex. A ball bouncing across the screen along the specified path). Also add appropriate sound effects.

Flash Scripting using Action Script

1. Write a flash script to assign Actions to an Object, and a Button.
2. Write a function in Action Script to call another function.
3. Write Action Script code to display System Information such as Operating System, Display Language, and Display Settings.
4. Write action script code to draw a Circle and a Rectangle.
5. Calculate the Distance between the Two Points using Action Script.