# HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

## COIMBATORE - 641 028

## B.Sc COMPUTER TECHNOLOGY

## SCHEME OF EXAMINATIONS – CBCS PATTERN

*(For the students admitted from the Academic year 2016 - 2017 and onwards)*

| CODE NO. | SUBJECT | LECTURE HRS/ WEEK | EXAM DURATION (HRS) | MAX.MARKS | | | CREDIT POINTS |
|---|---|---|---|---|---|---|---|
| | | | | IE | EE | TOTAL | |
| **First Semester** | | | | | | | |
| | **Part - I** | | | | | | |
| 16LAT01 / 16LAH01 / 16LAM01/ 16LAF01 | Tamil / Hindi / Malayalam / French - I | 6 | 3 | 25 | 75 | 100 | 3 |
| | **Part - II** | | | | | | |
| 16ENG001 | English - I | 6 | 3 | 25 | 75 | 100 | 3 |
| | **Part - III** | | | | | | |
| 16CTU01 | Computer Organization and Architecture | 5 | 3 | 25 | 75 | 100 | 4 |
| 16CTU02 | Programming with C | 5 | 3 | 25 | 75 | 100 | 4 |
| 16CTU03 | Practical I: Programming Lab - C | 4 | 3 | 40 | 60 | 100 | 3 |
| 16CTU04 | Practical II: Office Automation Lab | 4 | 3 | 40 | 60 | 100 | 3 |
| **Second Semester** | | | | | | | |
| | **Part - I** | | | | | | |
| 16LAT02 / 16LAH02 / 16LAM02 / 16LAF02 | Tamil / Hindi / Malayalam / French - II | 6 | 3 | 25 | 75 | 100 | 3 |
| | **Part - II** | | | | | | |
| 16ENG02 | English - II | 6 | 3 | 25 | 75 | 100 | 3 |
| | **Part - III** | | | | | | |
| 16CTU05 | Data Structures | 4 | 3 | 25 | 75 | 100 | 3 |
| 16CTU06 | Programming with C++ | 4 | 3 | 25 | 75 | 100 | 3 |
| 16CTU07 | Practical III : Programming Lab - C++ | 3 | 3 | 40 | 60 | 100 | 3 |
| 16CTU08 | **Allied :** Numerical Methods (MAT) | 5 | 3 | 25 | 75 | 100 | 3 |

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|---|---|---|---|---|---|---|---|
| | **Part - IV** | | | | | | |
| 16GSU01 | Value Education - Human Rights | 2 | - | 100 | - | 100 | 2 |
| **Third Semester** | | | | | | | |
| | **Part - III** | | | | | | |
| 16CTU09 | Principles of Compiler Design | 5 | 3 | 25 | 75 | 100 | 4 |
| 16CTU10 | Java Programming | 5 | 3 | 25 | 75 | 100 | 4 |
| 16CTU11 | Operating System - Unix | 5 | 3 | 25 | 75 | 100 | 4 |
| 16CTU12 | Practical IV: Programming Lab - Java | 5 | 3 | 40 | 60 | 100 | 3 |
| 16CTU13 | Practical V: Programming Lab - Unix | 3 | 3 | 40 | 60 | 100 | 3 |
| 16CTU14 | **Allied :** Mathematical Structures (MAT) | 5 | 3 | 25 | 75 | 100 | 3 |
| | **Part - IV** | | | | | | |
| 16GSU02 | Environmental Studies | 2 | - | 100 | - | 100 | 2 |
| **Fourth Semester** | | | | | | | |
| | **Part - III** | | | | | | |
| 16CTU15 | Visual Basic Programming | 6 | 3 | 25 | 75 | 100 | 5 |
| 16CTU16 | Data Communication and Networks | 6 | 3 | 25 | 75 | 100 | 5 |
| 16CTU17 | Microprocessor and ALP | 6 | 3 | 25 | 75 | 100 | 5 |
| 16CTU18 | Practical VI: Programming Lab - Visual Basic | 5 | 3 | 40 | 60 | 100 | 3 |
| 16CTU19 | **Allied :** Business Accounting (COM) | 5 | 3 | 25 | 75 | 100 | 3 |
| | **Part - IV** | | | | | | |
| 16GSU03 | **Skill Based:** Internet Security | 2 | - | 100 | - | 100 | 2 |
| | **Part - V** | | | | | | |
| 16GSU04 | Extension Activity | | - | 100 | - | 100 | 2 |
| **Fifth Semester** | | | | | | | |
| | **Part - III** | | | | | | |
| 16CTU20 | Relational Database Management Systems | 5 | 3 | 25 | 75 | 100 | 4 |
| 16CTU21 | Programming with PHP | 6 | 3 | 25 | 75 | 100 | 5 |
| 16CTU22 | Practical VII: Oracle Lab | 5 | 3 | 40 | 60 | 100 | 3 |
| 16CTU23 | Practical VIII: Programming Lab - PHP | 5 | 3 | 40 | 60 | 100 | 3 |
| 16CTU24 | Practical IX: HTML Lab | 3 | 3 | 40 | 60 | 100 | 3 |
| 16CTU25 | **Elective - I**<br>(a) Computer Installation and Services (OR)<br>(b) Artificial Intelligence and Expert Systems | 6 | 3 | 25 | 75 | 100 | 4 |
| | **Part - IV** | | | | | | |
| 16GSU05 | **Non - Major Elective:** General Awareness | | - | 100 | - | 100 | 2 |
| | **Part - V** | | | | | | |
| 16GSU06 | Law of Ethics | - | | 100 | | 100 | 2 |
| **Sixth Semester** | | | | | | | |
| | **Part - III** | | | | | | |

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|---|---|---|---|---|---|---|---|
| 16CTU26 | Software Testing | 6 | 3 | 25 | 75 | 100 | 5 |
| 16CTU27 | Open Source Tools | 6 | 3 | 25 | 75 | 100 | 5 |
| 16CTU28 | Practical X : Software Testing & SPM Lab | 6 | 3 | 40 | 60 | 100 | 5 |
| 16CTU29 | Practical XI: Open Source Lab | 6 | 3 | 40 | 60 | 100 | 5 |
| 16CTU30 | **Elective – II**<br>(a) Cloud Computing (OR)<br>(b) Digital Image Processing | 6 | 3 | 25 | 75 | 100 | 4 |
| 16CTU31 | Project Work | | - | 40 | 60 | 100 | 4 |
| | | | | | | | 142 |

## REGULATIONS

**Components for Evaluation:**

1. **Internal Examination Marks (For Part III theory papers)**

| Components | Marks |
|---|---|
| Test –I & II (Best of Two) | 10 |
| Model Exam | 10 |
| Assignment | 5 |
| **Total** | ------- **25** ===== |

**QUESTION PAPER PATTERN FOR I.E TEST I and II**
**(2 HOURS TEST)** **MAXIMUM: 50 Marks**

**SECTION - A (20 Marks)**
Answer **ALL** Questions
**ALL** Questions Carry **EQUAL** Marks
Short answers 10 (10 x 2 = 20 marks)

**SECTION - B (10 Marks)**
Answer **ALL** Questions
**ALL** Questions Carry **EQUAL** Marks
Either or Type (2 x 5 = 10 marks)

**SECTION - C (20 Marks)**
Answer any **TWO** Questions out of **THREE** questions
**ALL** Questions Carry **EQUAL** Marks (2 x 10 = 20 marks)

**QUESTION PAPER PATTERN FOR IE Model Examination**

**(3 HOURS TEST)**
**Marks** **MAXIMUM: 75**

**SECTION - A (20 Marks)**
Answer **ALL** Questions
**ALL** Questions Carry **EQUAL** Marks
**TWO** questions from each unit (10 x 2 = 20 marks)

**SECTION - B (25 Marks)**
Answer **ALL** Questions
**ALL** Questions Carry **EQUAL** Marks (5 x 5 = 25 marks)
Either or Type.
ONE question from each unit with internal choice

**SECTION - C (30 Marks)**
Answer any **THREE** Questions out of **FIVE** questions
**ALL** Questions Carry **EQUAL** Marks (3 x 10 = 30 marks)
ONE question from each unit

**2 a) Components for Practical I.E.**

| Components | Marks |
|---|---|
| Test –I | 20 |
| Test – II | 20 |
| **Total** | 40 |

**2 b) Components for Practical E.E.**

| Components | Marks |
|---|---|
| Completion of Experiments | 50 |
| Record | 5 |
| Viva | 5 |
| **Total** | 60 |

**3. Institutional/ Industrial Training, Mini Project and Major Project Work**

| Institutional /Industrial Training | | Mini Project | MajorProject Work | |
|---|---|---|---|---|
| Components | Marks | Marks | Components | Marks |

| | | | | |
|---|---|---|---|---|
| **I.E**<br>Work Diary<br>Report<br>Viva –voce<br>Examination | <br>25<br>50<br>25 | <br>-<br>50<br>50 | **I. E**<br>a) Attendance 10 Marks<br>b) Review /<br>Work Diary*[1] 30 Marks | 40 |
| **Total** | **100** | **100** | **E.E***[2]<br>a) Final Report 40 Marks<br>b) Viva-voce 20 Marks | 60 |
| | | | **Total** | **100** |

*[1] Review is for Individual Project and Work Diary is for Group Projects (group consisting of minimum 3 and maximum 5)

*[2]Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

**4. Components for Value Education (Part IV):**

| S.No. | Components | Marks |
|---|---|---|
| a) | Attendance<br>96% and above - 30 marks<br>91% to 95% - 25 marks<br>86% to 90% - 20 marks<br>76% to 85% - 10 marks | 30 marks |
| b) | Participation in group activity | 30 marks |
| c) | Assignment (2 x 10) | 20 marks |
| d) | Test<br>(1 hr for 20 marks)<br>2 out of three questions, 10 marks each | 20 marks |
| | **Total** | **100 marks** |

On completion of the above components students will be remarked as follows:

| Range of marks | Equivalent remarks |
|---|---|
| 80 and above | Exemplary |
| 70 – 79 | Very good |
| 60 – 69 | Good |
| 50 – 59 | Fair |
| 40 – 49 | Satisfactory |
| Below 39 | Not Satisfactory = Not completed |

- The passing minimum for this paper is 40%

- In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters.

5. **Guidelines for Environmental Studies (Part IV)**
   - The paper Environmental Studies is to be treated as 100% IE course which is offered in III Semester for II year UG students.
   - The classes will be handled for two hours per week till the end of the Semester. At least one field trip should be arranged.
   - Total Marks for the subject = 100

| Components | Marks |
|---|---|
| Two Tests (2 x 30) | 60 |
| Field visit and report (10 + 10) | 20 |
| Two assignments (2 x 10) | 20 |
| **Total** | **100** |

The question paper pattern is as follows:

**Test I** – 2 hours [3 out of 5 essay type questions] 3 x 10 = 30 Marks

**Test II** – 2 hours [3 out of 5 essay type questions] 3 x 10 = 30 Marks

**Total 60 Marks**

- The passing minimum for this paper is 40%
- In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters.

6. **Guidelines for Skill based subject - Internet Security (Part IV)**

| Components | Marks |
|---|---|
| Two Tests (2 x 40) | 80 |
| Two assignments (2 x 10) | 20 |
| **Total** | **100** |

The question paper pattern is as follows:

a) Test I – 2 hours [4 out of 7 essay type questions] 4 x 10 = 40Marks
b) Test II – 2 hours [4 out of 7 essay type questions] 4 x 10 = 40 Marks

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**Total 80 Marks**

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- The passing minimum for this paper is 40%
- In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters

7. **Guidelines for General Awareness (Part IV)**

| Components | Marks |
|---|---|
| Two Tests (2 x 50) | 100 |

The question paper pattern is as follows:
Test I – 2 hours [50multiple choice questions] 50 x 1 = 50Marks
Test II – 2 hours [50 multiple choice questions] 50 x 1 = 50 Marks

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**Total 100 Marks**

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- The passing minimum for this paper is 40%
- In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters

8. **Guidelines for Law of Ethics (Part V)**

| Components | Marks |
|---|---|
| Two Tests (2 x 50) | 100 |

The question paper pattern is as follows:
a) Test I – 2 hours [5 out of 8 essay type questions] 5 x 10 = 50Marks
b) Test II – 2 hours [5 out of 8 essay type questions] 5 x 10 = 50 Marks

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**Total 100 Marks**

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- The passing minimum for this paper is 40%
- In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters

## 9. Guidelines for Extension Activity (Part V)

- Atleast two activities should be conducted within this semester (IV) consisting of two days each.
- The activities may be Educating Rural Children, Unemployed Graduates, Self Help Group etc.

The marks may be awarded as follows

| No of Activities | Marks |
|---|---|
| 2 x 50<br>( Each Activity for two days) | 100 |

## 10.QUESTION PAPER PATTERN FOR EE (Part III Theory Papers)

**(3 HOURS TEST)** **MAXIMUM: 75 Marks**

**SECTION - A (20 Marks)**
Answer **ALL** Questions

**ALL** Questions Carry **EQUAL** Marks (10 x 2 =20 marks)

**TWO** questions from each unit

**SECTION - B (25 Marks)**
Answer **ALL** Questions

**ALL** Questions Carry **EQUAL** Marks (5 x 5 = 25 marks)

Either or Type.

ONE question from each unit with internal choice

**SECTION - C (30 Marks)**
Answer any **THREE** Questions out of **FIVE** questions

**ALL** Questions Carry **EQUAL** Marks (3 x 10 =30 marks)

ONE question from each unit

| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU01 | COMPUTER ORGANIZATION AND ARCHITECTURE | I |
| Objective: | To provide the organization, architecture and designing concept of computer system | |
| Unit No. | Topics | Hours |
| Unit I | **Data Representation**<br>Number Systems-Binary-Octal-Hexadecimal number-Complements-Floating Point Representation-Logic Circuits - Logic Gates-Combinational Circuits-Half-Adder-Full-Adder- Flip-Flops-JK – D- SR-T flip-flop. | 12 |
| Unit II | **Basic Computer organization**<br>Instruction codes - Computer registers - computer instructions - Timing and Control - Instruction cycle - Memory-Reference Instructions - Input-output and interrupt - Complete computer description. | 12 |
| Unit III | **Central processing unit**<br>Introduction - General Register Organization- Stack Organization - Instruction format - Addressing Modes - data transfer and manipulation - Program Control - Reduced Instruction Set Computer (RISC) - Complex Instruction Set Computer (CISC)- comparison of RISC and CISC – Parallel processing - Pipelining - Arithmetic Pipeline - Instruction Pipeline - RISC Pipeline. | 12 |
| Unit IV | **Input – Output organization**<br>Input-output interface - Asynchronous Data Transfer - Modes of Transfer - Priority Interrupt – DMA - Input-Output Processor (IOP) - CPU - IOP communication - Serial Communication. | 12 |
| Unit V | **Memory Organization**<br>Memory Sub System - Memory hierarchy - Main memory - Auxiliary memory - Associative memory - Cache memory - Virtual memory. | 12 |

**Text Book:**

1. *Morris Mano.M, "Computer System and Architecture", PHI, New Delhi, 3rd Edition.*

**Reference Books:**

1. *Stallings. W, "Computer Organization & Architecture", PHI, New Delhi.*
2. *Puri. V.K, "Digital Electronics Circuit and System", McGraw Hill, New Delhi.*
3. *Carter.M,"Computer Architecture", Schaum's outline series.*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU02 | PROGRAMMING WITH C | I |
| **Objective:** | On successful completion of this subject the students have the programming ability in C Language. | |
| **Unit No.** | **Topics** | **Hours** |
| **Unit I** | **Overview of C**<br>Importance of C–Basic structure of C Programs-Programming style-Executing a C Program- Constants, Variables and Data types: Character set - C Tokens – Keyword and Identifiers- Constants, Variables and Data types- Operators and Expressions: Types of Operators-Arithmetic Expressions-Evaluation of Expressions. | 12 |
| **Unit II** | **Managing Input and Output operations**<br>Reading and Writing a Character–Formatted I/O- Decision Making and Branching – Decision making with if statement – switch statement – Looping- while-do-for statement-Jumps in Loops. | 12 |
| **Unit III** | **Arrays**<br>Types of Array – Dynamic Array- Character Arrays and Strings – Reading strings from terminal-String Handling functions-Table of strings. User defined Functions – Elements-Function declaration – Category of function – Nesting of function - Recursion. | 12 |
| **Unit IV** | **Structures and Unions**<br>Array of structures – structures within structures- structures and functions. Union –size of structures-Bit fields. Pointers – Pointer expression – Pointers and Array-Pointer to function. | 12 |
| **Unit V** | **File management in C**<br>File operations-Dynamic memory allocation – Linked lists-MALLOC, CALLOC and RELLOC. Preprocessors – Macro substitution-Programming Guide lines. | 12 |

**Text Book:**

*1. Balagurusamy .E, "Programming in ANSI C", Tata McGraw-Hill, 4th edition.*

**Reference Books:**

1. *Byron S Gottfried, "Programming with C", Schaum's Outline Series – Tata McGraw Hill Publications, New Delhi.*
2. *Yashavant P. Kanetkar, "Pointers in C", BPB Publications 2003.*
3. *Ashok Kamthane , "Programming with ANSI and Turbo C", Pearson Education India, 2009.*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU03 | PRACTICAL I: PROGRAMMING LAB - C | I |
| **Objective:** | This subject provides a practical application using different tools and techniques in C programming. | |
| **Ex. No.** | **Program List** | |
| 1 | Write a program to print first N prime numbers. | |
| 2 | Write a C program to generate Fibonacci series. | |
| 3 | Write a program to find number of palindromes in a given sentence. | |
| 4 | Write a C program to implement a Sum of Series (sine, cosine, exponential). | |
| 5 | Write a C program to find the factorial of a given number using recursive function. | |
| 6 | Write a C program to sort the given set of numbers in ascending order. | |
| 7 | Write a C program to implement a Matrix operations (Addition, Subtraction, Multiplication – using functions. | |
| 8 | Write a C program to Create a structure to store the following details: Rollno., Name, Mark1, Mark2, Mark3, Total, Average, Result and Class. Write a program to read Rollno., Name and three subject marks. Find out the total, result and class as follows:<br>a) Total is the addition of three Subject marks<br>b) Result is pass if all subject marks greater than or equal to 40 else "Fail".<br>c) Class will be awarded for students who have cleared 3 subjects<br>i) Class "Distinction" if average >=75<br>ii) Class "First" if average lies between 60 to 74.<br>iii) Class "Second" if average lies between 50 & 59. | |
| 9 | Write a C program for String manipulations without using string functions (string length, string comparison, string copy, palindrome checking, counting words and linesin strings (Use function pointers). | |
| 10 | Write a C program to Develop a pay slip for an employee using file with the fields Eno, Ename, Basic. Calculate DA= 32% of Basic. HRA = 15% of Basic. PF=15% of Basic and print all details with Netpay. | |
| 11 | Write a C program to copy file into another file. | |
| 12 | Write a C program to find sum of numbers given in Command line arguments recursively. | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU04 | PRACTICAL II: OFFICE AUTOMATION LAB | I |
| Ex. No. | Program List | |
| 1 | Creating and formatting a simple document using<br>i. Bulleted & Numbered List, Tab Settings<br>ii. Adding Headers and Footers<br>iii. Find and Replace the word.<br>iv. Create a tabular data and column data | |
| 2 | Create a Business Letter using Mail Merge concept. | |
| 3 | Create a News Paper format document in MS- word. | |
| 4 | Create a worksheet to Find, delete and add records, formatting columns, row height, merging, splitting columns. Sort the contents in ascending and descending order (Class Marksheet) | |
| 5 | Create the worksheet in MS-EXCEL to store the following information:<br>Reg. no, Name, Mark1 , Mark2, Mark3 , Total Average<br>a) Using formula and function find the total, average, maximum, minimum total marks<br>b) Create the bar chart for average mark with proper title for axes, legend and gridlines. | |
| 6 | Create, display and interact with data using Pivot Tables and Pivot Charts of excel feature. | |
| 7 | Create 3 slides for a Seminar Lecture on introduction to computer and do the following<br>( a ) Numbering the Slides<br>( b ) Moving the Frames and Inserting Clipart<br>( c ) Inserting New Slide<br>( d ) Deleting Slide<br>( e ) Copying a Slide. | |
| 8 | Create 5 Slide presentation of your own and do the following<br>( a ) Inserting Pictures<br>( b ) Copying picture form previous slide<br>( c ) Copying text from previous slide | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU05 | DATA STRUCTURES | II |
| **Objective:** | This subject provides a practical application using different tools and techniques in Data structure and algorithms. | |

| Unit No. | Topics | Hours |
|---|---|---|
| **Unit I** | **Introduction**<br>Introduction to Algorithm –Arrays and sequential representations – ordered lists – Stacks and Queues – Evaluation of Expressions –Singly Linked List – doubly linked list-Polynomial addition. | **10** |
| **Unit II** | **Trees and Graphs**<br>Binary tree representations – Tree Traversal – Threaded Binary Trees –Counting binary trees – Graphs Terminology and Representations – Traversals, Connected Components. | **09** |
| **Unit III** | **Spanning trees and Symbol Tables**<br>Biconnected components – Hashing - Introduction- Static Hashing-Dynamic Hashing - Symbol tables - Static tree table-Dynamic table. | **09** |
| **Unit IV** | **Sorting and Searching**<br>Internal sorting - Insertion sort-quick sort-heap sort-Merge sort-two way merge sort-sorting on several keys. External Sorting: Storage device- Magnetic tape – Disk storage - Sorting with disk- K-way merging - Sorting with tape – Searching - Binary search. | **10** |
| **Unit V** | **Files**<br>Files -Queries and Sequential organizations - Index Techniques- File Organizations-sequential organizations-Random Organization-Linked Organization-Inverted Files-Cellular Partitions - Storage Management. | **10** |

**Text Book:**

1. *Ellis Horowiz, Sartaj Sahni and Sanguthevar, "Fundamentals of Data Structure", Galgotia Publications.*

**Reference Books:**

1. *Horowitz, Sahni, Anderson-freed, "Fundamentals of Data structures in C", Second edition, 2008.*
2. *Ellis Horowiz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications, 2001.*
3. *Narashimha Karumanchi, "Data Structures and Algorithms Made Easy", CareerMonk Publications, Second Edition.*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU06 | PROGRAMMING WITH C++ | II |
| **Objective:** | To inculcate knowledge on Object-oriented programming concepts using C++ | |

| Unit No. | Topics | Hours |
|---|---|---|
| Unit I | **Introduction to C++**<br>Introduction to C++ - Key concepts of Object-Oriented Programming – Advantages- Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: Decision Making and Statements: If.. Else, jump, go to, break, continue and Switch case statements - Loops in C++: For, While, Do - Functions in C++ - Inline functions – Function Overloading. | 10 |
| Unit II | **Classes, Objects and Constructor, Destructor**<br>Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – Array of objects –Friend functions – Overloading member functions – Bit fields and classes – Constructor and Destructor with static members. | 10 |
| Unit III | **Operator Overloading and Types of Inheritance**<br>Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – Type conversion. Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchical, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes. | 09 |
| Unit IV | **Array and Pointers**<br>Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – Array of classes – Memory models – New and Delete operators – Dynamic object – Binding , Polymorphism and Virtual function. | 10 |
| Unit V | **Files**<br>Files – File stream classes – File modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling – String- Declaring and Initializing string objects – String Attributes – Miscellaneous functions. | 09 |

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**Text Book:**

1. *Ashok N Kamthane, "C++ Programming", Pearson Education publication, 2003.*

**Reference Books:**


1. *Balagurusamy, E, "Object-Oriented Programming with C++" Tata Mc-Grawhill Publications 2003, [2nd Edition].*
2. *Maria Litvin & Gray Litvin , "C++ for you", Vikas publication, [2nd Edition] 2002.*
3. *Yashavant P. Kanetkar, "Let Us C++", BPB Publications, 2003 .*



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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU07 | PRACTICAL III: PROGRAMMING LAB - C++ | II |
| **Objective:** | To develop the object oriented programming skills | |
| **Ex. No.** | **Program List** | |
| 1 | Write a C++ Program to create a class to implement the Data Structure STACK. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element check for overflow and underflow conditions. | |
| 2 | Write a C++ Program to create a class to implement the Data Structure QUEUE. Write a constructor to initialize the items of the QUEUE. Write a member function REAR () to insert an element and member function FRONT() to delete an element check for overflow and underflow conditions. | |
| 3 | Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions. | |
| 4 | Write a C++ Program for Banking Information system using FRIEND FUNCTION. | |
| 5 | Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write a Member function ADD (), SUB (), MUL (), DIV () to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values. | |
| 6 | Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display stings. Overload the Operator + to concatenate two Strings, == to compare two strings | |
| 7 | Write a C++ Program to create class, which consists of STUDENT detail like Student Number, Student Name, Department, Mark. Write a member function to get and display them. Derive a class RESULT from the above class and write a member function to calculate TOTAL, PERCENTAGE, and GRADE. Display the result of the student depending on the grade using Multi Level Inheritance. | |
| 8 | Write a C++ Program to create class which consists of EMPLOYEEE detail like Employee Number, Employee Name, Department, Basic Salary and Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade using Multiple Inheritance. | |
| 9 | Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGE from class Shape and Calculate Area and Perimeter of each class separately and display the result | |
| 10 | Write a C++ program to perform Arithmetic operations using TEMPLATE. | |
| 11 | Write a C++ Program to implement Linear and Binary search | |

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| 12 | Write a C++ Program to merge two files into a single file. | |
|---|---|---|
| **Code No.** | **Subject** | **Semester No.** |
| **16CTU09** | **PRINCIPLES OF COMPILER DESIGN** | **III** |
| **Objective:** | To enrich the knowledge in various phases of compiler and its use, code optimization techniques, machine code generation, and use of symbol table. | |

| Unit No. | Topics | Hours |
|---|---|---|
| **Unit I** | **Introduction to compiler**<br>Introduction to compiler – Analysis of source program-The Phases of complier – cousins of compilers – The grouping of phases-compiler construction goals - Lexical analysis- Incorporating a symbol table – The role of lexical analyzer Generator – optimization of DFA. | **12** |
| **Unit II** | **Syntax Analysis**<br>The role of a parser – context Free Grammar –Top – down parsing-Recursive Descent parsing – predictive parsing – Bottom up parsing-shift reduce parsing – Operator precedence parsing – LR parsing. | **12** |
| **Unit III** | **Syntax**<br>Syntax – directed translation: Syntax- directed definition – construction of syntax trees – Bottom –up evaluation of S – attributes definition –AP down translation –Recursive evaluate – Type checking –Type system-Specification of a simple type checker – Type conversion – An algorithm for unification. Intermediate language – Declaration – Assignment Statements- Boolean Expression- Case statement – Back patching – procedure calls. | **12** |
| **Unit IV** | **Issues in Design**<br>Issues in the design of code generate- The target machine – Run time storage management – Basics Blocks and Flow Graphs – A simple code generator- DAG representation of Basic blocks – Optimization. | **12** |
| **Unit V** | **Principal of source optimization**<br>Introduction – principal source of optimization – optimization of basic blocks – Introduction a global data flow analysis –Runtime Environment –source Language issues-Storage organization-parameter passing. | **12** |

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**Text Book:**

1. *Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2003.*

**Reference Books:**

1. *Raghavan, "Introduction to Compilers", Tata McGraw-Hill, 2008.*
2. *Chithra D," Principles Of Compiler Design "Cbs Publishers & Distributors-New Delhi.*
3. *Alfred Aho and Jeffrey Ullman," Principles of Compiler Design", Addison-Wesley.*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU10 | JAVA PROGRAMMING | III |
| Objective: | To inculcate knowledge on java programming | |

| Unit No. | Topics | Hours |
|---|---|---|
| Unit I | **Introduction to Java**<br>Features of Java - Object Oriented Concepts – History of Java- Structure – Java Tokens – Statements – Java Virtual Machine - Data Types - Variables - Operators - Decision Making and Branching - Decision Making and Looping | 12 |
| Unit II | **Object Oriented concepts**<br>Classes, Objects and Methods - Methods & variables - Constructor-Overloading - Static members - Final Classes – Abstract method - Arrays, Strings and Vectors. – Interfaces: Multiple Inheritance – Extending interfaces-implementing interfaces. Packages: Putting Classes together-creating, accessing & using packages. | 12 |
| Unit III | **Multithreaded Programming**<br>Creating Threads-Extending Threads -Thread life cycle-Thread Exception-priority-implementing runnable interface - Managing Errors and Exceptions - Introduction - Exception handling – Exceptions - Multiple Catch statement - using finally statement– Applet Programming – Graphics Programming. | 12 |
| Unit IV | **Files**<br>Managing Input / Output Files in Java : Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters- Byte-Handling Primitive data Types – Random Access Files. | 12 |
| Unit V | **Advanced concepts of Java**<br>AWT Class and Controls: Introduction -AWT class - AWT controls-Labels, Buttons, CheckBox, List, TextField, TextArea – AWT managers and menus – Layout manager - MenuBar & Menus - Event handling by AWT components - Java Bean - Socket Programming – Servlets - Java Server Pages, JDBC. | 12 |

**Text Book:**

1. *Balagurusamy.E , "Programming With Java – A Primer –", TMH, 3rd Edition..*

**Reference Books:**

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1. *Patrick Naughton & Hebert Schildt , "The Complete Reference Java 2", TMH,. 3rd Edition.*
2. *John R.Hubbard, "Programming With Java" TMH, 2nd Edition.*
3. *Herbert Schildt, "The Complete Reference Java", Paperback, 7th Edition,2006.*

| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU11 | **OPERATING SYSTEM - UNIX** | III |
| **Objective:** | On successful completion of this subject the students must have the knowledge of Unix Operating System. | |
| **Unit No.** | **Topics** | **Hours** |
| **Unit I** | **Unix**<br>The Multi-tasking Operating System- Multitasking - Background process. Process Identification-Parent and Child - The Fork()-Orphan Process – Zombies - Process Synchronization - Sharing data between processes using Files - File Buffering - The exec() function Execv() and execvp() functions. | **12** |
| **Unit II** | **Unix**<br>The Multi-User Operating System – Booting Up- User Details- Group ID- Time- Process Group ID- Root File System- File Permissions- Data Security and the 'suid' Bit. | **12** |
| **Unit III** | **Unix**<br>More on Files – Unlocked Confusion- Explicit Unlocking- Read Inconsistency- Range Locking- Deadlock- System lock table- More control on files- Permissions and File Locking. | **12** |
| **Unit IV** | **Communicating Across Processes**<br>Signals- Signal Handling- About SIGHUP, SIGCLD, SIGALRM- KILL- Open Signals- Pipes- Lseek() and pipes- Many processes and one pipe- Sorting on pipe- Named Pipe- Message Queue- Creating a Message Queue- Permissions on Queue- Numbering System. | **12** |
| **Unit V** | **Semaphores**<br>Creating a Semaphore- Semaphore Exclusivity- Getting and setting Semaphore value- Atomicity through Structures- Semaphore Structures- Down Memory Lane- Shared Memory- Creating Shared Memory- Amoeba Devours- Hardware and Shared Memory- Getting rid of the segment- Changing User ID and Group ID of Segment. | **12** |

**Text Book:**

1. *Vijay Mukhi's The C Odyssey," Unix – The Open-boundless , Meeta Gandhi, Tilak Shetty and Rajiv Shah.*

**Reference Books:**

1. *Richard Stevens .W, Unix Network Programming – Interprocess Communications, Second Edition.*
2. *Richard Stevens., Unix Network Programming – Networking API's, Sockes and XTI, Second Edition.*
3. *Kernighan," The Unix Programming Environment", Prentice Hall India Learning Private Limited.*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU12 | PRACTICAL IV: PROGRAMMING LAB - JAVA | III |
| Objective: | To develop the programming skill in object oriented concepts and applets | |

| Ex. No. | Program List |
|---|---|
| 1 | Write the java program for the manipulation of string class. |
| 2 | Write a java program to demonstrate overloading & overriding. |
| 3 | Write a java program to implement the multiple inheritance using interfaces. |
| 4. | Write a java program to demonstrate the use of packages. |
| 5 | Write a java program to implement the concept of Multithreading. |
| 6 | Write a java program to create an Exception and throw the exception. |
| 7 | Write a java program to demonstrate Graphics and Applet class. |
| 8 | Create a java program to create Frame, Textbox, List box and buttons using AWT. |
| 9 | Write a java program to develop a menu using AWT. |
| 10 | Write a java program to implement the concept of Applet & AWT. |
| 11 | Write a java program to implement the concept of various events. |
| 12 | Write a java program which open an existing file and append the text to that file. |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU13 | PRACTICAL V: PROGRAMMING LAB - UNIX | III |
| **Objective:** | To develop the knowledge of Unix Operating System and its scripting. | |
| **Ex. No.** | **Program List** | |
| 1 | Write a program to demonstrate the usage of exec() function | |
| 2 | Write a program to fork a process and print the process id and parent process id. | |
| 3 | Write a program to display the basic network Commands | |
| 4 | Write a program to handle alarm and pause functions. | |
| 5 | Write a program for locking files. | |
| 6 | Write a program to illustrate the concept of Record Locking. | |
| 7 | Write a program to full duplex pipe. | |
| 8 | Write a program to implement Client Server using Message Queue. | |
| 9 | Write a program to execute the concept of Semaphores. | |
| 10 | Write a program to implement the concept of Shared Memory. | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU15 | VISUAL BASIC PROGRAMMING | IV |
| Objective: | To understand the Visual Basic event-driven programming concepts, terminology, and available tools, and learn to design and develop Windows-based business applications. | |
| Unit No. | Topics | Hours |
| Unit I | **Introduction to Visual Basic**<br>Introduction Graphical User Interface (GUI) - Programming Language (Procedural - Object Oriented - Event Driven) - The Visual Basic Environment - How to use VB complier to compile / debug and run the programs – Variables – Constants - and Calculations – Variables - Variables Public – Private – Static – Constants - Data Types - Naming rules/conventions – Constants - Named & intrinsic - Declaring variables - Scope of variables - Val Function - Arithmetic Operations - Formatting Data. | 15 |
| Unit II | **Decision & Conditions**<br>If Statement, If-then-else Statement - Comparing Strings - Compound Conditions(And, Or, Not) - Nested If Statements - Case Structure - Using If statements with Option Buttons & Check Boxes - Displaying Message in Message Box - Testing whether Input is valid or not- Using Call Statement to call a procedure. | 12 |
| Unit III | **Introduction to VB Controls**<br>Textboxes - Frames- Check Boxes- Option Buttons- Images- Setting a Border & Styles- The Shape Control- The line Control- Working with multiple controls and their properties- Designing the User Interface- Keyboard access- Tab controls- Default & Cancel property- Coding for controls- Menus- Sub-Procedures and Sub-functions - Defining / Creating and Modifying a Menu- Using common dialog box- Creating a new sub-procedure- Passing Variables to Procedures- Passing Argument ByVal-ByRef- Writing a Function Procedure. | 15 |
| Unit IV | **Multiple Forms**<br>Creating - Adding- removing Forms in project- Hide- Show Method- Load-Unload Statement- Me Keyword- Referring to Objects on a Different Forms- Arrays Single-Dimension Arrays- Initializing an Array using For Each- User-Defined Data Types- Accessing Information with User-Defined Data Types- Using List Boxes with array- Two dimensional arrays. | 15 |
| Unit V | **Data Files**<br>Sequential files & Random files- Accessing Database File Creating the database files for use by Visual Basic (Using MS-Access) Using the Data Control- setting its property- Using Data Control with forms- navigating the database object using the move next- move previous- move first and move last methods - checking for BOF and EOF- using list boxes and combo boxes as data bound controls- updating a database file ( adding-deleting records ) - Displaying data in grids. | 15 |

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**Text Book:**

1. *Julia Case Bradley & Anita C. Millspaugh , "Programming in Visual Basic 6.0" by McGraw-Hill.*

**Reference Books:**

1. *Byron S. Gottfried- "Visual Basic"- Schaum Outline Series- TMH.*
2. *Eric A. Smith- Valor Whisher- Hank Marquis-" Visual Basic 6 Programming Bible".*
3. *Rod Stephens-"Visual Basic 2012 Programmer's Reference"- Paperback – 26 Sep 2012.*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU16 | DATA COMMUNICATION AND NETWORKS | IV |
| Objective: | To understand the use, architecture and applications of networks. | |
| Unit No. | Topics | Hours |
| Unit I | **Introduction to communications and Networking**<br>Introduction – Fundamental concepts – Data communications – Protocols- standards - Standards organizations - Signal propagations- Analog and Digital signals- Bandwidth of a signal and a medium - Fourier analysis and the concept of bandwidth of a signal - The data transmission rate and the bandwidth. Information encoding - Introduction – Representing different symbols- Minimizing errors-Multimedia – Multimedia and Data compression. | 15 |
| Unit II | **Analog and digital transmission methods**<br>Introduction - Analog signal- Analog transmission - Digital signal- Digital transmission - Digital signal - Analog transmission - Baud rate and bits per second -Analog signal- Digital (Storage and) transmission - Nyquist Theorem - Modes of data transmission and Multiplexing Introduction – Parallel and Serial communication - Asynchronous- Synchronous and Isochronous communication - Simplex- Half-duplex and Full-duplex communication – Multiplexing - Types of Multiplexing - FDM versus DM. Transmission Errors: Detection and correction - Introduction – Error classification – Types of Errors –Error detection. | 15 |
| Unit III | **Transmission media**<br>Introduction - Guided media - Un Guided media - Shannon capacity. Network topologies- switching and routing algorithms - Introduction - Mesh topology – Star topology - Tree topology - Ring topology - Bus topology - Hybrid topology - Switching basics- Circuit switching – Packet switching - Message switching - Router and Routing – Factors affecting routing algorithms – Approaches. | 15 |
| Unit IV | **Networking protocols and OSI model**<br>Introduction – Protocols in computer communications - The OSI model - OSI layer functions -Integrated services digital networking (ISDN)- Introduction – Background of ISDN – ISDN architecture – ISDN interfaces - Functional grouping – Reference points - ISDN protocol architecture -Broadband ISDN (B-ISDN). | 15 |
| Unit V | **Asynchronous transfer mode (ATM)**<br>Introduction- Overview of ATM – Packet size – Virtual circuits in ATM – ATM cells – Switching – ATM layers – Miscellaneous Topics. | 12 |

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**Text Book:**

1. *Achyut. S. Godbole," Data Communications and Networks"- Tata McGraw-Hill Publishing Company- 2007.*

**Reference Books:**

1. *A.Forouzan- "Data communication and networking"- McGraw Hill.*
2. *Andrew S. Tanenbaum- "Computer Networks"- Prentice hall India Pub- Fourth Edition- 2005.*
3. *William Stallings-" Data and computer communications"- PHI- seventh edition- 2000.*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU17 | MICROPROCESSORS AND ALP | IV |
| Objective: | To introduce the basic concepts of microprocessor and assembly language programming. | |
| Unit No. | Topics | Hours |
| Unit I | **Introduction to microprocessors**<br>Evolution of microprocessors – Single-chip Microcomputer – Embedded Microprocessors – Bit- Slice processors – Microprogramming – RISC and CISC Processors – Scalar and Superscalar Processors – Vector Processors – Array Processors – Symbolic Processors – Digital Signal Processors | 15 |
| Unit II | **Intel 8086**<br>Pin description of Intel 8086-Operating modes-Register Organization of 8086-BIU-EU-Interrupts.Addressing modes of 8086. | 12 |
| Unit III | **8086 Instruction Set**<br>8086 Instruction Groups: MOV Instructions-ADD instructions-Instructions for multiplication- Instructions for division. Assembly language Programs for 8086: To find the Largest number in a Data array- To find the smallest number in a Data array. Block Move or Relocation. | 15 |
| Unit IV | **Intel 386 and 486 Microprocessor**<br>Intel 386 Microprocessor- Intel 486 Microprocessor-486DX Architecture-Register organization of 486 microprocessor-Operating modes of Intel 486. | 15 |
| Unit V | **Input/output devices**<br>Input devices-Output devices-CRT Screen-Printers-Memory and I/O Addressing. Interfacing of A/D Converter and Applications: Bipolar to Unipolar converter - other Microprocessors - AMD-MOTOROLA. | 15 |

**Text Book:**


1. *Badri Ram- "Microprocessors and ALP"- Fourth Revised and Enlarged Edition – Dhanpat Rai and Sons – 1993.*


**Reference Books:**


1. *Romesh S.Gaonkar-"Microprocessor Architecture- Programming and Applications with the 8085 / 8080A"- Wiley Eastern – 1990.*
2. *Ray A.K., Bhurchandi K.M,"Advanced Microprocessors and Peripherals", Tata McGraw-Hill Publishing Company Limited- Second Edition- 2007.*
3. *Krishnamurthy K.A-" Ten Days with 8085 Microprocessor"- Prentice Hall India Learning Private Limited 2010.*



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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU18 | PRACTICAL VI: PROGRAMMING LAB – VISUAL BASIC | IV |
| Objective: | Make the students to write the code which covers the following objectives | |
| Ex. No. | Program List | |
| 1 | Create a VB application to make the text bold- italic- underlined and also to color the text (using checkbox- option button- textbox controls) | |
| 2 | Using a scroll bar display the numbers from 1 to 100 in the textbox depending on the position of the scroll box. The numbers should be continuously as and when the scroll box is moved. | |
| 3 | Create a VB application that allows the user to change the shape by selecting a particular shape from a list of options from a list box- as well as change its color through a common dialog box. | |
| 4 | Create a VB application that creates the illusion of moving the jet plane in four directions- North- South- East- and West. And also let the user magnify and diminish the jet plane by changing the height and width properties of the object. | |
| 5 | Create a VB application with the following operations:<br>A To add the text typed in the text box as an entry in the listbox.<br>B.To remove entries from the listbox by pressing the "remove" button. | |
| 6 | Create a note pad using VB. | |
| 7 | Create a VB application with Simple login form for a Windows application that checks the entered username and password against a list of usernames and passwords in a database table. | |
| 8 | Create an application to explore different files in different directories which are in different drives using drive control- directory control and file control tools in a system. | |
| 9 | Create a Traffic Light program in Visual Basic using three shapes (set their shape properties to circle and fill the colors) and timer control | |
| 10 | Create an application for a Scientific Calculator | |
| 11 | Create a simple applications using file system controls | |
| 12 | Create a Database Applications using data control. | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU20 | RELATIOANAL DATABASE MANAGEMENT SYSTEMS | V |
| Objective: | To lay a strong foundation into the basic principles- theory and practice of using relational databases. | |
| Unit No. | Topics | Hours |
| Unit I | **Purpose of Database**<br>Overall System Structure - Entity Relationship Model - Mapping Constraints - Keys - E-R Diagrams. Data Storage and Querying Transaction Management. Database Architecture. | 12 |
| Unit II | **Relational Model**<br>Structure - Formal Query Language - Relational Algebra - Tuple and Domain Relational Calculus. | 12 |
| Unit III | **Introduction to Oracle**<br>Types of Databases- Relational Database properties. Structured Query Language - Basic Structure - Set Operations - Aggregate Functions - Date- Numeric- and Character Functions - Nested Sub queries - Modification Of Databases - Joined Relations-DDL - Embedded SQL. | 12 |
| Unit IV | **Relational Database Design**<br>Pitfalls - Normalization Using Functional Dependencies - First Normal Form-Second Normal Form-Third Normal Form Fourth Normal Form And BCNF. | 12 |
| Unit V | **Structured Query Language**<br>SQL (DDL-DML- DCL Commands) – Integrity Constraints – PL/SQL – PL/SQL Block – procedure- function – Cursor management – Triggers – Exception Handling. | 12 |

*Text Book:*


1. *Singh-"Database systems: Concepts- Design & applications"- Pearson Education.*


*Reference Books:*


1. *Raghu Ramakrishnan and Johannes Gehrke-" Database Management Systems"- McGraw-Hill Education- 2003.*
2. *Nilesh Shah-"Database system using Oracle"- PHI Learning Private Limited- second edition.*
3. *Abraham Silberschatz - Henry F. Korth- S. Sudarshan- " Database System Concepts"- Fifth edition- McGraw-Hill-2005.*



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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU21 | PROGRAMMING WITH PHP | V |
| Objective: | To develop the programming skills in PHP | |
| Unit No. | Topics | Hours |
| Unit I | Introducing PHP: What is PHP – What is Mysql – Developing a Web Application Platform: Html Embeddedness – Cross platform compatibility – stability – Fast Feature Development – Strong User Communities. | 15 |
| Unit II | Server side Scripting Overview – Static HTML – Client Side technologies – Server Side Scripting – what is Server-side Scripting | 15 |
| Unit III | Getting Started with PHP : Installing PHP : Installation procedures – Installing PHP on CentOS - Installing PHP on Debian - Installing PHP From Source – Microsoft Windows and Apache- Other Web servers – Developments tools – Canonical PHP Tags – Hello world – Jumping IN & Out of PHP Mode – including files . | 15 |
| Unit IV | Learning PHP Syntax and variables – Comments – Variables – Variable scope – Constants – Type Declaration – Automatic Type conversion – The simple types – Integers – Double – Boolean – NULL – Strings – Echo and print. | 15 |
| Unit V | Boolean Expression – Operators – Branching – Looping – Simple Mathematic Functions – Randomness. | 12 |

*Text Book:*

1. *Steve Suehring Tim Converse and Joyce Park - PHP6 and MySQL Bible- Wiley-India.New Delhi 2009.*

*Reference Books:*

1. *Dacie Cristian- Pack Pub AJAX and PHP - 2006*
2. *Scouarnec Yann- Stolz Jeremy Jeremy and Glass Michael - Beginning PHP5- APACHE- MYSQL Web Development - Wiley-India. New Delhi- 2005*
3. *Steven Holzner- The Complete Reference - Tata McGraw Hill Edition- NewDelhi- 2009*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU22 | PRACTICAL VII: ORACLE LAB | V |
| **Objective:** | To identify- explore- and transfer new technologies that have the potential to substantially improve Oracle in various fields | |
| **Ex. No.** | **Program List** | |
| 1 | Design a Database and create required tables. For e.g. Bank- College Database | |
| 2 | Apply the constraints like Primary Key - Foreign key- NOT NULL to the tables | |
| 3 | Write a sql statement for implementing ALTER-UPDATE and DELETE | |
| 4 | Write the queries to implement the joins | |
| 5 | Write the query for implementing the following functions: MAX()-MIN()-AVG()-COUNT() | |
| 6 | Write the query to implement the concept of Integrity constraints | |
| 7 | Write the query to create the views | |
| 8 | Perform the queries for triggers | |
| 9 | Perform the following operation for demonstrating the insertion - updating and deletion using the referential integrity constraints | |
| 10 | Write the query for creating the users and their role. | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU23 | PRACTICAL VIII: PROGRAMMING LAB PHP | V |
| Objective: | To develop the programming skills in PHP | |
| Ex. No. | Program List | |
| 1 | Write a program using controls and functions. | |
| 2 | Develop a program and check message passing mechanism between pages. | |
| 3 | Design a program using String function and Arrays. | |
| 4 | Develop a program using parsing functions (use Tokenizing). | |
| 5 | Write a program and check Regular Expression- HTML functions- Hashing functions. | |
| 6 | Develop a program and check File System functions- Network functions- Date and time functions. | |
| 7 | Design a program using session. | |
| 8 | Develop a program using cookie and session. | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU24 | PRACTICAL IX: HTML LAB | V |
| Objective: | To inculcate on fundamentals on Web Designing using HTML | |
| Ex. No. | Program List | |
| 1 | Write a Program to illustrate all the text formatting tags (body- pre- font-h1…h6- div- bold- italic- underline etc.-) | |
| 2 | Write a Program to illustrate Listing tags (Ordered- Unordered- Definition and Nested) | |
| 3 | Write a Program to illustrate Img tag by specifying all its alignment attributes and image mapping | |
| 4 | Write a Program to illustrate Table tag with all its attributes ( TH- COLSPAN- ROWSPAN- CELLSPACING- CELL PADDING- etc.-) | |
| 5 | Write a Program to illustrate Frame tag and use the Hyper Link tag (Anchor tag) in it | |
| 6 | Write a Program to illustrate Form tag | |
| 7 | Write a Program to illustrate CSS ( Inline- Internal and External Reference) | |
| 8 | Write a Program to illustrate an animation using marquee tag (using Text and image)- Embedded Multimedia | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU25 | ELECTIVE –I: COMPUTER INSTALLATION AND SERVICES | V |
| **Objective:** | On Successful Completion of this subject the students should have a thorough knowledge on the different components of the computer and how to install the various hardware devices. | |
| **Unit No.** | **Topics** | **Hours** |
| **Unit I** | **PC System**<br>Evolution of PC to Pentium- Personal Computer System - Functional Blocks-System Unit-Display Unit-Keyboard.<br>Inside PC- Motherboard Functional Blocks- BIOS: BIOS services-BIOS interaction- CMOSRAM- Motherboard types-Processors: CISC processor-RISC processor-Pentium Processor-CYRIX processor-AMD processor- Chipset. | 15 |
| **Unit II** | **On-Board Memory**<br>PC's Memory Organization-DRAM - SDRAM – FPM DRAM -EDO DRAM - DDR SDRAM –DR DRAM – Cache – Virtual- Memory-Memory packaging- SIMM- DIMM- RIMM- I/O Ports: Serial – Parallel – USB – Game Port-External Memory- Floppy Disk- Floppy Disk Drive - Floppy Disk Controller - Hard Disk: Hard Disk Drive Sub Assemblies-Hard Disk Controller- MMX: CD-ROM Disk-CD-ROM Drive-DVD-Sound Blaster-Video on Pc. | 15 |
| **Unit III** | **Input and Output Devices**<br>Keyboard-Mouse-Scanner-Digitizer-Digital Camera- Monitors and Adapters-CRT-VGA –Display Controllers – Digital Display Technology – CRT Controller – Graphic Cards- Printers - Dot Matrix Printer – Plotters – Laser Printers – Inkjet Printers | 15 |
| **Unit IV** | **Computer Installation and Troubleshooting**<br>Room Preparation – Power supply – PC Installation-Troubleshooting and Services- POST – Troubleshooting the Motherboard - Troubleshooting the Keyboard - Troubleshooting the FDD/HDD - Troubleshooting the Printer | 12 |
| **Unit V** | **Computer Maintenance**<br>Diagnostic software-CHECK IT – Microsoft Diagnostic – Norton Utilities – QA Plus – ATDIAGS - Data Security: Computer Virus – Virus Prevention Techniques – Antivirus Software Packages – Firewalls- Computers and Communications- Networking- LAN-WAN-Network Component- MODEM – Interrupt. | 15 |

*Text Book:*

1. *Balasubramaniam.D "Computer Installation and Servicing"- Second Edition by - Tata McGraw-Hill- 2005.*

*Reference Books:*

1. *Radhakrishnan .M ,Computer Installation and Troubleshooting ,ISTE- Learning Materials 2001.*
2. *Govind rajalu.B, "IBM PC And Clones",- Tata McGrawhill Publishers.*

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3. *Jame K. L, "Computer Hardware", Installation- Interfacing- Troubleshooting and Maintenance"- Kindle Edition- PHI 2013.*

| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU25 | **ELECTIVE –I:ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS** | V |
| **Objective:** | To have enriched knowledge regarding heuristic search- Knowledge representation and Expert system. | |

| Unit No. | Topics | Hours |
|---|---|---|
| **Unit I** | **Introduction to AI**<br>Introduction- AI Problems – AI techniques – Criteria for success- Problems- Problem Spaces- Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search. | 15 |
| **Unit II** | **Heuristic Search techniques**<br>Generate and Test – Hill Climbing – Best-Fist- Problem Reduction- Constraint Satisfaction- Means-end analysis. | 14 |
| **Unit III** | **Knowledge representation issues**<br>Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem. | 14 |
| **Unit IV** | **Using Predicate Logic**<br>Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction. Planning: Overview – Components of a planning system. | 14 |
| **Unit V** | **Representing knowledge using rules**<br>Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge .Brief explanation of Expert Systems – Definition – Characteristics – architecture – Knowledge Engineering – Expert System Life Cycle. | 15 |

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*Text Book:*

1. *Elaine rich and Kelvin Knight- "Artificial Intelligence"- Tata McGraw hill Publication- 2nd Edition-1991.(chapters 1- 6 ).*

*Reference Books:*

1. *Stuart Russell & Peter Norvig- "Artificial Intelligence a modern Approach"- 2nd Edition -Pearson Education.*
2. *Patterson D W-" Introduction To Artificial Intelligence And Expert Systems"- Pearson Education(Singapore) Pte. Ltd.*
3. *Janakiraman V S -"Foundations Of Artificial Intelligence And Expert Systems"- Macmillan Publisher-2005*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU26 | SOFTWARE TESTING | VI |
| **Objective:** | To develop the skill of software testing and to gain the knowledge on software testing and how to test the software at various levels. | |
| **Unit No.** | **Topics** | **Hours** |
| **Unit I** | Introduction to Testing: Briefly history of Testing - Testing opportunities - Testing principles- Software Development Life Cycle Models: Waterfall Model - Fish Bone Model - Spiral Model - RAD Model-Prototype Model - Phases of software project - Software quality - Quality Assurance - Quality Control - Difference between QA & QC. | 15 |
| **Unit II** | Software Testing Definition: Verification – Validation – Static testing – Dynamic Testing – Difference between verification and validation - Difference between static testing and Dynamic testing- Testing Techniques: Boundary value Analysis – Equivalent class partition - Test Design: Test Methodology – Test Scenarios – Test cases – Test Template – Types of Test Cases – Difference between Test Scenario and Test Case – Creating Manual Test case design for Sample Application. | 15 |
| **Unit III** | Testing Types: Black Box testing- White Box testing – Challenges in White Box Testing – Unit Testing – Integration Testing: Integration Testing as type of testing – Integration testing as a Phase Testing - Gray Box testing – Alpha Testing – Beta Testing – Glass Box Testing. | 14 |
| **Unit IV** | System and Acceptance Testing: System Testing Overview – Functional Testing - Non-Functional Testing - Functional versus Non-Functional Testing – Acceptance Testing – Summary of Testing Phases. Test Planning- Management- Execution and Reporting. | 14 |
| **Unit V** | Performance Testing: Factors governing Performance Testing – Methodology of Performance Testing – Tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: Types of Regression Testing- Best Practices in Regression Testing. | 14 |

*Text Book:*


1. *Software Testing Principles and Practices – Srinivasan Desikan & Gopalswamy Ramesh- 2006- Pearson Education.*


*Reference Books:*


1. *Renu Rajani- Pradeep Oak – "Software Testing. – Effective Methods- Tools & Techniques" – Tata McGraw Hill.*
2. *Software Project Management – Bob Hughes & Mike Cotterell- 4th ed- PHI.*
3. *Boris Beizer- "Software Testing Techniques"- Van Nostrand Reinhold.*


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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU27 | OPEN SOURCE TOOLS | VI |
| **Objective:** | Emphasize usability and a just works philosophy in default configurations and feature designs. | |

| Unit No. | Topics | Hours |
|---|---|---|
| Unit I | **Introduction to open source**<br>Open source software – The Web - Structural Data – Serving Up Static Data – Serving Up Dynamic Data – Serving up Content With Embedded HTML – Security. | 14 |
| Unit II | **Linux operating system**<br>Introduction about Linux – Linux Distributions : Download & Install – Decisions – Linux Partition Sizes – Accounts – Security - Basic Unix - Shell – Owners- Group- Permission- Ownership – Processes – Path and Environment – Commands | 15 |
| Unit III | **Apache**<br>Introduction about Apache – Start- Stop and restart Apache Service – configuration – Modifying Default Configuration – Modifying Default Configuration - Securing Apache - Set User and Group - .htaccess – Create a simple Website. | 15 |
| Unit IV | **My sql database**<br>Introduction about Mysql – Data Definition Language - Data Manipulation Language – Integrating PHP and Mysql – Performing Database Queries – Integrating Web forms and Databases | 15 |
| Unit V | **Server script**<br>Introduction about PHP – Server Side Scripting Overview – PHP Syntax and Variables – PHP Control Structures and Functions – Passing Information with PHP – String Handling. | 13 |

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***Text Book:***

1. *Steve Suehring Tim Converse and Joyce Park - "PHP6 and MySQL Bible"- Wiley-India-New Delhi 2009.*

***Reference Books:***

1. *Dacie Cristian- "Pack Pub AJAX and PHP" - 2006.*
2. *Scouarnec Yann- Stolz Jeremy Jeremy and Glass Michael - "Beginning PHP5- APACHE- MYSQL Web Development" - Wiley-India. New Delhi- 2005.*
3. *Christopher Diggins-" Linux Unwired"- Shroff Publishers & Distributors Pvt. Ltd-2004.*

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU28 | PRACTICAL X: SOFTWARE TESTING & SPM LAB | VI |
| **Objective:** | To inculcate knowledge on Software testing & SPM Programming concepts and how to test the Applications Using Automation test. | |
| **Ex. No.** | **Program List** | |
| | **SOFTWARE TESTING LAB**<br>Automation Tool: **Winrunner** | |
| 1 | Perform Synchronization point test using Flight Reservation Application | |
| 2 | Create a software test case to perform TSL programming for Flight Reservation Application | |
| 3 | Develop a test case to implement the GUI object properties Test for the Flight Reservation Application | |
| 4 | Write a test case to perform Bitmap check points for Flight Reservation Application | |
| 5 | Write a test case to perform Database check points for Student Information Application | |
| 6 | Develop a test case to implement Data Driven Test | |
| | **SOFTWARE PROJECT MANAGEMENT LAB** | |
| 1 | Using any of the CASE tools- Practice requirement analysis and specification for different firms. | |
| 2 | Practice function oriented design. | |
| 3 | Practice creating software documentation for the Analysis phase of software development life cycle for a real time application. | |
| 4 | Practice creating software documentation for the Development phase of software development life cycle for a real time application. | |
| 5 | Practice creating software documentation for the Implementation phase of software development life cycle for a real time application. | |
| 6 | Practice creating software documentation for the Testing phase of software development life cycle for a real time application. | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU29 | PRACTICAL XI: OPEN SOURCE LAB | VI |
| Objective: | To develop the skill in programming with Open source and also the programmatic skill in Unix- PHP and MYSQL | |
| Ex. No. | Program List | |
| 1 | Create a Program for arithmetic operations using bash script | |
| 2 | Create a String Manipulation program using Bash Script | |
| 3 | Create a Program for File Handling in Unix | |
| 4 | Create a User Control program in Unix. | |
| 5 | Create a Login form using PHP and MYSQL | |
| 6 | Create a Dynamic web page using PHP and Mysql. | |
| 7 | Create a Simple validation control in PHP. | |
| 8 | Create a Program to upload a file in PHP | |
| 9 | Create a Program for Fibonacci Series | |
| 10 | Create a webpage for Student Details using PHP and MYSQL | |

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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU30 | ELECTIVE –II:CLOUD COMPUTING | VI |
| Objective: | To learn the different layers of the cloud technologies- practical solutions such as Google- Amazon- Microsoft- SalesForce.com- etc. solutions as well as theoretical solutions. | |

| Unit No. | Topics | Hours |
|---|---|---|
| Unit I | **Introduction**<br>Defining Cloud Computing: Definition - Cloud Types - Characteristics of Cloud Computing - Role of Open standards - Cloud Architecture: Cloud Computing Stack: Composiblity. | 15 |
| Unit II | **Platforms**<br>Infrastructure - Platforms - Virtual Appliances - Communication protocols - Applications - Connecting to the cloud - Cloud Services: Infrastructure as a Service - Platform as a Service - Software as a Service. | 15 |
| Unit III | **Services and Security**<br>Identity as a Service - Compliance as a Service - Platforms: Load balancing and visualization– Understanding Hypervisors - Cloud Security: Securing the Cloud. | 14 |
| Unit IV | **Storage Capability**<br>Securing the data - Moving applications to the Cloud - Cloud Storage: Definition – Provisioning –Cloud storage - Cloud Backup solutions - Cloud storage Interoperability | 14 |
| Unit V | **Applications**<br>Moving applications to the Cloud - A Study on Google Web Services - Amazon Web Services - Microsoft Cloud Services. | 14 |

***Text Book:***


1. *Barrie Sosinsky, "Cloud Computing Bible", Wiley India Pvt. Ltd., 2011.*


***Reference Books:***


1. *Roger Jennings , "Cloud Computing with Windows Azure Platform", Wiley India Pvt. Ltd , 2009.*
2. *Miller Michael , "Cloud Computing: Web - Based Applications That Change the Way You Work and Collaborate Online", Que Publishing - 2008.*
3. *Venkata Josyula," Cloud Computing-" Pearson Education, First edition 2012.*


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| Code No. | Subject | Semester No. |
|---|---|---|
| 16CTU30 | ELECTIVE –II :DIGITAL IMAGE PROCESSING | VI |
| Objective: | To understand theoretical foundations of Digital Image Processing and to study various techniques of image enhancement. | |
| Unit No. | Topics | Hours |
| Unit I | **Introduction:** Introduction to Digital Image Processing – The Origins of Digital Image Processing- Gamma Ray Imaging – X Ray Imaging – Imaging in Ultra Violet band – Fundamental steps in Digital Image Processing – Components of an Image Processing System. | 15 |
| Unit II | **Digital Image Fundamentals:** Elements of Visual Perception – Light and the electromagnetic spectrum – Image sensing and Acquisition – Image Acquisition using a single sensor - Image Acquisition using sensor strips - Image Acquisition using sensor arrays – A simple image formation model. **Image Sampling and Quantization:** Basic Concepts in Sampling and Quantization – Representing digital images – Spatial & Intensity Resolution – Image Interpolation. | 15 |
| Unit III | **Color Image Processing:** Color Fundamentals – Color Models – Pseudo Color Image Processing – Basics of full Color image processing – Color transformation – Smoothing and Sharpening – Image segmentation based on color – Noise in color image – Color image compression | 14 |
| Unit IV | **Image Compression:** Fundamentals – Spatial and Temporal Redundancy - Irrelevant Information - Measuring Image Formation – Image Compression Models – Compression Methods – Huffman's coding – Arithmetic coding – Digital image watermarking | 14 |
| Unit V | **Image Segmentation:** Fundamentals of Image Segmentation – Thresholding – Using image smoothing to improve Global thresholding – Using edges to improve Global Thresholding – Region based segmentation: Region growing – Region splitting – Region Merging | 14 |

***Text Book:***


1. *Gonzalez R.C and Woods R.E- "Digital Image Processing"- Addison Wesley-third edition.*


***Reference Books:***


1. *Anil K. Jain- "Fundamentals of Digital Image Processing"- Prentice Hall.*
2. *Chanda & Majumdar- "Digital Image Processing and Analysis"- Prentice Hall- third edition.*
3. *Rafael C. Gonzalez-"Digital Image Processing "-3rd Edition.*



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