SYLLABUS - 2012 ADMISSION ONWARDS

By

University of Calicut

For

BACHELOR OF SCIENCE (B.Sc.)

IN

COMPUTER SCIENCE

UNDER THE

FACULTY OF SCIENCE

BOARD OF STUDIES IN COMPUTER SCIENCE

(*UNIVERSITY OF CALICUT*)

Thenhipalam, Calicut University P.O.

KERALA, 673 635

INDIA.

NOVEMBER 2012

B.Sc. Computer Science Programme Structure (2012 - Admission Onwards)

Total Number of Courses: 40

Total Credits : 120

Semester I

Course No.	Course Code	Title	Credit
01	A01	Communication Skills in English	3
02	A02	Critical Reasoning, Writing and Presentation	3
03	A07	Communication Skill in Languages other than English	4
04	CS1B01	Problem Solving using C.	2
05	CS1B02	Lab-I - Programming Language C	1
06	MM1C01	Complementary-I Mathematics	4
07	-C01	Complementary-I-Optional	3
		Total	**20**

Semester II

Course No.	Course Code	Title	Credit
08	A03	Reading Literature in English	4
09	A04	Reading on Indian Constitution Secularism and Sustainable Environment	4
10	A09	Literature in Languages other than English	4
11	CS2B03	Fundamentals of Data structures	3
12	CS2B04	Lab-II - Data structures using C	1
13	MM2C02	Complementary-II Mathematics	3
14	-C02	Complementary-II-Optional	3
		Total	**20**

Semester III

Course No.	Course Code	Title	Credit
15	A06	History and Philosophy of Science.	4
16	A12	General Informatics.	4
17	CS3B05	Fundamentals of Operating Systems.	4
18	CS3B06	Lab-III - Windows, Linux & Shell Programming.	1
19	MM3C03	Complementary - III Mathematics	3
20	-C03	Complementary-III-Optional	3
		Total	**20**

SEMESTER IV

Course No.	Course Code	Title	Credit
21	A13	Basic Numerical Skills.	4
22	A14	Entrepreneurship Development.	4
23	CS4B07	Fundamentals of Database Management System.	4
24	CS4B08	Lab-IV - PostgreSQL.	1
25	MM4C04	Complementary-IV Mathematics	3
26	-C04	Complementary-IV-Optional	3
		Total	**20**

SEMESTER V

Course No.	Course Code	Title	Credit
27	CS5B09	Java Programming.	4
28	CS5B10	Web Programming using PHP	4
29	CS5B11	Principles Software Engineering	4
30	CS5B12	Lab - V - Programming in Java	1
31	CS5B13	Lab - VI - Web Programming PHP	1
32	CS5D01	Open Course-I	4
33	CS5B14	Project Work	-
		Total	**20**

SEMESTER VI

Course No.	Course Code	Title	Credit
34	CS6B15	Computer Organization and Architecture.	4
35	CS6B16	Microprocessor and Applications 8086.	4
36	CS6B17	Computer Networks	4
37	CS6B18	Lab-VII Microprocessor Programming using TASM/ MASM/ NASM	1
38	CS6B19	Lab-VIII Network Programming Lab	1
39	CS6E01	Elective Course Visual Programming	4
40	CS6B20	Project Work	4
		Total	**20**

WORK HOURS & EVALUATION DETAILS.

Course No.	Course Code	Hours		Evaluation	
		Theory	Practical	Internal(%)	External(%)
04	CS1B01	1	0	25	75
05	CS1B02	0	2	100	0
11	CS2B03	1	-	25	75
12	CS2B04	0	2	100	0
15	A06	4	-	25	75
16	A12	4	-	25	75
17	CS3B05	3	0	25	75
18	CS3B06	0	4	100	0
21	A13	4	-	25	75
22	A14	4	-	25	75
23	CS4B07	3	-	25	75
24	CS4B08	0	4	100	0
27	CS5B09	4	-	25	75
28	CS5B10	4	-	25	75
29	CS5B11	4	-	25	75
30	CS5B12	0	4	100	0
31	CS5B13	0	4	100	0
32	CS5D01	3	-	25	75
33	CS5B14	0	2	-	-
34	CS6B15	4	-	25	75
35	CS6B16	4	-	25	75
36	CS6B17	4	-	25	75
37	CS6B18	-	4	100	0
38	CS6B19	-	4	100	0
39	CS6E01	4	-	25	75
40	CS6B20	-	2	25	75

First Semester

CS1B01: Problem Solving and C Programming

Course Number: 4
Contact Hours per Week: 1
Theory Number of Credits: 3
Number of Contact Hours: 15 Hrs.

Aim of the Course:

- To equip the students with fundamental principles of Problem Solving aspects.

- To learn the concept of programming

- To study C language

- To equip the students to write programs for solving simple computing problems

Prerequisites:

- Background of the basic science at +2 level.

Course Outline:

Module 1 - [3 Hours]:

Introduction : The problem solving aspect, Top-down design, Implementation of algorithms, Program verification, efficiency of algorithms. Introduction to C Programming, overview and importance of C, C Program Structure and Simple programs, Creation and Compilation of C Programs under Linux and Windows Platforms.

Module 2 - [3 Hours]:

Elements of C Language and Program constructs. Character Set,C Tokens, Keywords and Identifier, Constants, Variables, Data types, Variable declaration and assignment of values, Symbolic constant definition. C-Operators, Arithmetic operators, relational operators, and logical operators, assignment operators, increment and decrement operators, conditional operators, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, Type conversion in expressions, operator precedence and associativity, Mathematical Functions, I/O operations.

Module 3 - [3 Hours]:

Decision making, Branching and Looping. Decision making with IF statement, Simple IF statement, If. . .else statement, Nesting of If. . .else and else. . .if Ladder, Switch statement, Conditional operator, Go-to statement. Looping: While loop, Do-While, and For Loops, Nesting of loops, jumps in loop, skipping of loops.

Module 4 - [3 Hours]:

Array & Strings - One dimensional array, two dimensional array and multi-dimensional array, strings and string manipulation functions. The Concept of modularization and User defined functions-Multi-function Program, calling functions, various categories of functions, Nesting of functions and recursion, functions and arrays, scope and life-time of variables in functions, multi-file programs. Structures & Union structure definition , giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within arrays, structures and functions, Unions, bit-fields.

Module 5 - [3 Hours]:

Pointers and Files: Understanding pointers, accessing the address of a variable, declaring and initializing pointers, accessing a variable through its pointer, pointer expressions, pointer and arrays, pointer and character string, pointers and functions, pointers and structures, pointer to pointer - dynamic memory allocation.
Files : Defining, Opening and closing files - i/o operations on files - error handling on filesrandom access of filescommand line operations.
Preprocessor directives: Macro substitution directives - simple macros - macros with arguments - nesting of macros, Compiler control directives.

Text Books:

1. Programming in ANSI C by E. Balaguruswami.

References:

1. The C Programming Language by Brian W. Kernighan & Dennis M. Ritchie.

2. Let us C by Yashavant P. Kenetkar.

3. Byran Gotfried, Schaums Outline series- 'Programming with C'.

CS1B02: Lab I − C Programming Lab

Course Number: 5
Practical Hours per Week: 2
Number of Credits: 1
Number of Contact Hours: 24 Hours.

Aim of the Course:

- To make the students learn programming environment.

- To practice programming.

- To make the students equipped to solve mathematical or scientific problems using C.

Prerequisites:

- Knowledge in operating computer.

Course Outline:

Experiments should include but not limited to :

Lab 1: Simple C Programs like Computation of area of a circle, rectangle etc.

Lab 2: C Programs using Loops (like pyramid printing, factorial computation, number reversing etc.)

Lab 3 : Programs involving Arrays (Searching, sorting and vector operations etc.)

Lab 4 : Two dimensional arrays (like Matrix operations)

Lab 5 : String Manipulations

Lab 6 : Programs involving Structures (like addition of Two Complex numbers, student record creation and manipulation etc.)

Lab 7 : Programs involving Union

Lab 8 : Programs involving functions

Lab 9 : Recursion (recursive function to compute a factorial, reverse string etc)

Lab 10 : Pointers - simple programs to learn concept of pointers, array operation using pointers etc.

Lab 11 : File operations

Lab 12 : Command line arguments copy a file, delete a file etc.

Projects:

1. Design a Scientific Calculator and include as many functions as possible

2. Prepare rank list for finding the topper in the considering the grade obtained in various subjects.

3. Develop a telephone directory.

4. Write a program for sorting a list of input elements. User should be able to give an option for ascending order or descending order. Use command line arguments.

Note:
All lab works should be neatly recorded in a Laboratory Record Book in written form. However Program results can be pasted in the left hand side of the fare record. All students should have a rough record (observation note book) too, in which they write all the works to be carried out in the lab prior to his/her entering the lab. He/She may also note down the i/p and o/p that he gives for program verification in the observation note book(rough record).

Second Semester

CS2B03: Data and File Structures

Course Number: 10
Contact Hours per Week: 1 Theory
Number of Credits: 3
Number of Contact Hours: 15 Hrs.

Aim of the Course:

- To introduce the concept of datastructures.

- To make the students aware of various datastructures.

- To equip the students implementing fundamental datastructures.

Prerequisites:

- Knowledge in C Programming Language.

Course Outline:

Module 1 - [3 Hours]:

Introduction to data structures - need for data structures, definition, categories of data structures; Arraysstorage representation of 1D, 2D and Multi-dimensional arrays, Sparse matrix Representation. Lists: Static and Dynamic Lists, Linked Lists, creation, operations on linked lists.

Module 2 - [3 Hours]:

Stacks & Queues Stack - Definition, Operation on stack, Implementation using arrays and linked lists, Applications of Stacks, Function Calling,

Recursiondirect & indirect recursion, Evaluation of arithmetic Expressions, Conversion of Expressions - Prefix, Infix and Postfix expressions. Queues: Definition, Implementations using arrays and linked lists, Circular queue, Dequeue, Priority queues, Applications of queues.

Module 3 - [3 Hours]:

Trees - Definition, Basic terminology, Binary trees, Representation of binary trees, Sequential representation of binary trees, Linked representation of binary trees, Traversals, Threaded binary tree. Binary Search Trees: Definition, Insertion, Deletion, Traversal and Searching BST, AVL Trees, B-Tree and B+ Tree, Heap tree: Insertion and deletion.

Module 4 - [3 Hours]:

Graphs: Graphs: Representation of graphs, Adjacency Matrix, Adjacency List, Adjacency Multi-list, Graph search methods (BFS and DFS), Minimal Spanning Tree, Prims Algorithm and Kruskals Algorithms, Shortest path problem, Dijkstras Algorithm.

Module 5 - [3 Hours]:

Searching and Sorting: Searching: Linear search, Binary search, Comparison of different methods, Hashing: Different hashing functions, Methods for collision handling. Sorting: Insertion sort, Bubble sort, Selection sort, Quick sort, Heap sort and Merge sort methods, Comparisons and Implementation.

Text Books:

1. Fundamentals of datastructures By E. Horowitz & S. Sahni.

References:

1. 'Data Structure Using C and C++' By Aron M Tenenbaum.

CS2B04: Lab II – Data structures through C Language

Course Number: 11
Contact Hours per Week: 2
Number of Credits: 3
Number of Contact Hours: 26 Hrs.

Aim of the Course:

- To learn how to implement various data structures.

- To provide opportunity to students to use data structures to solve real life problems.

Prerequisites:

- Theoretical knowledge in Datastructures.

- Knowledge in C Programming.

Course Outline:

Experiments should include but not limited to :

Lab 1: Implementation of array operations:

Lab 2: Implementation Sparse Matrices using linked lists: Multiplication, addition.

Lab 3: Stacks and Queues : adding, deleting elements

Lab 4: Circular Queue : Adding & deleting

Lab 5: Implementation of linked lists: inserting, deleting, inverting a linked list.

Lab 6: Implementation of stacks & queues using linked lists

Lab 7: Implementation Polynomial addition, Polynomial multiplication using linked lists.

Lab 8: Implementation of trees and graphs.

Lab 9: Recursive and Non-recursive traversal of Trees.

Lab 10: Implementation of searching TechniquesLinear and Binary search.

Lab 11: Sorting techniquesBubble Sort, Insertion Sort, Quick Sort, Heap Sort and Merge Sort.

Lab 12: Simple Hashing Functions.

Note: All lab works should be neatly recorded in a Laboratory Record Book in written form. However Program results can be pasted in the left hand side of the fare record. All students should have a rough record (observation note book) too, in which they write all the works to be carried out in the lab prior to his/her entering the lab. He/She may also note down the i/p and o/p that he gives for program verification in the observation note book (rough record).

Third Semester

CS3B05: Fundamentals of Operating Systems.

Course Number: 17
Contact Hours per Week: 3
Number of Credits: 4
Number of Contact Hours: 39 Hours.

Aim of the Course:

- To learn objectives & functions of Operating Systems.

- To understand processes and its life cycle.

- To learn and understand various Memory and Scheduling Algorithms.

- To have an overall idea about the latest developments in Operating Systems.

Prerequisites:

- Knowledge in Datastructures.

Course Outline:

Module 1 - [6 Hours]:

Operating System Objectives and functions: The Evolution of Operating Systems, Serial Processing, Simple batch Systems, Multi Programmed batch Systems, Time Sharing Systems, Parallel Systems, Distributed Systems, Real time systems.

Module 2 - [9 Hours]:

Definition of Process, Process States, Process Control Block, Operations on Process, Process Communication, Communication in Client server System, Basic concepts of threads, Concurrency, Principles of Concurrency, Mutual exclusion, Semaphores, Messages, Dead lock, Dead lock Prevention, Dead lock detection, dead lock avoidance.

Module 3 - [8 Hours]:

CPU Scheduling: Scheduling Criteria, Scheduling algorithms - FCFS, SJF, Priority, RR, Multilevel, Feedback Queue, Process synchronization, The Critical Section Problem, Synchronization Hardware, Classical Problems of synchronization, File and Database System, File System, Functions of organization, Allocation and Free space management.

Module 4 - [8 Hours]:

Memory Management, Address binding, Logical Vs Physical address space, Dynamic Loading, Dynamic Linking and Shared Libraries, Overlays, Swapping, Contiguous Memory allocation, Paging, Segmentation, Virtual memory, Demand paging, Page replacement, Thrashing.

Module 5 - [8 Hours]:

Protection and security: policy and mechanism , authentication, authorization, Mobile OS: Concepts, history, features, architecture, future scope;
Case studies : Android, UNIX kernel and Microsoft windows NT(concept).

Text Books:

1. Operating System Concepts- Silberschatz, Galvin, Gagne, Sixth edition, John Willey & Sons INC.

References:

1. Operating Systems A Modern Perspective, Nutt G.J, Addison Wesley.

2. Operating Systems, Internals and Design Principles-William Stallings-Fifth Edition-PHI Publications New Delhi.

CS3B06:Lab - III - Windows, Linux & Shell Programming.

Course Number: 18
Practical Hours per Week:4
Number of Credits:1
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To have practice in Windows OS.

- To have practice in Linux OS and Shell.

- To practice various OS Commands.

- To learn shell programming under Linux/Unix.

Prerequisites:

- Theoretical knowledge in Operating System.

Course Outline:

Windows

- Exploring different controls on Desktop
- Explore different menus / submenus on Start Button
- Changing the size of various windows
- Installing various software (Learn the procedure for any software)
- Removing Software Creating Shortcuts
- Adding Printers
- Running MS DOS applications
- Managing Files and Folders
- Using various programs such as Word pad, Note pad, Calendar etc.

Linux & Shell Programming:

- Familiarisation of Shells in Linux

- Use of Vi editor

- Familiarisation of File and directory commands like pwd, mkdir, ls, chmod, mv, cp, rm, ln, find, cat, pr, sort, cmp, cut & paste etc.

- Familiarisation of Filters and Pipes: Grep, pg, wc, tr, pipe(|), redirection etc.

- Familiarisation of Other Commands: uname, logname, id, pid, who, tty, echo, ps, date, passwd, clear, cal, banner, man etc.

- Shell variables, operators and expressions, control & loop statements Simple shell programs like, multiplication table, find a particular user logged in, sort list of users, create and set pass word for n number of users at a time etc.

Fourth Semester

CS4B07: Fundamentals of Database Management Systems

Course Number: 23
Contact Hours per Week: 3
Number of Credits: 4
Number of Contact Hours: 39 Hours.

Aim of the Course:

- To understand need and working of DBMS.

- To understand various architectures of DBMS.

- To learn Relational model & SQL.

- To learn Relational database design.

Prerequisites:

- Knowledge in Datastructures.

Course Outline:

Module 1 - [7 Hours]:

Database System concepts and applications: Introduction to data bases, File Systems Versus a DBMS, Advantages and Disadvantages of using DBMS Approach, Database administrators and users. Data Models, Schemas, and Instances, Types of Data Models, Three Schema Architecture and Data Independence, Database Languages and Interfaces. Conceptual Data Models for Database Design: Entity Relationship Models-

Concept of Entity, Entity Sets, Relationship Sets, Attributes, Domains, Constraints, Keys, Strong and Weak Entities. Concepts of EER.

Module 2 - [9 Hours]:

Relational Data Model: Relations, Domains and Attributes, Tuples, Keys. Integrity Rules, Relational Algebra and Operations , Relational Calculus and Domain Calculus. Relational Database Design using ER to Relational Mapping. SQL- Data Definition in SQL: creation, updation , deletion of tables, modifying the structure of tables, renaming, dropping of tables. Constraints. Database Manipulation in SQL: Select command, Logical operators, Range searching, Pattern matching, Grouping data from tables in SQL, GROUP BY, HAVING clauses, Joins - Joining Multiple Tables, Joining a Table to itself. Views - Creation, Renaming the column of a view, destroys view.

Module 3: - [8 Hours]:

Relational database design: - Anomalies in a Database, Normalization Theory, Functional Dependencies. First, Second and Third Normal Forms, Relations with more than one Candidate Key, Good and Bad Decompositions, Boyce Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

Module 4 - [7 Hours]:

Transaction Management and Concurrency Control - Transaction: Properties (ACID), states, Commit, Rollback; Concurrency Control-Lost update problems, Locks, two phase locking.

Module 5 - [7 Hours]:

Introduction to OODBMS - Object Identity, Object Structure, Encapsulation of Operations, Methods, and Persistence, Object Query Language. Introduction to Multimedia database.

Text Books:

1. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education.

References:

1. Database System Concepts Abraham Silberschatz, Henry F Korth, S. Sudarshan, 5th Ed.
2. Introduction to Database Systems, CJ Date, Addison Wesley.
3. Database Management Systems Ramkrishnan McGraw Hill.

CS4B08 - DBMS Lab

Course Number: 24
Practical Hours per Week: 4
Number of Credits: 1
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn practical database design.

- To create & manipulate various database objects.

- To practice administration of DBMS through PostgreSQL.

- To practice SQL Commands.

Prerequisites:

- Theretical knowledge in DBMS & SQL.

Course Outline:

Lab 1: In this session you need to create database for an Employee management system of an ABC organisation. The details about different tables are given below. According to that you can proceed further and create tables using PostgreSQL/ MySQL.
Create the following tables with the specified constraints:

Department:
Department name - Not NULL unique
Department number - Primary Key
ManagerId - Refers to employee-id of employee table.
Manager
date of joining - Not NULL.

Employee:

First name	Not NULL
Middle initials	
Last name	Not NULL
Employee id	Primary Key
Date of Birth	
Address	
Gender	M or F
Salary	Range of 5000 to 25000
Date of Joining	
Department number	Refers to Department Number of Department table.

Department location:

Department number - Refers to Department number of department table.

Department location - Not NULL.

Department number & Department location are combined Primary Key

Project:

Project name-Not NULL.

Project number-Primary Key.

Project location-Not NULL.

Department number-Refers to department number of Department table.

Works-on:

Employee-id - Not NULL refers to employee-id of employee table.

Project number- Not NULL refers to Project number of Project table.

Hours - Not NULL.

Employee-id & Project number are combined primary key.

Dependent:
Employee-id - Refer to employee table employee id field
Dependent name -
Gender - M or F
Date of Birth - Not NULL
Relationship - Not NULL

Now enter a few sets of meaningful data and answer the following queries.

1. List the department wise details of all the employees.
2. Find out all those departments that are located in more than one location.
3. Find the list of projects.
4. Find out the list of employees working on a project.
5. List the dependents of the employee whose employee id is 001

Lab 2: These sessions is similar to the previous one, but in this session, assume that you are developing a prototype database of the College library management system, for that you need to create the following tables:

- Book Records
- Book details
- Member details and
- Book issue details

Book Records:
Accession Number
ISBN Number

Books :
ISBN Number
Author
Publisher
Price

Members:
Member Id
Member Name
Maximum Number of books that can be issue
Maximum Number of days for which book can be issued

Book Issue:
Member Id
Accession Number
Issue Date
Return Date

You must create constraints, including referential integrity constraints, as appropriate. Please note accession number is unique for each book. A book, which has no return date, can be considered as issued book. Enter suitable data into the tables. Now answer the following:

1. Insert data in all the three tables (use insert).

2. Insert appropriate description associated with each table and the column (use comment).

3. Display the structure of the tables.

4. Display the comments that you have inserted.

5. Using SELECT statement, write the queries for performing the following function:

(a) Get the list of all books (No need to find number of copies).
(b) Get the list of all members.
(c) Get the Accession number of the books which are available in the library.
(d) On return of a book by a member calculate the fine on that book.
(e) List of books issued on 01-Jan-2005.
(f)Get the list of all books having price greater than Rs. 500/-
(g) Get the list of members who did not have any book issued at any time.
(h) Get the list of members who have not returned the book.
(i) Display member ID and the list of books that have been issued to him/her from time to time.
(j) Find the number of copies of each book (A book accession number would be different but ISBN number would be the same).

(k) Find the number of copies available of a book of given ISBN number.

(l) Get the member ID and name of the members to whom no more books can be issued, because they have already got as many books issued as the number for which they are entitled.

Lab 3: This session is based on Lab 2 where you have created a library management system. In this session you have different query specification. You must create appropriate forms, reports, graphs, views and data filtering, use of multilevel report, etc. to answer these queries.

1. Get the list of ISBN-Number, Book name, available copies of the books of which available copies are greater than zero.

2. Get the list of ISBN-Number, Book name, Total copies, available copies of the book of which available copies are greater than zero. List should be displayed in alphabetical order of book name.

3. Get the list of ISBN number, Book name, Author, total copies, cost (cost is price total copies). List should be displayed in descending order of cost.

4. Get the list of books issued to each member.

5. Write query to know the maximum and average price of the books.

6. Get the list of all existing members and the number of days for which a member is allowed to keep the book. Also find out the members who have got the maximum number of books issued.

7. Get the list of member codes of those members who have more than two books issued.

8. Find the details of the books presently issued to a member.

9. Create the history of issue of a book having a typical accession number.

10. To set the width of the book name as 35.

Lab 4: Create the following table and perform the necessary tasks defined below one by one. You must use the query tools/ SQL/ Reports/ Forms/ Graphs/Views/ using client/server wherever needed.

1. Create the following table named customer

Column name	type	size
Customer id	Character	10
Name	Character	25
Area	Character	3
Phone	Numeric	7

Insert the appropriate data into table and do the following.

- Update Phone numbers of all customers to have a prefix as your city STD Code

- Print the entire customer table

- List the names of those customers who have e as second letter in their names.

- Find out the Customer belonging to area abc

- Delete record where area is NULL.

- Display all records in increasing order of name.

- Create a table temp from customer having customer-id, name, and area fields only

- Display area and number of records within each area (use GROUP by clause)

- Display all those records from customer table where name starts with a or area is abc.

- Display all records of those where name starts with a and phone exchange is 55.

Lab 5: Answer the following queries using Library system as created earlier. You must create a view to know member name and name of the book issued to them, use any inbuilt function and operators like IN, ANY, ALL, EXISTS.

a. List the records of members who have not been issued any book using EXISTS operator.

b. List the members who have got issued at least one book (use IN / ANY operator).

c. List the books which have maximum Price using ALL operator.

d. Display Book Name, Member Name, Issue date of Book. Create a view of this query of the currently issued books.

Lab 6: Create a table of Employee (emp-number, name, dept, salary) and Department (dept number, dept name). Insert some records in the tables through appropriate forms having integrity checks. Add some records in employee table where department value is not present in department table. Now answer the following query:

    a. Display all records from employee table where department is not found in department table.

    b. Display records from employee table in a report format with proper headings. This report must also contain those records where department number does not match with any value of department table.

    c. Display those employee records who have salary less than the salary of person whose empcode= A100.

    d. Create another table: SalesData (RegionCode, City, Salesperson-Code, SalesQty).

    e. Display records where salesperson has achieved sales more than average sales of all sales persons of all the regions.

Lab 7: Create the following tables:
Order party: (Order number, Order date, customer code)
Order: Order number, Item code, Quantity
The key to the second table is order-number + item-code
Create a form for data entry to both the tables.

Lab 8: Create a form for storing Bio-data of students. Create the supporting tables to store the data.

Lab 9: Design a suitable form for storing basic information and salary details of employees of an organisation. Design and implement the necessary tables.

Lab 10:
1. Write a procedure/trigger on department code so such that the validity of the code is checked and the name of department is automatically displayed on selection of department code. Assume, design and create the necessary tables and constraints.
2. Write a procedure/trigger to generate Order Number automatically in any of the order tables created in Lab 7.

Fifth Semester

CS5B09: Java Programming.

Course Number: 27
Contact Hours per Week: 1
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To have a review on concept of OOP.

- To learn Java Programming Environments.

- To practice programming in Java.

- To learn GUI Application development in JAVA.

Prerequisites:

- Knowledge in OOP & Programming.

Course Outline:

Module 1 - [8 Hours]:

Principles & Concepts of Object Orientation - Basic Principles of Object Orientation (Abstraction, Encapsulation, Modularity,Hierarchy, Typing, Concurrency, Persistence). Basic Concepts of Object Orientation(Object, Class, Attribute, Operation, State, Behaviour, Identity, Relationships/Association, Polymorphism, Message Passing).
Introduction to Java : History, Versioning, The Java Virtual Machine ,

Writing a Java Program, Packages, Simple Java Programs.

Language Components : Primitive Data Types, Comments, The for Statement, The if Statement, The while and do while Statements, The switch Statement, The break Statement, The continue Statement, Operators - Casts and Conversions, Keywords.

Module 2 - [10 Hours]:

Object-Oriented Programming: Defining New Data Types, Constructors, The String Class, String Literals, Documentation, Packages, The StringBuffer Class, Naming Conventions, The Date Class, The import Statement, Deprecation,The StringTokenizer Class.

Methods : Introduction - Method Signatures, Arguments and Parameters, Passing Objects to Methods, Method Overloading, Static Methods, The Math Class, The System Class, Wrapper Classes

Arrays: Processing Arrays, Copying Arrays, Passing Arrays to Methods, Arrays of Objects, The Arrays Class, Command Line Arguments, Multidimensional Arrays. Encapsulation: Constructors, The this Reference, Data Hiding, public and private Members, Access Levels, Static Data Members Inheritance & Polymorphism: Inheritance, extends keyword, Polymorphism, The Object Class, Method Overloading & Overriding. Abstract Classes and Interfaces: Abstract Classes, Abstract Class Example, Extending an Abstract Class, Interfaces.

Module 3 - [12 Hours]:

Exceptions, I/O and Threads Input and Output in Java: The File Class, Standard Streams, Keyboard Input, File I/O Using Byte Streams, Character Streams, File I/O Using Character Streams - Buffered Streams, File I/O Using a Buffered Stream, Keyboard Input Using a Buffered Stream, Writing Text Files. Threads : Threads vs. Processes, Creating Threads by Extending Thread, Creating Threads by Implementing Runnable, Advantages of Using Threads, Daemon Threads, Thread States, Thread Problems, Synchronization. Exceptions: Exception Handling, The Exception Hierarchy, Triggering Exceptions with throws, Suppressing Exceptions with throw, Developing user defined Exception Classes-The finally Block.

Module 4 - [10 Hours]:

Collections & Database Connectivity Collections: Vectors, Hashtables, Enumerations, Properties, Collection, Framework Hierarchy, Lists, Sets, Maps, The Collections Class.

Networking: Networking Fundamentals, The Client/Server Model , InetAddress, URLs, Sockets, Writing Servers, Client/Server Example.
Introduction to JDBC : The JDBC Connectivity Model, Database Programming, Connecting to the Database, Creating a SQL Query, Executing SQL Queries, Getting the Results, Updating Database Data, Executing SQL Update/Delete, Error Checking and the SQLException Class, The Statement Interface, The ResultSet Interface , ResultSetMetaData, Transaction Management.

Module 5: - [12 Hours]:

Applets, Events and GUI Applications: Introduction to GUI Applications - Applets - Types of Applet, Applet Skeleton, Update Method, Html Applet tag and passing parameter to applet. Event Handling: The Delegation Event Model, Event Classes, Event Listener Interfaces, Adapter Classes, Inner Classes. Java Desktop Applications, Introduction to the AWT, Overview of the AWT, Structure of the AWT, The AWT hierarchy, Working with:Color, Button, Canvas, Checkbox, Choice, Frame, Label, List, Scroll bar, TextArea, TextField, Font, FontMetrics, Graphics, Image, Menu Component, MenuBar, MenuItem , Checkbox MenuItem , Menu , Point, Polygon, Rectangle, Layout Manager, Menu Component, Containers, Components, Event handling, Simple Graphics Drawing Lines, Rectangles,etc.

Text Books:

1. Java Complete Reference, Herbert Schildt, Tata McGraw hill edition.

References:

1. J2EE Complete Reference, Jim Keogh, Tata McGraw hill edition.

2. Java Enterprise in a nutshell, David Flanagan,Jim Farley, William Crawford & Kris Mangnusson,OReill.

3. Patrick N & Schildt H, Java 2 The Complete Reference, Tata McGraw Hill,

CS5B10: Web Programming.

Course Number: 28
Contact Hours per Week: 4

Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn client side and server side scripting.

- To learn PHP Programming.

- To learn how to develop dynamic websites.

- To learn how to interact with databases through internet.

Prerequisites:

- Knowledge in Programming.

Course Outline:

Module 1 - [7 Hours]:

www, W3C, Web Browser, Web server, Web hosting, Web Pages, DNS, URL, Introduction e-documents - Static, Active & Dynamic. Web programming - client-side scripting and server-side scripting.

HTML: Introduction to HTML, Basic formatting tags: heading, paragraph, underline break, bold, italic, underline, superscript, subscript, font and image. Different attributes like align, color, bgcolor, font face, border, size. Navigation Links using anchor tag: internal, external, mail and image links.Lists: ordered, unordered and definition, Table tag, HTML Form controls: form, text, password, textarea, button, checkbox, radio button, select box, hidden controls, Frameset and frames

CSS: Introduction to Cascading Style Sheet (CSS), CSS Syntax, Comments, Id and Class, Background - Background Color, Background Image - Text - Text Color, Text Alignment, Text Decoration, Text Transformation, Text Indentation - CSS Font - Font Families, Font Style, Font Size - Setting Text Size - Using Pixels and Em - CSS Lists - Different List Item Markers, Unordered List, Ordered List, An Image as The List Item Marker - CSS Tables - Table Borders, Collapse Borders, Table Width and Height, Table Text Alignment, Table Padding, Table Color CSS Positioning - Static Positioning, Fixed Positioning, Relative Positioning, Absolute Positioning, Overlapping Elements - Float - Horizontal Align - Image Gallery - Image Opacity/Transparency - Image Sprites

Module 2 - [7 Hours]:

Javascript: Introduction, Client side programming, script tag, comments, variables, Document Methods: write and writeln methods, alert, Operators: Arithmetic, Assignment, Relational, Logical, Javascript Functions, Conditional Statements, Loops, break and continue. Events Familiarization: onLoad, onClick, onBlur, onSubmit, onChange

Module 3 - [14 Hours]:

PHP: Introduction to PHP, Server side scripting, Role of Web Server software, including files, comments, variables and scope, echo and print, Operators: Logical, Comparison and Conditional operators, Branching statements, Loops, break and continue, PHP functions.

Module 4 - [10 Hours]:

Working with PHP: Passing information between pages, HTTP GET and POST method, String functions: strlen, strops, strstr, strcmp, substr, str_replace, string case, Array constructs: array(),list() and foreach(), PHP advanced functions: Header , Session, Cookie, Object-Oriented Programming using PHP: class, object, constructor, destructor and inheritance.

Module 5 - [14 Hours]:

PHP & MySQL: Features of MySQL, data types, Introduction to SQL commands - SELECT, DELETE, UPDATE, INSERT, PHP functions for MySQL operations: mysql_connect, mysql_select_db, mysql_query, mysql_fetch_row, mysql_fetch_array, mysql_fetch_object, mysql_result, Insertion and Deletion of data using PHP, Displaying data from MYSQL in webpage.

Introduction to AJAX, Implementation of AJAX in PHP, Simple examples like partial page update, Concept of master page, applying templates.

Text Books:

1. Jon Duckett, Web Programming with HTML,XHTML, CSS, Wrox Beginning.

2. Jim Converse & Joyce Park, PHP & MySQL Bible, Wiley.

References:

1. Deitel, Harvey M. and Paul J., INTERNET & WORLD WIDE WEB HOW TO PROGRAM, 3/E, 2004

2. HTML 4.0 IN SIMPLE STEPS, Author:Kogent Solutions Publishers : Wiley

3. HTML 4 FOR DUMMIES, Author:ED TITTEL & MARY BURMEISTER Publishers: Wiley

4. Beginning PHP , D W Mercer,A Kent,S D Nowicki Publisher: Wrox.

5. PHP & MYSQL FOR DUMMIES, 3RD ED, Author:JANET VALADE Publishers: Wiley

CS5B11: Principles of Software Engineering

Course Number: 29
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn engineering practices in Software development.

- To learn various software development methodologies and practices.

- To learn and study various Evaluation methods in Software Development.

Prerequisites:

- Knowledge in Programming.

Course Outline:

Module 1 - [9 Hours]:

Introduction to Software Engineering, Software Engineering Approach, Software Process, Characteristics of a Software Process, Software Development Process Models, Process Management Process.

Module 2 - [8 Hours]:

Software Requirements, Problem analysis, Requirements Specification, Functional specification with use case, Validation.

Module 3: - [15 Hours]:

Function oriented Design Principles, Module Level Concepts, Structured Design Methodology, Verification, Object oriented analysis and design, Object Oriented Concepts, Design Principles, Unified Modeling Language, Design Methodology for Object oriented design. Verification-Design walkthrough, Critical Design Review, Consistency checks.

Module 4: - [10 Hours]:

Coding - Programming Principles and Guidelines, Coding Process, Verification Code Inspection, Unit Testing.

Module 5: - [10 Hours]:

Testing - Testing Fundamentals, Black Box Testing, White Box Testing, Testing Process.

Text Books:

1. An Integrated Approach to Software Engineering By Pankaj Jalote, 2nd Edition, Narosa Pub.

References:

1. Software Engineering - A Practical Approach By Roger S. Pressman McGraw Hill - International Ed.

2. Software Engineering By Ivan Somervelli.

CS5B12: LAB V - Java Programming

Course Number: 30
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To practice Java programming.

Prerequisites:

- Theoretical knowledge in Java programming.

Course Outline:

Lab 1: Data types, variables and operators

Exercise 1: Write a program in Java to implement the formula (Area = Height Width) to find the area of a rectangle. Where Height and Width are the rectangles height and width.

Exercise 2: Write a program in Java to find the result of following expression($Assume \quad a = 10, b = 5$)

i) $(a << 2) + (b >> 2)$

ii) $(a)||(b > 0)$

iii)$(a + b * 100)/10$

iv) $a \& b$

Exercise 3:

Write a program in Java to explain the use of break and continue statements.

Exercise 4: Write a program in Java to find the average of marks you obtained in your 10+2 class.

Lab 2: Statements and array

Exercise1: Write a program in Java to find AB where A is a matrix of 33 and B is a matrix of 34. Take the values in matrixes A and B from the user.

Exercise 2: Write a program in Java to compute the sum of the digits of a given integer. Remember, your integer should not be less than the five digits. (e.g., if input is 23451 then sum of the digits of 23451will be 15)

Lab 3: Class and Objects

Exercise 1: Write a program in Java with class Rectangle with the data fields width, length, area and colour. The length, width and area are of double type and colour isstring type .The methods are set_ length () , set_width (), set_ colour(), and find_ area (). Create two object of Rectangle and compare their area and colour. If area and color both are the same for the objects then display Matching Rectangles, otherwise display Non matching Rectangle.

Exercise 2: Create a class Account with two overloaded constructors.

The first constructor is used for initializing, the name of account holder, the account number and the initial amount in the account. The second constructor is used for initializing the name of the account holder, the account number, the addresses, the type of account and the current balance. The Account class is having methods Deposit (), Withdraw (), and Get_Balance(). Make the necessary assumption for data members and return types of the methods. Create objects of Account class and use them.

Exercise 3: Write a program in Java to create a stack class of variable size with push() and pop () methods. Create two objects of stack with 10 data items in both. Compare the top elements of both stack and print the comparison result.

Lab 4: Inheritance and polymorphism

Exercise 1: Write a Java program to show that private member of a super class cannot be accessed from derived classes.

Exercise 2: Write a program in Java to create a Player class. Inherit the classes Cricket_Player, Football_Player and Hockey_ Player from Player class.

Exercise 3: Write a class Worker and derive classes DailyWorker and SalariedWorker from it. Every worker has a name and a salary rate. Write method ComPay (int hours) to compute the week pay of every worker. A Daily Worker is paid on the basis of the number of days s/he works. The Salaried Worker gets paid the wage for 40 hours a week no matter what the actual hours are. Test this program

Exercise 4: Consider the trunk calls of a telephone exchange. A trunk call can be ordinary, urgent or lightning. The charges depend on the duration and the type of the call. Writ a program using the concept of polymorphism in Java to calculate the charges.

Lab 5: Package and Interface

Exercise 1: Write a program to make a package Balance in which has Account class with Display_Balance method in it. Import Balance package in another program to access Display_Balance method of Account class.

Exercise 2: Write a program in Java to show the usefulness of Interfaces as a place to keep constant value of the program.

Exercise 3: Create an Interface having two methods division and modules. Create a class, which overrides these methods.

Exercise 4: Write a program in Java which implements interface Student which has two methods Display_Grade and Attendance for PG_Students

and UG_Students (PG_Students and UG_Students are two different classes for Post Graduate and Under Graduate students respectively).

Lab 6: Exception Handling

Exercise 1: Write a program in Java to display the names and roll numbers of students. Initialize respective array variables for 10 students. Handle ArrayIndexOutOfBoundsExeption, so that any such problem doesnt cause illegal termination of program.

Exercise 2: Write a Java program to enable the user to handle any chance of divide by zero exception.

Exercise 3: Create an exception class, which throws an exception if operand is nonnumeric in calculating modules. (Use command line arguments).

Exercise 4: On a single track two vehicles are running. As vehicles are going in same direction there is no problem. If the vehicles are running in different direction there is a chance of collision. To avoid collisions write a Java program using exception handling. You are free to make necessary assumptions.

Lab 7: Multithreading.

Exercise 1: Write a Java program to create five threads with different priorities. Send two threads of the highest priority to sleep state. Check the aliveness of the threads and mark which thread is long lasting.

Exercise 2: Write a program to launch 10 threads. Each thread increments a counter variable. Run the program with synchronization.

Exercise 3: Write a program for generating 2 threads, one for printing even numbers and the other for printing odd numbers.

Exercise 4: Write a Java program using thread synchronization in multithreading (You can take some objects visible on screen for real time effect).

Lab 8: Reading, Writing and String handling in Java

Exercise 1: Writ a program in Java to create a String object. Initialize this object with your name. Find the length of your name using the appropriate String method. Find whether the character a is in your name or not; if yes find the number of times a appears in your name. Print locations of occurrences of a .Try the same for different String objects.

Exercise 2: Write a program in Java for String handling which performs the following:

i) Checks the capacity of StringBuffer objects.

ii) Reverses the contents of a string given on console and converts the resultant string in upper case.

iii) Reads a string from console and appends it to the resultant string of ii.

Exercise 3: Write a program for searching strings for the first occurrence of a character or substring and for the last occurrence of a character or substring.

Exercise 4: Write a program in Java to read a statement from console, convert it into upper case and again print on console.

Exercise 5: Write a program in Java, which takes the name of a file from user, read the contents of the file and display it on the console.

Exercise 6: Write a Java program to copy a file into another file.

Lab 9: Applets and its applications

Exercise 1: Write a Java Applet program which reads your name and address in different text fields and when a button named find is pressed the sum of the length of characters in name and address is displayed in another text field. Use appropriate colors, layout to make your applet look good.

Exercise 2: Create an applet which displays a rectangle/string with specified colour & coordinate passed as parameter from the HTML file.

Exercise 3: Create an applet which will display the calendar of a given date.

Exercise 4: Write a program to store students detail using Card Layout.

Exercise 5: Write a Java Applet program, which provides a text area with horizontal and vertical scrollbars. Type some lines of text in the text area and use scrollbars for movements in the text area. Read a word in a text field and find whether the word is in the content of the text area or not.

Lab 10: Networking and other advanced feature and JAVA

Exercise 1: Write a Java program to find the numeric address of the following websites

- www.indiatimes.com

- www.rediff.com

- www.apple.com

In addition to this, find the Internet Address of your local host.

Exercise 2: Create an applet which takes name and age as parameters and display the message `<name> is <age> year old`. Print the URL

of the class file.

Exercise 3: Write a program to test Socket functionality for appropriate hostname and port number.

Exercise 4: Write a Java program to connect to a database created in MySQL/PostgreSQL/MS ACCESS using JDBC concept. Perform basic operations of Selection, Insertion and Deletion on the database.

CS5B13: Lab VI - Web Programming.

Course Number: 28
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To practice client side and server side scripting.

- To practice PHP Programming.

- To practice developing dynamic websites.

- To practice how to interact with databases through PHP.

Prerequisites:

- Theoretical knowledge of PHP Programming.

Course Outline:

Lab 1:

- Setup WAMP/XAMPP Server or Setup Apache, MySQL and PHP separately in your PHP Lab.
- Simple PHP program that displays a welcome message.
- Write a php program to generate a random number between 1 and 100.
- Modify above program to accept range of the random number from HTML interface.

Lab 2: Programs involving various control structures like:

- 'if, else, elseif/else if'
- Alternative Syntax for 'if, else, elseif/else if'

Lab 3: Programs involving various control structures like:

- while, do-while, for, foreach, switch, break, continue.
- Try alternative syntax for while, do-while, for, foreach, switch.

Lab 4: Programs involving the following.

- declare, return.
- require, include, require_ once, include_once and goto.

Lab 4: Programs to demonstrate PHP Array functions.

- PHP Array Sorting,
- PHP Key Sorting,
- PHP Value Sorting,
- PHP MultiArray Sorting,
- PHP Array Random Sorting,

Lab 5: Programs to demonstrate PHP Array functions.

- PHP Array Reverse Sorting,
- Array to String Conversion,
- Implode() function,
- String to Array, Array Count,
- Remove Duplicate Values

Lab 6: Programs to demonstrate PHP Array functions.

- Array Search,
- Array Replace,
- Array Replace Recursive,
- Array Sub String Search

Lab 7: Demonstrate the following.

- Use of regular expression to compare two strings.

- Extract Domain name from URL.

- Find the number of rows from a mysql database for your query.

Lab 8: Generate a Guestbook which will allow your website visitor to enter some simple data about your website.

Lab 9: Develop a PHP program for Email Registration.

Lab 10: Develop a project for making Application form and performing Degree Admission On-line.

Sixth Semester

CS6B15: Computer Organization & Architecture

Course Number: 34
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn basic Architecture of a Computer.

- To learn basic Computer Organization.

Prerequisites:

- Basic knowledge of Computer.

Course Outline:

Module 1 - [10 Hours]:

Basic Computer Organization and Design: Instruction Codes , Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference Instructions, Input, Output and Interrupt Design of Basic Computer, Design of Accumulator logic.

Module 2 - [14 Hours]:

Micro programmed Control: Control Memory, Address sequencing, Micro program Example, Design of control unit. Processor Organization:

general register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation, program control. Computer Arithmetic: Addition, Subtraction, Multiplication, Division algorithms - Floating point arithmetic operations, Decimal arithmetic operations.

Module 3 - [8 Hours]:

Memory Organization: Memory Hierarchy, Main memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware, hit/miss ratio, magnetic and optical storage devices

Module 4 - [8 Hours]:

Input-Output Organization: Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

Module 5 - [12 Hours]: Parallel Processing: Basic Parallel Processing Architecture - Taxonomy- SISD. MISD, SIMD, MIMD structures - CISC Vs RISC - Symmetric Multi processors - Cache coherence and MESI protocol - Clusters - Non Uniform Memory Access. Pipelining: Basic Concepts of pipelining, Instruction Pipelining. Hazards, Reservation Tables, Collision, Latency, Dynamic pipeline, Vector processing & Vector processors

Text Books:

1. M. Morris Mano, "Computer System Architecture", Prentice-Hall of India, Pvt. Ltd., Third edition, 2007

References:

1. William Stallings "Computer Organization and Architecture", Prentice-Hall of India, Pvt. Ltd., Seventh edition, 2005.

CS6B16: Microprocessor & Applications

Course Number: 35
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To understand internals of Microprocessor.

- To learn architecture of 8086 μP

- To learn instruction set of 8086 μP

- To learn how to program a μP

Prerequisites:

- Basic knowledge of Computer.

Course Outline:

Module 1 - [12 Hours]:

16-Bit Microprocessor: 8086 Architecture, Pin Configuration, 8086 Minimum and Maximum mode configurations,

Module 2 - [10 Hours]:

Addressing modes, 8086 Instruction set (Data transfer, Arithmetic, Branch, Processor control & String instruction), 8086 interrupts.

Module 3 - [10 Hours]:

Assembler Directives: Data Definition And Storage Allocation, Program Organization, Alignment, Program End value, Returning Attribute, Procedure Definition, Macro Definition, Data Control, Branch Displacement, Header File Inclusion-Target Machine Code Generation Control Directives.

Module 4 - [10 Hours]:

Peripherals and Interfacing: Interfacing output displays (8212), interfacing input keyboards, key Debounce, Programmable communication interface (8251A), programmable peripheral interface (8255), Programmable DMA Controller (8257), Programmable interrupt controller (8259), Programmable interval timer (8253).

Module 5 - [10 Hours]:

Advanced Microprocessors: Introduction to 80186, 80286, 80386, 80486 and Pentium processors, General introduction to BIOS and DOS interrupts.

Text Books:

1. Barry.B.Brey. The Intel Microprocessor 8086/8088. 80186, 80286, 80386 and 80486 Architecture Programming and Interfacing, Prentice Hall of India Pvt.Ltd.1995.

References:

1. K.R. Venugopal, Raj Kumar,Microprocessor X86 programming, Bpb publications New Delhi

2. Abel P,IBM PC Assembly Language & Programming 5th Edition Parson Education Asia 2001

3. B Ram, Fundamentals of Microprocessors and Microcomputers - Dhanpat Rai Publications Pvt. Ltd., New Delhi

4. Mohamad Rafiquzzaman, Microprocessors and Microcomputer Based System Designing. Universal Bookstall, New Delhi

5. Yu. Cheng Liu, Glenn A Gibson, Microcomputer Systems: The 8086/8088 Family. Architecture, Programming & Designing Prentice Hall of India Pvt. Ltd., New Delhi

6. Ray A.K.Bhurchandi.K.M, Advanced Microprocessor and Peripherals, Tata McGraw-Hill, 2002.

CS6B17: Computer Networks

Course Number: 36
Contact Hours per Week: 4
Theory Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn about transmissions in Computer Networks.

- To learn various Protocols used in Communication.

- To have a general idea on Network Administration.

Prerequisites:

- Knowledge in datastructure.

- Knowledge in Operating System.

Course Outline:

Module 1 - [12 Hours]:

Introduction to Computer networks, Topology, categories of networks, Internetwork, Internet, Network Models, Layered model, OSI and TCP/IP models, Transmission media, Wired and unwired media. Physical layer, Analog and Digital data, Periodic and Aperiodic signals, Composite signals, Digital data transmission, Transmission Modes - Analog Transmission, Multiplexing, Frequency division multiplexing, Time Division Multiplexing and Wave Division Multiplexing, Switching - Circuit switching, Packet Switching and Message Switching, DTE - DCE Interface, EIA - 232 interface, X.21 modems.

Module 2 - [12 Hours]:

Data link layer, Error detection and correction, Types of errors, Single bit error and Burst error,Vertical redundancy check(VRC), longitudinal redundancy Check(LRC), Cyclic Redundancy Check(CRC), Error correction - Single bit error correction, Hamming code Data compression - Huffman code, data link control, Line discipline,Flow control,Error control, Multiple Access, Random Access, ALOHA, pure ALOHA and slotted ALOHA, CSMA/CD and SCMA/CA, Polling, Wired LANs, Ethernet - IEEE standards, Wireless LANs - IEEE - 802.11, Bluetooth

Module 3 - [10 Hours]:

Network layer, Networking and Internetworking devices - Repeaters, Bridges, Routers, Gateways, Logical addressing - IPv4 & IPv6 addresses, Network Address Translation(NAT), Internet protocols, internetworking, Datagram,Transition from IPv4 to IPv6, Address Mapping-Error reporting and multicasting - Delivery, Forwarding and Routing algorithms, Distance Vector Routing, Link State Routing, Multicast routing protocols, The Dijkstra Algorithm.

Module 4 - [10 Hours]:

Transport layer, Process-to-process Delivery:UDP, TCP and SCTP, Congestion control and Quality of Service,Application Layer, Domain Name Systems-Remote Login-Email-FTP,WWW,HTTP; Network management :SNMP, Network security, Cryptography.

Module 5 - [8 Hours]:

Network Administration, IP address - Configuring network host - setting hostname - assigning IP address, configuring the Network Interface card, Setup a LAN with more than two systems, Setting up Internet services File Transfer Protocol(FTP), Trivial File Transfer Protocol(TFTP),Simple Mail Transfer Protocol(SMTP) and Post Office Protocol(POP), Setting up Intranet Services, Network File System(NFS), Network Information Service(NIS) and Dynamic Host Configuration Protocol(DHCP), Samba printing and Web server.

Text Books :

1. Data Communications and Networking, Fourth Edition by Behrou A Forouzan, McGraw-Hill reprint, 2011.

References:

1. Linux Administration - A Beginners Guide, Third Edition, Steven Graham and Steve Shah, Dreamtech, 2003.

CS6B17: Lab - Microprocessor Programming Using TASM/MASM/NASM

Course Number: 38
Practical Hours per Week: 4
Number of Credits: 1
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn Microprocessor Programming.

Prerequisites:

- Knowledge in Microprocessor internals.

- Knowledge in Programming.

Course Outline:

Lab 1:

- Setup TASM/MASM/NASM for Assembly Language Programming.
- Add two numbers in two consecutive memory locations & store the result in next memory location.

Lab 2:

- Develop a program to read a character from console and echo it.
- Develop a program to read 10 characters from console.

Lab 3:

- Use MOV and XCHG instruction to exchange values in two memory locations.
- Find sum of two BCD numbers stored in memory.

Lab 4:

- Read two decimal numbers then add & display the result.
- Read two decimal numbers and print smaller.

Lab 5:

- Read two decimal numbers then multiply & display the result.
- Convert ASCII Code to its BCD equivalent.

Lab 6:

- Calculate average of 3 numbers stored in memory.
- Evaluate an expression x= a * b + c/d.

Lab 7: Reverse a given string.

Lab 8: Write a program to validate a password.

Lab 9: Sort a list of numbers.

Lab 10: Locate a number present in array.

Lab 11: Display the current system time using DOS int21h.

Lab 12: Convert an ASCII number into equivalent Binary using assembly code. Call this program in C and display the result.

CS6B18: Lab - Network Administration

Course Number: 39
Practical Hours per Week: 4
Number of Credits: 1
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn Network Administration.

Prerequisites:

- Knowledge in Computer Network.
- Knowledge in Programming.

Course Outline:

Lab 1: IP address - configuring.

Lab 2: Configuring network host - setting hostname - assigning IP address,

Lab 3: configuring the Network Interface card -

Lab 4: Setup a LAN with more than two systems

Lab 5: Setting up Internet services File Transfer Protocol(FTP),

Lab 6: Trivial File Transfer Protocol(TFTP),

Lab 7: Simple Mail Transfer Protocol(SMTP) and Post Office Protocol(POP)

Lab 8: Setting up Intranet Services - Network File System(NFS),

Lab 9: Network Information Service(NIS) and Dynamic Host Configuration Protocol(DHCP),

Lab 10: Samba printing and Web server.

Open Courses

CS5D01: Introduction to Computers & Office Automation

Course Number: 33 - A
Contact Hours per Week: 3
Number of Credits: 4
Number of Contact Hours: 39 Hours.

Aim of the Course:

- To learn Office Automation.

Prerequisites:

- Basic knowledge in Computer & Internet.

Course Outline:

Module 1 - [10 Hours]:

Introduction to Computers: Types of Computers - DeskTop, Laptop, Notebook and Netbook
Hardware: CPU, Input / Output Devices, Storage Devices - System - Software - Operating Systems, Programming Languages, Application Software - Networks - LAN, WAN - Client - Server.

Module 2 - [13 Hours]:

Documentation Using a Word Processor (OpenOffice Writer / M.S. Word)- Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool,

Document Dictionary, Page Formatting, Bookmark, Advance Features - Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

Module 3 - [10 Hours]:

Electronic Spread Sheet(OpenOffice Calc/MS-Excel) - Introduction to Spread Sheet, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advanced features - Pivot table & Pivot Chart, Linking and Consolidation.

Module 4 - [10 Hours]: Presentation using (OpenOffice Impress/MS-Power Point): Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

Module 5 - [13 Hours]: Internet - History of Internet - Intranet and Extranet - DNS - Connections - Dial-up, ISDN, DSL, T1, T3, WiFi, Wireless, and Satellite Communications - E-mail, Chat, Forum, Blog, and Newsgroups - Browsers - Search Engines.

References:

1. Absolute Beginner's Guide to Computer Basics, Michael Miller, Prentice Hall.

2. Learn Microsoft Office - Russell A.Stultz - BPB Publication.

3. Internet & World Wide Web - How to program, H.M.Deitel, P.J.Deitel, et al., Prentice Hall.

CS5D02: Web Designing

Course Number: 33 - B
Contact Hours per Week: 3
Number of Credits: 4
Number of Contact Hours: 39 Hours.

Aim of the Course:

- To learn Webdesigning.

Prerequisites:

- Basic knowledge in Computer & Internet.

Course Outline:

Module 1 - [8 Hours]:

HTML: Introduction - history of html, sgml - structure of html document, web page layout, html tags and types - font type, paragraph formatting, meta data, blockquote, hyperlinks, linking, comments, white space, horizontal ruler, images, ordered and unordered lists, frames, tables, forms

Module 2 - [8 Hours]:

DHTML: Introduction, DHTML technologies, elements of DHTML, document object model, events - window events, form events, keyboard events, mouse events, style sheets, properties used in style sheets - background properties, positioning properties.

Module 3 - [8 Hours]:

Javascript: Introduction and advantages of javascript, java script syntax, writing javascript in html, javascript operators, arrays and expressions, programming contructs - for .. in loop, while loop - dialog boxes and prompts - alert, prompt, confirm methods - functions - built-in functions and userdefined functions, scope of variables, handling events, using event handlers and event methods, form object, properties, methods, form element's properties and methods.

Module 4 - [8 Hours]:

HTML Editor(Frontpage/Bluefish): Introduction, advantages, creating, opening, saving a web page, building forms, formatting and aligning text and paragraph, adding lists, styles and themes, linking pages, working with images, frames

Module 5 - [7 Hours]:

Web fundamentals: History of internet, basic services, search engines, e - mail, WWW, web browsers, web servers - IIS, apache - protocols - HTTP, FTP, telnet - uses of internet.

References:

1. Internet and World Wide Web - H.M.Dietel - Pearson.

CS5D03: Introduction to Problem Solving and C Programming

Course Number: 33 - C
Contact Hours per Week: 3
Theory Number of Credits: 4
Number of Contact Hours: 39 Hrs.

Aim of the Course:

- To introduce fundamental principles of Problem Solving aspects.

- To learn the concept of programming.

- To learn C language.

Prerequisites:

- Background of the basic science at +2 level.

Course Outline:

Module 1 - [8 Hours]:

Introduction : The problem solving aspect, Top-down design, Implementation of algorithms, Program verification, efficiency of algorithms. Introduction to C Programming, overview and importance of C, C Program Structure and Simple programs, Creation and Compilation of C Programs under Linux and Windows Platforms.

Module 2 - [7 Hours]:

Elements of C Language and Program constructs. Character Set,C Tokens, Keywords and Identifier, Constants, Variables, Data types, Variable declaration and assignment of values, Symbolic constant definition.

C-Operators, Arithmetic operators, relational operators, and logical operators, assignment operators, increment and decrement operators, conditional operators, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, Type conversion in expressions, operator precedence and associativity, Mathematical Functions, I/O operations.

Module 3 - [9 Hours]:

Decision making, Branching and Looping. Decision making with IF statement, Simple IF statement, If. . .else statement, Nesting of If. . .else and else. . .if Ladder, Switch statement, Conditional operator, Go-to statement. Looping: While loop, Do-While, and For Loops, Nesting of loops, jumps in loop, skipping of loops.

Module 4 - [8 Hours]:

Array & Strings - One dimensional array, two dimensional array and multi-dimensional array, strings and string manipulation functions.
Structures & Union structure definition , giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within arrays, structures and functions, Unions, bit-fields.

Module 5 - [7 Hours]:

The Concept of modularization and User defined functions-Multi-function Program, calling functions, various categories of functions, Nesting of functions and recursion, functions and arrays, scope and life-time of variables in functions, multi-file programs.

Text Books:

1. Programming in ANSI C by E. Balaguruswami.

References:

1. The C Programming Language by Brian W. Kernighan & Dennis M. Ritchie.
2. Let us C by Yashvant P. Kanetkar.
3. Byran Gotfried, Schaums Outline series- 'Programming with C'.

CS5D04: Introduction to Multimedia

Course Number: 33 - D
Contact Hours per Week: 3
Theory Number of Credits: 4
Number of Contact Hours: 39 Hrs.

Aim of the Course:

- To learn Multimedia

Prerequisites:

- Basic knowledge in Computer & Internet.

Course Outline:

Module 1 - [8 Hours]:

Multimedia Basics: Multimedia: Definition, Multimedia Developers, Multimedia Project, Multimedia Highway - Multimedia Applications: Business, Schools, Home, Public Places, Virtual Reality - Stages of Multimedia Project: Planning & Costing, Designing & Producing, Testing, Delivering - Multimedia Hardware: Macintosh Platform, Windows Platform, Networking Mac & Windows Computers - Connections: SCSI, IDE, USB, Firmware (IEEE 1394). Memory & Storage Devices: RAM, ROM, Floppy & Hard Disks, Zip, Jaz, SyQuest Drives, Optical storage Devices, CD, DVD - Input Devices: Keyboard, Mouse, Trackball, Touch Screen, Magnetic Card Encoders and Readers, Graphics Tablets, Scanners, OCR, Infrared Remotes, Voice Recognition Systems, Digital Cameras - Output Hardware: Audio Devices, Amplifiers & Speakers, Monitors, Video Devices, Projectors, Printers - Communication Devices: Modems, ISDN & DSL, Cable Modems - Basic Software Tools: Text Editing and Word Processing Tools, OCR Software, Painting and Drawing Tools, 3-D Modeling and Animation Tools. Image Editing Tools, Sound Editing Tools - Animation, Video and Digital Movie Tools - Video Formats, Quick time for Windows & Macintosh, Microsoft Video for Windows, Movie Editors, Compressing Movie files - Multimedia Authoring Tools - Multimedia Authoring, Authoring Software - Types - Card or Page based Tools, Icon based Event-driven Tools, Time based Tools - Cross-Platform Authoring.

Module 2 - [8 Hours]:

Text & Sound for Multimedia: Text:- Fonts, Faces, Cases - Text in Multimedia - Designing with Text, Choosing Text Fonts, Symbols & Icons - Font Editing & Design Tools - Fontographer, Making Pretty Text - Hyper Media & Hyper Text - Sound: Definition, Acoustic Signals, Amplitude, Frequency, Sampling Rate, Quantization, Multimedia System Sounds - Digital Audio - Digital Audio files, File size versus Quality, Setting proper Recording levels - Editing Digital Recordings - Multiple Tracks, Trimming. Splicing and Assembly, Volume Adjustments, Format Conversion, Resampling or Downsampling, Fade-in & Fade-out, Equalization, Time Strecting, Digital Signal Processing(DSP), Reversing Sounds - MIDI, Audio File Formats, MIDI versus Digital Audio, Sound for WWW, Adding Sound to Multimedia Project, Red Book Standard. 34

Module 3 - [8 Hours]:

Graphics & Animation: Images & Graphics: Introduction - Making Still Images - Bitmaps, Clipart, Bitmap Software - Capturing & Editing Images - Scanning Images, Vector Drawing - Vector Graphics versus Bitmaps, Conversion between bitmaps & Drawn Images, 3D Drawing & Rendering - Color:- Natural Light & Color - Computerized Color - Additive Color, Subtractive Color, Monitors, Computer Color Models - Color Palettes, Dithering - Image File Formats - Macintosh, Windows, Cross-Platform - Animation: Definition, Principles of Animation, Animation by Computer - Animation Techniques - Cel Animation, Computer Animation, Kinematics, Morphing, Animation File Formats.

Module 4 - [8 Hours]:

Analog & Digital Video: Video:- Understanding how Video Works - Broadcast Video Standards - NTSC, PAL, SECAM, ATSC DTV, HDTV - Analog Video - Overscan and Safe Title Area, Video Color, Interlacing Effects, Text & Titles for Television - Digital Video - Digital Video Architectures, Digital Video Compression (MPEG 1, 2, 4, 7, 21) - Video Recording & Tape Formats - Composite Analog Video, Component Analog Video (S-Video, Three Channel Component - RGB, YUV, Chrominance, Luminance) - Composite Digital, Component Digital, ATSC - Digital TV, Comparison of Formats - Shooting & Editig Video - Shooting Platform, Lighting, Chroma Keys, Composition, Optimizing Video Files for CD-ROM.

Module 5 - [7 Hours]:

Designing& Delivering Multimedia: Designing Multimedia:- Structure, Navigation, Hotspots, Hyperlinks, Buttons, Icons - Designing the user Interface - Expert Modes, GUIs, Graphical Approaches, Audio Interfaces - A Multimedia Design Case History, Producing Multimedia - Delivering Multimedia - Testing, Alpha Testing, Beta Testing, Polishing to Gold - CD Technology, CD Standards (Red, Yellow, Green & Orange Book Standards), White Book, DVD.

Text Books:

1. Multimedia: Making It Work - Tay Vaughan (TATA McGRAW-HILL).

References:

1. Multimedia: Computing Communications & Applications - Ralf Steinmetz and Klara Nahrstedt, Pearson Education .

2. Multimedia BASICS - Weixel, Fulton, Barksdale, Morse, Thomson Brooks/Cole - ESWAR Press .

3. Multimedia & Web Design - Vikas Gupta, Dreamtech Press.

4. Adobe Premiere Pro Bible - Droblas, Greenberg , Wiley - India.

5. Digital Multimedia - Chapman & Chapman, Wiley - Dreamtech.

6. Fundamentals of Multimedia - ZeNinan Li, Mark Drew, Pearson - PrenticeHall.

Electives

CS6E01: Hardware Assembly and Troubleshooting

Course Number: 39-A
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn basics of a computer system.

- To learn various components inside a computer system.

- To learn trouble shooting of computer system.

Prerequisites:

- Knowledge in operating a computer system.

Course Outline:

Module 1 - [8 Hours]:

Fundamental Of Computer: Block diagram and brief introduction of each block- Types of computers, generation of computers.

Module 2 - [10 Hours]:

Personal/ Micro Computers: Main Parts : CPU Box, Monitor, & Peripherals [Keyboard, Mouse, Speaker] (A Brief introduction).Inside CPU Box: Motherboard, I/O Cards, Cables, Floppy Drivers, HDD, CD-Drive, SMPS (Brief introduction of each, with their function).

Module 3 - [12 Hours]:

Memory: Basic Concept, Binary Cell, Semiconductor memory. Types of Memory - RAM and ROM in detail - Memory Chips: RAM and ROM EPROM etc. Memory Modules and packaging - Logical and Physical organization of memory in computer. Cache Memory - LX and LZ, EDO - Various terms used in computer memory.

Module 4 - [12 Hours]:

PC-Assembly and CMOS Setup and Troubleshooting: Observation of all parts of Floppy drives, HDD, CD, and SMPS. Identification of cables and computers, Mounting Motherboard in cabinet Installation of cards, devices and then connecting cables - Fitting of cabinet. CMOS - Setup Troubleshooting.BIOS.

Module 5 - [10 Hours]:

I/O systems:Basic of Printers: Types of printers and printing mechanism, How printer works - Inject printer, working of laser printer, Fonts/Type faces - Troubleshooting. Ports:serial, parallel, USB, PS2, Audio port, Ethernet.

Text Books:

1. Hardware bible By : Winn L Rosch, Techmedia publications.

References:

1. Trouble shooting, maintaining and repairing PCs By Stephon J Bigelow Tata McGraw Hill Publication.

2. Computer Fundamentals By B.Ram

CS6E02: System Software

Course Number: 39-B
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To build fundamental knowledge in system softwares.

- To learn functions of various system softwares.

- To learn specifically learn compilation process of a program.

Prerequisites:

- Basic knowledge in Programming.

Course Outline:

Module 1 - [10 Hours]:

System software - General concept - Assemblers, loaders, linkers, macros, compilers, interpreters, operating system. Design of assemblers.

Module 2 - [10 Hours]:

Macros and macro processors - Macro definitions and instructions. Macro calls.

Module 3 - [12 Hours]:

Loading , linking and relocating Loader schemes- Binders, linking loaders, overlays, dynamic binders-Dynamic loading and dynamic linking - Relocatability of programs.

Module 4 - [14 Hours]:

Compilers - Phases of a compiler - Lexical, syntax, intermediate code generation, optimization, code generation, symbol table and error correcting routines - Passes of a compiler.

Module 5 - [6 Hours]:

Case studies of lexical and syntax analyzers: LEX and YAAC.

Text Books:

1. Systems programming and operating systems, D.M.Dhamdhere.

References:

1. Systems programming, John J Donovan.

CS6E03: Visual Programming

Course Number: 39-C
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 52 Hours.

Aim of the Course:

- To learn concept of Event Driven Programming.

- To learn the basic principles of visual programming

- To study VB.Net language

Prerequisites:

- Basic knowledge in Programming.

Course Outline:

Module 1 - [12 Hours]:

Introduction to visual programming - Concept of event driven programming - Introduction to VB.Net environment, The .NET Framework and the Common Language Runtime. Building VB.NET Applications, The Visual Basic Integrated Development - Basic Language - Console application and windows application, Data types, Declaring Variables, scope of variables, operators and statements.

Module 2 - [10 Hours]:

Making Decisions with If . . . Else Statements, Using Select Case, Making Selections with Switch and Choose, Loop statements - Do Loop, for, while - The With Statement - Handling Dates and Times - Converting between Data Types - Arrays - declaration and manipulation - Strings & string functions - Sub Procedures and Functions.

Module 3 - [10 Hours]:

Windows Applications - Forms - Adding Controls to Forms, Handling Events, MsgBox , InputBox , Working with Multiple Forms, Setting

the Startup Form, SDI & MDI Forms, Handling Mouse & Keyboard Events, Common controls (Text Boxes, Rich Text Boxes, Labels, Buttons, Checkboxes, Radio Buttons, Group Boxes, List Boxes, Checked List Boxes, Combo Boxes, Picture Boxes, Scroll Bars, Tool Tips, Timers) - properties - methods

Module 5 - [10 Hours]:

Object-Oriented Programming - Creating and using Classes & objects - Handling Exceptions - On Error GoTo - Raising an Exception - Throwing an Exception - Using Structured Exception Handling - Debugging and tracing.

Module 5 - [10 Hours]:

Data Access with ADO.NET - Accessing Data with the Server Explorer - Accessing Data with Data Adaptors and Datasets - Creating a New Data Connection - Creating and populating Dataset - Displaying Data in a Data Grid - Selecting a Data Provider - Data Access Using Data Adapter Controls - Binding Data to Controls - Handling Databases in Code - Binding to XML data.

Text Books:

1. Visual Basic .NET Black Book, by Steven Holzner

References:

1. VB.NET for developers, By Keith Franklin, Rebecca Riordan, SAMS.

2. Sams Teach Yourself Visual Studio .NET 2005 in 21 Days, By Jason Beres.

3. Learning Visual Basic .NET by Jesse Liberty.

4. Visual Basic .Net programming in easy steps BY TIM ANDERSON, DreamTech Press.