BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

B.Sc. Computer Science Course Structure under CBCS.

(For the Candidates admitted from the Academic year 2016-2017 onwards)

Semester	Part	Course	Title	Instru. Hours/ Week	Credit	Exam Hours	Int	Extn.	Total
I	I	Language Course – I (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course - I (ELC)		6	3	3	25	75	100
	III	Core Course – I (CC)	Programming in C	6	5	3	25	75	100
		Core Practical - I (CP)	Programming in C Lab	3	2	3	40	60	100
		First Allied Course –I (AC)		4	4	3	25	75	100
		First Allied Course – II (AC)		3	-	-	-	-	-
	IV	Value Education	Value Education	2	2	3	25	75	100
		Total		**30**	**19**				**600**
II	I	Language Course – II (LC) - – Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course – II (ELC)		6	3	3	25	75	100
	III	Core Course – II (CC)	Programming in C++	6	6	3	25	75	100
		Core Practical - II (CP)	Programming in C++ Lab	3	2	3	40	60	100
		First Allied Course – II (AC)		3	3	3	25	75	100
		First Allied Course – III (AC)		4	2	3	25	75	100
	IV	Environmental Studies	Environmental Studies	2	2	3	25	75	100
		Total		**30**	**21**				**700**
III	I	Language Course – III (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course - III (ELC)		6	3	3	25	75	100
	III	Core Course – III (CC)	Programming in Java	6	5	3	25	75	100
		Core Practical - III (CP)	Programming in Java Lab	3	2	3	40	60	100
		Second Allied Course – I (AC)		4	4	3	25	75	100
		Second Allied Practical (AP)		3	-	-	-	-	-
	III	Non Major Elective I - for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Working Principles of Internet	2	2	3	25	75	100
		Total		**30**	**19**				**600**

Sem	Part	Course	Title	Hrs	Cr	Dur	Int	Ext	Total
	I	Language Course –IV (LC) - Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course–IV (ELC)		6	3	3	25	75	100
	III	Core Course – IV (CC)	Database Systems	5	5	3	25	75	100
		Core Practical - IV (CP)	Database Systems Lab	3	2	3	40	60	100
		Second Allied Practical (AP)		3	3	3	40	60	100
IV		Second Allied Course–II (AC)		3	2	3	25	75	100
	IV	Non Major Elective II - for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Fundamentals of Information Technology	2	2	3	25	75	100
		Skill Based Elective - I	Skill Based Elective - I	2	2	3	25	75	100
	Total			**30**	**22**				**800**
		Core Course V [CC]	Data Structures and Algorithms	5	5	3	25	75	100
		Core Course VI [CC]	Computer Networks	5	5	3	25	75	100
		Core Course VII [CC]	Digital Electronics and Microprocessor	5	5	3	25	75	100
	III	Core Practical V [CP]	Digital Electronics and Microprocessor Lab	4	3	3	40	60	100
V		Major Based Elective - I	Software Engineering / System Analysis and Design / Management Information System	5	5	3	25	75	100
		Skill Based Elective - II	Skill Based Elective - II	2	2	3	25	75	100
	IV	Skill Based Elective – III	Skill Based Elective – III	2	2	3	25	75	100
		Soft Skills Development	Soft Skills Development	2	2	3	25	75	100
	Total			**30**	**29**				**800**
		Core Course VIII [CC]	Operating Systems	6	6	3	25	75	100
		Core Course IX [CC]	Programming in PHP	6	6	3	25	75	100
		Core Practical VI [CP]	Programming in PHP Lab	5	4	3	40	60	100
	III	Major Based Elective - II	Computer Graphics / Cloud Computing / Business Process Outsourcing	6	6	3	25	75	100
VI		Major Based Elective - III	Mini Project (Students to do it in their respective Colleges) / Dot Net Lab / Linux Lab	6	6	3	40	60	100
	V	Extension Activities	Extension Activities	-	1	-	-	-	-
		Gender Studies	Gender Studies	1	1	3	25	75	100
	Total			**30**	**30**				**600**
	Grand Total			**180**	**140**	**-**	**-**	**-**	**4100**

List of Allied Courses

Allied Course I   Allied Course II
Mathematics   **Applied Physics**

Language   Part – I   -   4
English Part –II   -   4
Core Paper   -   9
Core Practical   -   6
Allied Paper   -   4
Allied Practical   -   2
Non-Major Elective   -   2
Skill Based Elective   -   3
Major Based Elective   -   3
Environmental Studies -   1
Value Education   -   1
Soft Skill Development -   1
Gender Studies   -   1
Extension Activities   -   1 (Credit only)

* for those who studied Tamil upto 10th +2 (Regular Stream)

 + Syllabus for other Languages should be on par with Tamil at degree level

those who studied Tamil upto 10th +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV

** Extension Activities shall be out side instruction hours

Non Major Elective I & II – for those who studied Tamil under Part I

a) Basic Tamil I & II for other language students
b) Special Tamil I & II for those who studied Tamil upto 10th or +2 but opt for other languages in degree programme

Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]
The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]
The passing minimum for University Examinations shall be 40% out of 60 marks [i.e. 24 marks]

*****

CORE COURSE I

PROGRAMMING IN C

Objective:

To impart basic knowledge of Programming Skills in C language.

Unit I

Introduction to C – Constants, Variables, Data types – Operator and Expressions.

Unit II

Managing Input and Output operations – Decision Making and Branching – Decision Making and Looping.

Unit III

Arrays – Character Arrays and Strings – User defined Functions.
Unit IV

Structures and Unions – Pointers – File management in C.

Unit V

Dynamic memory allocation – Linked lists- Preprocessors – Programming Guide lines.

Text Book:

1. Balagurusamy E., Programming in ANSI C , Sixth Edition, McGraw-Hill, 2012

Reference Book:

1. R.S. Bichkar, Programming with C, University Press, 2012

*****

CORE PRACTICAL I

PROGRAMMING IN C LAB

Objective :

To Impart Practical Training in C Programming Language

1. Write a Program to convert temperature from degree Centigrade to Fahrenheit.
2. Write a Program to find whether given number is Even or Odd.
3. Write a Program to find greatest of Three numbers.
4. Write a Program to using switch statement to display Monday to Sunday.
5. Write a Program to display first Ten Natural Numbers and their sum.
6. Write a Program to find Multiplication of Two Matrices.
7. Write a Program to find the maximum number in Array using pointer.
8. Write a Program to reverse a number using pointer.
9. Write a Program to solve Quadratic Equation using functions.
10. Write a Program to find factorial of a number using Recursion.
11. Write a Program to show Call by Value and Call by Reference.
12. Write a Program to add two numbers using pointer.
13. Write a Program to create a file containing Student Details.
14. Write a Program to update the details of student's information using various file modes.

*****

CORE COURSE II

PROGRAMMING IN C++

Objective:

To impart basic knowledge of Programming Skills in C++ language.

Unit I

Basic Concepts of Object- Oriented Programming - Benefits of OOP - Object Oriented Languages - Applications of OOP – Structure of C++ Program - Tokens, Expressions and Control Structures – Functions in C++

Unit II

Classes and Objects – Constructors and Destructors –Operator Overloading and Type Conversions

Unit III

Inheritance : Extending Classes – Pointers - Virtual Functions and Polymorphism

Unit IV

Managing Console I/O Operations – Working with Files – Templates – Exception Handling

Unit V

Standard Template Library – Manipulating Strings – Object Oriented Systems Development

Text Book

1. Balagursamy E, Object Oriented Programming with C++, Tata McGraw Hill Publications, Sixth Edition, 2013

Reference Books

1. Ashok Kamthane, Programming in C++, Pearson Education,2013.

*****

PROGRAMMING IN C++ LAB

Objectives :

To Impart Practical Training in C++ Programming Language

1. Classes

Write a Program using a class to represent a Bank Account with Data Members – Name of depositor, Account Number, Type of Account and Balance and Member Functions – Deposit Amount – Withdrawal Amount. Show name and balance. Check the program with own data.

2. Constructor & Destructor

Write a program to read an integer and find the sum of all the digits until it reduces to a single digit using constructor, destructor and default constructor.

3. Default & Reference Argument

Write a program using function overloading to read two matrices of different data types such as integers and floating point numbers. Find out the sum of the above matrices separately and display the total sum of these arrays individually.

4. Operator Overloading

a. Addition of Two Complex Numbers.
b. Matrix Multiplication

5. Inheritance

Prepare Pay Roll of an employee using Inheritance.

6. Pointers

a. Write a Program to find the number of vowels in a given text
b. Write a Program to check for Palindrome

7. Files

Prepare Students Mark List in a file with Student Number, Mark in four subjects and Mark Total. Write a program to arrange these records in the ascending order of Mark Total and write them in the same file overwriting the earlier records.

8. Exception Handling

Prepare Electricity Bill for customers generating and handling any two Exceptions.

*****

CORE COURSE III

PROGRAMMING IN JAVA

Objective:

To understand the basic concepts of Object Oriented Programming with Java language

Unit I

Object Oriented Programming : Introduction to OOP – Objects and Classes – Characteristics of OOP – Difference between OOP and Procedure Oriented Language – Introduction to java Programming : Introduction – Features of Java – Comparing java and Other Languages – Applications and Applets – Java Development Kit – Complex Programs – Java Source File Structure – Prerequisites for Compiling and Running Java Programs

Unit II

Java Language Fundamentals : The Building Blocks of Java – Data Types – Variable Declarations – Wrapper Classes – Operations and Assignment – Control Structures – Arrays – Strings – StringBuffer Class

Unit III

Java as an OOP Language : Defining Classes – Modifiers – Packages - Interfaces

Unit IV

Exception Handling : Introduction – Basics of Exception Handling – Exception Hierarchy – Constructors and Methods in Throwable Class - Unchecked and Checked Exceptions – Handling Exceptions in Java – Exception and Inheritance – Throwing User-defined Exceptions – Redirecting and Rethrowing Exceptions – Advantages of Exception Handling Mechanism – Multithreading : Introduction – Creating Threads – Thread Life-cycle – Thread Priorities and Thread Scheduling – Thread Synchronization – Daemon Threads – Tread Groups – Communication of Threads

Unit V

Files and I/O Streams : Overview – Java I/O – File Streams – FileInputStream and FileOutputStream – File Streams – RandomAccess File – Serialization - Applets : Introduction – Java Applications versus Java Applets – Applet Life-cycle – Working with Applets – The HTML APPLET Tag – The java.Applet package

Text Book :

1. Object Oriented Programming through Java, P. Radha Krishna, University Press, 2011.

Reference Book:

1. Java Programming, K. Rajkumar, Pearson India, 2013

*****

CORE PRACTICAL III

PROGRAMMING IN JAVA LAB

Objectives :

To Impart Practical Training in Java Programming Language

1. Write a program to sort the given numbers using arrays.
2. Write a program to implement the FIND and REPLACE operations in the given multiple text.
3. Write a program to implement a calculator to perform basic arithmetic Operations.
4. Write a program to find the area of a rectangle using constructor
5. Write a program to find the student's percentage and grade using command line arguments.
6. Write a program to draw circle or triangle or square using polymorphism and inheritance.
7. Implement multiple inheritance concepts in java using interface, you can choose your own example of a company or education institution or a general concept which requires the use of interface to solve a particular problems.
8. Write a program to create threads and assign priorities to them
9. Write a program to develop an applet to play multiple audio clips using multithreading.
10. Write a program to create a window with three check boxes called red, green and blue. The applet should change the colors according to the selection.

*****

NON MAJOR ELECTIVE I

WORKING PRINCIPLES OF INTERNET

Objective :

To understand the working Principles of Internet

Unit I

What is Internet ? The Internet's underlying Architecture

Unit II

Connecting to the Internet – Communicating on the Internet

Unit III

How the World Wide Web works. Common Internet tools

Unit IV

Multimedia on the Internet – Intranet and shopping on the Internet

Unit V

Safeguarding the Internet

Text Book:

1. How the Internet Works, Preston Gralla, Pearson Education, Eighth Edition, 2006.

Reference Book :

1. Internet for Everyone, Alexis Leon, S. Chand (G/L) & Company Ltd; Second Edition 2012.

<center>*****</center>

DATABASE SYSTEMS

Objective :

To provide the basic concepts of the Database Systems including Data Models, Storage Structure, Normalization and SQL

Unit I

Introduction: Database-System Applications- Purpose of Database Systems - View of Data -- Database Languages - Relational Databases - Database Design -Data Storage and Querying Transaction Management -Data Mining and Analysis - Database Architecture - Database Users and Administrators - History of Database Systems.

Unit II

Relational Model: Structure of Relational Databases -Database Schema - Keys - Schema Diagrams - Relational Query Languages - Relational OperationsFundamental Relational-Algebra Operations Additional Relational-Algebra Operations- Extended Relational-Algebra Operations - Null Values - Modification of the Database.

Unit III

SQL:Overview of the SQL Query - Language - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - Set Operations - Null Values Aggregate Functions - Nested Subqueries - Modification of the Database -Join Expressions - Views - Transactions - Integrity Constraints - SQL Data Types and Schemas - Authorization

Unit IV

Relational Languages: The Tuple Relational Calculus - The Domain Relational Calculus Database Design and the E-R Model: Overview of the Design Process - The Entity-Relationship Model - Reduction to Relational Schemas - Entity-Relationship Design Issues - Extended E-R Features - Alternative Notations for Modeling Data - Other Aspects of Database Design

Unit V

Relational Database Design: Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies-More Normal Forms - Database-Design Process

Text Book:

1. Database System Concepts, Sixth edition, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill-2010.

Reference Books:

1 Database Systems: Models, Languages, Design and Application, Ramez Elmasri, Pearson Education 2014

*****

CORE PRACTICAL IV

DATABASE SYSTEMS LAB

Objective :

To Impart Practical Training in MySQL

1. Create a table and perform the following basic mysql operations

   a) Set the primary key
   b) Alter the structure of the table
   c) Insert values
   d) Delete values based on constraints
   e) Display values using various forms of select clause
   f) Drop the table

2. Develop mysql queries to implement the following set operations

   a) Union
   b) Union all
   c) Intersect
   d) Intersect all

3. Develop mysql queries to implement the following aggregate functions

   a) Sum
   b) Count
   c) Average
   d) Maximum
   e) Minimum
   f) Group by clause & having clause

4. Develop mysql queries to implement following join operations

   a) Natural join
   b) Inner join
   c) Outer join-left outer, right outer, full outer
   d) Using join conditions

5. Develop mysql queries to implement nested subqueries

   a) Set membership (int, not int)
   b) Set comparison (some, all)
   c) Empty relation (exists, not exists)
   d) Check for existence of Duplicate tuples(unique, not unique)

6. Develop mysql queries to create a views and expand it.

7. Develop mysql queries to implement

   a) String operations using %
   b) String operations using '_'
   c) Sort the element using asc,desc
      [*create necessary reletions with requires attribute]

8. Consider the following database for a banking enterprise

BRANCH(branch-name:string, branch-city:string, assets:real)
ACCOUNT(accno:int, branch-name:string, balance:real)
DEPOSITOR(customer-name:string, accno:int)
CUSTOMER(customer-name:string, customer-street:string, customer-
            city:string)
LOAN(loan-number:int, branch-name:string, amount:real)
BORROWER(customer-name:string, loan-number:int)

   i.   Create the above tables by properly specifying the primary keys and the
           foreign keys
   ii.   Enter at least five tuples for each relation
   iii.   Find all the customers who have at least two accounts at the *Main*
           branch.
   iv.   Find all the customers who have an account at *all* the branches located
           in a specific city.
   v.   Demonstrate how you delete all account tuples at every branch located
           in a specific city.
   vi.   Generate suitable reports.
   vii.   Create suitable front end for querying and displaying the results.

                              *****

<div align="center">

NON-MAJOR ELECTIVE II

FUNDAMENTALS OF INFORMATION TECHNOLOGY

</div>

Objective :

To Provide the Basic Concepts in Information Technology

Unit I

Introduction to Computers - Generation of Computers - Classfication of Digital Computer - Anatomy of Digital Computer.

Unit II

CPU and Memory - Secondary Story Devices - Input Devices - Output Devices.

Unit III

Introduction to Computer Software - Programming Language - Operating Systems - Introduction to Database Management System.

Unit IV

Computer Networks - WWW and Internet - Email - Web Design

Unit V

Computers at Home, Education, Entertainment, Science, Medicine and Engineering - Introduction to Computer Security - Computer Viruses, Bombs, Worms.

Text Book:

1. Fundamentals of Information Technology, Alexis Leon And Mathews Leon, Vikas Publishing House Pvt. Ltd, 2009

Reference Book:

1. Fundamentals of Computers and Information Technology, M.N Doja, 2005

<div align="center">

*****

</div>

CORE COURSE V

DATA STRUCTURES AND ALGORITHMS

Objective:

To understand the concepts of Data Structures and Algorithms.

Unit I

Arrays and sequential representations – ordered lists – Stacks and Queues – Evaluation ofExpressions – Multiple Stacks and Queues – Singly Linked List – Linked Stacks and queues – Polynomial addition.

Unit II

Trees – Binary tree representations – Tree Traversal – Threaded Binary Trees – Binary Tree Representation of Trees – Graphs and Representations – Traversals, Connected Components and Spanning Trees – Shortest Paths and Transitive closure – Activity Networks – Topological Sort and Critical Paths.

Unit III

Algorithms – Priority Queues - Heaps – Heap Sort – Merge Sort – Quick Sort – Binary Search – Finding the Maximum and Minimum.

Unit IV

Greedy Method : The General Method – Optimal Storage on Tapes – Knapsack Problem – Job Sequencing with Deadlines – Optimal Merge Patterns.

Unit V

Back tracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring.

Text Books:

1. Fundamentals of Data Structure – Ellis Horowiz, SartajSahni, Galgotia Publications, 2008.
2. Computer Algorithms – Ellis Horowiz, SartajSahni and Sanguthevar Rajasekaran, University Press, 2008.

Reference Book:

1. Data Structures – Seymour Lipschutz, Tata Mcgraw Hill, Schaum's Outline Series, 2014.

*****

CORE COURSE VI

COMPUTER NETWORKS

Objective:

To understand the Design and Organization of Computer Networks

Unit I

Overview and Physical Layer: Introduction: Data Communications - Networks - Network Types, Network Models: TCP/IP Protocol Suite- The OSI Model, Bandwidth utilization : Multiplexing- Spread Spectrum, Transmission Media: Guided Media-Unguided Media, Switching: Circuit Switched Network-Packet Switching-Structure of a switch

Unit II

Data Link Layer: Error Deduction and Correction : Introduction- Cyclic codes-Forward error correction, Data link Control: Data link layer protocols- Media Access Control: Random Access- Controlled Access, Wireless Networks: IEEE 802.11- Bluetooth-Cellular Telephone- Satellite network- Connection devices,

Unit III

Network Layer Services : Packet Switching- Network layer performance- IPV4 Addresses- Internet Protocol-Routing Algorithms - IPV6 Addressing

Unit IV

Transport Layer : Transport Layer Protocols- User Datagram Protocol - TCP:TCP Services TCP features - Windows in TCP - Flow Control - Error Control- TCP Congestion Control - TCP timers

Unit V

Application Layers : Client Server Programming - Word Wide Web & HTTP - FTP - Email - DNS

Text Book:

1. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw Hill, Fifth Edison, 2013.

Reference Book:

1. Data Communications and Networks, Achyut Godbole and Atul Kahate, McGraw Hill Education, 2011.

*****

<h1 style="text-align: center;">CORE COURSE VII</h1>

<h2 style="text-align: center;">DIGITAL ELECTRONICS AND MICROPROCESSOR</h2>

Objective :

To provide an overview about Digital Electronics and Microprocessors

Unit I

Number Systems and Codes: Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Octal Numbers – Hexadecimal Numbers – Binary Codes – Logic Gates and Circuits: – AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive NOR Gates

Unit II

Boolean Algebra: Definitions – Fundamentals of Boolean Algebra – Boolean Functions – Minterms and Maxterms – Laws and Theorems of Boolean Algebra – DeMorgan's Theorem - Simplifying Logic Circuits – Sum of Products – AND-OR Networks – Sum of Products and Product of Sums Forms – Karnaugh Maps – Product of Sums Simplification – NAND and NOR Implementation - Don't Care Conditions – Overlapping Groups – Rolling the Map – Eliminating Redundant Groups.

Unit III

Combinational Logic Circuits: Introduction – Adders – The Half Adder – The Full Adder –Subtractors – BCD Adder – Multiplexers – Demultiplexers – Decoders – Encoders – Sequential Logic Circuits: Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop –Master Slave Flip Flop Registers: Counters – Asynchronous or Ripple Counter – Ring Counter – Shift Registers.

Unit IV

Evolution of Microprocessor – Single chip Microcomputer – Microprocessor Applications –Buses- Memory Addressing capacity and CPU – Microcomputers – Processor Architecture – Intel 8085 – Instruction cycle – Timing Diagram

Unit V

Instruction Set of Intel 8085 – Instruction and Data Format – Address Modes – Status Flags – Intel 8085 instruction - Programming Microprocessor – Assembly language – Assembler.

Text Books:

1. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi, 2009.
2. Fundamentals of Microprocessors and Microcomputers, Badri Ram, Eighth Edition, Dhanpat Rai Publications,2012.

Reference Books:

1. Digital Logic Design,M.MorrisMano ,Pearson Education, 2010
2. Microprocessors and Microcontrollers, Senthil Kumar Saravanan, Jeevananthan, Oxford Univ Press, 2010

<p style="text-align: center;">*****</p>

CORE PRACTICAL V

DIGITAL ELECTRONICS AND MICROPROCESSOR LAB

Objective :

To Impart Practical Training related to Digital Electronics and Microprocessors

A. Digital Electronics Experiments

1. Verification of Logic gates
2. Construction of half and full adder
3. K-Map
4. Shift register
5. Up Down Counters

B. Microprocessor Experiments

1. EightBit Addition and Subtraction
2. Sum of series
3. Data transfer
4. Maximum of N Numbers
5. Decimal to Hexadecimal

*****

MAJOR BASED ELECTIVE I (A)

SOFTWARE ENGINEERING

Objective:

To provide knowledge of the various phases of Software Engineering Process

Unit I

Introduction : Introduction to Software Engineering - Software Process - Software Process Models - Software Model - Requirements Engineering Principles : Requirements Engineering - Importance of Requirements - Types of Requirements - Steps involved in Requirements Engineering

Unit II

RequirmentsAnalysis Modeling : Analysis Modeling Approaches - Structured Analysis - Object Oriented Analysis - Design and Architectural Engineering : Design Process and Concepts - Basic Issues in Software Design - Characteristics of Good Design - Software Design and Software Engineering - Function Oriented System vs Object Oriented System - Modularity, Cohesion, Coupling, Layering - Real Time Software Design - Design Models - Design Documentation

Unit III

Object Oriented Concepts : Fundamental Parts of Object Oriented Approach - Data Hiding and Class Hierarchy Creation - Relationships - Role of UML in OO Design - Design Patterns - Frameworks - Object Oriented Analysis - Object Oriented Design - User Interface Design : Concepts of User Interface - Elements of User Interface - Designing the User Interface - User Interface Evaluation - Golden Rules of User Interface Design - User Interface Models - Usability

Unit IV

Software Coding - Introduction to Software Measurement and Metrics - Software Configuration - Project Management Introduction - Introduction to Software Testing - Software Maintenance

Unit V

Web Engineering : Introduction to Web - General Web Characteristics - Web Application Categories - Working of Web Application - Advantages and Drawbacks of Web Applications - Web Engineering - Emerging Trends in Software Engineering - Web 2.0 - Rapid Delivery - Open Source Software Development - Security Engineering - Service Oriented Software Engineering - Web Service - Software as a Service - Service Oriented Architecture - Cloud Computing - Aspect Oriented Software Development - Test Driven Development - Social Computing

Textbook:

1. Software Engineering, Chandramouli Subramanian, SaikatDutt, Chandramouli Seetharaman, B.G.Geetha, Pearson Publications, 2015

Reference Books:

1. Software Engineering, Jibitesh Mishra, Pearson Education, 2011

*****

SYSTEM ANALYSIS AND DESIGN

Objective :

To understand the concepts in the Design and Analysis of the System

Unit I

Overview**:** Introduction - The System Development Life Cycle (SDLC) - System Development - Methodologies - Project Team Roles and Skills - Planning Phase**:** Identifying business value - Feasibility Analysis - Creating the work plan, staffing the project, Controlling and directing the project.

Unit II

Analysis Phase**:** System Analysis - analysis process, business process automation, business process improvement, business process reengineering, developing the analysis plan. Gathering Information – interviews, joint application design, questionnaires, document analysis, observation, selecting the appropriate technique. Process Modelling – data flow diagrams, use cases. Data Modelling – ER diagram.

Unit III

Design Phase**:** System Design – design strategies, developing the design plan, moving from logical to physical model. Architecture Design – computing architectures, infrastructure design, global issues, security, User Interface (UI) – principles of UI design, UI design process, navigation design, input design, output design. Data Storage Design – data storage formats, optimizing data storage. Program Design – structure chart, program specification.

Unit IV

Implementation Phase: Construction - managing programming, system testing, developing documentation. Installation – conversion, change management, post implementation activities & maintenance, concept of PERT and GANTT Charts.

Unit V

Management Information System**:** Concept of Management, organization & System approach to management, MIS Planning, Designing and implementation, Role of DSS, Decision making & MIS, DSS and Knowledge Management System.

Text Book:

1. System Analysis and Design, Kenneth E Kendall Julie, PHI, 2012

Reference Book:

1. Modern Systems Analysis and Design, Jeffrey A. Hoffer, Pearson India, 2011

<p align="center">*****</p>

MANAGEMENT INFORMATION SYSTEM

Objective:

To understand the concepts Management Information Systems and their Applications.

Unit I

Definition of MIS – Systems approach – meaning and objectives of MIS – MIS and use of computer – limitations of MIS

Unit II

Computer Software for information systems – introduction – system software – Application software – Software Trends.

Unit III

Information system in Business – introduction – Functional areas of Business – marketing information system – Human Resource Information system

Unit IV

Application of Information Technology in Business – Introduction of E-Commerce, Mobile Commerce, E- Governance, E- enterprises, From PC to the Web.

Unit V

Information security, Ethics and Society – Challenges of Securing computer systems – Types of Security Breaches, Cyper Laws and IT Act 2000 – Ethical and social Dimensions of Information Technology

Text Books:

1. Management Information System, A.K. Gupta, S. Chand and Company,2010
2. Management Information System, Dr. S.P. Rajagopalan – Margham Publications, 2012

Reference Books:

1. Management Information System, P. Mohan, Himalaya Publishing House, 2006
2. Management Information System, Managerial Perspectives, D.P. Goyal, Macmilan, 2010

*****

OPERATING SYSTEMS

Objective:

To provide the Fundamental Concepts in an Operating System.

Unit I   Introducing Operating Systems

Introduction - What Is an Operating System-Operating System Software -A Brief History of Machine Hardware -Types of Operating Systems -Brief History of Operating System Development-Object-Oriented Design

Unit II   Memory Management

Early Systems: Single-User Contiguous Scheme -Fixed Partitions-Dynamic Partitions-Best-Fit versus First-Fit Allocation -Deallocation - Relocatable Dynamic Partitions. Virtual Memory: Paged Memory Allocation-Demand Paging-Page Replacement Policies and Concepts -Segmented Memory Allocation-Segmented/Demand Paged Memory Allocation - Virtual Memory-Cache Memory

Unit III   Processor Management

Overview-About Multi-Core Technologies-Job Scheduling Versus Process Scheduling-Process Scheduler-Process Scheduling Policies-Process Scheduling Algorithms -A Word About Interrupts-Deadlock-Seven Cases of Deadlock -Conditions for Deadlock-Modeling Deadlock-Strategies for Handling Deadlocks –Starvation-
Concurrent Processes: What Is Parallel Processing-Evolution of Multiprocessors-Introduction to Multi-Core Processors-Typical Multiprocessing Configurations--Process Synchronization Software

Unit IV   Device Management

Types of Devices-Sequential Access Storage Media-Direct Access Storage Devices-Magnetic Disk Drive Access Times- Components of the I/O Subsystem-Communication among Devices-Management of I/O Requests

Unit: V   File Management

The File Manager -Interacting with the File Manager -File Organization - Physical Storage Allocation -Access Methods-Levels in a File Management System - Access Control Verification Module

Text Book:

1. Understanding Operating Systems, Ann McIver McHoes and Ida M. Flynn, Course Technology, Cengage Learning, 2011.

Reference Book:

1. OperatingSystems,AchyutGodbole and AtulKahate , McGraw Hill Publishing, 2010

*****

CORE COURSE IX

PROGRAMMING IN PHP

Objective :

To understand the Concepts of PHP and Ajax.

Unit I

Essentials of PHP - Operators and Flow Control - Strings and Arrays.

Unit II

Creating Functions - Reading Data in Web Pages - PHP Browser - Handling Power.

Unit III

Object-Oriented Programming –Advanced Object-Oriented Programming .

Unit IV

File Handling –Working with Databases – Sessions, Cookies, and FTP

Unit V

Ajax – Advanced Ajax – Drawing Images on the Server.

Text Book:

1. The PHP Complete Reference, Steven Holzner, McGrawHillEducation, 2007

Reference Books:

1. PHP: A Beginner's Guide, Vikram Vaswani, McGraw Hill Education, 2008

*****

CORE PRACTICAL VI

PROGRAMMING IN PHP LAB

Objective :

To Impart Practical Training in PHP Programming Language

1. Write a program to find the factorial of a number.
2. Write a program using Conditional Statements.
3. Write a program to find the maximum value in a given multi dimensional array.
4. Write a program to find the GCD of two numbers using user-defined functions.
5. Design a simple web page to generate multiplication table for a given number.
6. Design a web page that should compute one's age on a given date.
7. Write a program to download a file from the server.
8. Write a program to store the current date and time in a COOKIE and display the 'Last Visited' date and time on the web page.
9. Write a program to store page views count in SESSION, to increment the count on each refresh and to show the count on web page.
10. Write a program to draw the human face.
11. Write a program to design a simple calculator.
12. Design an authentication web page in PHP with MySQL to check username and password.

*****

MAJOR BASED ELECTIVE II (A)

COMPUTER GRAPHICS

Objective:

To understand the concepts on basic Graphical Techniques, Raster Graphics, Two Dimensional and Three Dimensional Graphics

Unit I

Overview of Computer Graphics System: Video Display Devices – Raster Scan Systems – Random – Scan Systems - Graphics Monitors and Workstations – Input Devices – Hardcopy Devices – Graphics Software.

Unit II

Output Primitives: Line Drawing Algorithms – Loading the Frame Buffer – LineFunction – Circle – Generating Algorithms.Attributes of Output Primitives: Line Attributes – Curve Attributes – Color and Grayscale levels– Area fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions.

Unit III

2D Geometric Transformations: Basic Transformation – Matrix Representations – Composite Transformations – Window to View port Co-Ordinate Transformations.Clipping: Point Clipping – Line Clipping – Cohen-Sutherland Line Clipping – Liang BarskyLineClipping – Polygon Clipping – Sutherland – Hodgman Polygon Clipping – Curve Clipping – TextClipping.

Unit IV

Graphical User Interfaces and Interactive Input Methods: The User Dialogue – Inputof Graphical Data – Input Functions – Interactive Picture Construction Techniques.Three Dimensional Concepts: 3D-Display Methods – #Three Dimensional Graphics Packages

Unit V

3D Geometric and Modeling Transformations: Translation – Scaling – Rotation – Other Transformations.Visible Surface Detection Methods: Classification of Visible Surface Detection Algorithm –Backface Detection – Depth-Buffer Method – A-Buffer Method – Scan-Line Method –Applications of Computer Graphics.

Text Book:

1. Donald Hearn M. Pauline Baker, Computer Graphics C Version, Second Edition, Pearson Education, 2014.

Reference Book:

1. Computer Graphics, Sunil Kumar Sharma, ManojSinghal, Pearson Education,2014

*****

MAJOR BASED ELECTIVE II (B)

CLOUD COMPUTING

Objective :

To understand the concepts in Cloud Computing and its Security

Unit I

Cloud Computing Foundation : Introduction to Cloud Computing – Move to Cloud Computing – Types of Cloud – Working of Cloud Computing

Unit II

Cloud Computing Architecture : Cloud Computing Technology – Cloud Architecture – Cloud Modeling and Design - Virtualization : Foundation – Grid,Cloud and Virtualization – Virtualization and Cloud Computing

Unit III

Data Storage and Cloud Computing : Data Storage – Cloud Storage – Cloud Storage from LANs to WANs – Cloud Computing Services : Cloud Services – Cloud Computing at Work

Unit IV

Cloud Computing and Security : Risks in Cloud Computing – Data Security in Cloud – Cloud Security Services – Cloud Computing Tools : Tools and Technologies for Cloud – Cloud Mashaps – Apache Hadoop – Cloud Tools

Unit V

Cloud Applications – Moving Applications to the Cloud – Microsoft Cloud Services – Google Cloud Applications – Amazon Cloud Services – Cloud Applications

Text Book

1. Cloud Computing – A Practical Approach for Learning and Implementation, A.Srinivasan and J.Suresh, Pearson India Publications, 2014

Reference Book

1. Cloud Computing: Principles and Paradigms, edited by RajkumarBuyya, James Broberg, Andrzej, Wiley India Publications, 2011

*****

MAJOR BASED ELECTIVE II (C)

BUSINESS PROCESS OUTSOURCING

Objective :

To provide the Knowledge about the working environment of Business Process Outsourcing Industry

UNIT I

Search For Competitiveness - Need For Outsourcing - BPOs: Beyond Call Centres

UNIT II

Transition Management - BPO Business Models - BPO Governance

UNIT III

Legal Issues in BPO Contracts - BPO—Regulatory Issues - Service Supplier Selection

UNIT IV

Service Level Agreement - BPO Legal Contract - BPO to KPO: Up In The Value Chain

UNIT V

HR Challenges in BPO Industry - Performance Evaluation In BPO - BPO— Prerequisites And Precautions - Service Quality Issues in BPO

Text Book

1. Business Process Outsourcing: A Supply Chain of Expertises, Vinod V. Sople, Prentice Hall of India, 2011.

Reference Book:

1. Business Process Outsourcing, Sarika Kulkarni, Jaico Publishing House, Delhi 2005

*****

MAJOR BASED ELECTIVE III (A)

MINI PROJECT

Students to do Mini Project in their respective Colleges. The **objective** of the Mini Project is to enable the students to work in convenient groups of not more than Four members on a project with a Latest Software.

*****

MAJOR BASED ELECTIVE III (B)

DOT NET LAB

Objective :

To Impart Practical Training in Dot Net Programming Language

1. Design ASP.Net web form using Html Server Controls to enter job seeker's details.
2. Create an ASP.Net web form using Web control to enter E-Mail registration form.
3. Apply appropriate validation techniques in E-Mail registration form using validation controls.
4. Write an ASP.Net application to retrieve form data and display it the client browser in a table format.
5. Create a web application using ADO.Net that uses which performs basic data manipulations:

   (i). Insertion (ii) Updating (iii) Deletion (iv) Selection
   Hint: Do operations using Ms-Access and SQL-Server

6. Create an application using Data grid control to access information's from table in SQL server.
7. Create an application using Data list control to access information's from table in SQL server and display the result in neat format.

Case Studies (Must Include basic database operations such as Insertion, Deletion, Modication, Selection and Searching)

9. Job Search Portal.
10. College Portal.
11. Company Portal.

*****

MAJOR BASED ELECTIVE III (C)

LINUX LAB

Objective : To Impart Practical Training in LINUX Operating System

Write Shell Programs for the following using the Linux Operating System

1. Check whether the given number is prime or not.
2. Find the biggest of given two numbers
3. Write a program to check the given number is odd or even
4. Write a program to generate Fibonacci Series
5. Write a program to prepare electric bill for domestic consumers.

   For first 100 units - Rs.0.75/ unit
   For next 100 units - Rs.1.50/unit
   Above 200 units - Rs.3.00/unit.

   Prepare the bill for the following format:
   Customer No.   -----------
   Customer Name -----------
   Pre.Reading   -----------
   Cur.Reading   -----------
   Units Consumed -----------
   Charge   -----------
                                    Signature

6. Write a program to display the result PASS or FAIL using the informationgiven below:

   Student Name, Student Reg. No. Mark1, Mark2, Mark3, Mark4. The minimum pass for each subject is 50.

7. Write a program to prepare a Payroll with Basic Pay, DA, Allowances, PF and Gross Pay.
8. Using Case Statement, write a program to check the files ending with vowels.
9. Write a single program to sort the names and numbers in alphabetical, ascending and descending order.
10. Write a menu driven program to print Bio-data for five persons.

                                    *****